



# The Commercial Reality of 5G

---

**Chris Pearson**  
President  
5G Americas



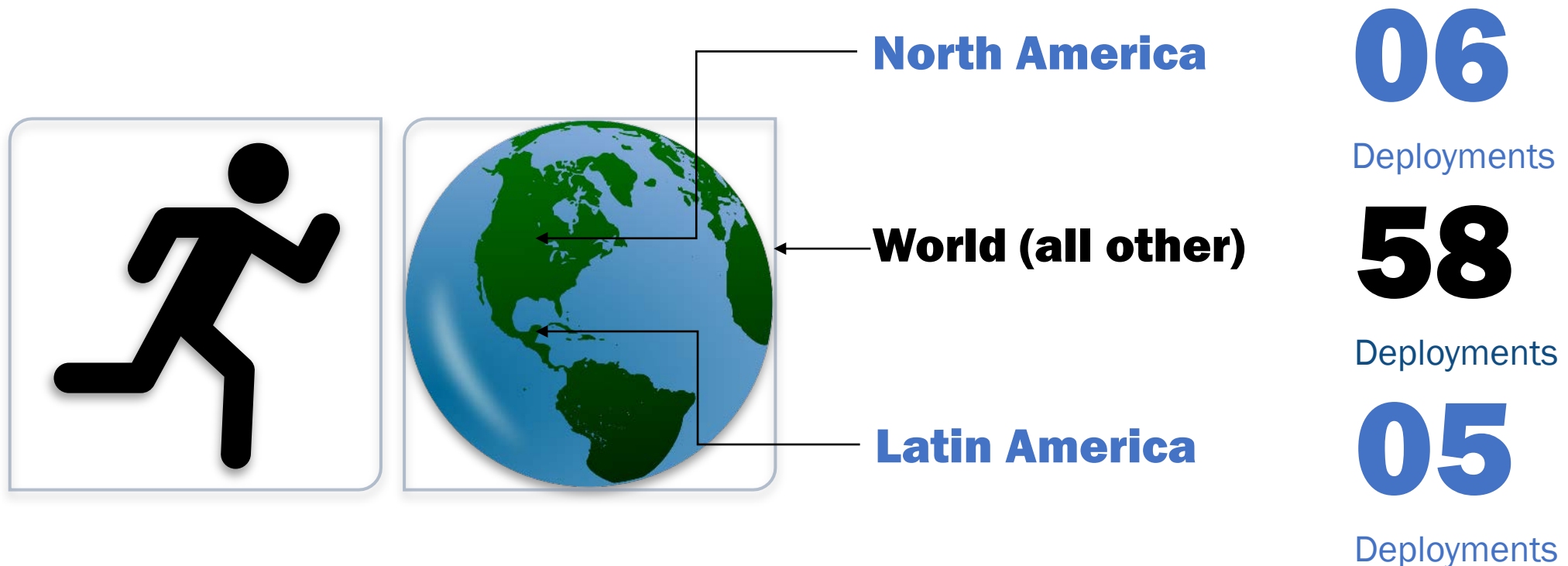
# 5GAmericas.org

## Who We Are

**5G Americas** facilitates and advocates for the advancement and transformation of LTE, 5G and beyond throughout the Americas.



# Fast Start: 5G Is A Commercial Reality



# 5G Deployments in North America (US)



Launched nationwide 5G in December 2019

- Built 5G ready network in 30 cities in 2018
- Launched 5G mmWave in NY, LA, Dallas, Cleveland & Atlanta on June 28, 2019
- Launched Nationwide standardized mobile 5G on 600 MHz in December 2019, including 'pre-paid'



Launched 5G standardized mobile service in 2018

- Initially launched mmWave in 2018
- 190 markets in 30 states have 5G lowband, 35 cities have mmWave service
- Nationwide standardized mobile 5G using sub 6GHz spectrum in early 2020



Launched 5G in February 2020



Initially launched pre-standard commercial Fixed Wireless 5G in 4 cities in October 2018

- Started with mmWave spectrum in 2018
- Launched standardized 5G mobility service in 30 cities in 2019
- Will cover half the U.S. population in 2020 with low, mid and mmWave spectrum

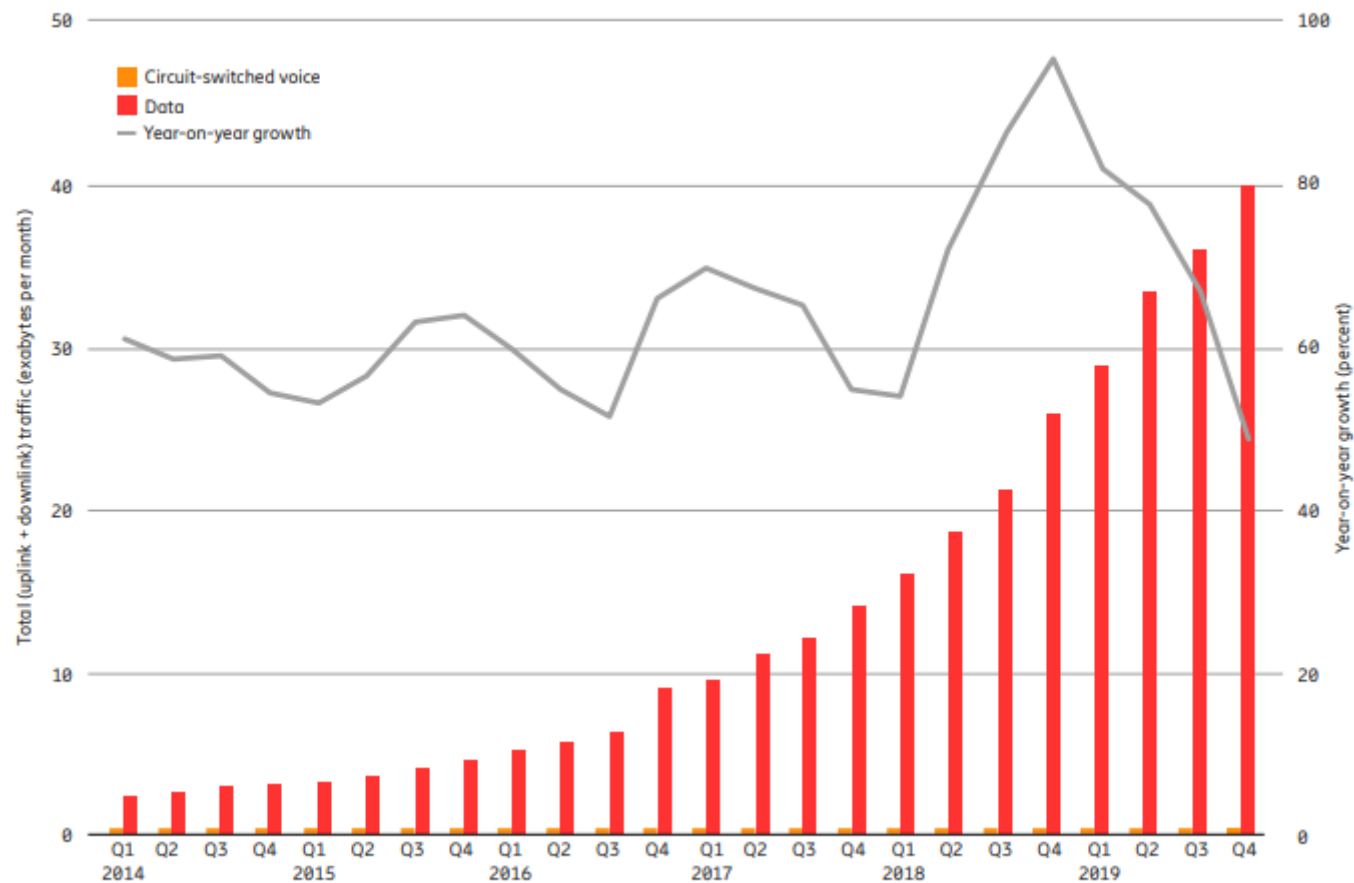


Launched standardized mobile 5G on 2.5GHz in 2019

- 9 cities launched by August 2019
- Additional launches expected

# Staggering data growth

Global mobile data traffic and year-on-year growth (EB per month)

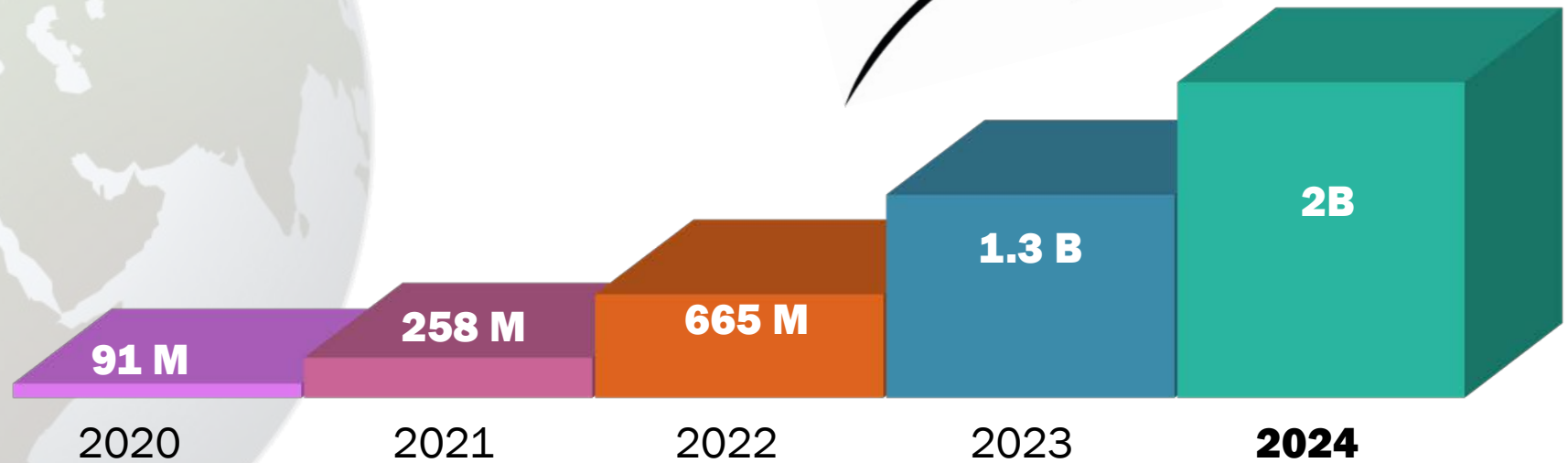


Source: Ericsson traffic measurements (Q4 2019)

<sup>2</sup>Traffic does not include DVB-H, Wi-Fi or Mobile WiMAX. VoIP is included in data traffic



# Global 5G Subscription Forecast 2020-2024



Source:

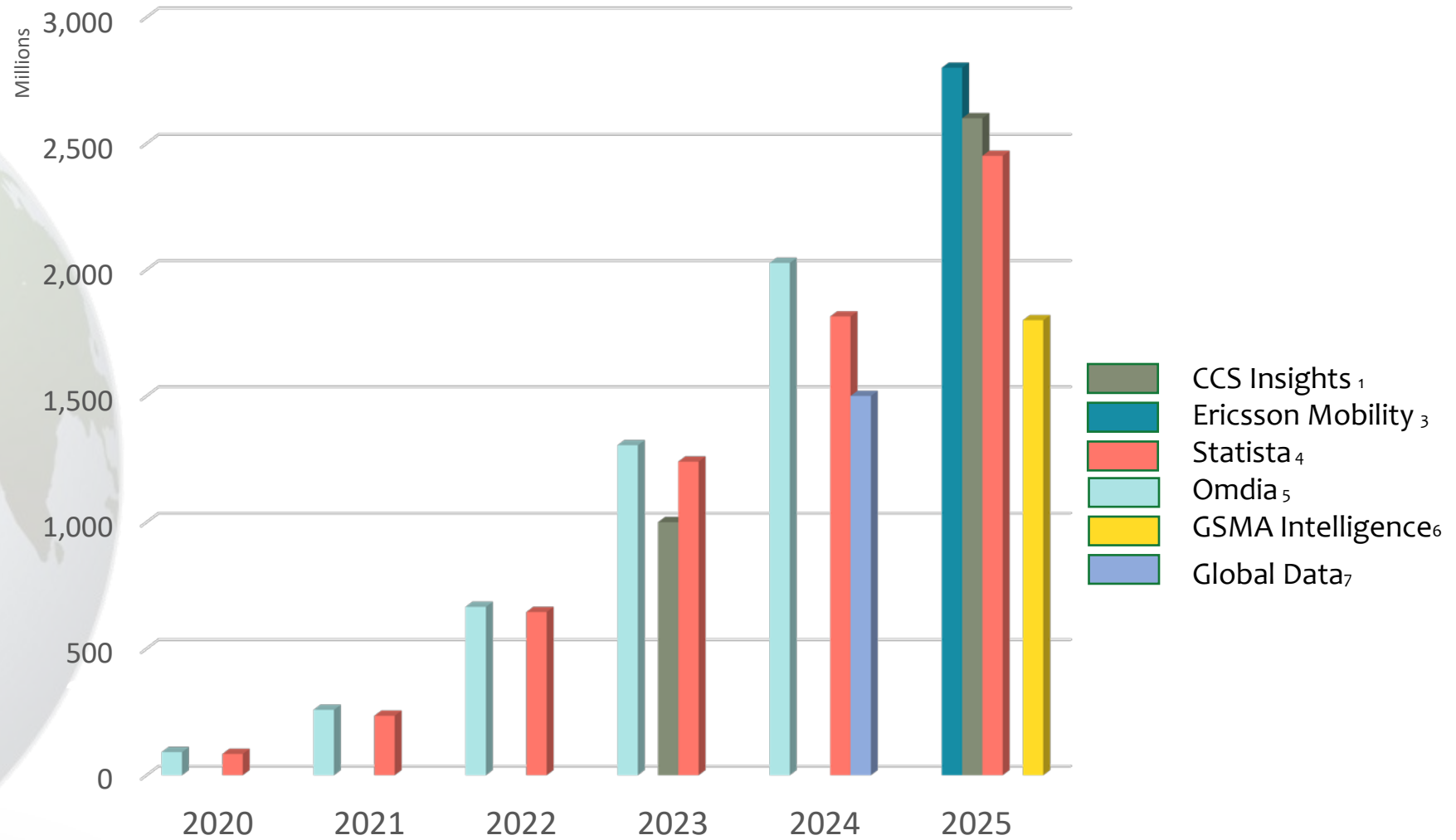


March 2020

Forecast includes M2M



# Global 5G Subscription Forecasts Vary By Analyst



Sources:  
1 CCS Insights, Networks' Ambitions to Launch 5G Early Raise Global Forecast, Sept. 2018  
3 Ericsson, Mobility Report, December 2019  
4 Statista, Feb 2019  
5 Omdia, WCIS, December 2019  
6 GSMA Intelligence, Feb 2019  
7 Global Data, September 2019





# Leading for a 5G era

- 5G global markets are going from 31 Billion in 2020 to **\$11 Trillion** in 2026<sup>3</sup>
- Network investment will hit **\$1.1 trillion** over the next five years, focused mostly on 5G<sup>2</sup>

- US investments **\$1.3 Trillion**<sup>4</sup>
- 4G Leadership = economic benefits and mobile digital service ecosystem added \$100 Billion annual GDP<sup>1</sup>
- 5G leadership will drive continued innovation and associated benefits<sup>1</sup>

- 5G could boost US by **\$500 Billion annually**<sup>5</sup>
- **3 Million** new jobs<sup>5</sup>
- Savings and benefits in excess of **\$160 Billion** for local communities<sup>5</sup>

Sources:

1 Chairman Ajit Pai remarks at White House 5G Summit, September 2018

2 GSMA

3 ReportsnReports

4 Intel & Ovum:

5 Accenture





# 5G Services

The global 5G services market size is estimated to reach **USD \$45.7 billion by 2020** and register a **CAGR of 32.1% from 2021 to 2025**<sup>1</sup>

FWA for business will be more profitable than consumer access market and also **81% of revenue**<sup>2</sup>



Figure 1: The insatiable demand for faster, better mobile broadband

Source:

1. [Grandview Research](#)
2. [Research and Markets](#), Nov 2019

Fig. 1 [Qualcomm & Nokia](#) - Making 5G a Reality



# 5G and Smart Cities



**68 percent** of the world population is projected to live in urban areas by 2050, growing from **55 percent** today<sup>2</sup>

**smart cities market** to grow from USD \$308 Billion in 2018 to USD **\$717 Billion by 2023**, at a Compound Annual Growth Rate **(CAGR) of 18.4%** during the forecast period.



## Solving urban problems



- **Smart Lighting**
- **Air Quality & Weather Monitoring**
- **Smart Parking + Metering**
- **Public Safety**
- **Traffic Sensors**
- **Public Transit Fleet Management**
- **Parks Management and Monitoring**

Source:

1. [Markets and Markets](#)
  2. [UN Revision of World Urbanization Prospects](#)
- Icon by Manthana Chaiwang





# 5G and Transportation



According to analysts at Gartner, the share of cars actively connected to a 5G service will grow from a current base of 15 per cent to **74 per cent by 2023 and 94 per cent five years later**.<sup>1</sup>



**5.9 GHz “mid-band” for C-V2X** empowers 5G communications in transportation sector



- **Autonomous Vehicles**
  - Cars & Transport trucks
  - *Convoys can reduce drag by 20-60%*
- **AI operational and inventory** decisions automated
  - Greater efficiencies and accuracy
  - Optimize stock levels and product availability
- **Finance operations**
  - Remotely track and monitor a customer’s product or service usage
  - Charge customers remotely

Source:

1. [Gartner](#)

Ericsson Insights and Reports, September 2019

Icon by Freepik



# 5G and Public Safety



## **First Responder Network Authority (FirstNet)**, a

nationwide network being built exclusively for first responders to streamline their communications, especially in rural areas<sup>1</sup>



- Massive wireless sensor networks<sup>2</sup>
- 4K video cameras
- AR and VR headsets
- Advanced voice and video communications
  - Voice over LTE (VoLTE)
  - Mission-critical push-to-talk (MC-PTT)
  - Mission-critical push-to-video (MC-PTV)
  - other voice and messaging services

Source:

1. "What would 5G technology mean for government?" NextGov, June 2019

2. Ericsson blog

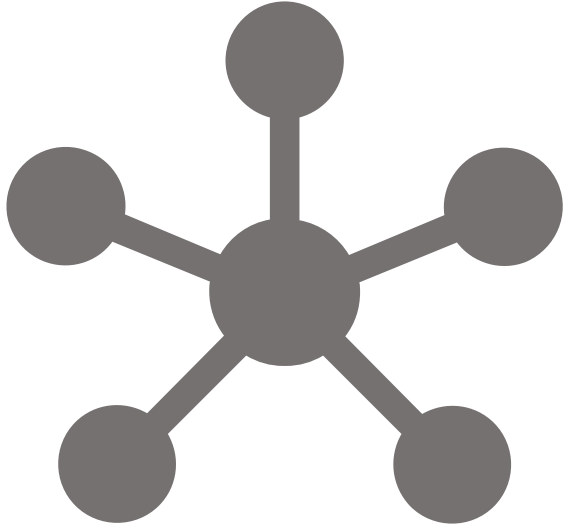






# 5G Key Ingredients

What will it take to get it? How will we get there?



**Network  
Densification**



**Spectrum**

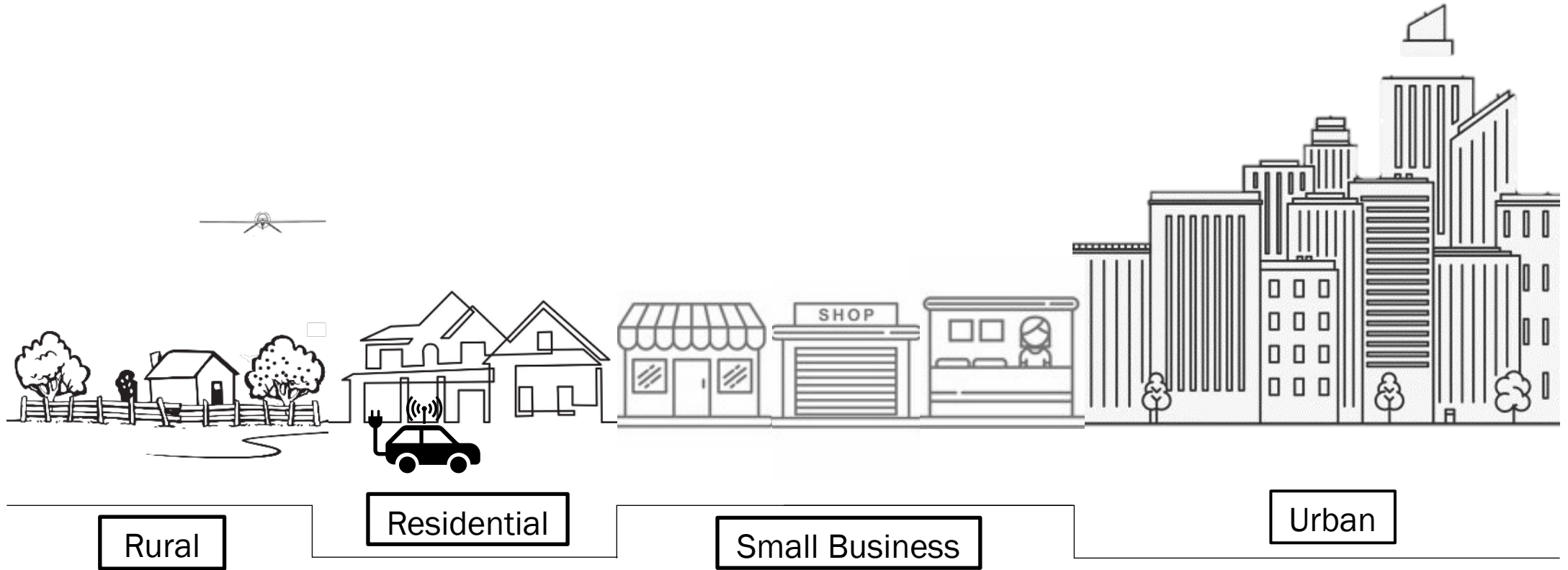


# Network Densification

Cell site deployments and placement



## Network Densification is a key driver for enabling 5G



# Network Densification



**4G** denser than 3G and **5G** denser than 4G = **5G** **10X denser** than 3G?

**4G:** **Macro cell towers** carried the bulk of 4G mobile traffic + **Small cells** deployed where specific capacity needed

**5G:** **Diverse Portfolio of cell sites**  
**Macro cell towers** carry a lot of traffic. + **Small cells** for local coverage  
**Variety of cells** for capacity & coverage + **Offloading, Sharing and unlicensed spectrum**

## Regulatory (US)

**The FCC and current administration is committed to U.S. being a leader in 5G.**

**FCC 5G Deployment Plan:**

- Transparent processes
- Reasonable fees
- Accelerated review processes

**5G deployments impacted by long municipal bureaucratic review processes.**

Could occur in urban, suburban or rural areas. However, 21 states have approved legislation to streamline processes.



# Spectrum

National and international considerations

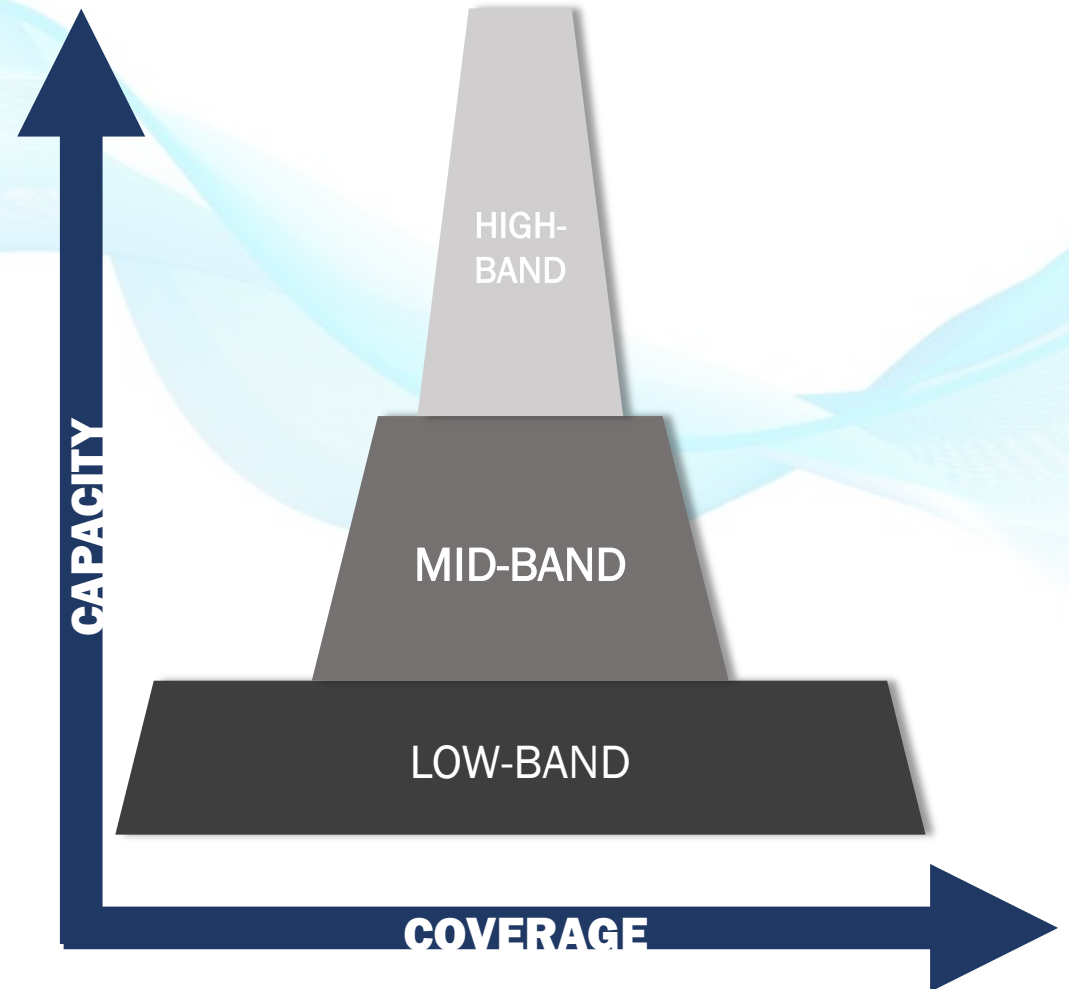
# Ensure continued 5G leadership

## SPECTRUM NEEDED ACROSS ALL BANDS

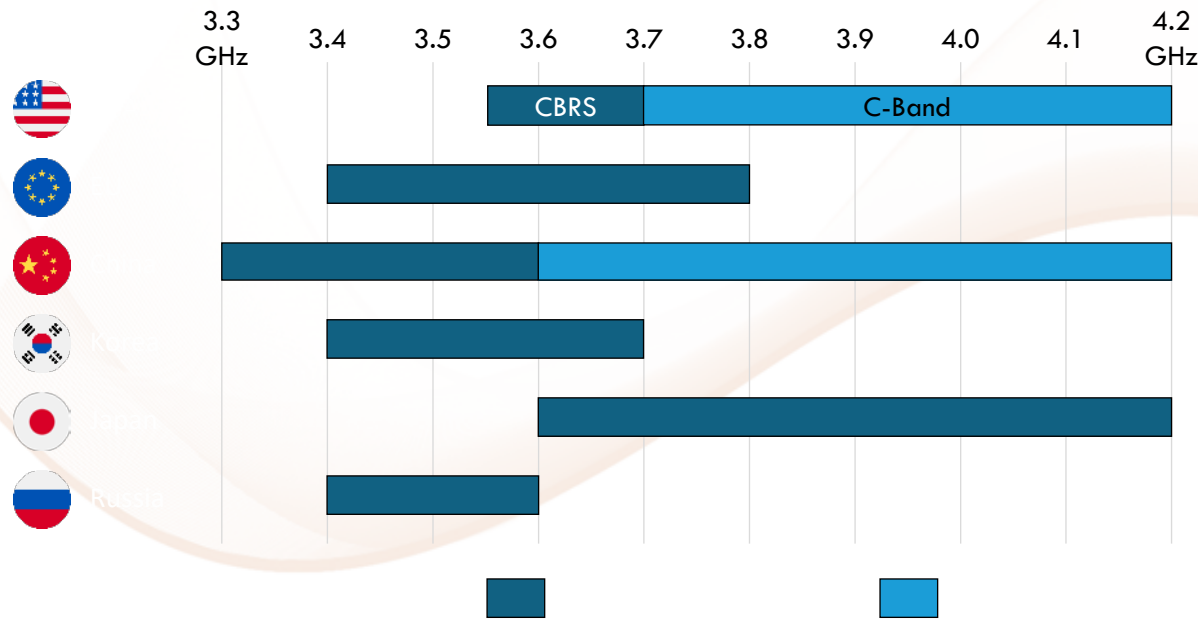
Low-band for coverage reliability

Mid-band for capacity, coverage and speed

High-band for capacity, speed, traffic hotspots and localized applications



# Global 5G ecosystem is forming around 3.5 GHz mid-band spectrum



- **All major regions**, with the exception of US, have allocated significant amount of mid-band spectrum for 5G and are starting with it
- **Mid-band is very important** for 5G leadership in the US
- **US is a leader in mmWave** but mid-band is critical for 5G leadership

# U.S. Spectrum Considerations



## LOW-BAND

- Operators using existing spectrum assets below 3 GHz



## MID-BAND

- CBRS Shared Spectrum 3550-3700 MHz
- FCC C-band Proposal on 3.7 GHz to 4.2 GHz
- NTIA studying 3.1 GHz to 3.55 GHz
- FCC Proposal on 5.850 GHz to 5.925 GHz



## HIGH-BAND

- mmWave spectrum - Auctions
  - 28 GHz – completed January 2019
  - 24 GHz – completed May 2019
  - 37 GHz – completed March 2020
  - 39 GHz – completed March 2020
  - 47 GHz – completed March 2020



# 3<sup>rd</sup> mmWave Auction (US)



**AT&T won 3,267 licenses** in 411 PEAs, bidding about \$2.38 billion



**T-Mobile bid about \$931 million** to win 2,384 licenses in 399 PEAs, purchasing both 47 GHz and 37-39 GHz spectrum.



**Verizon won 4,940 licenses** across 411 PEAs after bidding about \$3.4 billion

- 37, 39 and 47 GHz spectrum bands
- Top Bidders: **AT&T, T-Mobile, Verizon**
- Auction 103 ended with **\$7.57 billion in gross bids**
- **\$0.009 per MHz PoP**
- **Additional winning bidders not listed**
- **US continues to lead in allocation of mmWave spectrum**





**5G is a Commercial  
Reality!**





# Thank You

## 5GAmericas.Org

