

Wireless Broadband Technology



Brian Pickering

Business Development 5G e2e NAM

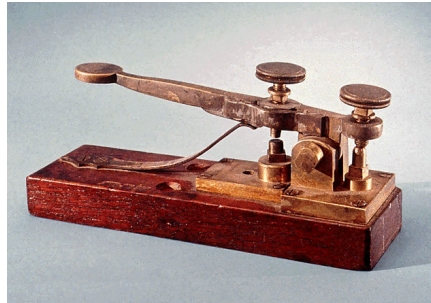
Nokia

NOKIA

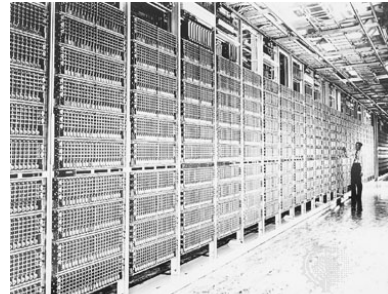
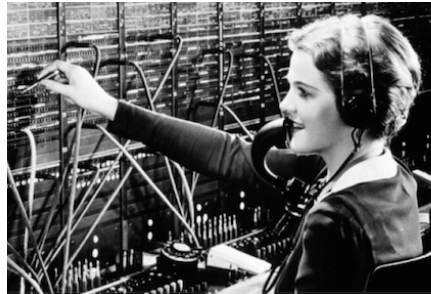
The past

Breathtaking rate of innovation in communication devices and networks

Devices

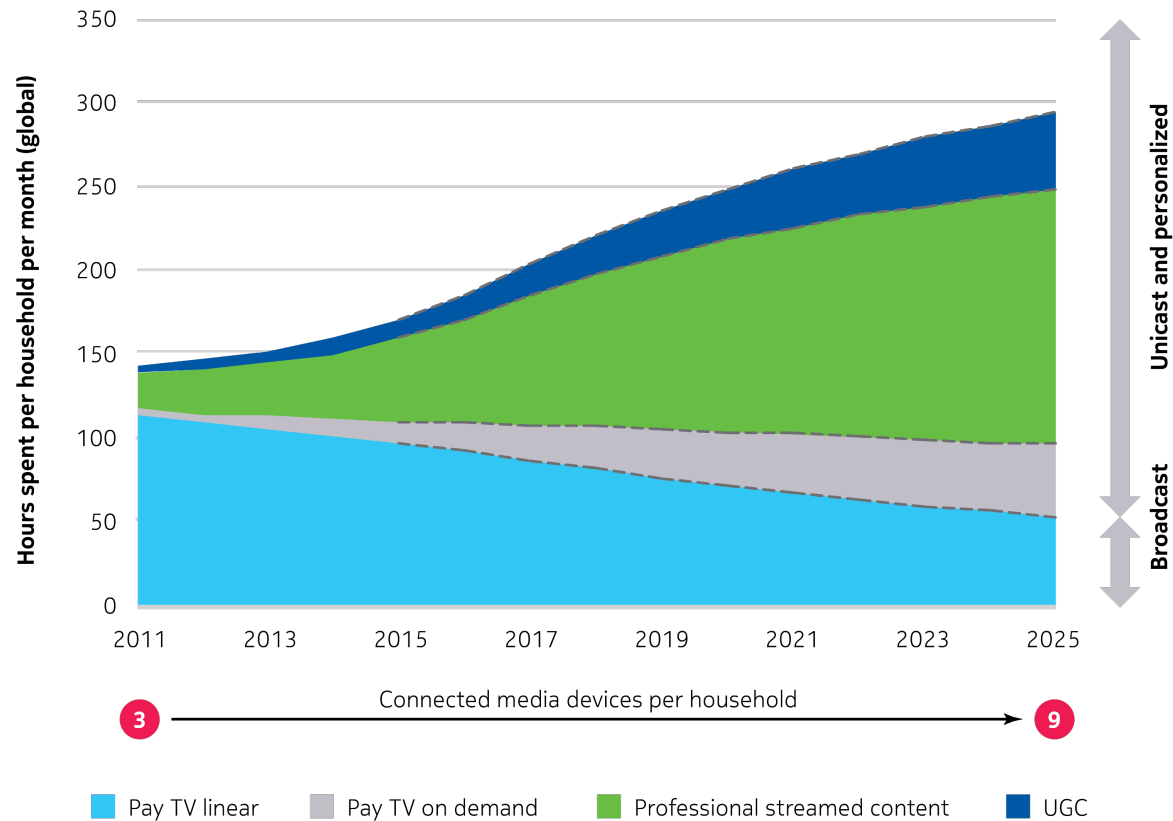


Networks



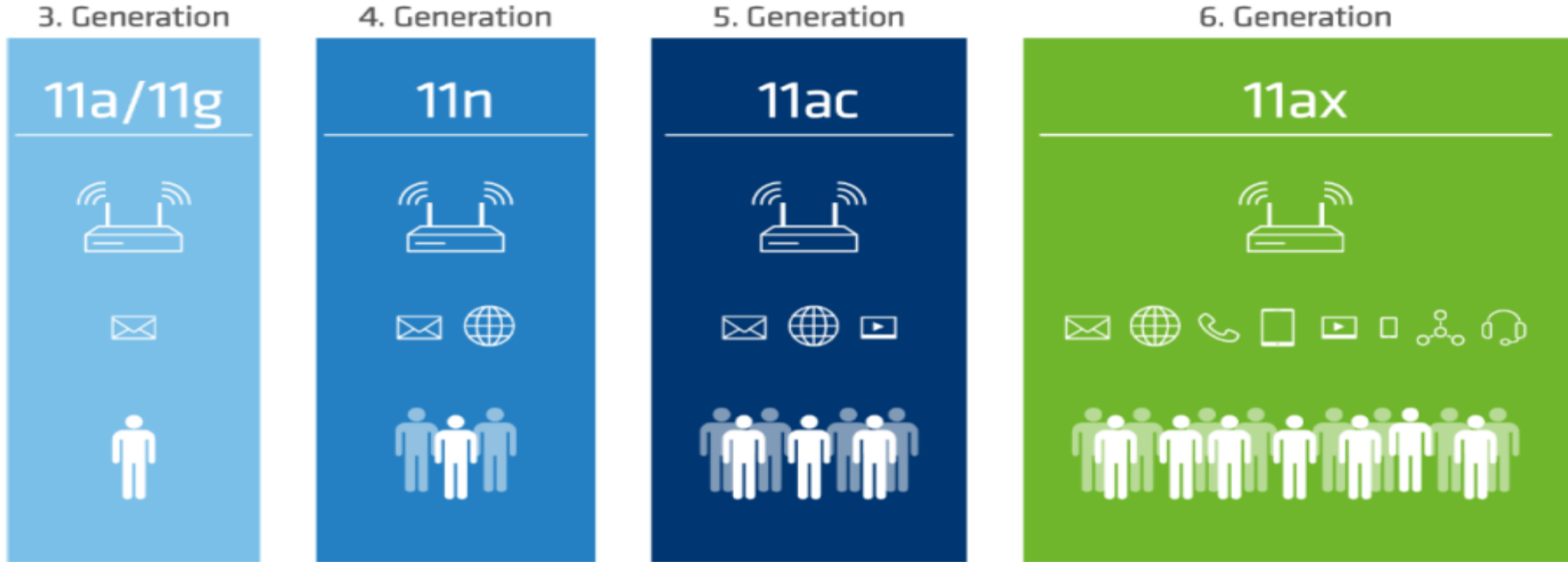
The Future of Media

Anyone can publish. Anyone can watch any time, anywhere



WiFi Evolution

	<u>Data Transfer Speed</u>	<u>Frequency</u>
Wi-Fi 4	450 Mbps	2.4 GHz
Wi-Fi 5	1300 Mbps	5.0 GHz
Wi-Fi 6	10 Gbps	2.4 + 5.0 GHz

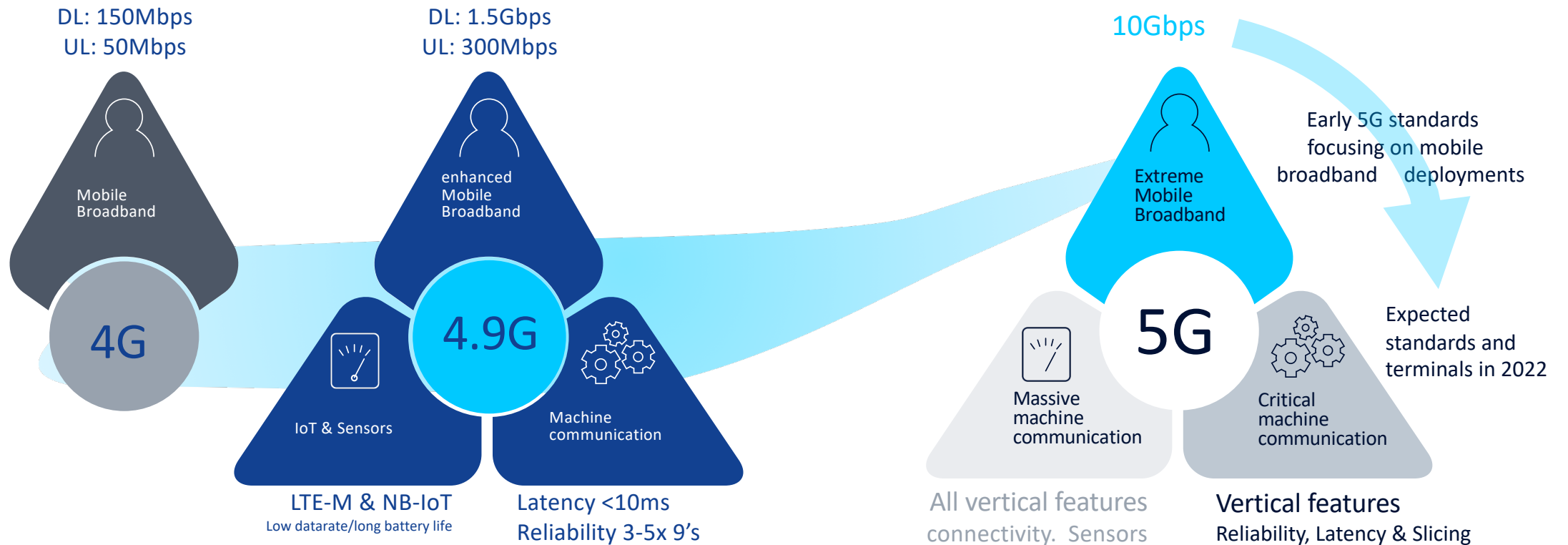


Wi-Fi 4

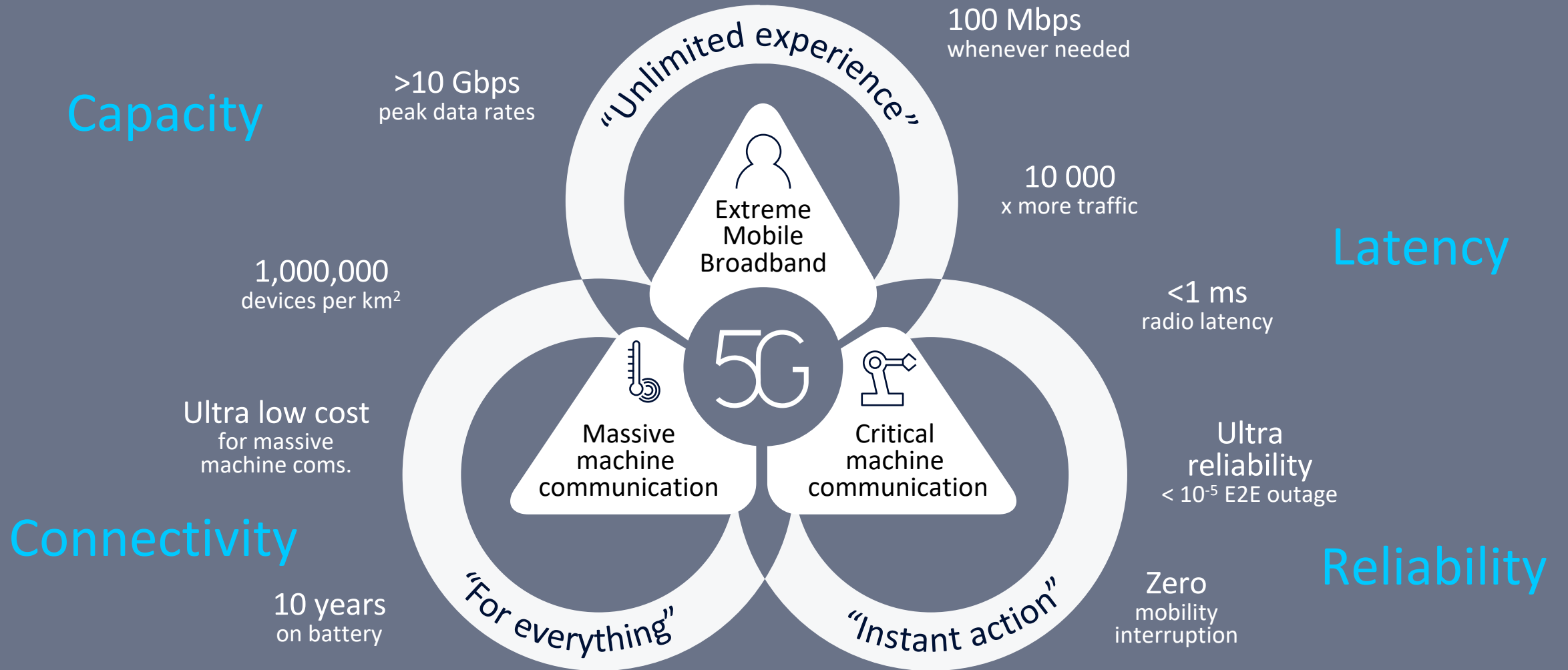
Wi-Fi 5

Wi-Fi 6

Evolution from 4G to 5G



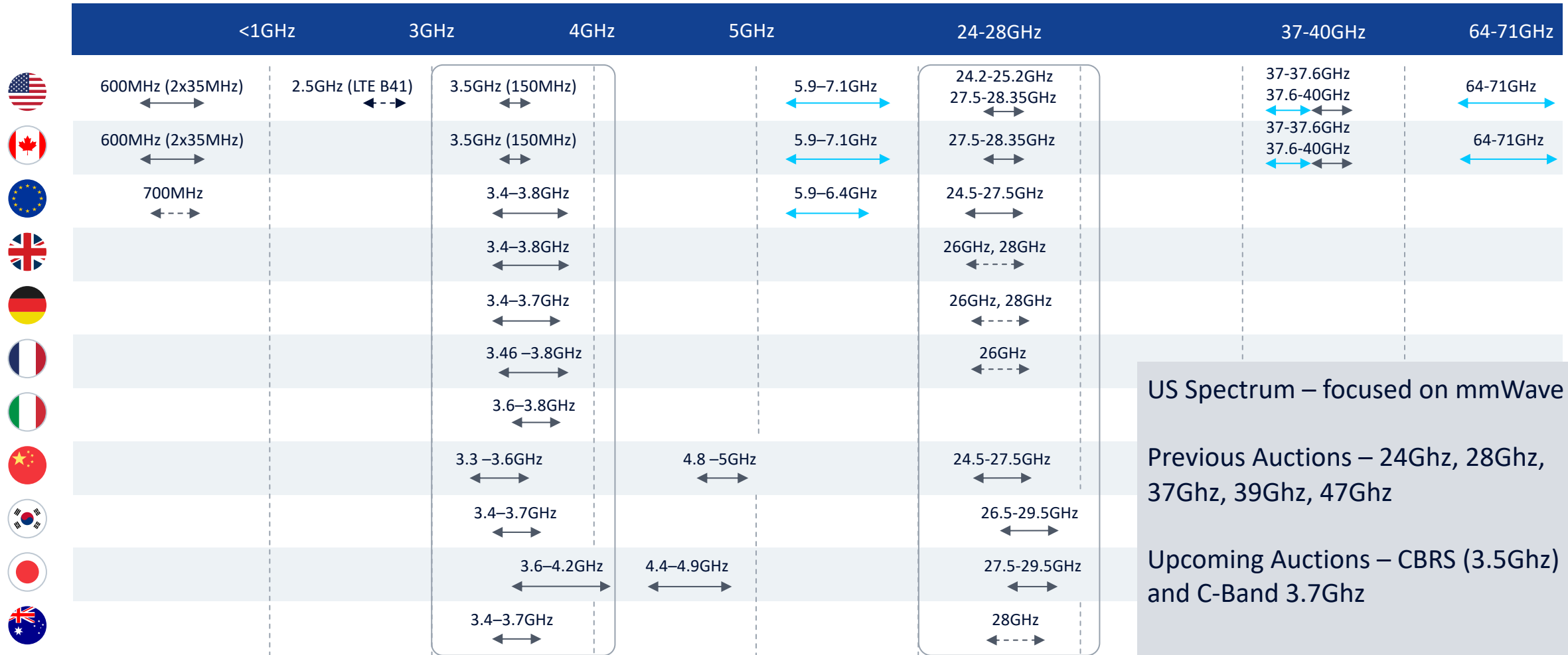
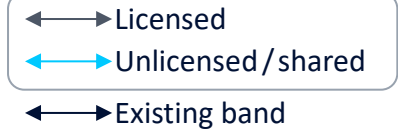
5G Will Create New Possibilities



Global snapshot of 5G spectrum

Around the world, there is a pattern of band allocation

New 5G band



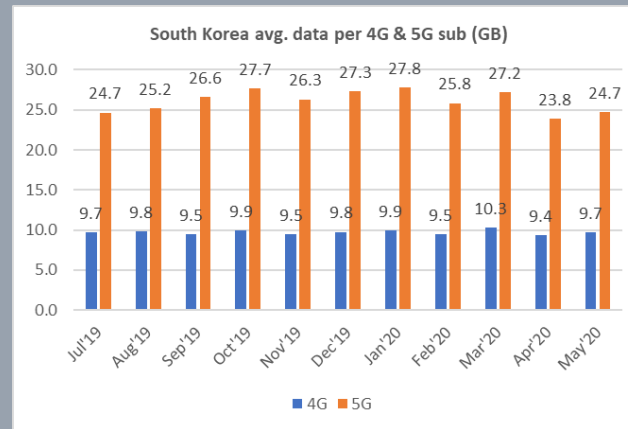
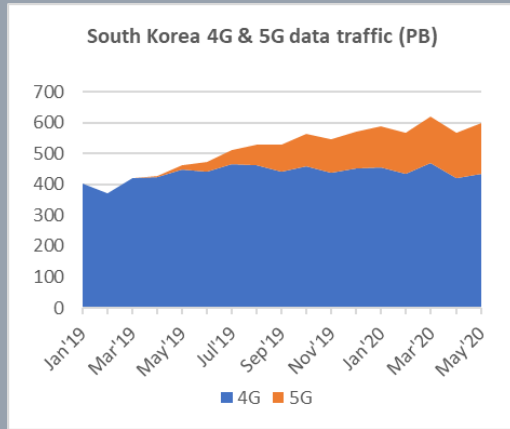
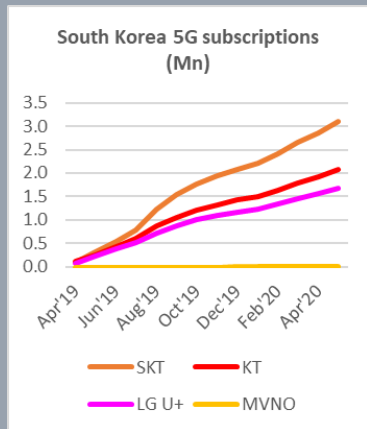
US Spectrum – focused on mmWave

Previous Auctions – 24GHz, 28GHz, 37GHz, 39GHz, 47GHz

Upcoming Auctions – CBRS (3.5GHz) and C-Band 3.7GHz

Early results from South Korea

Strong subscriber growth, high data usage, positive revenue indications



Source: MSIT South Korea

6.88m 5G subscribers @ end May'20 (=9.9% of total mobile base).

- **27.2% of total mobile data traffic was on 5G.**

Average monthly 5G data usage Dec-May=26.1 GB
(~2.7 x LTE average data usage).

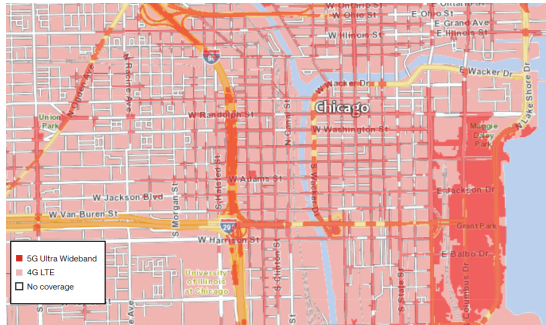


5G in USA

"Being the first" is the real use case

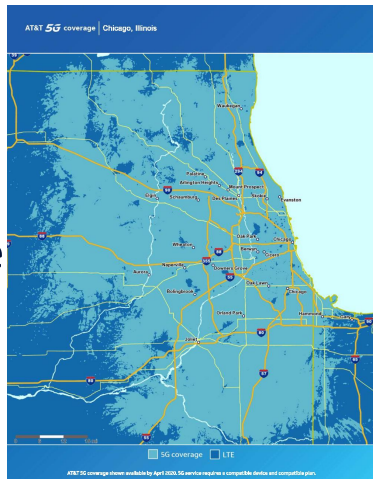
Verizon

Focused on mmWave, Dense Urban, 34 cities launched to date.



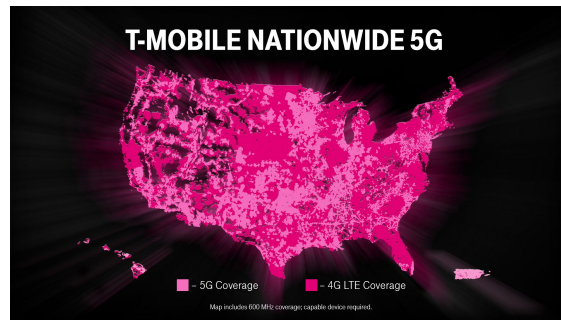
AT&T

35 cities (39Ghz). In Dec. launched 850Mhz, 344 cities in low band to date (170M pops)

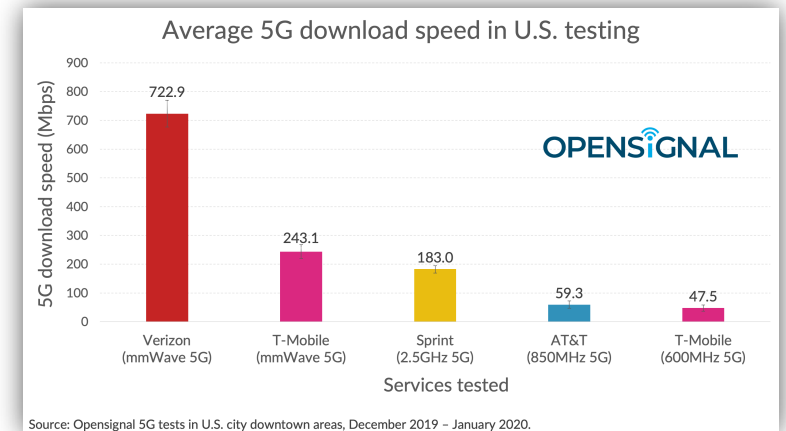


Tmobile

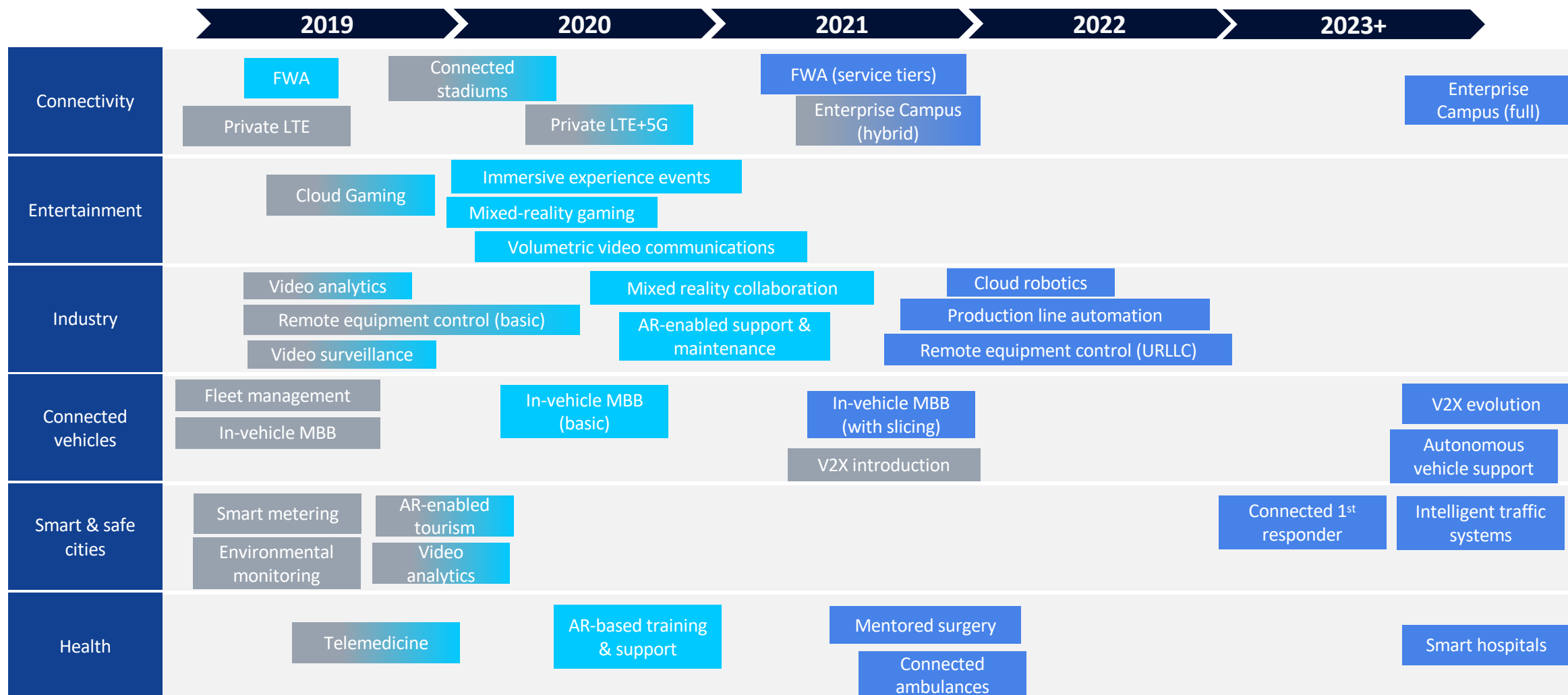
Launched 600Mhz covers 220M pops (nationwide), 6 cities with mmWave, Re-Launch of 2.5Ghz



Speed vs Coverage?



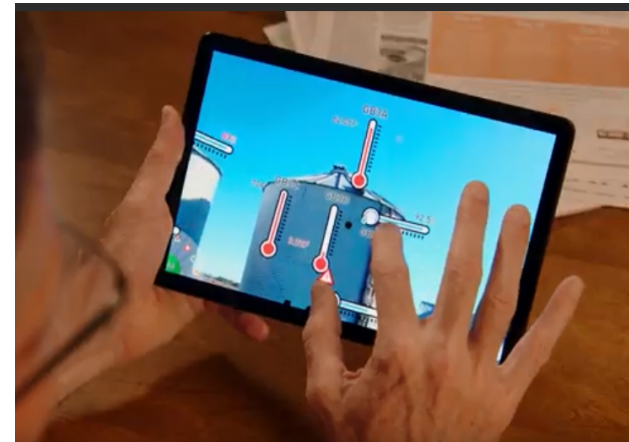
5G monetization – anticipated use case evolution*



Charter: Smart Farm Trial in Keystone, Iowa

Video Surveillance and Analytics

5G eases the physical demands of farming and enables high productivity



Determine where action is required

- Remote Control of equipment
- Video Surveillance and Analytics

Increased efficiency

Anywhere Precision

More freedom

Issues addressed:

- Disease & pests
- Irrigation problems
- Security

Thank You