

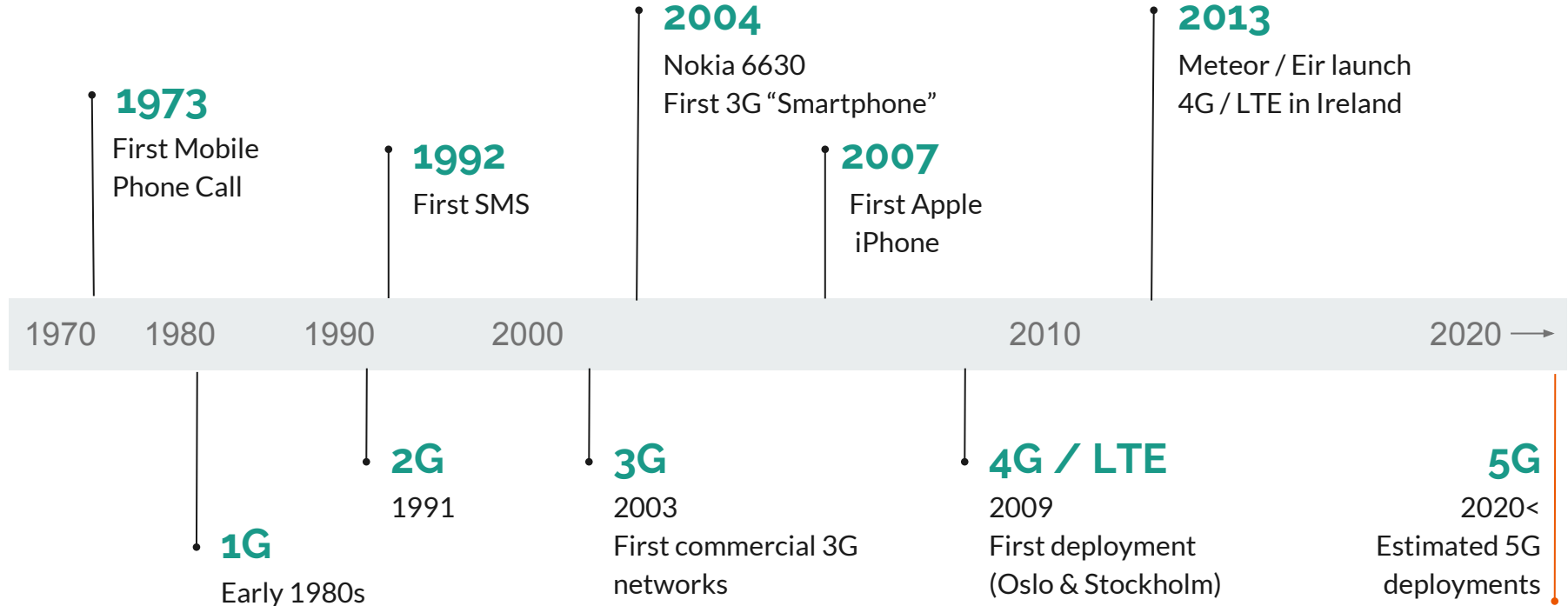


5G

The Next Step in Mobile Communications

Rebecca Kane

A Brief History



18 Billion

Connected Devices, 2017

7.5 Billion
People

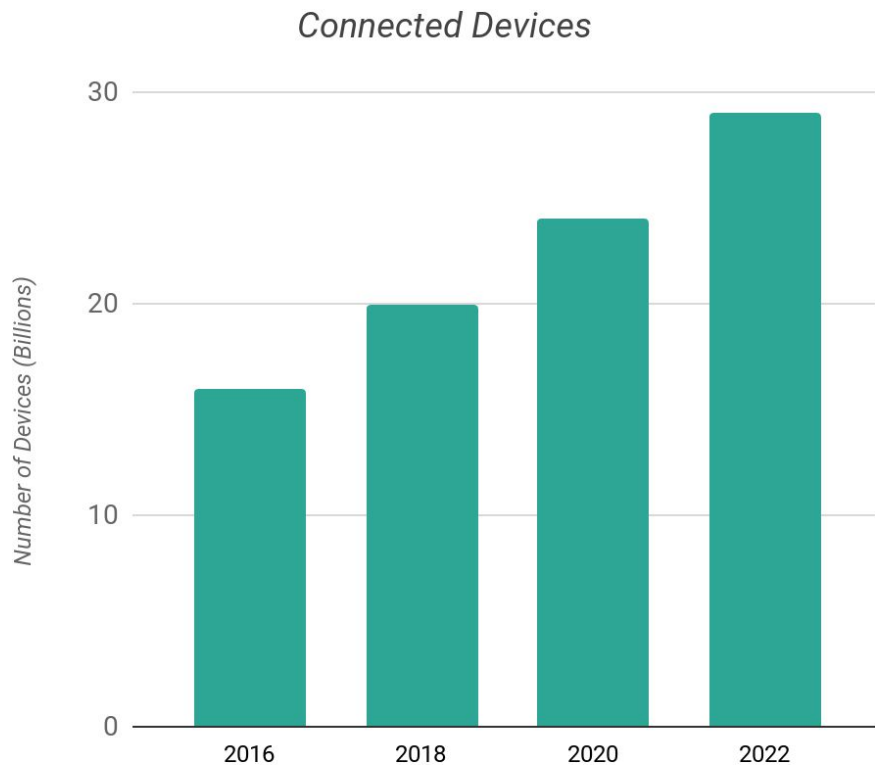
2.4 Devices Per Person

29 Billion

Estimated Connected Devices, 2022

7.7 Billion
People

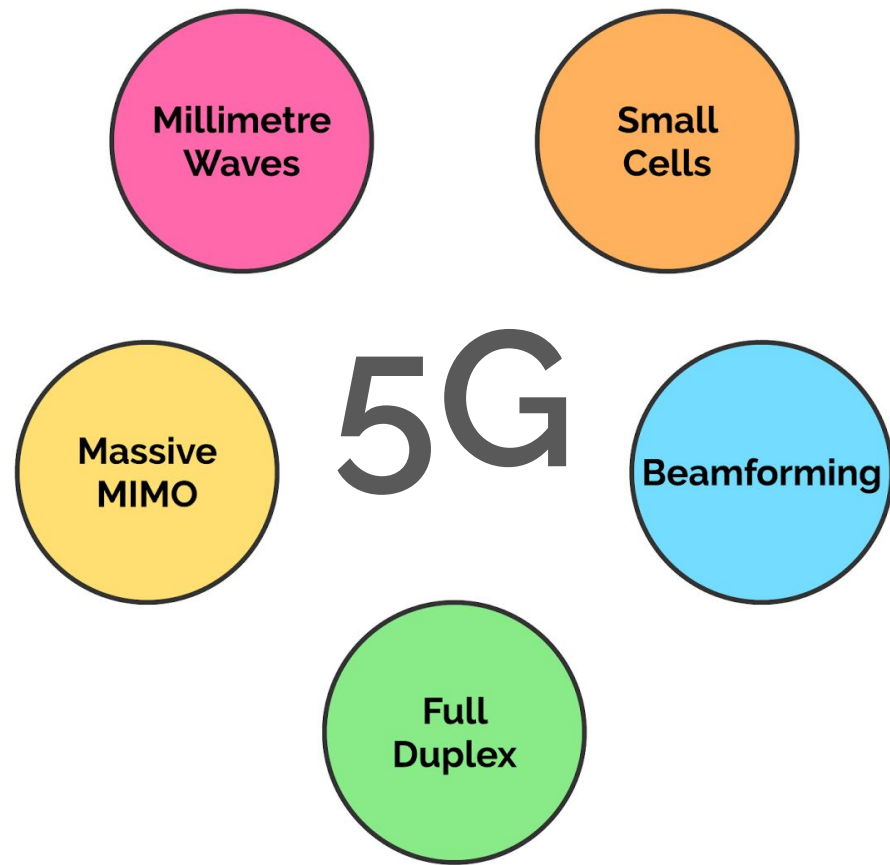
3.7 Devices Per Person



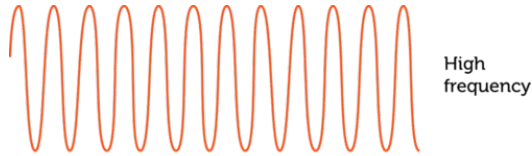
Source: Ericsson IoT Outlook, 2017



Proposed Technologies



Millimetre Waves

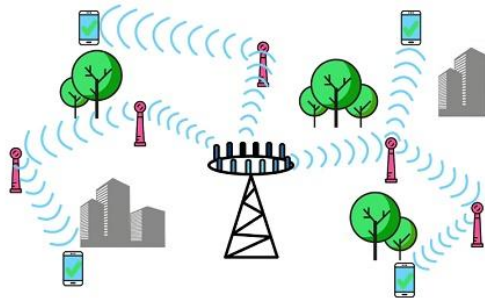


High
frequency



Low
frequency

Small Cells



Electromagnetic Spectrum in GHz



Whole New Area of the Spectrum

=

More Bandwidth for Everyone

What about the obstacles?

Portable Miniature Base Stations

=

Stronger Signals

Massive MIMO

Multiple Input Multiple Output

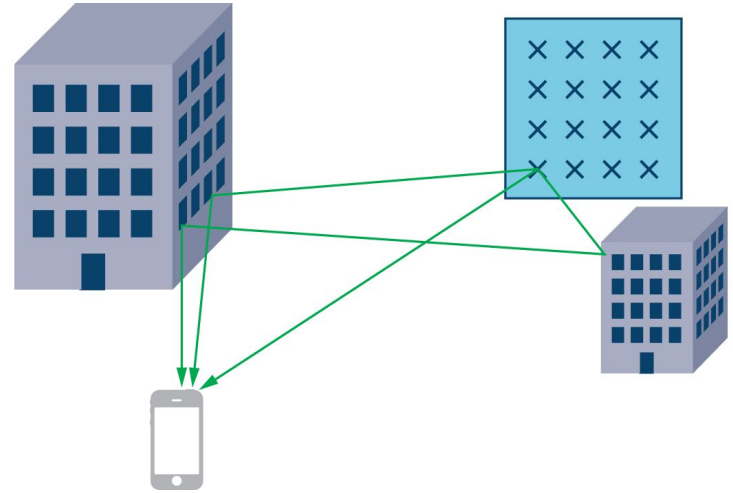
4G Stations > 12 Ports $\begin{cases} > 8 \text{ Transmitting} \\ > 4 \text{ Receiving} \end{cases}$

5G Stations > **100 Ports**

Handling more data at once

More Antennae = More Interference

Beamforming



Identify the most efficient route,
reduce interference

Full Duplex

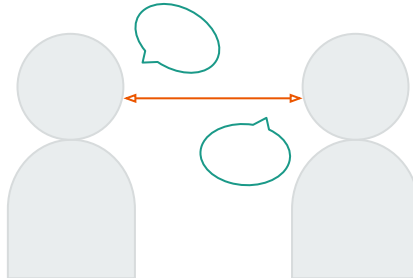
Half Duplex :

*Information can flow both ways on the same frequency, but **not at once**.*

Full Duplex :

Send and receive data simultaneously over the same frequency.

→ **Twice** as fast





Use Cases

Personal

Always Connected
Accessible Media

Societal

Hospitals
Schools
Smart Vehicles
Heavy Machinery (Remote)
Business - Monitoring, tracking and automation
(agriculture)

An aerial photograph of the Chicago skyline at dusk. The city is densely packed with skyscrapers, including the Willis Tower and the Trump Tower. The city extends to the edge of Lake Michigan, which is visible in the background under a twilight sky with scattered clouds. The text "[Conclusion Slide]" is overlaid in white on the right side of the image.

[Conclusion Slide]