



Millimetre wave Sharing

September, 2020

Communications
Research Centre Canada



Source: Communications Research Centre Canada

Outline

- Millimetre Wave (mmWave)
 - Challenges
 - Opportunities
 - Sharing
- Moving Forward

mmWave

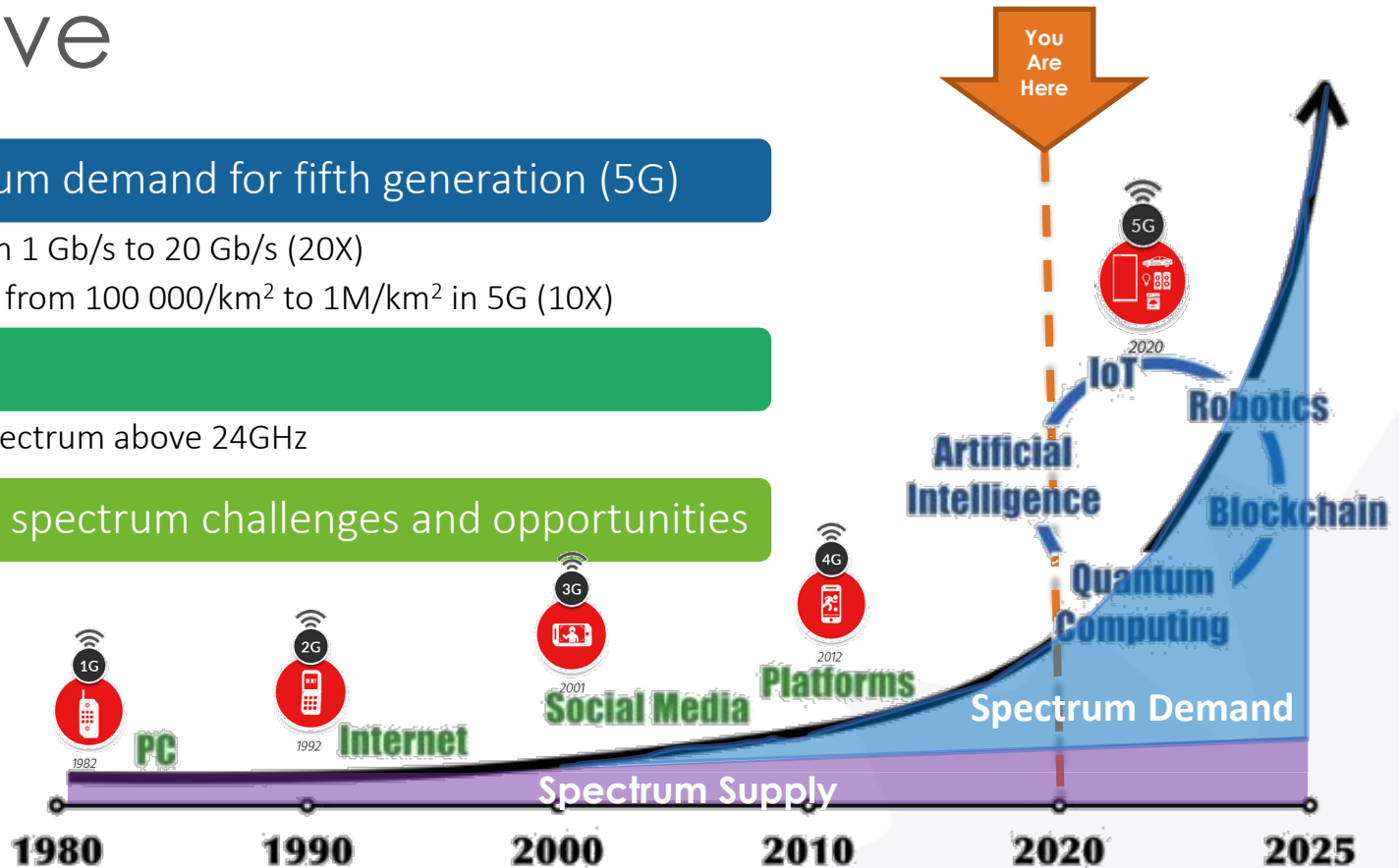
Increasing spectrum demand for fifth generation (5G)

- Peak data rates from 1 Gb/s to 20 Gb/s (20X)
- Connection Density from 100 000/km² to 1M/km² in 5G (10X)

Supply for 5G

- Exploit mmWave spectrum above 24GHz

Sharing mmWave spectrum challenges and opportunities



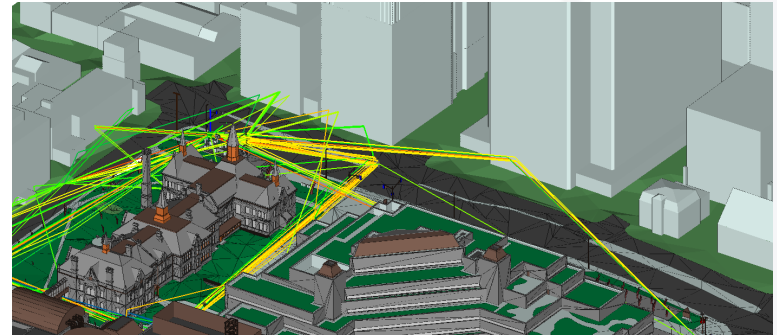
Graph Source: <https://hackernoon.com/are-you-ready-for-an-artificially-intelligent-future-b9df618d53b4>

<https://www.design1st.com/impact-5g-on-iot-product-development/>

Exponential Growth of Technology

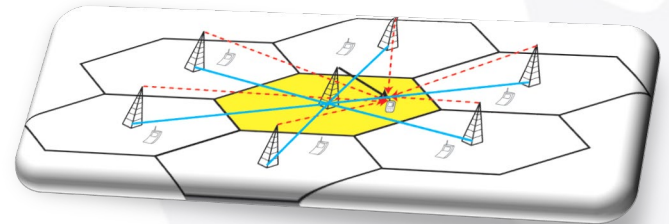
mmWave Challenges - Physics

- mmWave doesn't propagate as far relative to frequencies below 6GHz
- Reception quality is strongly affected by objects in local environment
- Signals suffer from blockage effects
- Increased attenuation from atmospheric absorption, weather etc.



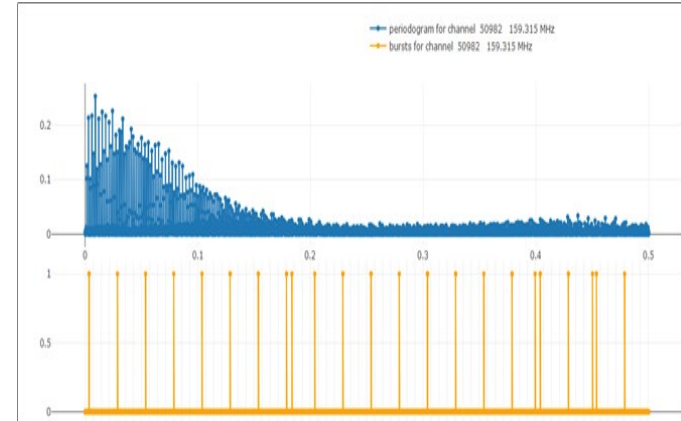
mmWave Challenges - Deployment

- Trend towards micro/pico cells
- Coordinated deployment at street level
- Infrastructure, power, connectivity and backhaul
- Municipal negotiation
- Reporting on base station locations, capabilities



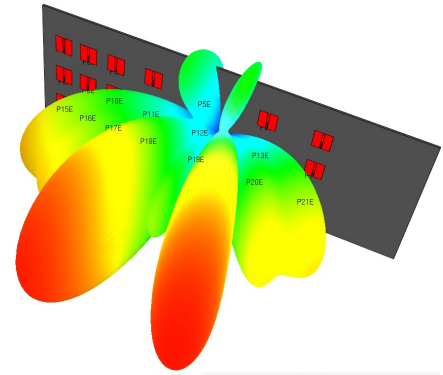
mmWave Challenges - Regulatory

- Monitoring the spectrum usage of mmWave
- Detecting harmful interference
- Enforcing compliance
- Certifying equipment



mmWave Opportunities - Technology

- Physical limitations addressed through technology advances
 - Massive Multiple-Input-Multiple-Output (MIMO) phased array a reality at mmWave
 - Beamforming/steering – narrow, directive beams



mmWave Sharing

- Technology advances creates many unknowns
 - Density of mmWave deployments
 - Coordinated vs. uncoordinated access
 - Types of sharing models
 - Information that allows sharing
- Regulatory impact: localised licencing

Moving Forward

- Solving some of the mmWave unknowns will help unlock more spectrum for commercial mobile and wireless broadband usage
- Input from industry and academia can impact how mmWave spectrum is licenced

Canada 
