Wi-Fi in 5G
CEPT Workshop on New Spectrum Solutions for Industry Sectors

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Outline

• About Wi-Fi Alliance®

• Role of Wi-Fi® in enabling 5G
  – Delivering high-performance connectivity
  – Supporting mobile offload

• Economic Value of Wi-Fi

• Wi-Fi Spectrum Requirements in Europe
About Wi-Fi Alliance
The worldwide network of companies that brings you Wi-Fi®

Effective global collaboration
800+ member companies
Constant evolution
Driving industry growth
Wi-Fi Alliance Vision:
Connecting everyone and everything, everywhere
Role of Wi-Fi in enabling 5G
Wi-Fi delivers high-performance connectivity

- Wi-Fi is expected to deliver over 50% of all IP data traffic by 2022
- Wi-Fi delivers more than half of all internet traffic today

Source: Cisco VNI Mobile, 2019
Wi-Fi delivers high-performance connectivity

With existing deployment densities 25 times greater than those of small cells, Wi-Fi is the only readily available technology that comes close to delivering network capacity requirements envisioned for 5G (note WiFi4EU initiative).

![Global Public Wi-Fi Hotspots](image)

Note: *Middle East and Africa represents 1 percent of global public Wi-Fi hotspots by 2022. Source: Maravedis, Cisco VNI Mobile, 2018.
Wi-Fi enables mobile offload

Offloading from expensive cellular networks on to lower-cost-per-bit Wi-Fi networks projected to grow

– In 2017: 54% of total mobile data traffic was offloaded through Wi-Fi
– In 2022: 59% of total mobile data traffic is projected to be offloaded through Wi-Fi

![Graph showing growth in Wi-Fi offload traffic]

Source: Cisco VNI Mobile, 2019
Wi-Fi enables mobile offload

- From 2G to 3G to 4G to 5G: Wi-Fi offload continuous to grow
- More than previous G’s, 5G rollout depends on Wi-Fi availability

![Mobile Data Traffic and Offload Traffic, 2022](source: Cisco VNI Mobile, 2019)
Economic Value of Wi-Fi
Components of Economic Value

- **Consumer surplus:** Total amount consumers are willing to pay for a product or service compared to going without it.
- **Producer surplus:** Economic benefit producers earn from a product or service.
- **GDP contribution:** Market value of all final goods and services produced in a period.

**economic surplus**
Six major economies studied...

- Wi-Fi generated $2 Trillion USD economic value in 2018 and rises to $3.5 Trillion in 2023
- Full study is available at: www.valueofwifi.com
Wi-Fi Spectrum Requirements in Europe
**Wi-Fi Spectrum Requirements in Europe**

- While Wi-Fi evolved from a nascent technology to an integral component of telecom infrastructure, it continues to operate in a limited spectrum that was made available 20 years ago.

- Wider Wi-Fi channels are needed to support higher data rates and lower latency applications:
  - Video and VR today vs. text/email in 2000s
  - 80 MHz/160 MHz channels today vs. 20 MHz channels in 2000s

- Studies confirm: *currently available spectrum is insufficient to meet growing demand for Wi-Fi*
  - Wi-Fi Alliance Study

![Wi-Fi Spectrum Shortfall: 2020 and 2025 Europe](chart)

*Source: Quotient Associates, 2017*
Wi-Fi Spectrum Requirements in Europe

Wi-Fi is critical to delivering 5G and Gigabit Society objectives but spectrum congestion threatens Wi-Fi functionality and socioeconomic value.

- Insufficient Wi-Fi Spectrum
- Degradation in Wi-Fi performance and user experience
- Not delivering “Gigabit” connectivity
- Reduced Socioeconomic Value
Wi-Fi Spectrum Requirements in Europe

- 6 GHz spectrum is uniquely suited to support next generation Wi-Fi (Wi-Fi-6)
  - sufficient bandwidth for implementation of wider channels (e.g. 80/160 MHz)
  - already allocated to Mobile service worldwide (ITU Radio Regulations)
  - Existing 5 GHz radios could be readily extended to cover the 6 GHz range
  - Good potential for global harmonization

- Industry and policymakers are taking action to make additional spectrum available for Wi-Fi access
  - Industry carried out numerous technical analyses to confirm that sharing with existing users in 6 GHz spectrum is feasible
  - European Commission Mandate for Wi-Fi in the 6 GHz band
  - In a recently unveiled 5G FAST Plan, US FCC Chairman Pai emphasized the importance of making 6 GHz spectrum
  - US FCC Notice of Proposed Rulemaking
Wi-Fi Spectrum Requirements in Europe

**Wi-Fi Spectrum Requirements in Europe**

- **5925 MHz**
  - UNII-5
    - 59 x 20 MHz
    - 29 x 40 MHz
    - 14 x 80 MHz
    - 7 x 160 MHz
  - UNII-6
    - 160 MHz
  - UNII-7
    - 160 MHz
  - UNII-8
    - 160 MHz

- **6425 MHz**
- **6525 MHz**
- **6875 MHz**
- **7125 MHz**

- **5.925 GHz to 6.425 GHz** in USA
  - 1.2 Gigahertz in USA

- **5925 - 6425 MHz**
  - 24 x 20 MHz
  - 12 x 40 MHz
  - 6 x 80 MHz
  - 3 x 160 MHz
  - 500 Megahertz in Europe

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Wi-Fi is one of the dominant economic engines of the digital ecosystem

In the last 20 years, Wi-Fi technology performance has advanced by more than 100 times since its inception, and continues to evolve. Today’s Wi-Fi complements a diverse range of 5G scenarios.

Spectrum shortfall threatens Wi-Fi functionality and innovation

We encourage the European regulators to take action