13th Annual European Spectrum Management Conference

The European Electronic Communications Code - Key areas for spectrum policy and next steps

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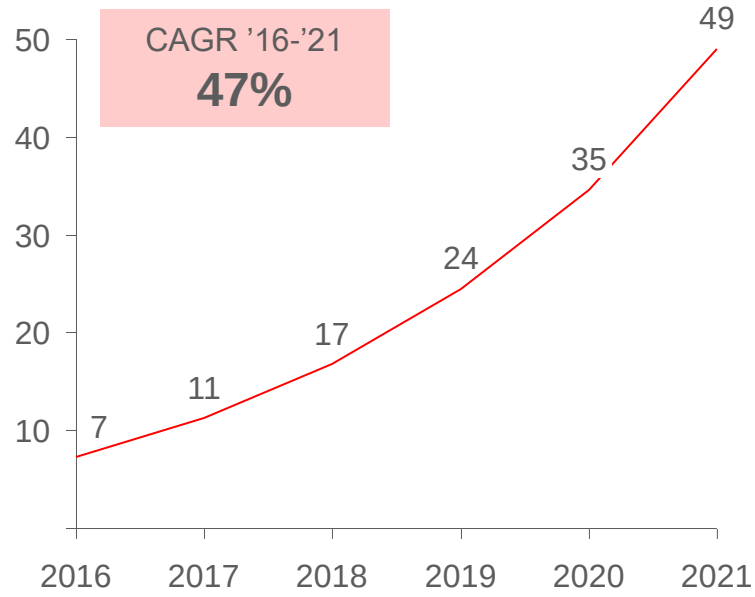
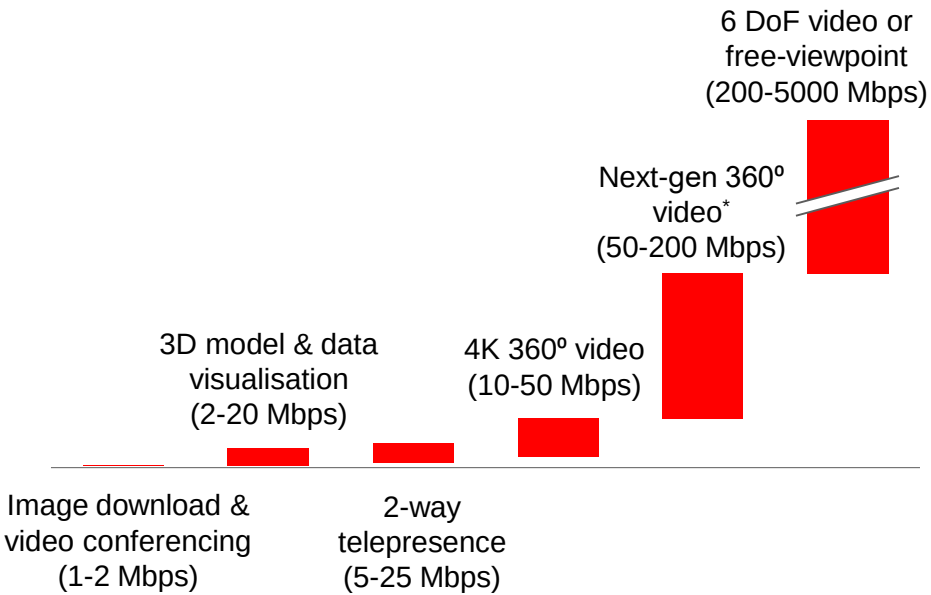
Consumer demands and new applications are fuelling the need for higher network capacity

Global mobile data consumption (m of TB/mth)

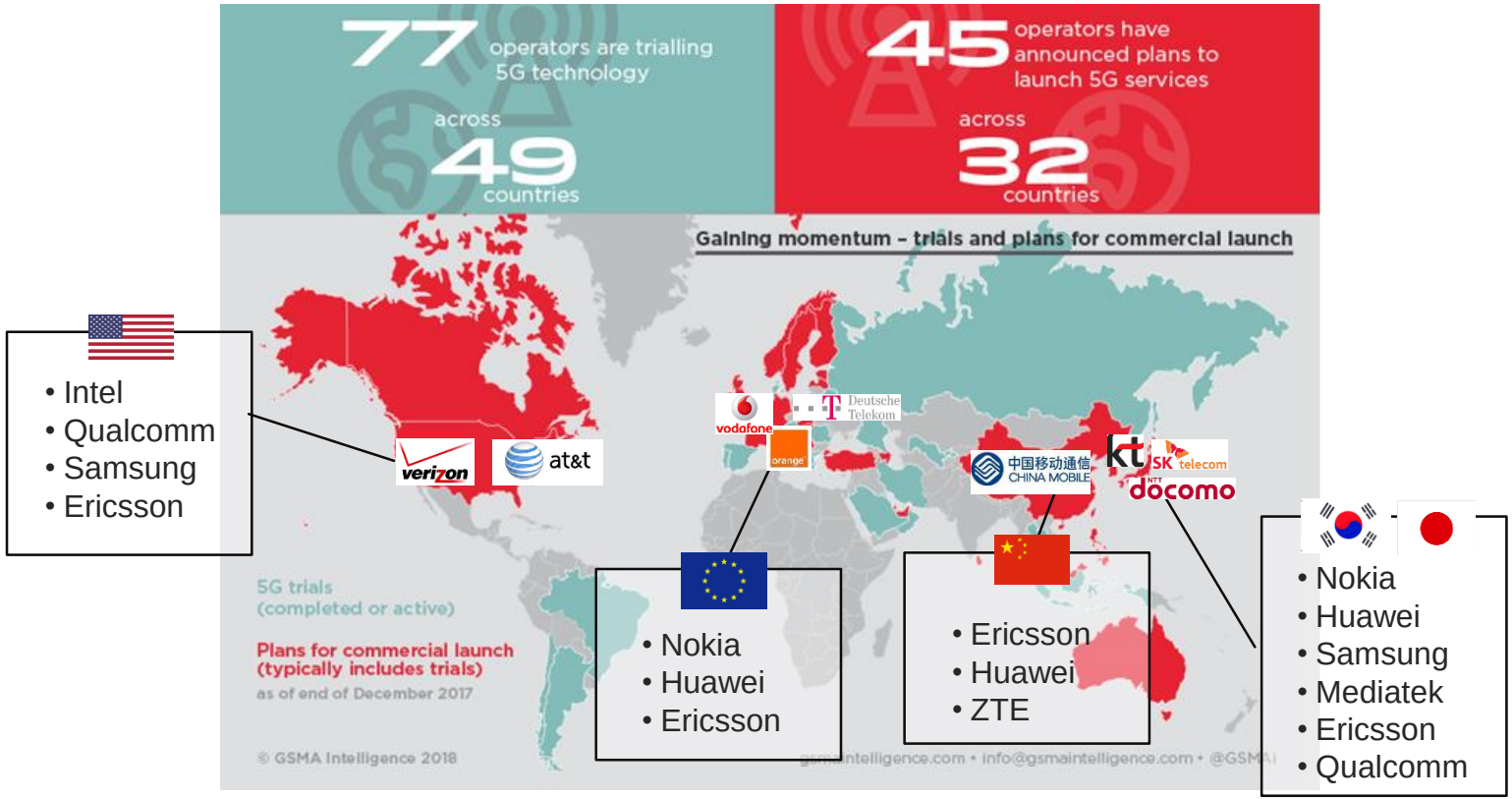


Bandwidth requirements by application (Mbps)



Source: GSMA, Qualcomm, Cisco; Note: Next-gen 8K, 90+ FPS, HDR & stereopscopic videos

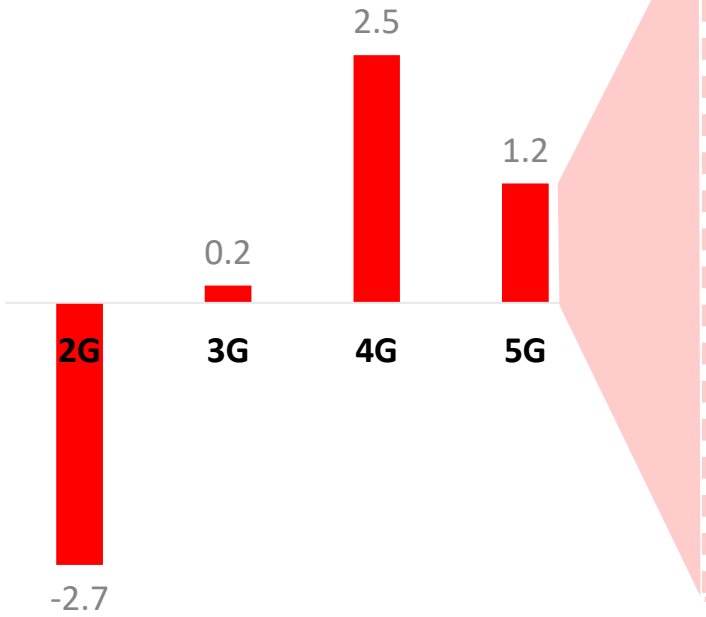
Operators are making strides in 5G around the world



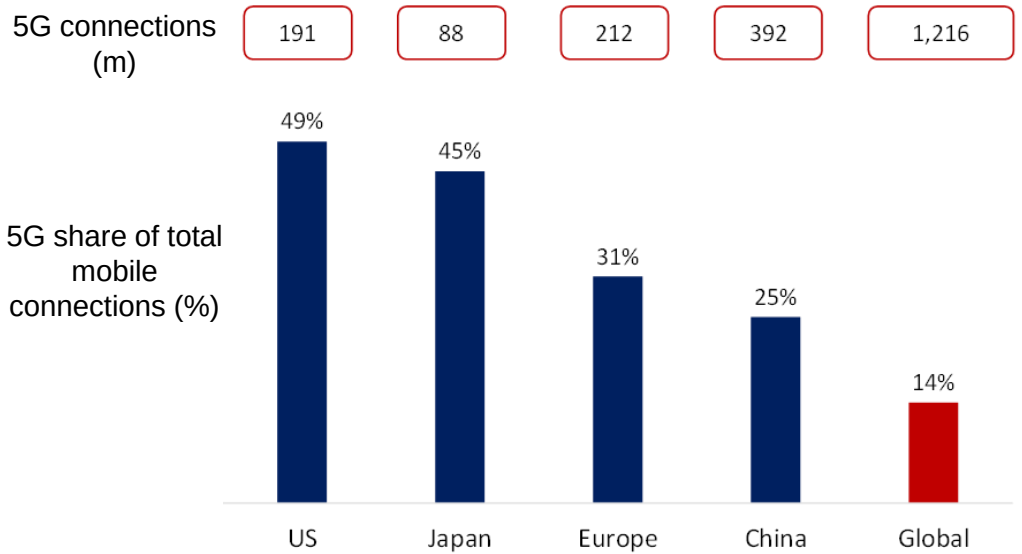
Source: GSMAi

Global comparison

Mobile net adds (2018-25, billion)



70% of the 5G base will be in 4 markets



Source: GSMAi

Mobile technologies that will impact 5G

Antenna

- Massive MIMO
- Active Antenna
- Multiple antenna models
- Long range deep coverage

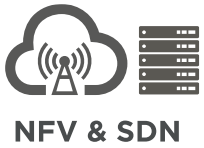
Densification

- Self backhauling
- Energy Efficiency
- Adapts to transport requirements

New Radio

- Below 1 GHz: for IoT and mobile broadband
- 1 GHz to 6 GHz: for mobile broadband
- Above 6 GHz: extreme mobile broadband

Virtualisation



- Virtualisation
- NFV and SDN to adapt the network
- Service enabler for network slicing

Massive Connectivity

- Optimisation for millions of connected devices
- Multi-year battery life
- Massive connectivity

EU Regulatory Framework

- New Framework, new opportunity and big 5G ambitions for Europe
- Final compromise is a missed opportunity
- Lack of real predictability to encourage innovation and investment:
  - Is it 20 years or 15? No real improvement for renewal
  - Loopholes, possibility for delays and interventions in a lot of “justified cases”
- Overall (marginal) improvement compared with previous Directives:
  - Peer-review process
  - Release of pioneer bands
  - Small cells

Spectrum availability and harmonisation are fundamental to the success of 5G deployment…

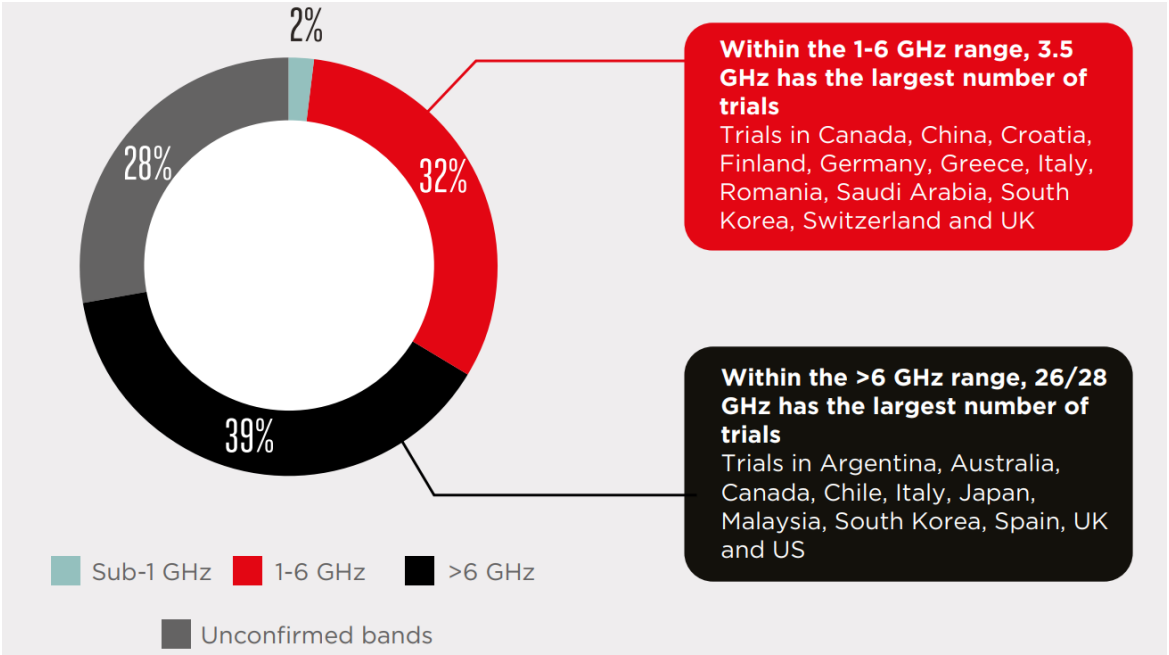
5G needs spectrum across three ranges

Sub-1 GHz
- Widespread coverage
- IoT services

1-6 GHz
- Good balance of coverage x capacity benefits

>6 GHz
- Capacity (ultra-high speeds)
- mmWave

Spectrum bands used for global 5G trials



Source: “The 5G Era in the US” (Mar 2018), GSMA; “”5G Spectrum Public Policy Position” (Nov 2016), GSMA

5G requires significant amounts of spectrum

- Significant new **globally harmonised** mobile spectrum is needed to ensure 5G services meet future expectations and deliver on the full range of potential capabilities

- Spectrum blocks *per operator* need to be sufficiently wide to allow the data throughput needed for 5G
  - ~ 50 to 100 MHz in mid-band spectrum
  - ~ 500 MHz to 1 GHz in mmWave spectrum

For more information on 5G

Source: GSMA

Thank you