



# **Session 2 - Stimulating investment in 5G: balancing investment certainty and flexibility**

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# 5G is On

**South Korea** – KT, LGU+, SKT have launched commercial services in 2019

**China** – China Mobile plans to deploy 10,000 base stations by 2020

**Japan** – NTT DoCoMo has stated it will launch commercial services in 2020



**Europe** – in July 2016, the major operators published a 5G manifesto with a target of launching 5G in at least one city in each of the member states by 2020

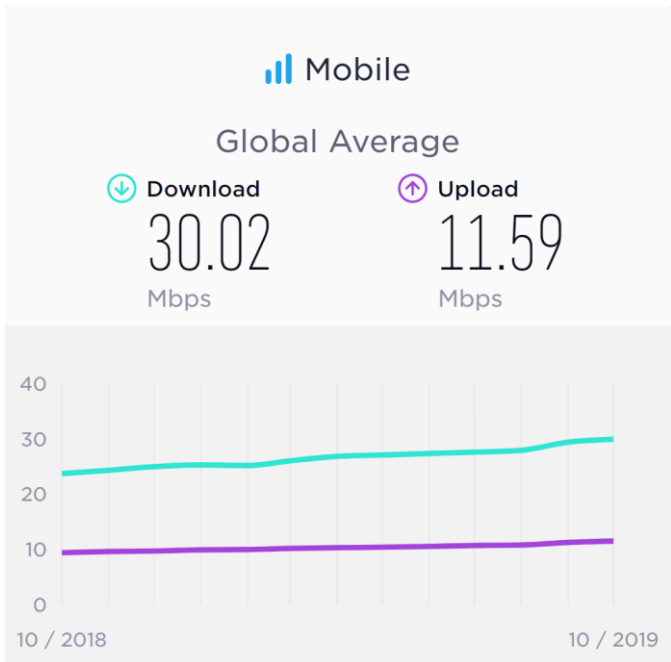
**US** – operators have been testing and developing fixed-wireless solutions using mmW technologies have launched commercial services

**Middle East** – Etisalat has indicated it will launch a nationwide 5G network in time for Expo 2020 in the UAE

Source: GSMA Intelligence



# Mobile broadband performance



Global median download speed: 25,43 Mbps

- 20 EU countries above global average
  - Fastest: 69 Mbps on average
  - 7 out of top 14 countries (above 50 Mbps) are from the EU
- ALL Europe above median speed
- EU vs. US:
  - 20 EU countries above the US
  - Faster in the EU average almost twice as fast as the US

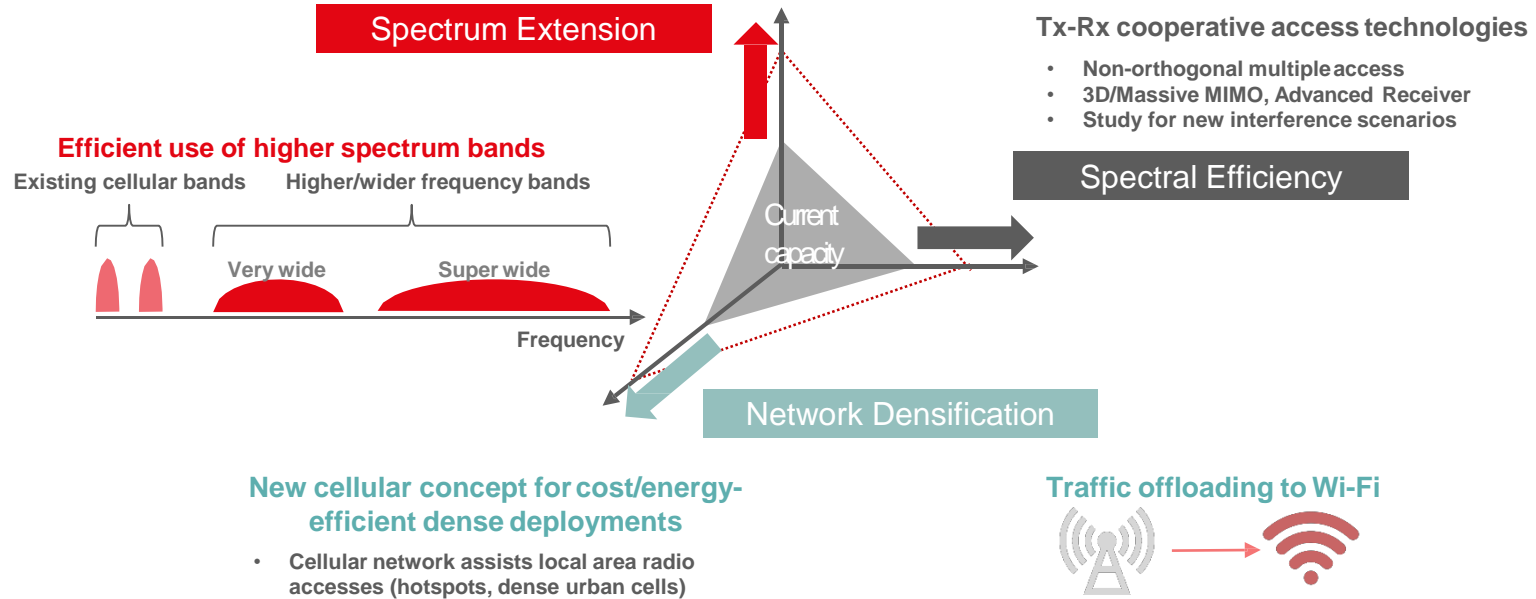
Source: Speedtest Global Index, October 2019

Appendix III: Table III.E.1  
Ookla Speed Test - Estimated LTE Upload Speeds by Service Provider, Nationwide

Service Provider	2H2015			1H2016			2H2016		
	Mean Upload Speed (Mbps)	Median Upload Speed (Mbps)	Number of Tests ('000s)	Mean Upload Speed (Mbps)	Median Upload Speed (Mbps)	Number of Tests ('000s)	Mean Upload Speed (Mbps)	Median Upload Speed (Mbps)	Number of Tests ('000s)
AT&T	6.43	4.75	2,720	7.25	5.37	2,630	7.44	5.23	2,526
Sprint	4.51	3.46	2,604	4.93	3.91	2,774	4.75	3.50	2,291
T-Mobile	11.22	9.23	3,990	12.38	9.79	3,755	11.96	9.24	3,756
Verizon Wireless	7.87	4.89	2,899	8.30	5.10	2,792	8.44	4.99	3,066
Total	7.99	5.50	12,735	8.73	5.87	12,199	8.74	5.67	11,905

Source: Ookla SPEEDTEST intelligence data, © 2016 Ookla, LLC. All rights reserved. Published with permission of Ookla. The "Total" mean and median nationwide estimates are based on test results for all service providers included in the Ookla sample dataset.

# The three dimensions of 5G infrastructure roll out

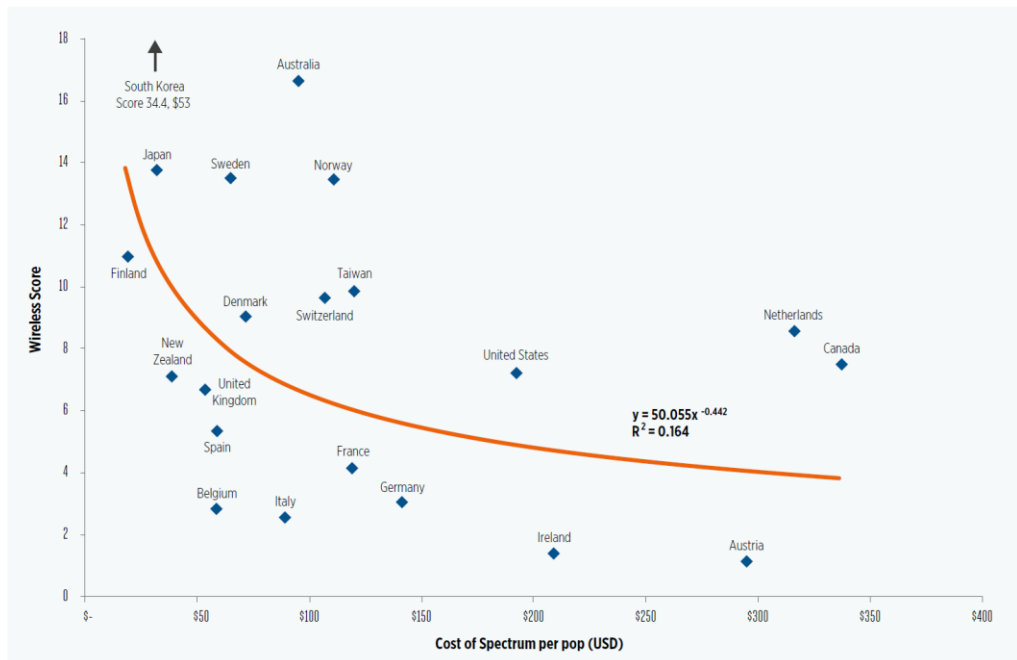


Reconstructed from Takehiro Nakamura "5G Concepts and Technologies" (Globecom 2014)



# Spectrum pricing and network performance – evidence from 4G

FIGURE 11: SPECTRUM COSTS AND WIRELESS SCORE IN HIGH INCOME COUNTRIES



Our wireless score has three components:

3G/4G COVERAGE (%)

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4G SUBSCRIBERS (%)

\*

AVERAGE SPEED (Mbps)

Source: “GSMA, Effective Spectrum Pricing: Supporting better quality and more affordable mobile services”, February 2017

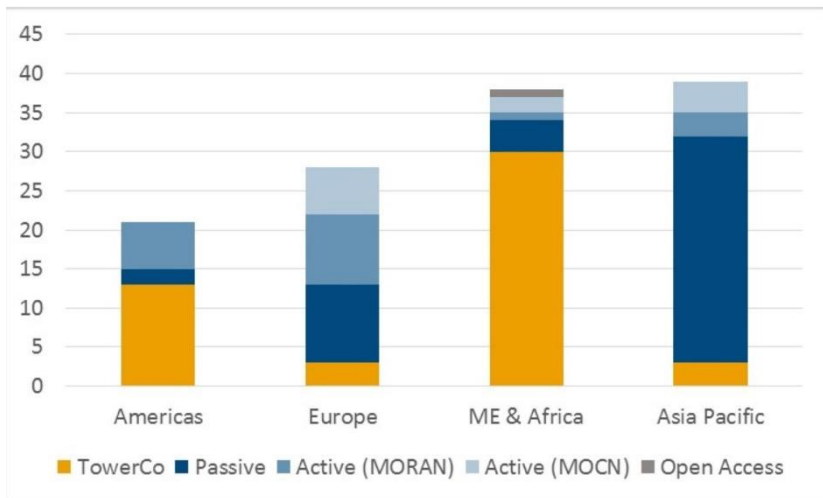


# 5G spectrum allocation in Europe

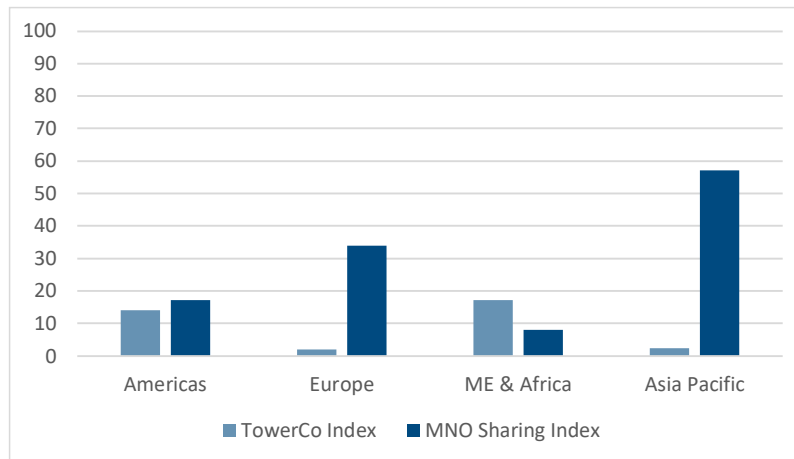
- 700 Mhz
  - Allocated in 7 countries (but not available yet in one)
  - 2020-2021: 7 more countries will allocate this band
  - Unclear for the others
- 3 Ghz
  - 7 countries have allocated
  - 2 more scheduled in 2020
- mmW
  - 2 countris have allocated
  - 5 more scheduled in 2020
- 100 Mhz recommendation seldom followed
  - Risk of low investments in the gear that underpins fancy functionality of 5G



# Infrastructure sharing a key feature of mobile markets



MNO Network Infrastructure Sharing Deals by Region (2001-14)

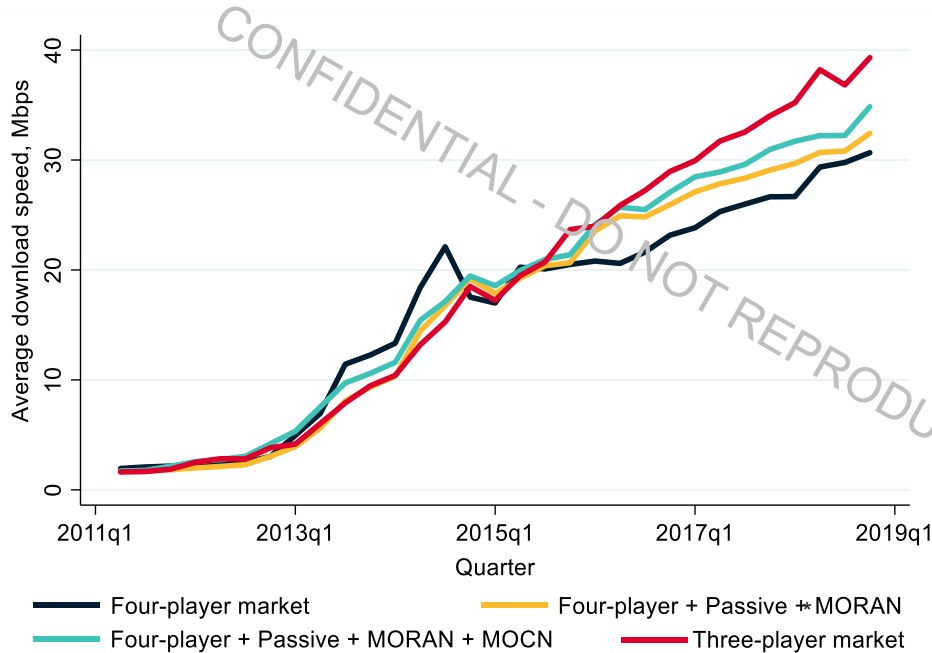


Region			
AM	70% of deals are tower/passive.		
EUR	>50% of deals are active.		
MEA	~80% of deals are towers.		
AP	75% of deals are passive.		

Source: Coleago



# EU - Network sharing has improved performance



- Increasing levels of network integration and sharing increases the performance on average
- Pure three-player markets still outperforming all versions of four-player markets

Source Ookla, GSMA Intelligence



# Network densification

- **EECC, Article 57, *Deployment and operation of small-area wireless access points*,**
  - *“Competent authorities shall not unduly restrict the deployment of small-area wireless access points. Member States shall seek to ensure that any rules governing the deployment of small-area wireless access points are nationally consistent. Such rules shall be published in advance of their application. In particular, competent authorities shall not subject the deployment of small-area wireless access points complying with the characteristics laid down pursuant to paragraph 2 to any individual town planning permit or other individual prior permits.*



# Conclusion

- Europe's lead in 4G is strong
  - Few key factors played a part – useful lessons for 5G
- 5G leadership at risk
  - Need coordinated effort on spectrum release at prices that do not choke investments and in the right amount across the different bands
  - Network densification
    - Regulatory certainty and flexibility for infrastructure sharing
    - Sites access and fees



# Thank you