Briefing Note

The importance of cable in the 5G landscape

The advent of 5G is a significant evolution in wireless technology. It will play a key role in delivering Gigabit services to European industry and consumers, reaching across many economic sectors.

The European Commission has identified two pillars - 5G and IoT (the Internet of Things) – as foundations for their connectivity goals. In the words of Commissioner Öettinger "*5G is the key to an 'always best connected' society, which will benefit from infrastructure and services that are "smarter", secure, reliable, more sustainable but still affordable. 5G will provide virtually ubiquitous, ultra-high bandwidth, 'connectivity' not only to individual users but also to connected objects.*"

This briefing note explains the crucial role that cable HFC networks will play in the 5G landscape.

What is 5G?

5G is not just an evolution of mobile broadband. It will support the transformation of processes in all economic sectors[1], connecting devices more securely, automatically and remotely. Unsurprisingly, forecasts anticipate 29 billion connected devices by 2022[2].

Performance levels and requirements for systems and equipment are already being defined by industry bodies, and standardisation levels are being set.

1 5GPPP Vision Paper
2 Ericsson Mobility report – November 2016

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Mobile Generations

	1G	2G	3G	4G	5G
Characteristics	• Basic Voice service • Analog Based protocols	• Voice designed • Improved coverage and capacity • First digital standards (GSM & CDMA)	• Designed for voice with some data (multimedia, text, internet) • First mobile broadband service	• Designed primarily for data • IP based protocols (LTE) • True mobile broadband	• More data capacity • Massive connected devices per Km^2 • Lower end-to end latency • Less energy consumption
Speed	2,4 Kbps	64 Kbps	~2 Mbps	~100 Mbps	$\geqq$ 10Gbps

Why is 5G important?

The hyper connected world will give rise to highly automated services which will require network capabilities beyond those available today. New services like automated driving and tactile internet will rely on the new performance characteristics of 5G. These connected devices will be permanently sending and receiving data – meaning that a network technology that can process terabytes of data is essential.

Let's take connected cars for example. It is estimated that connected cars will send more than 25GB/Hour[3] to the cloud, which exceeds the capacity[4] of most existing smartphones. And it's not just a question of capacity – latency[5] plays a part too. Safety will be the top tier requirement, with only instantaneous reactions acceptable. The communication infrastructure behind the connected car will have to achieve a connectivity with very low latency.

In order for 5G technology to achieve its potential, several developments need to take place. Primarily, the convergence process of the network architecture needs to accelerate with both fixed and mobile networks more and more interlinked. 5G connectivity will rely on a network of short range antennas. Crucially, these antennas need a backhaul for which the robust and resilient cable network is a perfect match.

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[3] The Internet on Wheels and Hitachi, Ltd. by Hitachi Data Systems, December 2015
[4] **Capacity** - the amount of data that can be delivered at a certain point in time.
[5] **Latency -** how much time it takes for a packet of data to get from one designated point to another.

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Why are cable networks a key enabler for 5G in the European Union?

Cable operators have begun the most recent upgrade of their networks to the DOCSIS 3.1 standard. This latest version of our technology will enable cable operators to support all the 5G requirements.

DOCSIS 3.1 embraces the new speed demands of a Gigabit society, providing **peak speeds** of 10 Gbps download and 2 Gbps upload. Work has already begun on the next phase of development, which will be able to deliver peak speeds of symmetrical up and download 10 Gbps.

In adition, DOCSIS 3.1 will use a sophisticated algorithm to reduce latency of cable networks. *Cable and FTTP networks are technologically equivalent in latency[6] performance*.

Cable DOCSIS 3.1 - 5G readiness

Data volume   √

Connected devices density   √

Speed   √

Energy consumption   √

Latency   √

In Conclusion

5G is clearly dependent on very robust fixed networks to deliver its potential. At today's stage of technology development, the networks capable of enabling it are FTTP and cable HFC. And with cable networks passing more than half of all European households, cable is ready to fulfil its potential as the backbone of a 5G network in the future.

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[6] http://www.cablelabs.com/cable-broadband-technology-gigabit-evolution/

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