5G Manifesto

Introduction

Commissioner G.H. Oettinger, responsible for the Digital Economy & Society, announced in February that the European Commission intends to develop a **5G Action Plan** aimed at giving Europe the leadership in the deployment of standardised 5G networks as from 2020. In this context, the Commissioner has called upon the industry to contribute to the shaping and consequent backing of the 5G Action Plan.

The Digital Single Market (DSM) calls for actions to "boost competitiveness through interoperability and standardisation" and to support the digitalisation of Europe's industry and services sectors. 5G has the potential to deliver substantial performance and capacity improvements for personal communications, public and enterprise communication. It has the potential to provide a suitable communication solution basis for many vertical applications, as well as to offer new architectural concepts and value chains to efficiently support innovation and future needs. 5G is about the seamless interworking of different network technologies, mobile, fixed as well as satellite, and their co-existence within a common infrastructure of standardised and customer specific networks or IT functionalities, designed to fit vertical industries as well as consumers to broaden digital inclusiveness.

The industry took on the challenge to identify the best context in which to launch 5G services (including enhanced mobile broadband, massive machine type communications and ultra-reliable and low-latency communications, as currently being standardised within 3GPP and ITU) across Europe by 2020. Such commercial 5G launches will require substantial investments in new infrastructure, a large amount of spectrum and new capabilities, as well as a close collaboration between telecom players (telecom operators, mobile operators, satellite operators, infrastructure and device vendors) and vertical industries (including their hardware and software ecosystems) in order to ensure that (i.) technical requirements are identified and suitably addressed and (ii.) business models are available and acceptable to providers and users. Cooperation between the telco Industry and Verticals is paramount to achieve scale and return on investment for 5G.

This **5G Manifesto** intends to foster effective interactions and collaboration with industry verticals, the formation of ecosystems as a result of large-scale demonstrators and, last but not least, an investment-centric policy framework - bringing together the key levers to ensure European digital leadership in 5G and beyond.

5G can be the key enabler for the digitalisation of the European economy

The fast-paced digitalisation of "vertical industries" (such as transport, logistics, automotive, health, manufacturing, energy, media, entertainment) and the public sector (including smart cities, public safety and education) - provides opportunities for Europe's information and communication technologies (ICT) and vertical industries to bring to market new and innovative solutions.

5G can be a key enabler of this digitalisation, accommodating the **diverse connectivity needs of industrial applications** (e.g. high speed, low latency, resilience, ubiquity etc.) through a common "system of systems" approach. Industry Verticals expect 5G to deliver enhanced levels of service assurance and guarantees to cater for specialised use-cases. A fundamental enhancement brought by 5G is the possibility to deliver virtual "network slices" offering different capabilities according to specialised needs. 5G network slices are meant to run on shared infrastructure without deteriorating the agreed levels of service. At the same time, 5G preserves the economy of scale benefits of a common network infrastructure, avoiding technology fragmentation, preventing energy and spectrum wastage and facilitating cross-sector innovation, thus improving the competitiveness of the European economy. 5G can therefore facilitate connectivity, network access and service security of different vertical sectors and be instrumental to the management and automation of business assets and processes.

A strong 5G dialogue must be further developed between vertical industries and the telecom sector, starting from the basis of an in-depth mutual understanding. 4G technology and the future roadmap are pillars for 5G. Scale of investment is required to achieve 5G and an industrial collaboration between Telco and Industry stakeholders is required to ensure 5G can create substantial value by offering digital solutions that meet genuine business needs at European and global scale and across a variety of use-cases. The telecommunication industry therefore invites the European Commission and Member States to promote the benefits of 5G networks as these meet the digital connectivity needs of vertical industries and public institutions more cost-effectively than stand-alone or be-spoke solutions. In addition, the European Commission should legally secure investment and welfare-enhancing forms of economic cooperation between market-players involved in the development of 5G ecosystems.

In order to facilitate the adoption of 5G technologies, the European Commission and Member States must encourage and incentivise cross-sector innovation through adequate policies and support for cross-sector hubs for experiments, trials and large scale pilot programs. Policies and rules must be future-oriented, pro-investment and pro-innovation. It would be appropriate to investigate whether regulatory harmonisation in some industry sectors, such as healthcare, energy or automated transport, is feasible and could help unlock truly pan-European services. Cross-sector policy enhancements must be ambitious and implemented speedily in order to capitalise on the 5G innovation "window".

Ecosystem-forming initiatives by industry players and the role of EU

Supporting standards definition activities. Standards are crucial for 5G success. EU policy makers play an important role in fostering 5G standardisation, including: (i.) co-funding of standardisation activities, (ii.) helping SDO (Standards Development Organisation) harmonisation; (iii.) incentivising private sector investment into capital intensive, long-term R&D for contribution to 5G standards; (iv.) seamless interworking of verticals application across different technologies through standard interfaces (e.g. from cellular to satellite) to allow ubiquity and resilience in the 5G "system of systems" and (v.) encouraging 5G international coordination and cross-sectorial endorsement (through participation of representatives of European vertical industries to the development of 5G standards and vertical use-cases) while avoiding any duplication of standards across telco and vertical industries.

Equally crucial to 5G success in Europe is the creation of a skilled community of software developers to bring the next wave of technology innovation to full business fruition with value adding vertical applications.

Pan-European 5G trials. Greater awareness and momentum for 5G in Europe will be achieved if there is coordination across European stakeholders' various pre-commercial trials. These deployments would act as catalysts to turn innovation into full business solutions once 5G standards have been released. A two-phase trial roadmap, encompassing different use-cases, is being proposed.

- **Before 2018** (before the availability of the first 5G 3GPP release): Technology trials run by independent trial consortia in various countries, **independent of the status of standardisation,** demonstrate and validate new 5G capabilities as well as foster an ecosystem around new 5G capabilities. Vertical industries will already be involved in this phase.
- **Around 2018** (5G 3GPP first release close to being finalised – and additional frequency spectrum for 5G expected to be identified in WRC 2019 to enable the full performances capabilities of 5G in terms of capacity and speed): European stakeholders agree on **trial specifications** (use-cases, scenarios, interfaces, agreement to transfer use-cases across trial networks) valid for pan-European trials, based as much as possible on standard-compliant systems. These trials aim to demonstrate wider interoperability and support for vertical use-cases in order to claim global public attention.

The following 5G use-cases are currently under consideration:

- Demonstration of the concept of 5G network virtualisation (slicing) to accommodate specific needs or business models with enhanced levels of service assurance and guarantees.

- Connected **automotive** scenarios, including ultra-broadband infotainment, safety applications and automated / autonomous driving across motorways in Europe.

- **Connected eHealth** scenarios that can spark Healthcare innovation and business transformation across the continuum of care, keeping Healthcare affordable to citizens and government (and tax payers).

- Reliable, high capacity broadband connectivity in connected planes, railway and high-speed transportation across Europe, and **transport and logistic** networks with multimodal cargo (truck, rail, shortsea, barge, plane/drone).

- **Public Safety** use-cases providing security, reliability and real-time broadband connectivity for key events involving large audience, for example at European Soccer Championship 2020.

- **Smart grids**: ensuring networks stability and coordinating energy distribution from diverse sources (e.g. wind, solar, power-plant) and different regions.

- **Smart City** use-cases including connected bus shelters, real-time traffic monitoring and analytics, crowd management, smart homes, ageing population, augmented reality for tourism and advertising.

- **Media and entertainment** use-cases, including the integration of satellite and terrestrial network services, demonstrating the power of multicast and caching for delivering a cost-effective and scalable user experience **anywhere in Europe** (e.g. at the Glasgow-Berlin European Championships in 2018 and European Soccer Championship 2020)**,** as well as immersive video scenarios showcasing the benefits of 5G capacity enhancements.

The industry players are committed to delivering a roadmap of trials and demonstrators by January 2017, to achieve interoperability of networks and use-cases for the period 2018 – 2020 and make 5G benefits known to vertical players, investors and the general public.

Funding Instruments to drive the 5G ecosystem: In addition to funding research and innovation projects of the 5GPPP, the European Commission should consider allocating funds to trials and large-scale demonstrators as well as establishing a 5G Venture Fund to foster a new wave of start-ups and innovation around 5G technologies.

- FUND FOR LARGE SCALE DEMONSTRATORS: Funding is required to incentivise vertical industries to experiment with new services that are enabled or enhanced by 5G technologies, as early as 2018 and to allow the 2-way process to align requirements between 5G networks and vertical industries. Such grants can be between the €0.5bn (billion) to €1.0bn range (also from existing EU funding instruments), awarded through agile governance.

- 5G VENTURE FUND: such an instrument, above the € 1bn mark, would allow the EU to take equity stakes in European innovative start-ups aiming at developing 5G technologies and applications across verticals. If equipped with cross-industry expertise and venturing best practices, the 5G Venture Fund will become catalyst for digital innovation at European scale (500 million users, several billions of connected objects), attracting private capital along the way to accompany successful startups during the upscale process.

Both instruments must be characterised by lean administrative procedures, simple and effective governance.

Separately, any infrastructure funding should be focused on physical infrastructure, such as ducts or a digital spine, that provides the greatest benefit for operators and that can facilitate wider fibre investment and competition in the development of 5G.

In order to bootstrap the 5G demand market, Public Institutions (such as national health services, education, municipal authorities, etc.) also have a critical role to play as early adopters or anchor tenants of 5G solutions that, with associated budgets, can help to kick-start 5G in Europe in the 2020 timeframe.

A 5G action plan unfolding in a Digital Single Market

Spectrum: Sufficient spectrum - licensed in time and at reasonable prices - is needed if the 5G target launch date is to be met and to support the various applications and technologies that are envisaged in a "system of systems". This

means harmonised licensing of 700MHz, 3.4-3.8GHz and higher-frequency bands (for 24GHz and beyond) by 2020 taking into account the outcomes of ongoing studies, preparing to identify and clear future expansion bands, and removing restrictions in existing licences and uses that might prohibit the deployment of 5G. The spectrum aspects of the Digital Single Market - namely, harmonisation and predictability of spectrum policy across Member States (including spectrum availability, licensing procedures and costs, licence terms, and liberalisation and renewal of existing spectrum) - are also essential to encourage more investment into the mobile sector and in 5G. The telecommunication industry expects substantial evolution in spectrum policy harmonisation and bands availability well ahead of WRC 19.

Aligned roadmaps and deployment priorities across EU Member States: Vertical industries operate across European Member States and require pan-European and cross-border 5G services. The European 5G Action Plan must reassure vertical industries that 5G deployment, as a progressive evolution from the existing 4G technologies, will be synchronised across Europe to achieve homogenous availability both in terms of location and time. The automotive, smart grid, transportation & mobility, manufacturing and media & entertainment sectors will be front-runner 5G users. They call for 5G initial deployments as soon as 2020. In order to help make this new ecosystem a reality, **European operators will target launching 5G in at least one city in each of the 28 European Member States by 2020**. These smart cities will be strong and tangible innovation platforms for Europe, as hubs of social and economic activities.

Investments at the centre of 5G Policy Framework

5G is expected to require significant investments over time, including a new radio access layer, high bandwidth backhaul links, core network upgrades and, for certain scenarios, increased densification of cell sites. Such investments will take place if the **right regulatory environment is created** in particular in the context of the forthcoming review of the European Electronic Communications Framework.

A regulatory environment that puts increased emphasis on investment including R&D: The EU regulatory framework should be reformed to have as **a primary objective** a requirement for NRAs (National Regulatory Authorities) to secure long-term benefits to consumers and European economic development by **incentivising investments in connectivity by all players** and promoting innovation, in contrast to the past focus on cheaper prices. This is especially important in the 5G context, as well as more generally.

Improved regulatory certainty means:

- **Fewer and simpler rules** focused on cases where regulated access to key infrastructure (not replicable through competitive investment) still needs to be safeguarded, based on an assessment of market competition at the retail level;
- The right investment environment that encourages commercial flexibility through **co-investment and risk-sharing models** allowing for a fair long-term return on investments;
- A **withdrawal of ex-ante regulation** when appropriate is consistent with **greater investment incentives for all players**, in fibre among other 5G ready infrastructures.
- Where access regulation remains, **long-term commercial agreements that enable competitive outcomes** should be encouraged wherever possible as an alternative to regulation.

Local regulation to facilitate the construction of denser networks: 5G will require a step-up in investment in mobile access points and supporting fixed infrastructure. Achieving a dense deployment of 5G infrastructure requires **greater harmonisation and simplification of rules** and **the removal of deployment barriers**, including: right-of-way for the installation of passive facilities; supportive municipal site rental charges; removal of taxation on sites and antennas; and predictable, harmonised electromagnetic field (EMF) emissions limits.

Shaping of other ICT regulations that otherwise risk creating barriers to 5G services: **Policies and rules must be future-oriented, pro-investment and pro-innovation**.

All players in the **digital value chain** should operate on a **level playing field**, with equivalent and proportionate privacy requirements to innovate in data-driven markets. There is no justification for imposing stricter obligations on Electronic Communications providers than on other providers of digital services. Converging digital services need converged regulation that is light-touch, future-proof and that facilitates a European single market for services. Regulation should define principles to protect consumer rights and competition, focusing on outcomes (e.g. service characteristics) rather than on means (e.g. how operators evolve and manage their networks).

The EU and Member States **must reconcile the need for Open Internet with pragmatic rules that foster innovation**. The telecom Industry warns that the current Net Neutrality guidelines, as put forward by BEREC, **create significant uncertainties around 5G return on investment**. Investments are therefore likely to be delayed unless regulators take a positive stance on innovation and stick to it.

Telco and Industry Verticals concur that the implementation of Net Neutrality Laws should allow for both innovative specialised services required by industrial applications and the Internet Access quality expected by all consumers.

In this context we must highlight **the danger of restrictive Net Neutrality rules**, in the context of 5G technologies, business applications and beyond. 5G introduces the concept of "Network Slicing" to accommodate a **wide-variety of industry verticals' business models** on a common platform, at scale and with services guarantees.

Automated driving, smart grid control, virtual reality and public safety services are examples of use-cases with distinguished characteristics which call for a **flexible and elastic configuration of resources** in networks and platforms, on a **continuous basis**, depending **on demand**, **context** and the **nature of the service**. According to the telecom industry, BEREC's draft proposal of implementation rules is excessively prescriptive and could make telcos risk-averse thus hampering the exploitation of 5G, ignoring the fundamental agility and elastic nature of 5G Network Slicing to adapt in real time to changes in end-user / application and traffic demand. The 5G objective of creating new business opportunities and satisfying future end-user needs would be at risk, with a regulation not coherent with the market demand evolution .

It is paramount **to ensure 5G monetisation** to drive investments. Monetisation can take place across the entire value chain with **end-users, service providers and industry verticals** in order to ensure **fair returns**, speed up adoption by end-users and ensure consumers are not alone in picking up the bill for the innovation that will help the business cases of the service providers. Operators should also be **free to mix and manage** different technology generations, mobile or otherwise, that are enabling 5G mobile technology to serve their customers optimally.

Member States and public organisations playing a role in realising 5G: The success of 5G will depend on EU-wide scale support, with **Member States acting coherently** - whether in regard to licensing, providing appropriate state support (such as public investment into a digital spine), or directing early public sector participation.

This 5G manifesto is endorsed by,

> *List of < CEO name , title, company name>; by alphabetical order of the companies*

The following companies from the vertical industries express interest in this initiative and are willing to engage in the next phase,

> List of <Company name>; by alphabetical order> [only large and medium size companies with cross-border activities at time of signature, can be enlarged later]

Additional companies are welcome to add their names in support of this 5G Manifesto

Contact: < >