Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C.

In the Matter of,	)	
Promoting the Deployment of 5G Open Radio	)	**GN Docket No.21-63**
Access Networks	)	

Comments of Telefónica S.A.

on the Notice of Inquiry

I- Introduction

Telefonica welcomes the opportunity that the *Federal Communication Commission* has opened to provide comments on the *Notice of Inquiry* on the matter of *Promoting the Deployment of 5G Open Radio Access Networks.*

Telefonica considers that Open RAN is the natural next step in the process of making telecom networks fully virtualized, flexible, programmable and automatable.

Our firm has a long-term strategic commitment towards network virtualization and the use of open standards acting as a pioneer of this evolution since as early as 2014[i] . Below we list some of the most significant milestones of this ongoing process within Telefonica:

- In July 2017, Telefonica published a White paper on network virtualization: UNICA architecture strategy[ii]; in 2018 Telefonica started materializing this network strategy with the first deployment of UNICA[iii] network.
- Adhesion to the most relevant international initiatives that develop and or promote the adoption and use of Open RAN: Telecom Infra Project (2016)[iv] [v], O-RAN Alliance where Board member (2018)[vi] [vii] and Open RAN Policy Coalition (2020)[viii].
- In June 2019, Telefonica launched RFIs for Open RAN technology to help improve connectivity - Telecom Infra Project[ix]
- In October 2019, Telefonica invests in Altiostar[x]

- In March 2020, Telefónica joins forces with Altiostar, Gigatera Communications, Intel, Supermicro and Xilinx for the development and deployment of Open RAN in 4G and 5G[xi]
- In September 2020, Telefonica signs MoU with Rakuten for the development of Open RAN[xii]
- In January 2021, Telefonica releases a White paper containing the views on the design, architecture, and technology of 4G/5G Open RAN networks[xiii]
- In January 2021, Telefonica together with the major European Operators signs an MoU on Open RAN[xiv] [xv]

We have also been pioneers in the deployment of Open RAN based networks across our footprint:

- Peru: Telefonica presents *Internet para Todos* to connect the unconnected testing Open RAN Technologies[xvi]
- United Kingdom: Telefónica UK – O2 starts Open RAN trials[xvii] [xviii] [xix]
- Germany: Telefónica Deutchland – O2 First German network operator with Open RAN in live operation[xx]
- Brazil: Telefónica Brazil – Vivo starts Open RAN trials in Petrolina and Juazeiro[xxi]
- Argentina: Telefónica Argentina – Movistar lights up first Open RAN based network in South America[xxii]

II-Advantages of implementing Open RAN solutions: network automation and security.

Operators and traditional vendors[xxiii] [xxiv] [xxv] [xxvi] already have a proven experience on the virtualization of telecom networks. The disaggregation of software and hardware in the telecom industry is not a new trend, having already been embraced time ago with enthusiasm by both operators and vendors. Industry's most relevant step towards networks of the future is already taking place.

Despite virtualization's progress, the required innovation and flexibility capabilities for the networks of the future has not yet been achieved. The network of the future will provide cutting-edge services as close to the user as possible to secure the ultra-low latency necessary for some of the most promising use cases associated with 5G and 6G technologies. The Radio Access Network will become a cornerstone of this architecture.

Open RAN developments help to address the openness of network architectures that makes operators a platform for innovation. Networks require the adoption of open standardized interfaces as the base for open architectures.

5G, as a cloud native technology, rises the difficulty of network operation and management, increasing the number of critical tasks, its complexity and relevance. To address this challenge, networks need to be as automated as possible. The massive amounts of data that will be generated and processed require the incorporation of AI and

machine learning technologies into our networks. We need to incorporate capabilities that nowadays are not present in the Telecom nor the vendor sector[xxvii].

Moreover, the adoption of open standard interfaces allows the evolution of Open RAN into a virtual Open RAN, wherein software can be separated from the hardware components of the RAN and baseband units can be deployed on a consistent cloud platform. The evolution into a cloud based Open RAN enables network operators to automate deployment at scale and optimize the location of workloads. By distributing computing power and functions away from the base stations to centralized hubs operators can enhance network management and leverage automation to improve spectral efficiency, increase availability of services and applications. A similar situation arises in relation with network security. Security concerns around disaggregation and cloudification appear for both open and private cloud solutions, as security concerns reside in virtualization. TI developments and expertise on this matter must be incorporated into telecom networks.

Open RAN expands the perimeter of security to protect -the points of contact-, as Open RAN equipment will likely involve more than just one vendor. But this is nothing else but business as usual, not a non-starter problem: threats and solutions will remain the same. The role of the integrators shall thus become extremely relevant.

The main differences between traditional and open, both virtualized, architectures are quite well known:

- Traditional architectures
    - The proprietary nature of several interfaces, like CPRI, prevent operators from adopting more than a single vendor for radio and baseband equipment. This results in vendor lock-in for innovation, as innovation will only take place at the pace determined by such single vendor.
    - Software functionality is constrained by what the vendor has developed, and the licenses activated
    - The hardware is specific to the solution designed and provided by the vendor, so it could not be reused for other purposes through just a software update, as it would be the case with general purpose processors (GPP) and equipment.
- Open architectures
    - Operators can execute a wide range of functionalities and applications developed by an extensive and diverse community of developers.
    - Using a wider range of basebands and radios from different vendors enables multivendor interoperability as a way of increasing competition having multiple positive effects
        - Significantly enhances supply chain security, even in circumstances where a provider halts its activity.
        - Allow for a more cost-effective solution as it will be based on x86 platforms and COTS.
    - Operators will be able to personalize their own networks that will be essential to deliver agile and differentiated services to customers.

In short, Open RAN is a required step into the networks of the future that will generate an ecosystem of innovation over-the-network increasing telecom companies' capabilities to differentiate among themselves offering tailor made network based services that will incorporate new talent and know-how in the way networks serve society that we cannot fully anticipate, like 4G brought the App vibrant ecosystem that we enjoy today. And more important yet, it will provide the foundations for nurturing an even more promising 6G.

III- A global and trusted supply chain

When the Open RAN initiatives took ground, the most relevant motivation on the vendors ecosystem side was the migration to x86 technology architecture, in a similar fashion IT did almost a decade ago, and the need to incorporate the cloud advantages that IT services have into the telecom sector, profiting from both the synergies and scale that IT and telecommunication sectors could achieve if adopting the same technologies.

Governments' concerns on untrusted vendors and on a secure supply chain become relevant at a later stage, being Open RAN a fit and timely solution although not conceived with such purpose in mind. Open RAN rightly addresses the issue of untrusted vendors as it increases vendor diversity on the back of open standards, disaggregation of equipment, and thus the possibility to be based on hardware for general purpose (commercial of the shell - COTS).

Telefonica considers that it is fundamental to have a diverse, competitive, and vibrant vendor supply chain also in terms of geographical diversity, with the participation of different geographical regions. For the success of Open RAN, a global development is required in which geographically diverse initiatives contribute to foster a global innovative ecosystem. We need to take advantage of this diversity and know-how to generate synergies and accelerate the advent of this new open network architecture that will conform the networks of the future.

IV- The importance of global cooperation on Open RAN

Open RAN's support and development effort should be a global initiative counting with a strong coordinated commitment from likeminded allies to mutually reinforce technological autonomy and secure trust in the supply chain. Counting with a leading European Open RAN ecosystem will add to US efforts for a trusted and secure digital infrastructure, while securing and leaping forward the success of Open RAN.

The international cooperation on Open RAN standardization and implementation is also fundamental for the success of Open RAN solutions. There must be only one Open RAN solution fully standardized by a recognizable Standards Development Organisation and globally adopted by the industry likewise happened with 4G. In face of the renewed focus on transatlantic relations, fostering the development and adoption of Open RAN should become a strategic priority for a potential launching of an EU-US Trade and Technology

Council. EU and US should join forces on this common interest initiative to nurture vibrant Open RAN ecosystems at both sides of the Atlantic.

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