

**Statement of FCC Commissioner Michael O’Rielly**  
**Before the**  
**United States Senate**  
**Committee on Commerce, Science, & Transportation**  
**Hearing on “Industries of the Future”**  
**January 15, 2020**

Good morning. Let me start by extending my deep appreciation to Chairman Wicker and Ranking Member Cantwell for inviting me to join this important hearing on the future of innovation.

While I hold views on many of the technology advancements likely to be discussed by my fellow panelists, I intend to focus my comments today on the development and deployment of those within the jurisdiction of the Federal Communications Commission (FCC). In this case, key topics include next-generation wireless services (more commonly referred to as 5G), unlicensed wireless opportunities, spectrum policy in general, and other related issues. Sound FCC policy in these areas will provide a solid foundation and enable additional platforms for many other non-FCC regulated technologies to flourish. Moreover, past and future FCC decisions will have considerable positive impact on the U.S. economy and workforce. I would be pleased to answer any questions you may have on these matters or any others.

*5G Wireless*

From my previous positions as Congressional staff to my current perch at the FCC, I have witnessed multiple migrations from one wireless generation to the next. I truly believe that 5G has the opportunity to revolutionize wireless communications and, for that matter, the entire communications landscape. While I try not to overhype the technology and believe we must have realistic expectations regarding deployment and adoption timelines, its potential to transform not only consumer products but also the industrial sector is clear. Rather than being one among many consumer purchases, future wireless services have the potential to be ingrained within almost every aspect of American life.

In terms of functionality, 5G is expected to far exceed current wireless metrics. Specifically, it is estimated that speed will improve by 5 to 20 times over 4G; capacity will increase by 100-fold; and average latency will drop from 40 to 50 milliseconds to one. This will open the door to fully operational wireless platforms that are on par with current fiber network offerings, erasing the need for many legacy regulations and policies. While many American consumers already substitute wireless broadband experiences for wired ones, 5G will bring about the realization of what many, including myself, have referred to as “wireless fiber.”

Moreover, these advancements will have far-reaching economic impact. A recent Qualcomm-initiated study estimated that 5G would generate \$13.2 trillion in economic benefit by 2035, support 22.3 million jobs, and produce economic global growth of \$2.1 trillion – an amount equivalent to Italy’s current economy.<sup>1</sup> Similarly, a 2018 CTIA report suggests the U.S. impact alone to be \$275 billion in investment, leading to \$500 billion in economic growth and three million new American jobs.<sup>2</sup>

It is important to note that the network architecture for 5G is different from that of prior generations. Whereas past technologies were designed to eventually replace earlier versions, 5G is intended to work

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<sup>1</sup> <https://www.qualcomm.com/media/documents/files/ihs-5g-economic-impact-study-2019.pdf>

<sup>2</sup> <https://api.ctia.org/wp-content/uploads/2018/04/Race-to-5G-Report.pdf>

in partnership with existing 4G wireless networks. That means, 5G can be deployed more incrementally without the dramatic effect of completely leaving consumers behind the curve.

### *Spectrum Resources & Agenda*

To ensure U.S. wireless providers and potential new entrants have sufficient wireless spectrum to offer 5G, the Commission has been aggressive in identifying, allocating, and licensing for this purpose. But, the spectrum allocation process requires long lead times and extensive preparations. Consider that the Commission started working on many of the high-bands targeted for 5G services (e.g., 37 and 39 GHz) around the time I arrived at the Commission in 2013,<sup>3</sup> and, yet, we are just getting to the auctions now. There are multiple reasons for the time lag, but none involve political influence or lack of interest.

Some critics have asserted that the Commission has failed to make mid-band spectrum available for advanced wireless services, including 5G. As someone who has been actively and aggressively working to make these frequencies available, I strongly disagree with this assessment. My efforts on the 3.5 GHz band, or CBRS, along with those of the Chairman and his team, demonstrate that our high-band efforts did not divert attention from the mid bands. The past administration had focused on the millimeter-wave bands, so these efforts were further along. Moreover, our work to reform the 3.5 GHz band market sizes and other previously misaligned decisions did not delay the availability of this spectrum. Instead, ensuring the functionality of the protection mechanisms (e.g., SASs and ESCs), enabling spectrum sharing with U.S. Navy radar systems, took longer than expected, and the software needed to provide a fair and transparent auction for a greater number of licenses required considerable time to develop.

Additionally, for almost four years, I have served as a lead champion to reallocate the C-Band for new commercial wireless services. Such efforts have required considerable work to convince the current satellite users to shrink their spectrum footprint for the betterment of our spectrum policy objectives. This also required extensive consideration into how to accommodate and protect existing services and users, as well as working through the different mechanisms and components needed to execute a fair and transparent auction process. While I certainly wish this process could have concluded earlier, the most important thing now is getting it done.

Along with C-Band and CBRS, the other immediate mid-band priority is the 3.1 to 3.55 GHz Band. Congress has been clear in enacted legislation that it expects the appropriate Federal government agencies to conduct an honest and fair assessment of sharing this specific band with commercial wireless providers for new advanced wireless services. Yet, it is my understanding that the applicable agencies are only looking at one portion, 3.45 to 3.55 GHz, for this purpose, rather than the entire band. Given its location and the need for more mid-band spectrum, I suggest that the proper course of action should be to free the top 100 megahertz for exclusive, commercial use and open a considerable amount of the remaining 350 MHz for sharing. Even if you disagree with this approach, allowing federal agencies to ignore the law and spectrum realities should not be tolerated.

### *Macro Towers*

Facilitating 5G deployment requires more than just sound spectrum policy. It will need a concerted effort to bypass attempts by rogue local and state governments to extract untenable riches from new

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<sup>3</sup> Spectrum Frontiers Notice of Inquiry, <https://docs.fcc.gov/public/attachments/FCC-14-154A1.pdf>

technology users or drag out siting reviews due to ineptitude or attempts to preserve power. This is not a new phenomenon, and it is why legislation on the topic, like the Thune-Schatz bill, would be so helpful.

While considerable attention is paid to small cell design and installation, in many suburban and rural markets, 5G offerings will rely on equipment attached to macro towers. The Commission will need to be aggressive to ensure the siting process is not impeded, and I am hopeful we will take new action on macros in the very near future.

### *Unlicensed Spectrum Opportunities*

While considerable work has been done to open new bands for licensed services, it is equally important to address the critical need for more unlicensed spectrum. Over the last many years, unlicensed technologies have experienced a vast amount of innovation, leading to amazing new consumer products and immeasurable economic benefits. Yet, the current unlicensed spectrum workhorses, 2.4 and 5 GHz, are facing saturation, meaning that congestion is preventing optimal performance and the deployment of new services. Thus, unlicensed users are seeking a mid-band allocation to enable their next-generation standard that calls for wider channels, allowing far greater speeds, capacity, and functionality.

To accomplish this and realize further unlicensed innovation, the Commission must allocate additional bands for unlicensed use, which is something Commissioner Rosenworcel and I have pursued for quite a while. Debate will likely continue in the coming weeks and months over how best to accomplish this, but I firmly believe that the Commission needs to move forward expeditiously to open 5.9 and 6 GHz for unlicensed use. In both instances, incumbent provider services can be properly protected or accommodated, as needed, to prevent harmful interference while allowing the benefits of unlicensed technologies to flourish.

### *Communications Workforce*

The deployment and maintenance of infrastructure used to provide 5G services will require a plethora of American workers with the requisite skill sets. While much attention has rightfully been paid to the need for more tower installation crews, job growth in additional fields, including radio frequency management, communications engineering, and other related skills, is similarly needed. While some of these positions can be filled in the regular course and with on-the-job training, others will require more extensive efforts. In other words, industry is likely to require a more systemic plan of action, potentially leveraging the assistance of the Federal government, than in past technological evolutions. I would humbly suggest that this endeavor is not necessarily within the expertise of the FCC, but better suited to other agencies and departments. In particular, the Department of Labor, given its vast resources, may be better positioned to exert some leadership in this area, and I understand it has announced new grant monies for apprenticeship programs that include telecommunications and broadband services.

### *Wireless Power*

In terms of a relatively new innovation issue, I believe that wireless power may be vital for the success of future connectivity and productivity. Specifically, with billions upon billions – and perhaps trillions – of additional wireless devices expected to be deployed over the next few years, be it smartphones, IoT sensors, automated equipment and the like, providing sustainable and reliable power will be a challenge. I suggest to you that power is likely to be delivered differently in the future, as outlets with

plugs and disposable batteries are likely to be replaced by wireless power. This is not only because of the nightmare of trying to provide electrical service to such a mass of devices and equipment, but also simply a matter of reducing weight and improving functionality.

Specifically, obtaining sufficient components to manufacture enough wiring and long-lasting batteries to meet overall demand will be difficult, if not impossible. And, this is without even taking into account the shortage of rare earth elements and the geopolitical fight developing in that area. So, the race will be on to produce and deploy wireless power technology, with multiple players already in the market and I'm sure more to come.

Undoubtably, we are fairly early in the process, but we'd better figure out all of the regulatory complications and barriers before the device explosion occurs. The Commission may be the right entity to guide, design, or manage the transition to wireless power.

### *World Radiocommunication Conference*

On the international front, the WRC is a roughly month-long event held every three to four years by the International Telecommunication Union (ITU), a specialized agency of the United Nations, for the primary purpose of harmonizing spectrum use among the member nations. After my participation at WRC-19 in Egypt, I suggest that its outcome was mixed, and its future is questionable. While the conference achieved some objectives in various, muddled forms, the process was severely lacking.

Despite meeting some of our goals to a certain extent, WRC-19, like WRC-15, raised some fundamental concerns that ultimately call into question the continued value of future conferences. In particular, it was very evident that certain foreign delegations were sent with clear directions to oppose the United States and other forward-thinking nations. This appeared, from my viewpoint, motivated by larger geopolitical purposes and to protect domestic industries from competition from U.S.-based companies. Such conduct went far beyond normal negotiation strategy, serving to further sour many other participants' perspectives regarding the value of WRC and, more fundamentally, the ITU itself.

The U.S. is not without options if certain member nations of the ITU continue to disrupt existing processes and slow progress towards a next-generation wireless world. Ultimately, we should not let ourselves be obstructed by rogue nations that have little interest in global wireless development or are willing to undermine progress for purposes of a larger self-interested agenda. This is one reason I think the U.S. should explore the formation of a G7-like organization or loose coalition of leading wireless nations, as an alternative to the ITU. Near-global harmonization could be achieved through agreement of the largest, leading wireless nations of the world. To some degree, this is why the private standard-setting organizations — i.e., those outside the ITU — have become more prominent and why I have also spent considerable time ensuring these entities are not sidelined by certain nations' political agendas.

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In the end, innovation — and thus the industries of tomorrow — will only happen if there is the right environment for it to develop. This hearing is a positive step for that purpose.