

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

The Information Technology and Innovation Foundation (ITIF) appreciates this opportunity to comment on the above-captioned notice of inquiry.¹ ITIF supports efforts to accelerate a more open architecture for wireless equipment and appreciates the Commission’s inquiry. It is early days in this transition—both industry stakeholders and the Commission can benefit from this information gathering and identification of potential problems.

The risks of an overly concentrated telecommunications equipment market are now of wide concern.² The potential future where a significant portion of the global telecom equipment supply chain is provided by firms subject to the jurisdiction of countries that do not abide by the norms and expectations of global trade and do not share our values. Wireless technology is increasingly critical infrastructure, anticipated to continue to be more tightly integrated into economic production across a range of industries. This concern is particularly acute in the provision of radio access network (RAN) equipment.

Other commenters are no doubt in a better position to explain the complexities of OpenRAN and the current state of its development. The basic idea is that by openly defining the specifications for interfaces between components of the RAN, the functionality of the radio network can be disaggregated, with at least some components implemented through software on generic hardware. Such an architecture should allow for a

1 Founded in 2006, ITIF is an independent 501(c)(3) nonprofit, nonpartisan research and educational institute—a think tank. Its mission is to formulate, evaluate, and promote policy solutions that accelerate innovation and boost productivity to spur growth, opportunity, and progress. ITIF’s goal is to provide policymakers around the world with high-quality information, analysis, and recommendations they can trust. To that end, ITIF adheres to a high standard of research integrity with an internal code of ethics grounded in analytic rigor, policy pragmatism, and independence from external direction or bias. See About ITIF: A Champion for Innovation, <http://itif.org/about>.

2 For discussion of these broader 5G competitiveness dynamics, see Doug Brake, “A U.S. National Strategy for 5G and Future Wireless Innovation,” ITIF (April, 2020), <https://itif.org/publications/2020/04/27/us-national-strategy-5g-and-future-wireless-innovation>.

more diverse supply chain where operators can choose preferred components from a variety of different vendors. Hopefully, such a future architecture will provide faster innovation, with many updates or re-configurations happening in software rather than hardware.

The dynamic underling this transition toward a more disaggregated architecture of modular components is not new. The tools of virtualization, commodity hardware, and open interfaces have seen broad adoption throughout IT and networking due to the ability for this architecture to drive lower costs and enable more rapid innovation. Wide area access networks have already put some of these technologies to use as well.

Incorporating these advances into the radio portion of wireless networks, however, presents real challenges that will take some time to work through. The full vision of AI network optimization of a fully disaggregated, modular, virtualized network is some time off. In some ways, the systems surrounding open RAN likely will not be fully incorporated into wireless networks until 6G, with many 5G systems already being deployed with existing architectures. While there is good reason for the excitement around the opportunity of open RAN to mitigate important national security risks and drive innovation, it is important policy be made with a clear picture of the challenges with migrating to open architectures and the timeframes it will take to get there.

By initial indications, open RAN looks like a promising direction for the industry, and policymakers are right to explore opportunities to support the development of these systems. The USA Telecom Act, as incorporated into the NDAA, brings welcome testbed support and will hopefully be funded soon. The Endless Frontiers Act may well augment federal funding for research in this area as well. Helping to scale up R&D in this area and providing testbeds to experiment with open architectures and uncover challenges before scale deployment would no doubt be helpful. The FCC can play an important role in convening stakeholders and identifying any regulatory barriers to the widespread adoption of this technology.

However, the FCC should not take too strong a hand in forcing a swift transition to open architectures, such as through mandates tied to the replacement of untrusted equipment. Shaping the equipment used in the rip-and-replace program likely won't be effective in driving open architectures and instead may make for a costly, cumbersome transition. Transitioning small rural carriers to open RAN equipment does not make sense (and it's not even clear the rip-and-replace process is a cost-effective risk reduction to begin with). Some of these small companies may have only one network engineer; burdening them with a complex systems integration process would in many instances not be feasible and would likely not make a large impact in the overall industry transition.

Open RAN is a promising opportunity, and there are thankfully strong incentives for operators to move in this direction on a time scale that makes sense and fits with new spectrum deployments or gradual technology transitions. An open RAN ecosystem is anticipated to bring more innovation and diversity to the radio equipment market, and it is also likely to significantly reduce costs for operators as well.

The strength of the U.S. system is our dynamic, competitive market where firms are free to experiment with different partners and technologies. The wireless market is highly competitive, and new-entrant Dish is marshalling forces for a greenfield network built on these open, modular systems—if this is truly the future, our competitive market is poised to drive us there. There is no need for government directives or technology mandates. There is also little reason for the Commission to be concerned with whether the cost savings from

an open RAN transition immediately flow to consumers. In a dynamic industry like the commercial wireless sector, undergoing multiple technological changes, where to allocate added savings is a complicated question best left to those under competitive pressure. If this was a static industry with companies hesitant to transition to 5G or to transform radio architecture, such questions might be legitimate. But the dynamism and competition of this sector has been of clear benefit to consumers, and we can expect that to continue.

We should not take the naïve view that a greater number of smaller equipment providers necessarily means greater innovation, and then blindly seek to structure the RAN sector to maximize the number of firms. As a general matter, the relationship between competition and innovation is not always clear. Often larger, well-established firms are able to better support the costs of long-term innovation and technological breakthroughs, but if a market is dominated by only one or two firms, a lack of competitive pressure can slow innovation. However, if a market is too fragmented, with too many small players, companies may lack the profits to reinvest into future innovation.³ We should not be afraid of a robust industrial policy to support these critical industries (or, for that matter, other industries that play an important role in our national competitiveness, such as aerospace, biopharmaceuticals, or semiconductors). But we should also not assume exactly what direction open RAN will take and what the ideal structure of this market will be.

In many ways, open RAN is a clear security improvement over the current ecosystem, especially considering the global growth of Huawei backed by unfair Chinese government policies. Beyond the structure of the industry overall, a narrower sense of security is important to consider. Open RAN allows for more transparency in systems. What was once relatively black box hardware may potentially be more easily be understood and monitored. Individual components can more easily be sourced by trusted suppliers, and it will be more difficult for unfair Chinese policies to see one firm dominate disaggregated elements.

At the same time, a shift to a modular, disaggregated RAN ecosystem would entail a great deal of complexity. It will be more difficult to manage risk within this far more complex supply chain, at least compared to simply trusting suppliers from like-minded nations. Many components may still be sourced through suppliers subject to jurisdiction of countries that do not share the interests of the United States. The more modular components also mean a broader attack surface—at least in theory, the potential for unforeseen problems or vulnerabilities may be increased. This more complex system likely should be preferred to today’s closed systems, but regulators should have open eyes about the challenges involved.

The FCC should continue to take a risk-based approach to security. There are often externality problems for cyber- or supply chain security, and many policymakers share a legitimate desire to see security features incorporated early in the development in these systems, “baked in rather than bolted on,” as some would say. The FCC and its advisory committees should work cooperatively with industry stakeholders and other participants in the standards setting environment to identify potential security challenges that need to be

³ See Robert D. Atkinson, “How China’s Mercantilist Policies Have Undermined Global Innovation in the Telecom Equipment Industry” ITIF (June 2020), <https://itif.org/publications/2020/06/22/how-chinas-mercantilist-policies-have-undermined-global-innovation-telecom>.

addressed. The FCC and other government actors such as NIST can help lower the cost of identifying and mitigating risks early in the development process, rather than establishing stringent punitive measures. Industry appears to be taking this issue seriously and has launched a task group to specifically address the security challenges of disaggregating RAN functionalities.⁴

There are also serious challenges in the management and integration of various hardware and software elements from different vendors. It is not yet clear what the structure of this market sector will look like—to what extent this management will be performed in-house by operators or if systems integrators will take on the task. Managing products from multiple vendors, all with different life cycles is a seriously difficult task. The Commission should continue to allow space for the industry to evolve, and not assume how the RAN market will be organized in the future.

When it comes to the long-term challenges with a China-backed companies, open RAN is also only one tool in the toolkit—not a silver bullet. Chinese policies have made firms like ZTE and particularly Huawei highly competitive in the global market.⁵ Some of these industrial policies are neutral or even helpful to the broader international wireless innovation ecosystem. R&D tax incentives and subsidies, supporting rapid deployment of wireless networks and small cells, and supporting workforce training and STEM education are all policies we should seek to emulate. However, Huawei also benefitted from other notorious Chinese party practices, such as forced technology transfers, intellectual property theft, currency manipulation, and excessive export financing above OECD guidelines.⁶ Open RAN is an important tool in mitigating the risks of dominance from firms that do not play by the rules and expectations of international trade. But alone, restructuring the RAN architecture likely will not be sufficient to combat these unfair practices—the Commission and other government actors should avoid focusing too narrowly on RAN architectures as a solution to the Huawei challenge.

To be clear, a transition to wireless architectures based on open specifications is very encouraging. This technological evolution should drive continued innovation in wireless equipment, drive down costs, and reduce risk in the supply chain. But there is a risk of an open RAN bandwagon driving well-intentioned policy that ultimately wastes resources or undermines innovation long-term. Support for testbeds and additional R&D in this area should no doubt be supported. The FCC should of course continue efforts to facilitate the deployment of wireless infrastructure and make more spectrum available to the commercial market.

⁴ Amy Zwarico, et al., “The O-RAN ALLIANCE Security Task Group Tackles Security Challenges on All O-RAN Interfaces and Components” *O-RAN Alliance Blog* (Oct. 2020), <https://www.o-ran.org/blog/2020/10/24/the-o-ran-alliance-security-task-group-tackles-security-challenges-on-all-o-ran-interfaces-and-components>.

⁵ See Robert D. Atkinson, “How China’s Mercantilist Policies Have Undermined Global Innovation in the Telecom Equipment Industry” ITIF (June 2020), <https://itif.org/publications/2020/06/22/how-chinas-mercantilist-policies-have-undermined-global-innovation-telecom>.

⁶ Ibid.

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