Before the
DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, DC 20554

In the Matter of	)
	)
Public Wireless Supply Chain Innovation Fund	) Docket No. 221202-0260
Implementation	) RIN 0693-XC05
	)

COMMENTS OF UNITED STATES CELLULAR CORPORATION

United States Cellular Corporation ("UScellular")[1] submits these comments in response to National Telecommunications and Information Administration's ("NTIA") request for comment on implementation of the Public Wireless Supply Chain Innovation Fund ("Fund").[2] UScellular commends NTIA for its leadership in exploring and fostering interoperability and diversity in the United States' communications infrastructure.

I.   Introduction and Summary.

UScellular supports the concepts and goals of an Open Radio Access Network ("RAN") and is particularly encouraged that this administration has committed a historic amount of funds investing in an open, transparent, interoperable, standards-based radio access network. In these comments, UScellular details its experience with attempting to initiate trials of Open RAN, recommends practical solutions to significant Open RAN challenges, and suggests the types of projects that the Fund should support. For the immediate purpose of the funding wireless innovation, UScellular urges NTIA to focus on strengthening existing equipment vendors as they

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[1] United States Cellular Corporation is a mobile communications and broadband provider, offering to more than 5 million customers in 21 states. We built a state of the art network that is tailored to the communities we serve across rural, suburban and city-center spaces. We make sure you stay connected to the people matter, no matter where they are. It's what we do. It's who we are.

[2] NTIA, *Public Wireless Supply Chain Innovation Fund Implementation*, Request for Comment (Dec. 13, 2022), Docket No. 221202-0260, https://www.federalregister.gov/documents/2022/12/13/2022-26938/public-wireless-supply-chain-innovation-fund-implementation.

continue to compete against companies on the Federal Communications Commission's ("FCC" or "Commission") Covered List.

II. UScellular Commends NTIA for Exploring Ways to Foster Open RAN, but Challenges Persist.

UScellular supports the concepts and goals of Open RAN and has been closely monitoring developments in the industry. Open RAN presents opportunities to develop a more diverse vendor market, encourage innovative 5G and next generation equipment solutions including open, standards-based, interoperable equipment, help to relieve the wireless technology supply chain delays, enhance 5G and next generation competitiveness, and promote a secure communications ecosystem. For these reasons, UScellular believes that Open RAN is a promising solution for future mobile broadband networks but not ready for near-term use. Unfortunately, Open RAN lacks the maturity that is needed for commercial deployment and as a replacement for currently operating large-scale, 5G networks that support macro, small-cell and centralized RAN architectures.

UScellular is uniquely situated to provide feedback on efforts to develop an open, interoperable, competitive radio access network. UScellular is an active member of the Open RAN Policy Coalition, participates in the O-RAN Alliance, and joined the FCC for its ORAN workshop in 2021 and NTIA's listening session on January 24, 2023. In July 2021, UScellular released a Request for Information ("RFI") to eight RAN vendors including both incumbent UScellular vendors as well as several new entrants to the equipment vendor market. The RFI solicited information from these vendors regarding their readiness to initiate lab trials of Open RAN technology. Specifically, UScellular's RFI solicited information from the eight RAN vendors in the below areas.

- Readiness to support lab trials of Open Interfaces including Open RAN compliant 7.2x fronthaul interface, Open sidehaul X2/Xn, and Open F1 mid-haul interfaces;

- Expected trial availability of RAN Intelligent Controller ("RIC") applications;

- Additional vendor partners required to support hardware and software requirements as well as interoperability;

- Evaluation of system integration facilities;

- Operations, administration and maintenance of Open RAN including upgrades, maintenance, lifecycle and repairability;

- Feature performance parity comparisons to traditional RAN; and

- Network security.

Based on responses to our RFI and subsequent technical discussions, UScellular learned that Open RAN technology has not matured enough for large-scale deployments. In particular, UScellular discovered that all eight RAN providers lacked readiness for trial activity and therefore heard mixed support for open interfaces from RAN vendors. Specifically, UScellular identified the below challenges.

- Open RAN technology has mostly only been deployed by greenfield or new operators and large-scale deployments by brownfield or incumbent operators have not materialized.

- System integration is complex and costly to implement because there are multiple vendors that would need to integrate and many aren't ready for full integration. Importantly, no one RFI participant was ready or equipped to lead this type of integration.

- Interoperability with existing RAN infrastructure requires bi-lateral agreements, customized integration, and significant testing prior to deployment.

- Open RAN expands the threat surface, and the involvement of multiple infrastructure component suppliers creates added concerns around interoperability, accountability, and the complexity of the security infrastructure.

- Open RAN performance is not comparable with existing RAN architecture including lack of parity with power efficiency, network performance, and feature support. Performance is a primary consideration for UScellular as its existing RAN networks have a proven history of reliable voice and data communications including emergency services such as 911.

- Finally, because of all the reasons identified above, Open RAN would likely increase the cost of vendor and infrastructure deployment, counter to one of the desired goals of ORAN. At best, unit cost savings are unclear and worse, likely to be offset by higher costs for system integration and security infrastructure implementation.

Despite these findings, UScellular has continued our pursuit of trial activity with incumbents and negotiation of trial activity with new entrants in an effort to advance the maturity and readiness of Open RAN. Nevertheless, there is still significant work for Open RAN to become a reality.

II.   NTIA Should Spend the Fund on Solving the Challenges that have stalled Open RAN Deployments as well Emerging Technologies.

UScellular applauds Congress for making available to NTIA $1.5 billion towards the development of an open and interoperable RAN. While UScellular has concerns about Open RAN in its current form, UScellular is optimistic about the future of open mobile broadband networks. Hence, this Fund represents a down payment on Open RAN and next generation technologies. Given UScellular's experience attempting to trial Open RAN and participation in

ongoing policy discussions, UScellular makes the below recommendations on how to best use the Fund.

- NTIA's Fund should explore opportunities for trusted and established RAN vendors from allied nations including Ericsson, Nokia, and Samsung to participate, with the objective to develop a fully interoperable and open RAN ecosystem. To date, new entrants into the RAN market have been at the center of Open RAN developments. While the Fund represents an opportunity to increase competition in the vendor ecosystem, UScellular encourages NTIA to invest in proven RAN vendors from allied nations, rather than focusing its efforts only on new entrants and/or smaller players that lack operational expertise and experience.

- The Fund should focus on RIC development including third party xApps and rApps. This focus will provide opportunity to leverage emerging artificial intelligence and machine learning technologies for the greatest innovation of RAN evolution including increased RAN programmability, automation and improved customer experience.

- To take a phrase from Commerce Secretary Gina Raimondo, NTIA should "re-shore or friend-shore" equipment and technology from vendors residing in US allied countries.[3] This will help to secure our supply chain and create a more diverse and competitive equipment market.

- NTIA should support increased testbed deployments of 5G Open RAN networks with the goal of expediting the development of solutions for issues that predominantly hinder

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[3] Gina Raimondo, *Remarks by U.S. Secretary of Commerce Gina Raimondo on the U.S. Competitiveness and the China Challenge*, Nov. 30, 2022, http://www. commerce.gov/news/speeches/2022/11/remarks-us-secretary-commerce-gina-raimondo-us-competitiveness-and-china (last visited Jan. 27, 2023).

Open RAN, including interoperability and system integration and features like 911 compatibility and critical security infrastructure and other systems.

- NTIA should spur deployment of additional independent testing and certification lab facilities such as the O-RAN Alliance Open and Testing and Integration Centers where an independent third party can perform end to end testing, conformance, and certification.

- UScellular is a founding member of CTIA's 5G security test bed. This test bed has convened the world's leading telecom and technology organizations to assess and address the current and future of cybersecurity. Similarly, UScellular recommends that NTIA explore the possibility of additional joint partnership opportunities bringing together wireless suppliers, mobile operators, federal agencies and/or academia to accelerate the needed maturity of Open RAN technology.

- Another effective use of the Fund should be development of cost effective and innovative mmWave solutions such as repeaters that can help with covering more households for fixed wireless access and help bridge the digital divide, a major initiative of this administration.

- Finally, a portion of the Fund should be used to create a healthier ecosystem of energy efficient radio solutions and radio platforms for smart cities for use on streetlights and street furniture.

IV. Conclusion.

In a consolidating equipment and technology market for advanced communications and in particular 5G and next generation technologies, UScellular commends NTIA for exploring ways to reduce pressures on supply chain delays, create a more competitive 5G ecosystems, and

secure our communications networks. While not ready for commercial deployment today, the

Fund is a necessary step towards making Open RAN a reality for future generations.

Respectfully submitted,

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