25 January 2023

Ms. Josephine Arnold
National Telecommunications and Information Administration
US Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230

Re: Notice and Request for Comment on Public Wireless Supply Chain Innovation Fund Implementation (Docket NTIA-2022-0003)

Dear Ms. Arnold:

Juniper Networks submits these comments in response to the National Telecommunications and Information Administration's (NTIA) above-captioned notice and request for comments regarding the Public Wireless Supply Chain Innovation Fund. Juniper recommends that NTIA ensure that the programs spur the development of open standard-based RAN products and the building of multi-vendor networks that leverage those products.

Juniper Networks is a publicly-traded corporation headquartered in the United States. We develop high-performance networking hardware and software spanning 5G, wireless, routing, switching, security, and network management solutions. We are a proud provider of these solutions to cloud services, service providers, and enterprises around the globe.

With respect to Open RAN, joint innovation is critical to the creation of an ecosystem of best-of-breed solutions and to accelerate deployment of those solutions. That is why we are working across the community - with platform providers, equipment vendors, RAN Intelligent Controller (RIC) application vendors, and system integrators - to develop and deliver Open RAN solutions. Juniper is demonstrating admission control, domain orchestration, and network slicing with industry partners, including mobile operators. We also are collaborating

on RIC platform-specific applications to improve customer experience, maximize return on investment, and drive ecosystem innovation. We are collaborating to integrate field-hardened RAN automation and optimization applications on our RIC; this integration will accelerate and simplify 4G and 5G network deployments and increase spectral efficiency. One of our true innovations is to extend our artificial intelligence, machine learning, and data science expertise from the enterprise to the RIC. The introduction of AI into the RIC will enhance automation and significantly improve RAN efficiency. Finally, we are driving technical and energy efficiency through lightweight compute and memory needs.

With this background, we address NTIA's questions herein.

Questions on the State of the Industry

1. What are the chief challenges to the adoption and deployment of open and interoperable, standards-based RAN, such as Open RAN? Are those challenges different for public vs. private networks?

a. What are the challenges for brownfield deployments, in which existing networks are upgraded to incorporate open, interoperable, and standards-based equipment?

A primary obstacle to upgrading existing networks is one that Open RAN is intended to fix: the implementation of proprietary protocols and interfaces that theoretically restricts operators to a limited set of 5G providers. This occurs because some operators, when upgrading existing networks, will believe they are reliant on their existing providers' proprietary protocols and thus unable to incorporate newer, open standard technologies without a complete rip-and-replace. This simply is not true; proprietary protocols certainly enable and encourage single-vendor networks, but they do not mandate them.

In actuality, Open RAN developers are designing solutions that can enable operators to incorporate Open RAN products into brownfield deployments without wholesale network replacements. These products not only work with existing, legacy networks but also enable operators to bring in other vendor solutions as their network use cases expand. For instance, our RIC platform is based on a cloud-native microservices architecture and is fully compliant with the O-RAN specifications and interfaces to enable multi-vendor integration. It supports both an open API and an SDK for integration with any third-party O-RAN-compliant xApps or rApps, giving network operators greater flexibility and choice of suppliers. When network operators have choices, providers are under pressure to innovate and lower costs.

On the contrary, when operators feel pressured to upgrade networks using products from the same legacy provider or providers, they could be subjecting themselves to deeper vendor lock-in. This diminishes competition and enables legacy providers to raise prices and slow innovation. Unfortunately, both public and private networks face this situation.

5. How do global supply chains impact the open, interoperable, and standards-based RAN market, particularly in terms of procuring equipment for trials or deployments?

It is well known there have been global supply chain constraints for the past several years. The major causes also are well known - the pandemic and resulting shutdowns, the Russian invasion of Ukraine, and the cybersecurity/trade war with the US and allied countries on one side and China on the other. While the private sector has been able to navigate these restrictions and deliver needed products and services to customers across the globe, further restrictions could be detrimental to 5G development and deployment.

Questions on Technology Development and Standards

7. Are the 5G and open and interoperable RAN standards environments sufficiently mature to produce stable, interoperable, cost-effective, and market-ready RAN products? If not:

a. What barriers are faced in the standards environment for open and interoperable RAN?

Juniper Networks is a proud participant in several industry-wide organizations driving the development of open and interoperable RAN. These include the O-RAN Alliance, 3GPP, and the Telecom Infra Project (TIP); all of which are identified by name in the implementing law as key to 5G standards development. Beyond mere membership, Juniper is a founding member of the O-RAN Alliance and remains deeply involved in its work:

- Chair of Slicing Task Group
- Chair of Use Case Task Group
- Leading Slice Management and Slice SLA Assurance work items
- Editor of WG2 (Non-RT RIC & A1) Use Cases and Requirements specification
- Editor of WG3 (Near-RT RIC & E2) Use Cases and Requirements specification
- Leading multiple O-Cloud and transport network related items in WG6 & WG9

Notwithstanding the excellent strides these groups are making in 5G standards development, there are two potential barriers to full Open RAN deployment, both of which exist in the current, non-5G standards ecosystem. Unfortunately, it is possible these issues will permeate the 5G ecosystem also. First, some SDO participants fail to adhere to SDO principles by not licensing their standard-essential patents (SEPs) on fair, reasonable, and non-discriminatory (FRAND) terms; instead, SEP owners seek unreasonably high royalties and threaten injunctions against SEP users. Some SEP owners even petition favorable foreign courts for injunctions as a way to gain leverage in licensing discussions. The landscape of global litigation involving SEPs has led parties to pursue extraterritorial anti-suit injunctions as a countermeasure. Anti-suit injunctions occur when a court that is hearing a patent case enjoins one of the parties from seeking judicial relief on a related issue in a foreign jurisdiction.

Patent holdout has reached such a level that standards experts view it as anti-competitive. In fact, federal antitrust agencies have gone so far as to challenge this behavior as an antitrust violation in recent years. In addition, there have been intense efforts by parties on both sides of the FRAND issue to sway how Congress and federal agencies address licensing policy. We anticipate this behavior could affect Open RAN standards development and patent licensing, as well.

Another barrier does not pertain to the standards bodies or standards development and licensing but instead what technologies actually are standards. There are existing networking technologies that some technology customers believe to be open standard even though they remain proprietary in nature. They are believed to be open only because they were submitted to an SDO for consideration as a standard; these protocols were never adopted as standards and should not be marketed or considered as standards. When proprietary technologies are marketed as or believed to be open standard, there are two downstream impacts – (1) it makes it more difficult for actual standardized technology to flourish in the market; and (2) it further entrenches the market penetration of the legacy/proprietary technologies.

Questions on Integration, Interoperability, and Certification

10. How can projects funded through the program most effectively support the "integration of multi-vendor network environments"?

NTIA can encourage the integration of multi-vendor networks in two ways. First, to be eligible for Innovation Fund programs, applicants should have to attest that their products comply fully with relevant Open RAN specifications.

Second, applicants should have to explain how they will consider and integrate multiple vendors into their projects. To the extent certain RAN elements are available from only one vendor, then lack of heterogeneity should not be a negative factor in their evaluation.

11. How do certification programs impact commercial adoption and deployment?

a. Is certification of open, interoperable, standards-based equipment necessary for a successful marketplace?

A mandated certification process is not needed to spur a successful marketplace. 5G vendors – at least most of them – already strive to meet international, consensus standards on a voluntary basis. Juniper believes that complying with relevant standards makes us more competitive in the market.

Questions on Security

17. "Promoting and deploying security features enhancing the integrity and availability of equipment in multi-vendor networks," is a key aim of the Innovation Fund (47 U.S.C 906(a)(1)(C)(vi)). How can the projects and initiatives funded through the program best address this goal and alleviate some of the ongoing concerns relating to the security of open and interoperable, standards-based RAN?

a. What role should security reporting play in the program's criteria?

We recommend that NTIA not include a reporting requirement in this program as any reporting would overlap with existing or pending requirements. The federal government already has several initiatives underway to broaden cybersecurity/cyberincident reporting requirements that apply to the private sector. Here are just a few of the more recent mandates:

- Cyber Incident Reporting Critical Infrastructure Act (CIRCIA). The Department of Homeland Security's (DHS) Cybersecurity and Infrastructure Security Agency (CISA) is implementing this law, which requires covered entities to report to the government on cyber incidents and other issues.
- DHS's Transportation Security Administration is requiring several transportation sectors within its regulatory purview to report to the agency on cyber incidents affecting their operations.

- Department of Defense (DoD) regulations already require defense contractors to report to DoD on cyber incidents relevant to covered contracts.
- The Securities and Exchange Commission is considering a rule to require public companies to submit public filings on cyber incidents material to their businesses.
- Finally, Juniper and other companies report cyber vulnerabilities to DHS, other government agencies, and industry coalitions so that other stakeholders can take steps to protect their operations and their products.

Considering the breadth of the existing reporting ecosystem, an NTIA requirement could be duplicative (at best) or be confusing to manufacturers and customers.

b. What role should security elements or requirements, such as industry standards, best practices, and frameworks, play in the program's criteria?

Security is a paramount consideration for technology companies; if we are seen as not having secure operations or secure products, we will lose investors, customers, our reputations, and our market value. That is why we reference numerous security standards in our operations and product development processes. In addition, manufacturers such as Juniper Networks that provide products and services to the US government are subject to Executive Order 14028 and attendant guidance and regulations, which impose numerous cybersecurity and reporting requirements on our operations and products. In essence, there is no shortage of regulations, industry standards, and best practices guiding security in the IT industry.

18. What steps are companies already taking to address security concerns?

As noted above, legitimate providers already strive to meet industry-led standards on a voluntary basis.

Questions on Program Execution and Monitoring

22. How can NTIA ensure that a diverse array of stakeholders can compete for funding through the program? Are there any types of stakeholders NTIA should ensure are represented?

In order to reach the broadest industry audience, we recommend that NTIA continue with public requests for comments and nationwide listening sessions. To reach industry stakeholders that are not as engaged in Open RAN policy discussions but are involved in standards and product development, NTIA should consider holding briefings for the various

standards groups that are listed in the statute. Market entrants are more likely to hear about the Innovation Fund through their involvement with such groups than they are through any direct outreach from trade associations, and they are unlikely to be reviewing the Federal Register for relevant notices.

25. How can the fund ensure that programs promote U.S. competitiveness in the 5G market?

c. What requirements, if any, should NTIA take to ensure "American-made" network components are used? What criteria (if any) should be used to consider whether a component is "American-made"?

Because supply chains are global, to the extent that some raw materials may be sourced from only a few countries, we recommend against the imposition of geographic sourcing restrictions. Most industry providers are based in the United States such that the majority of the benefits of our efforts and investments accrue to the domestic economy. Note also that some foreign companies in the 5G space have US subsidiaries that could benefit from an 'American-made' requirement, so the federal investments still could benefit foreign companies. For that reason, we recommend against a domestic sourcing limitation.

26. How, if at all, should NTIA collaborate with like-minded governments to achieve Innovation Fund goals?

To the extent NTIA permits companies with foreign parents to participate in the Innovation Fund, NTIA should press the governments of those foreign parents to (1) fund testbeds and trials in their countries and (2) permit US companies to participate in those testbeds and trials.

Thank you for your consideration of these views. If you have any questions about this submission, please feel free to contact me at spgarg@juniper.net or 571-203-1908.

Sincerely,

Sampak P. Garg
Senior Director and Associate General Counsel