NOKIA

November 9, 2021

Marlene H. Dortch, Secretary
Federal Communications Commission
45 L Street, NE
Washington, DC 20510

Jeffrey Marks
Vice President
Regulatory Affairs

Address:
1200 G Street, NW
Suite 800
Washington, DC 20005

Email:
jeffrey.marks@nokia.com

Re: Notice of Ex Parte Presentation
Promoting the Deployment of 5G Open Radio Access Networks, GN Docket No. 21-63
Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs, WC Docket No. 18-89

Dear Ms. Dortch:

On November 5, 2021, Robert Backhouse, Brian Hendricks, and the undersigned, all of Nokia, met via teleconference with Commission staff from the Office of Economics and Analytics and the Wireless Telecommunications Bureau. Commission meeting attendees are listed below. Nokia provided the attached presentation and answered questions from Commission staff.

Nokia has been a leading supplier of each generation of wireless network, at the cutting edge of the communications technologies that enrich our lives and power the global economy. Our customers include communications service providers whose combined networks support 6.1 billion subscriptions, as well as enterprises in the private and public sector that use our network portfolio to increase productivity and enrich lives. We are a trusted partner in the U.S. market, with a strong U.S. presence including Bell Labs, headquartered in New Jersey, which leads our R&D efforts in 5G, 6G and Open Radio Access Networks (RAN). Just as we were a leader in developing the standards and technologies that underly the classical, single vendor architectures of today, we are also the largest contributor to O-RAN Alliance specifications that will ensure a sustainable ecosystem for the interfaces required for Open RAN networks.

Nokia provided the Commission's meeting participants an update on the status of key specification work that is essential to creating an Open RAN ecosystem, deployments and trials in which Nokia is involved, and information on the expected timelines for the availability of Open RAN compliant equipment at scale. In addition, Nokia responded to several representations recently made to the Commission on these topics, including profoundly misleading statements made in multiple recent *ex parte* filings by Mavenir.[1]

The Nokia participants stressed the difference between early multivendor deployments in which Nokia and others have participated, and what should ultimately be the end-state goal of policymakers -- a truly open ecosystem. Simply declaring a deployment "open" does not make it so, if, for example, it is achieved through a private agreement in which vendors have disclosed their specifications to each other but are not building to the type of open, common specifications envisioned by the O-RAN Alliance work. Lack of conformity to common specifications would make it very difficult for another supplier to step into such a deployment later, effectively limiting the carrier's options for partners. That is hardly the end-state "mix and match" environment that would reflect an open ecosystem.

It is for this reason that Nokia has encouraged the Commission and other U.S. Government stakeholders to focus on providing grant and other support for R&D that will allow other companies to contribute time and technology to the specification process for the various interfaces involved in the RAN environment. To date, the majority of the work to create commercially mature specifications for the various RAN interfaces has been done by Nokia and a small handful of contributors to the working groups within the O-RAN Alliance. Broader participation will help to advance more of the interface specifications toward commercial maturity. And, in turn, this will facilitate broader opportunities for suppliers to enter the marketplace providing the type of innovative and sustainable ecosystem policymakers envision.

Nokia will continue our active participation in the O-RAN Alliance because we believe it is the best way to create the truly open, multivendor marketplace for which policymakers strive. Commission staff asked whether finishing the specifications was a prerequisite to deployment. Nokia responded, "no." Deployments can move forward (and, indeed, are moving forward) now with vendors conformance testing to those O-RAN Alliance specifications that are commercially mature, with the capability to later make changes and upgrades necessary to support additional specifications that advance.

Nokia also addressed our experience in the marketplace with most of our service provider customers continuing to explore Open RAN but not yet adopting Open RAN architecture deployments at scale. A question asked by Commission staff was whether 4G (and prior generation) classical RAN architecture deployments would impede a carriers' choice of Open RAN for 5G or future generation deployments. Nokia responded that carriers have invested significantly in their networks over many years and each carrier has a diverse set of configurations and unique architecture, typically several generations of technology, and different strategies in deploying new solutions. These and many more factors need to be considered when a carrier chooses architectural and vendor solutions for the future. The existing classical RAN architecture is just one of the factors that needs to be considered, but there are many options that

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[1] *See, e.g.,* Letter from Caressa D. Bennet, Counsel for Mavenir Systems, Inc. to Marlene Dortch, Secretary, FCC, GN Docket No. 21-63 and WC Docket No. 18-89 (filed Nov. 2, 2021).

would not prevent a carrier from selecting an Open RAN solution, provided that solution met its performance and other requirements. A non-standalone (NSA) 4G/5G network, sharing spectrum across these technologies, known as dynamic spectrum sharing (DSS), would require tight coordination and detailed interoperability testing.

At the Commission's request, Nokia then reviewed with the meeting participants the demands of our customers with respect to Open RAN and classical RAN architectures. While there are some vendors that only offer Open RAN architecture and/or limited RAN products, Nokia is able to provide a choice of classical or Open RAN depending on the desires of our customers. To date, the vast majority of service providers have chosen classical RAN solutions, deferring investment in Open RAN until further commercial maturity has been demonstrated. Of course, we recognize there is demand for continued development of open solutions, evidenced by the fact that our 5G RAN products are Open RAN capable. Just like any other new features or architectures we (or other vendors) introduce, service providers first engage in rigorous testing to ensure the new upgrade offers comparable performance, security, and feature parity with existing equipment deployed in networks. Nokia strongly advises the Commission to resist suggestions by Open RAN-only vendors that the government should force the hand of operators when they are not yet comfortable with Open RAN from a technology or business perspective.

We noted that when operators are satisfied that Open RAN solutions, including our own, meet or exceed performance, security, and feature parity of their existing networks, they will likely accelerate their plans for wide Open RAN deployment. Until that level of comfort is achieved, the Commission should expect the pace of adoption to be measured. This is a market reality, not, as some have suggested, a market failure. Nokia renewed our recommendation that the Commission and other U.S. government stakeholders support a variety of subscale deployments (i.e., innovation zones, test beds, etc.) that look like various network configurations and deployments in the marketplace today, through which interoperability, performance and security can be shown, as such deployments could provide much of the information operators are seeking.

The Commission meeting participants also asked us about the source of certain pricing information that they indicate Mavenir has presented to the Commission as "Nokia" pricing compared to Mavenir's cost estimates for Open RAN components. The source for this pricing information is a presentation given to the Rural Wireless Association in July 2021, publicly available here: http://www.smartandsecurenetworks.com/conference-presentations/ (click "Mapping Real World Deployment Costs to the Cost Catalog"). As is stated in the document, the pricing data provided in the presentation for classical RAN components is not Nokia pricing, but rather is simply drawn from entries across the Widelity Preliminary Cost Catalog, published by the Commission March 25, 2021, and available here: https://docs.fcc.gov/public/attachments/DA-21-355A1.pdf. We would be happy to further discuss this presentation with the Commission, although we cannot speak directly to how Mavenir has calculated total cost of ownership for its own products compared to classical RAN.

To this point, the marketplace has indicated significant interest in, and support for, an Open RAN ecosystem, but many operators have publicly stated they need to see more to demonstrate commercial maturity and readiness. This is not an issue of Open RAN being "ready" or not. It is an issue where the buyers desire more information about the commercial

maturity and capability of open solutions. Rather than focus on proposals to mandate adoption or engage in legally dubious interventions to force a solution onto the buyers, policymakers should focus on investments that will enable R&D, specification/standardization efforts, and platforms that will answer some of the open questions that operators have. Nokia urges the Commission to promote *competition* in a diverse market, rather than entertaining requests for mandates by a single entity seeking government intervention to close sales in the short term, when its target customers continue to have valid concerns. Nokia asks the Commission to support a vibrant ecosystem with the opportunity for multiple entrants to participate and for that market entry to be scalable, sustainable, and long lasting.

Please contact the undersigned with any questions in connection with this submission.

Respectfully submitted,

/s/ Jeffrey A. Marks

Jeffrey A. Marks
Vice President, Regulatory Affairs
North America

cc: **Commission Attendees**

Office of Economics and Analytics	Wireless Telecommunications Bureau
Patrick DeGraba	Charles Mathias
Paul Lafontaine	Justin Park
Cher Li	Kambiz Rahnavardy
Catherine Matraves	Thuy Tran
Donald Stockdale	
Patrick Sun	