



February 10, 2021

Submitted via email to [5GChallengeNOI@ntia.gov](mailto:5GChallengeNOI@ntia.gov)

Rebecca Dorch  
National Telecommunications and Information Administration  
U.S. Department of Commerce  
325 Broadway  
Boulder, CO 80305

**Re: Open RAN Policy Coalition Comments on 5G Challenge Notice of Inquiry, Docket No. 210105–0001, RIN 0660–XC04**

Dear Ms. Dorch:

The Open RAN Policy Coalition appreciates the opportunity to provide input to the National Telecommunications and Information Administration (“NTIA”) and the Department of Defense (“DoD”) 5G Initiative in response to the 5G Challenge Notice of Inquiry (“NOI”).<sup>1</sup> The Coalition consists of a diverse group of companies organized to promote policies and initiatives that will advance the adoption of open and interoperable solutions in the wireless Radio Access Network (“RAN”) as a means to promote innovation, spur competition, and expand the supply chain for advanced wireless communications technologies, including 5G.<sup>2</sup>

As we described in detail in our response to NTIA’s request for comment on the implementation plan for the National Strategy to Secure 5G, Coalition members are devoting

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<sup>1</sup> Department of Commerce, National Telecommunications and Information Administration, *5G Challenge Notice of Inquiry*, Docket No. 210105-0001, RIN 0660-XC049 (Jan. 11, 2021) <https://www.ntia.doc.gov/files/ntia/publications/fr-5g-challenge-noi-01112021.pdf>.

<sup>2</sup> Coalition members represent a cross-section of the wireless communications industry, ranging from network operators to network solutions providers, systems integrators, cloud providers, edge device manufacturers, and more. The Coalition presently consists of the following members: Airspan, AltioStar, American Tower, Analog Devices, ARM, AT&T, AWS, Benetel, Bharti Airtel, Broadcom, Ciena, Cisco, Cohere Technologies, CommScope, Crown Castle, DeepSig, Dell Technologies, Deutsche Telekom, DISH Network, Facebook, Fujitsu, GigaTera Communications, Google, Hewlett Packard Enterprise, IBM, Inseego, Intel, JMA Wireless, Juniper Networks, Ligado Networks, Marvell, Mavenir, Microsoft, NEC Corporation, NewEdge Signal Solutions, Nokia, NTT, Nvidia, Oracle, Palo Alto Networks, Parallel Wireless, Pivotal Commware, Qualcomm, Quanta Cloud Technology, Radisys, Rakuten Mobile, Reliance Jio, Rift, Robin, Samsung Electronics America, STL Tech, Telefónica, Texas Instruments, U.S. Cellular, US Ignite, Verizon, VMWare, Vodafone, World Wide Technology, XCOM-Labs, and Xilinx.

significant resources to developing, standardizing, and validating open interfaces to allow secure and reliable interoperability across diverse market players, lower the barrier to entry for new innovators, and lower the cost of adoption by service providers.<sup>3</sup> We are pleased that our federal partners are also prioritizing this shared goal in the 5G Challenge and multiple related initiatives, and we look forward to working with you closely on these issues in the months and years ahead. To that end, we offer the following three suggestions to most effectively scope the 5G Challenge in support of NTIA and DoD’s missions:

1. Clarify the Terms, Scope, and Goals of the Challenge to Support Open and Interoperable Interfaces;
2. Target the Challenge to Focus on Areas of Impact by Prioritizing Real-World Applications Rather Than Basic Research and by Defining Evaluation Metrics; and
3. Leverage the 5G Challenge to Augment DoD Testbeds and the NTIA Wireless Innovation Fund.

We describe these recommendations in greater detail below.

#### **1. Clarify the Terms, Scope and Goals of the Challenge to Support Open and Interoperable Interfaces.**

The NOI seeks recommendations on constructing a Challenge to “accelerate the development of the open 5G stack ecosystem,” but then risks some confusion by citing the use of both (1) open-source implementations in the 5G protocol stack and (2) interoperability among implementations created with code sourced from a single organization as the technical motivations for this Challenge. To ensure stakeholders have a common understanding of the Challenge’s goal and scope, NTIA and DoD should use the term “open and interoperable technologies” rather than “open stack,” and should clarify the distinction between “open and interoperable technologies” and “open source.”

- “Open and interoperable technologies,” including Open RAN among other components of the 5G network, refers to defined standards for open (i.e., transparent, not proprietary) interfaces between different components of the 5G network that allow for modularity to facilitate interoperability among a diverse community of suppliers. Generally, Open RAN is based on standards and specifications developed through the O-RAN Alliance and 3GPP, among others.

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<sup>3</sup> Comments of the Open RAN Policy Coalition, *In the Matter of The National Strategy to Secure 5G Implementation Plan*, Docket No. 200521–0144 (Jun. 25, 2020) (“ORPC Secure 5G Comments”), [https://www.ntia.gov/files/ntia/publications/open\\_ran\\_policy\\_coalition-06252020.pdf](https://www.ntia.gov/files/ntia/publications/open_ran_policy_coalition-06252020.pdf).

- In contrast, “open source” refers to an open (i.e., public, not private) effort to design a framework or utility software whose source code can be used freely by organizations to build a final product with or without modifications.

The focus of this Challenge should remain on fostering the development of knowledge about how to optimize network architectures built from multiple vendors’ technology, leveraging open interoperability at the interfaces between components in the stack. “Open and interoperable technologies” are, therefore, essential to the nature and purpose of this Challenge. By contrast, “open source” refers to source code that is freely available to the development community. Both “open and interoperable technologies” and “open source” can be important elements of a secure, reliable, and interoperable 5G system.<sup>4</sup> However, “open source” is distinct from the “open and interoperable technologies” focus of this Challenge. Indeed, it is possible for a component of the 5G technology stack to be built with open source code (or not) and to have interoperable interfaces with other components (or not) – each irrespective of the other. “Open and interoperable technologies” do not necessarily rely on or directly relate to “open source” software. Therefore, the Challenge and criteria for evaluating participants should remain agnostic as to whether components of the 5G stack are built using “open source” or proprietary code—and instead focus on openness and interoperability in the interfaces between network components.

Further, to promote cooperation, collaboration, and interoperability within the 5G ecosystem, the Challenge should focus participant efforts around the goal of optimizing cost efficiencies and facilitating a more diverse, secure, and innovative equipment ecosystem of trusted U.S. and allied suppliers. For instance, some Coalition members are exploring the use of general purpose hardware to drive cost efficiencies and avoid bottlenecks in the network supply chain. Participants in the Challenge should focus on developing and applying technologies and applications that will be a foundation for a more competitive, cost effective, and secure 5G network supply chain.

## **2. Target the Challenge to Focus on Areas of Greatest Impact by Prioritizing Real-World Applications Rather Than Basic Research and by Defining Evaluation Metrics.**

Recognizing the vital role of basic research in the overall innovation ecosystem, the 5G Challenge should focus participants on applied science to deliver outcomes that will have the greatest impact on 5G development and deployment in the immediate term. Significant stakeholder collaboration has already led to consensus regarding key standards and specifications in the 5G ecosystem. Indeed, given that Open RAN’s multiple real-world deployments and demonstration projects already underway constitute applied science, openness and interoperability in the RAN is hardly a research project. This moment, therefore, calls for targeted

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<sup>4</sup> Security visibility and control mechanisms are important for both open and interoperable technologies and open source software.

development and deployment to find solutions that can catapult open and interoperable 5G forward and bring more suppliers into the market.

Likewise, to achieve the most effective outcomes possible, NTIA and DoD should identify metrics at the outset of the Challenge that will be used to evaluate the success of and awards granted to participants. For example, the Challenge may test conformance with the 5G interface test suite or, alternatively, may choose winners from among a pool of open-standard conforming solutions, ranking success in performance (e.g., data rate, reliability, latency, etc.). NTIA and DoD should clarify that the Challenge is seeking solutions that are “best performing while open” (rather than simply “most open”) and should detail how the Challenge will assess these qualities, taking into account, for instance, issues such as energy efficiency, security and reliability, and integration.

In guiding and evaluating participants, NTIA and DoD should look for innovation in areas that can have the biggest impact on competition and innovation in the 5G supply chain. In particular, while the 5G system has been broken down into a number of standardized interfaces, further advances in globally standardized Open RAN will have a disproportionate impact in promoting competition and security and will facilitate use of transformational technologies.<sup>5</sup> Standardizing protocols and interfaces in the RAN hardware and software will drive transparent, vetted security and interoperability, and also advance a diverse supply chain among trusted U.S. and allied suppliers.<sup>6</sup> When matched with 5G cloud architectures, Open RAN will ensure resilience, scalability and segmentation, and facilitate multi-access edge computing. This segmentation, containerization, and virtualization provides the promise for enhanced security and isolation from the hardware up.

With these Open RAN possibilities in mind, the Challenge should target specific categories of interfaces in which advances in openness and interoperability will have the greatest impact.<sup>7</sup> For next steps in building this Challenge, NTIA and DoD should seek additional information from industry regarding practical, technical, regulatory, commercial or other obstacles to openness and

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<sup>5</sup> See ORPC Secure 5G Comments at 4-7.

<sup>6</sup> The Coalition supports the United States Standards Strategy’s principles on standardization, which champion a market-driven, transparent, and consensus-based process for the development and adoption of standards. See American National Standards Institute (ANSI), *United States Standards Strategy* (2020), <https://share.ansi.org/Shared%20Documents/Standards%20Activities/NSSC/USSS-2020/USSS-2020-Edition.pdf>.

<sup>7</sup> See Open RAN Policy Coalition, FAQs “What does it mean to ‘open’ the protocols and interfaces between the various RAN subcomponents?” (last visited Feb. 10, 2021), <https://www.openranpolicy.org/faqs/> (“The key concept of Open RAN is “opening” the protocols and interfaces between the various subcomponents (radios, hardware and software) in the RAN. As a technical matter this is what the industry refers to as a disaggregated RAN. There are three primary elements: (1) the radio unit (RU), is where the radio frequency signals are transmitted, received, amplified and digitized. The RU is located near, or integrated into, the antenna; (2) the Distributed Unit (DU) is where the real-time, baseband processing functions reside. The DU is located at, or near, the cell site; and (3) the Centralized Unit (CU) where the slower, packet processing functions reside. The CU is located deeper in the network near the core. It is the interfaces between the RU, DU and the CU which are the focus of Open RAN. By opening and standardizing these interfaces, and incentivizing implementation of the same, we move to an environment where networks can be deployed with a more modular design without being dependent upon a single vendor.”).

interoperability, and where existing standards development is underway. This Challenge should not duplicate or otherwise usurp industry standards processes such as 3GPP and the O-RAN Alliance, but instead should prompt demonstration projects to advance practical breakthroughs in openness and interoperability in key interfaces of the 5G stack.

### **3. Leverage the 5G Challenge to Augment DoD 5G Testbeds and the NTIA Wireless Innovation Fund.**

In developing and administering the 5G Challenge, NTIA and DoD have a unique opportunity to augment the progress and impact of related efforts across the federal government as part of a whole-of-nation 5G effort. The success of this Challenge, like the success of 5G itself, depends on engaging a broad set of diverse stakeholders to populate the 5G supply chain. DoD should use this opportunity to bring both lessons learned and ongoing inquiries from current 5G testbed efforts to the Challenge. Meanwhile, NTIA should explore ways to leverage the newly authorized Wireless Innovation Fund to improve the Challenge and to seek “force multiplier” opportunities to maximize the impact of all these efforts, including regarding 5G security.

DoD should also take advantage of its role as a purchaser of 5G products and an early adopter of cutting edge information and communications technology. DoD procurement officials should be made aware of the advances the Challenge brings and should meaningfully engage with participants to drive results that further the DoD mission. Just as modular and interoperable hardware and interoperable software will drive down costs and invite more participants, DoD’s purchasing power toward those ends to develop its own capabilities can help complement the development of wireless technology by stimulating competition and innovation in the wider 5G technology supplier market.

NTIA and DoD continue to lead critical U.S. government efforts to advance secure, reliable, and interoperable next generation networks. The 5G Challenge presents a unique opportunity to propel deployment of 5G forward along with the myriad use cases that will rely on its unprecedented speed, precision, and security. To achieve the best outcomes, the 5G Challenge should target its scope to solicit solutions that foster open technologies, focusing on real-world applications that can be brought to bear now and will complement related ongoing federal efforts to spur 5G development and deployment.

The Open RAN Policy Coalition values this opportunity to provide initial comment and looks forward to continued collaboration with NTIA and DoD on this critical issue going forward.

Sincerely,

/signed/  
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Diane Rinaldo  
Executive Director