

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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

**REPLY COMMENTS OF
THE TELECOM INFRA PROJECT**

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TABLE OF CONTENTS

INTRODUCTION AND SUMMARY 1

I. OPEN NETWORK ARCHITECTURES ARE ADVANCING RAPIDLY AND WILL BRING SIGNIFICANT BENEFITS..... 2

 A. There is Overwhelming Consensus that the Market is Moving Swiftly Toward Open RAN..... 2

 B. The Record Confirms that Open RAN Will Bring Flexibility, Innovation, and Other Benefits to U.S. Operators and Vendors Alike. 4

 C. The Record Confirms that Open RAN Will Be Secure, Energy-Efficient, and Offer High Performance. 6

 D. A New Study Illustrates that Open RAN Will Have a Significant Positive Economic Impact. 8

II. THE TECHNOLOGY ECOSYSTEM IS READY TO DELIVER THE BENEFITS OF OPEN NETWORK ARCHITECTURES..... 9

 A. The Record Confirms that Open RAN is Coalescing Around Standards and Frameworks from Key Organizations Including TIP..... 10

 B. System Integrators Offer Initial Open RAN Deployments and Single-Point-of-Contact Options for Ongoing Support and Lifecycle Management. 12

III. THE COMMISSION SHOULD LEVERAGE AND SUPPORT THE WORK OF INDUSTRY ORGANIZATIONS LIKE TIP..... 13

 A. TIP’s Real-World Testing and Productization Work Will Promote Interoperability and Build Confidence Among U.S. Operators..... 15

 B. TIP’s Recently-Released OpenRAN Template RFP Will Help Facilitate Procurement of Open RAN Equipment by Operators and Integrators. 16

CONCLUSION..... 17

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The Telecom Infra Project (TIP)¹ respectfully files these reply comments in response to the Notice of Inquiry (NOI) in the above-captioned proceeding.²

INTRODUCTION AND SUMMARY

The overwhelmingly positive response to the NOI from nearly 50 different companies and organizations confirms the strong support of the telecommunications ecosystem for open network architectures, including Open RAN. There is universal acknowledgement that the marketplace is moving toward openness, and that this will bring numerous benefits including providing flexibility for operators and driving innovation and competition among vendors. Importantly, the record confirms that these benefits will also include greater security, energy efficiency, and a high level of performance. The comments also confirm that Open RAN will lower costs, and a new economic analysis attached to these reply comments shows that this will lead to a substantial contribution of \$285 billion to global GDP over the next decade.

¹ TIP is a global community founded in 2016 that includes hundreds of companies, from service providers and technology partners to systems integrators and other connectivity stakeholders. TIP and its members work together to develop, test, and deploy open, disaggregated, and standards-based solutions. Visit <https://telecominfraproject.com> for more information.

² Notice of Inquiry, *Promoting the Deployment of 5G Open Radio Access Networks*, [FCC 21-31](#), rel. Mar. 18, 2021 (“NOI”).

The record also confirms that the technology marketplace is more than ready to deliver on these promised benefits. As many commenters explain, the market has been converging around the work of a few organizations including TIP and the O-RAN Alliance, leading to the development of standards and real-world productization of disaggregated and interoperable solutions. Building on this progress, several systems integrators have explained in their comments the solutions they offer to operators today, from initial network deployment through ongoing support and product lifecycle management. The Commission should therefore leverage the work of TIP and others to help advance the movement toward open networks more rapidly.

I. OPEN NETWORK ARCHITECTURES ARE ADVANCING RAPIDLY AND WILL BRING SIGNIFICANT BENEFITS.

The record now plainly confirms that Open RAN and other open network architectures represent the future of telecommunications network infrastructure. As described below, this reality is now widely accepted even by the traditional RAN vendors, who have explained their own contributions toward various efforts related to Open RAN. The record also confirms that open network architectures will bring flexibility and innovation to the marketplace, that U.S. vendors will play a strong role in providing solutions from 2G to 5G and beyond, and that Open RAN will bring significant economic benefits to global GDP as costs decrease over time.

A. There is Overwhelming Consensus that the Market is Moving Swiftly Toward Open RAN.

There is a universal understanding that the RAN infrastructure equipment market in the United States is presently split between three vendors – Ericsson, Nokia, and Samsung.³ Although they do compete against each other, some point out that the small number of players

³ Ericsson Comments at 10, Nokia Comments at 8; *see also* Mavenir Comments at 9. Nokia is a founding member of TIP, and both Nokia and Samsung are founding and active members of the Open RAN Policy Coalition (ORPC).

has “hinder[ed] RAN innovation and the introduction of new services.”⁴ Against that backdrop, TIP’s initial comments explained at length how the movement toward Open RAN has been accelerating, including an ever-increasing number of deployments around the world.⁵

To begin with, operators are embracing the technology. For example, NTT DOCOMO, Japan’s leading mobile operator with over 80 million subscribers, launched “the world’s first Open RAN standard-based commercial service” in Japan in 2019.⁶ They confirm that Open RAN has enabled “enormous flexibility and interoperability” which “has made Open RAN an attractive opportunity” for the vendors that participate, and the company recently formed an alliance with NEC to support further entry into the market.⁷ DISH has wholeheartedly embraced the technology and provides concrete examples of the benefits of open architectures, including “best-in-class security solutions,” more customer control of features like service-level agreements, and more.⁸

Meanwhile, the record now shows that all three incumbent vendors also recognize that, in Ericsson’s words, “[t]he market is clearly trending toward openness.”⁹ As such, they are introducing their own Open RAN solutions to move network functionality to cloud-based solutions that rely upon commercial, off-the-shelf hardware.¹⁰ In part, this is because their operator customers are demanding that suppliers incorporate more openness.¹¹ Indeed, Nokia

⁴ CommScope Comments at 1-2.

⁵ TIP Comments at 3-8.

⁶ NTT Group Comments at 2.

⁷ *Id.* at 5-6.

⁸ DISH Comments at 4-7.

⁹ Ericsson Comments at 2.

¹⁰ *Id.* at 8-9, Nokia Comments at 2.

¹¹ Ericsson Comments at 12.

states that it is “pushing ... to progress this process and expand the ecosystem of open interfaces available on the market,” while Samsung observes that this “drives competition among vendors in the network.”¹²

A recent analysis suggests that the incumbent vendors may adapt to the changing environment by being more selective about areas in which to build an advantage. For example, Nokia has stated that it intends to be a leader in the areas in which it chooses to compete, with an emphasis on advanced mission-critical networks.¹³ Regardless, there is no meaningful dispute in the record that Open RAN represents the future and that the market is moving in this direction.

B. The Record Confirms that Open RAN Will Bring Flexibility, Innovation, and Other Benefits to U.S. Operators and Vendors Alike.

Flexibility. The movement toward open network architectures is ultimately about flexibility. For example, Samsung explains that Open RAN “gives service providers the flexibility to select best-in-class components for radio and baseband functions from a diversity of sources.”¹⁴ Furthermore, Ciena notes that these “best-in-breed” networks can “leverage[e] a broad and secure multi-vendor supply chain resulting in accelerated technology innovation and implementation.”¹⁵ This flexibility provides operators with a more modular upgrade path, such as by replacing baseband units while leaving radio units in place.¹⁶

¹² Nokia Comments at 7; Samsung Comments at 3.

¹³ Analysys Mason, *The Economic Impact of Open and Disaggregated Technologies and the Role of TIP*, May 2021, at 26 (“Analysis Mason 2021 Study”) (citing Nokia press release, *Nokia Provides a Mid-Point Update on Strategy and Operating Model*, Dec. 16, 2020, <https://www.nokia.com/about-us/news/releases/2020/12/16/nokia-provides-a-mid-point-update-on-strategy-and-operating-model/>).

¹⁴ Samsung Comments at 3-4.

¹⁵ Ciena Comments at 1.

¹⁶ Samsung Comments at 4.

Innovation. The early benefits of enabling new entrants to innovate are already evident. For example, AirHop, which is commercially deployed in Rakuten Mobile’s Open RAN network, cites spectral efficiency gains from its near-real-time RAN optimization technology of more than 30% for dense indoor deployments and a reduction of handover failures by 80% in coverage areas experiencing high interference.¹⁷ Rakuten itself cites a 40% reduction in capital expenditures and 30% reduction in operational expenditures compared to a traditional, legacy deployment model.¹⁸ Meanwhile, Wavelabs is creating AI-based solutions to help automate network monitoring, anomaly detection, root cause analysis, and remediation.¹⁹ These are just a few examples of how the diversity enabled by open architectures will ultimately lead to innovation that benefits the ecosystem as a whole.

U.S. vendors. As CommScope notes, Open RAN has the potential to bring “new domestic infrastructure design, manufacturing, and testing jobs into the 5G marketplace,” as well as “reduc[ing] reliance on international suppliers of critical components of U.S. wireless infrastructure.”²⁰ It also engages a new set of solutions vendors – many with significant integration experience – in the telecom ecosystem. Already in this proceeding, the Commission has received numerous supportive comments from large American technology companies who are not traditionally viewed as telecom vendors, including Dell, Google, HPE, IBM, Microsoft, Red Hat, and VMWare. In addition to cloud players, Open RAN has also been embraced by U.S. semiconductor companies like Qualcomm, Intel, and Xilinx, as their comments confirm.²¹

¹⁷ AirHop Comments at 2.

¹⁸ Rakuten Comments at 5-6.

¹⁹ Wavelabs Comments at 7.

²⁰ CommScope Comments at 3.

²¹ See Qualcomm Comments at 5-6 (describing how Qualcomm’s RAN platform furthers the Open RAN ecosystem); Intel Comments at 4-5 (describing how Intel’s products are used in 5G

In addition to the innovation that a disaggregated software-based approach will facilitate, the engagement of these larger companies is excellent sign for future investment and development of the Open RAN technology ecosystem.

Support for 2G and 3G operators. TIP's OpenRAN project group encompasses not just 4G and 5G solutions, but also 2G and 3G as well. To that end, vendors are already releasing OpenRAN products with legacy support for 2G and 3G networks, helping to smooth the eventual upgrade path for operators. For example, Parallel Wireless markets an "ALL G" unified solution, and some of its OpenRAN deployments in the Middle East and Africa are focused on network modernization from 2G to 3G to 4G.²²

C. The Record Confirms that Open RAN Will Be Secure, Energy-Efficient, and Offer High Performance.

Security. The record confirms that Open RAN will offer "state-of-the-art technology and security."²³ As DISH explains, its Open RAN service will offer its customers "unprecedented visibility, application programming interfaces (APIs), tools and security capabilities to complement their existing security model."²⁴ It is also adopting a "secure by design" strategy based on a zero-trust model. Qualcomm confirms that "[i]t is a misconception that disaggregation of the RAN increases the attack surface," because the compartmentalization and modularization of components "reduces the attack surface of each component and prevents a

ORAN solutions); Xilinx Comments at 5 (describing Xilinx's portfolio of products to serve the "fast-growing" Open RAN market).

²² Parallel Wireless, *White Paper: Parallel Wireless Creates OpenRAN "ALL G" Radio Access Network Architecture*, https://www.parallelwireless.com/wp-content/uploads/Parallel-Wireless_intel_allg.pdf (visited May 18, 2021) (generally describing the company's 2G/3G/4G/5G solution); *id.* at 4 (map showing network modernization deployments).

²³ DISH Comments at 4.

²⁴ *Id.*

single point of failure.”²⁵ Moreover, cloud-native solutions allow security-sensitive components to be deployed in a protected environment like a data center, while other performance-sensitive but non-security critical radio functions can be deployed closer to end users.²⁶ The Open RAN Policy Coalition confirms these benefits, citing greater operator visibility, shifting the location of security functions, integrating best-in-class security platforms, enabling zero-touch management through automation, and increasing the speed at which security upgrades and patches can be installed.²⁷

Energy efficiency. Qualcomm – which is developing products intended for the Open RAN market – confirms that energy consumption of Open RAN will be competitive with other solutions.²⁸ As the company notes, Open RAN will lead to an ecosystem of silicon providers, including Qualcomm, “who will compete on energy consumption as a key metric.”²⁹ This is already happening: Xilinx states that it has created “new custom adaptive products that have cost, performance, and *power consumption*” like other products while requiring “fewer resources.”³⁰ Marvell has been introducing Open RAN products designed to address “capacity, power, cost and time-to-market challenges” associated with current architectures.³¹

²⁵ Qualcomm Comments at 10.

²⁶ *Id.*

²⁷ Open RAN Policy Coalition Comments at 24-26.

²⁸ Qualcomm Comments at 12.

²⁹ *Id.*

³⁰ Xilinx Comments at 7.

³¹ Press Release, *Marvell Expands 5G Technology Leadership with End-to-End Open RAN and Virtualized RAN Platform Solutions*, Dec. 8, 2020, <https://www.marvell.com/company/newsroom/marvell-expands-5g-technology-leadership-with-end-to-end-open-ran-virtualized-ran-platform-solutions.html> (emphasis added).

Performance. The record confirms that Open RAN networks will also deliver on the promise of high performance. For example, CommScope explains its ONECELL indoor small cell solution that enables “a clear 5G signal throughout buildings of virtually any size through a simple deployment process.”³² Marvell and Analog Devices have combined to offer an advanced 4G/5G radio unit that supports high antenna counts and multi-gigabit per second throughput by leveraging next-generation massive MIMO design.³³ And as noted above, both Qualcomm and Xilinx cite performance improvements as factors in their silicon offerings for Open RAN.

D. A New Study Illustrates that Open RAN Will Have a Significant Positive Economic Impact.

Since the initial comments were filed, a leading telecom research firm, Analysys Mason, has released a new study confirming the significant economic impact of Open RAN.³⁴ The study estimates that the economic benefits to global GDP could reach \$285 billion during the 2021-30 period using baseline assumptions, and could double from that level if conditions allow for faster adoption.³⁵ By the end of the period in 2030, Open RAN will be adding \$91 billion per year to global GDP in the baseline case. Notably, these baseline estimates assume a CAPEX savings of 15% in 2025 that rises to 20% by 2030, and a very modest OPEX savings of 3% in 2025 that

³² CommScope Comments at 4.

³³ Press Release, *Marvell and Analog Devices Announce 5G Massive MIMO Radio Unit Solutions*, Dec. 8, 2020, <https://www.marvell.com/company/newsroom/marvell-and-analog-devices-announce-5g-massive-mimo-radio-unit-solutions.html>.

³⁴ Analysys Mason, *The Economic Impact of Open and Disaggregated Technologies and the Role of TIP*, May 2021 (“Analysys Mason 2021 Study”).

³⁵ Analysys Mason 2021 Study at 37.

rises to 10% by 2030.³⁶ Meanwhile, Rakuten has cited CAPEX gains of 40% and OPEX gains of 30%, so the economic estimates in the study may ultimately prove conservative.³⁷

Analysys Mason has also validated other elements of the case for open network architectures. The firm conducted a survey of 60 mobile network operators in 2020, including Tier 1 and Tier 2 operators and new entrants, finding that about 85% of respondents consider disaggregated architecture to be either “essential” or “important” for their next-generation end-to-end networks.³⁸ The survey also confirmed that virtualization of the evolved packet core has actually progressed further than the RAN, with 78% of operators planning to deploy a virtualized core by the end of 2022 – and of those, 60% aim to have started a *cloud-native* core implementation.³⁹

II. THE TECHNOLOGY ECOSYSTEM IS READY TO DELIVER THE BENEFITS OF OPEN NETWORK ARCHITECTURES.

With nearly 50 companies or organizations filing initial comments, the record confirms that the ecosystem of industry players interested in open network architectures is both deep and diverse. It includes software, cloud, and virtualization companies like Dell, Google, Microsoft, Red Hat and VMWare, system integrators like IBM, Fujitsu, and NEC (some of whom also have their own specific product offerings), and semiconductor companies like Arm, Intel, Qualcomm, and Xilinx. Stakeholders with specific yet diverse interests in network core, transport, and RAN solutions have also explained their product offerings and their support for open network

³⁶ Analysys Mason 2021 Study at 39.

³⁷ Rakuten Comments at 5-6.

³⁸ Analysys Mason, [*Open, Disaggregated Networks Will Transform MNOs' 5G Business Cases, May 2020*](#), at 9 (“Analysys Mason 2020 Study”).

³⁹ Analysys Mason 2020 Study at 16.

architectures, including companies like Airhop, Airspan Networks, Ciena, CommScope, and Mavenir.

A. The Record Confirms that Open RAN is Coalescing Around Standards and Frameworks from Key Organizations Including TIP.

The record confirms that the work of TIP and the O-RAN Alliance are complementary and have achieved a remarkably wide level of buy-in across the ecosystem in defining and productizing Open RAN.⁴⁰ Additionally, to the extent there are any bottlenecks in the standards process, TIP is working to ameliorate them. For example, AirHop Communications points out that “industry efforts to increase the flow of use cases standardization, like the work being promoted in the TIP RAN Intelligence & Automation Group (RIA), [are] essential for the success of standards-based [near-real-time] RIC.”⁴¹ The Open Networking Foundation explains that ONF and the ONF SD-RAN project “collaborates and aligns efforts with the Telecom Infra Project.”⁴² Qualcomm confirms that it views TIP and ONF as “forums for implementers to work together on solutions.”⁴³

Likewise, Fujitsu explains that Open RAN standards and policy bodies “include *primarily* 3GPP, O-RAN Alliance, Telecom Infra Project (TIP), the Open RAN Policy Coalition, and others,” and it explains the complementary roles these organizations play.⁴⁴ Rakuten Mobile cites its “key leadership role as co-chair of the Open Core Network working group within the

⁴⁰ *See, e.g.*, Fujitsu Comments at 3 (explaining how the O-RAN Alliance and TIP “align” in the development of interoperable Open RAN solutions, and urging the FCC to note which service providers and vendors participate in multiple bodies).

⁴¹ AirHop Communications Comments at 3.

⁴² Open Networking Foundation Comments at 2.

⁴³ Qualcomm Comments at 4.

⁴⁴ Fujitsu Comments at 3 (emphasis added).

Telecom Infra Project.”⁴⁵ Telefónica mentions its “adhesion to the *most relevant* international initiatives that develop and or promote the adoption and use of Open RAN,” mentioning TIP, the O-RAN Alliance, and the Open RAN Policy Coalition.⁴⁶

As TIP explained in our opening comments, TIP plays a pivotal role in accelerating and productization and commercialization of Open RAN and other open network architectures.⁴⁷ This work is undertaken by aligning mobile network operators and vendors, and (in the RAN context) publishing requirements of various subsystems including the RU, DU, and CU. TIP is also publishing details of various uses cases where AI and machine learning can be applied to drive RAN optimization and improve RAN performance. TIP is also supporting integration activities via its community lab program, and ensuring that Open RAN actually comes to fruition after being hardened through field trials.⁴⁸

CPRI. TIP addressed the promise and pitfalls of CPRI and eCPRI in our opening comments.⁴⁹ TIP agrees with Qualcomm that CPRI’s deployment provides “existence proofs” of RAN disaggregation where baseband processing is separated from radio units.⁵⁰ However, TIP also agrees that “[u]nfortunately, each of these implementations are proprietary.”⁵¹ This further demonstrates the importance of organizations like TIP that go beyond standards to focus on real-world productization and end-to-end testing and validation.

⁴⁵ Rakuten Comments at 17.

⁴⁶ Telefónica Comments at 1 (emphasis added).

⁴⁷ See generally TIP Comments at 36-42.

⁴⁸ *Id.*

⁴⁹ TIP Comments at 14-15.

⁵⁰ Qualcomm Comments at 4.

⁵¹ *Id.*

B. System Integrators Offer Initial Open RAN Deployments and Single-Point-of-Contact Options for Ongoing Support and Lifecycle Management.

As TIP has explained, multiple companies are already providing systems integration services for Open RAN deployments.⁵² The record now clearly demonstrates that several companies offer comprehensive systems integration services for Open RAN, including initial deployment as well as post-deployment support and lifecycle management. For example, Fujitsu serves as the “single point of contact” to provide technical support and issue resolution for its solution, and uses “multivendor laboratory environments with configurations that mirror [its] customer deployments to perform functional, interoperability, performance, and regression testing.”⁵³

Similarly, IBM explains that in its Open RAN deployment in Argentina, the company “led the systems integration, pre-integrating the solution and enabling its end-to-end deployment.”⁵⁴ IBM also envisions that integrators could be responsible for managing the solution post-deployment as well. NEC, which develops Open RAN hardware, also provides systems integration services to operators around the world. In order to provide “pre-tested, integrated Open RAN solutions to carriers,” the company is making significant investments in interoperability testing.⁵⁵ Mavenir states that it “manage[s] end-to-end integration, simplifying the engagement for wireless operators and creating an offering that is on par with those of the traditional, hardware-centric proprietary vendors.”⁵⁶

⁵² TIP Comments at 24-25.

⁵³ Fujitsu Comments at 11.

⁵⁴ IBM Comments at 4.

⁵⁵ NEC Comments at 2.

⁵⁶ Mavenir Comments at 25.

Meanwhile, Airspan Networks offers “5G standalone, end-to-end Open RAN solutions,” as well as 5G RAN and fixed wireless access deployments in which it couples 4G and 5G solutions with Citizens Broadband Radio Service (CBRS) spectrum and point-to-multipoint solutions.⁵⁷ Wavelabs Technologies also works with fixed wireless access and CBRS providers, and can “consult, plan, design, architect, implement, and deliver a 4G (and 5G-ready) end-to-end solution....”⁵⁸

Of course, TIP agrees with commenters who point out that some operators may want more traditional approaches – and in turn, some vendors will meet the needs of the market with “their own mix of open and integrated solutions.”⁵⁹ That said, the single-vendor model may not actually be any more advantageous for small operators even from a support perspective, since small operators are occasionally stymied by the need to deal with different corporate departments within a large vendor.⁶⁰

III. THE COMMISSION SHOULD LEVERAGE AND SUPPORT THE WORK OF INDUSTRY ORGANIZATIONS LIKE TIP.

The record confirms the important role that TIP plays in the open network architecture ecosystem, with many companies referencing their participation in TIP and/or specific work that

⁵⁷ Airspan Comments at 1, 2.

⁵⁸ Wavelabs Comments at 3.

⁵⁹ Ericsson Comments at 10.

⁶⁰ *See, e.g.*, Triangle Communications Comments, WC Docket No. 18-89, at 3 (Apr. 9, 2021) (“Installation of SSPV [sole-source proprietary vendor] equipment necessitates interaction with various, seemingly non-interconnected, departments within the SSPV. When a network problem arises, the situation invariably devolves into intra-company, inter-divisional finger pointing as the cause of the problem is investigated. At the end of the day, Triangle chases down the various finger points to locate the cause of the problem. Triangle understands this to be the nature of the beast, the equipment and connections are immensely complex, and Triangle does not mean to imply any level of dissatisfaction with this process or with any SSPV. Triangle’s point is that Triangle does not see how working with multiple ORAN vendors would differ materially in this regard.”); Mavenir Comments at 25 n. 51 (quoting Triangle).

TIP undertakes.⁶¹ The Commission should leverage this work to advance real-world productization of open network architecture solutions, including specific efforts like TIP’s recent project to create a template RFP for a mobile network operator to procure an Open RAN solution (described below).

Specifically, TIP urges the Commission to explore the possibility of directing funding toward vendor-neutral organizations to support and enhance testing and validation efforts. For example, the USA Telecom Act – which was enacted as part of the FY21 NDAA and specifically mentioned TIP – authorized a grant program to support the development and deployment of these technologies.⁶² The United States Innovation and Competition Act of 2021, which is currently being considered by the full Senate, would appropriate \$1.5 billion to NTIA to fund that program.⁶³ While NTIA would manage that program, Section 2520 of the same bill – which itself authorizes an NTIA-run testbed – also would require NTIA to consult with the Commission “with respect to ongoing work by the Commission to develop other testbeds, including private sector testbeds.”⁶⁴ The Commission should use the record in this proceeding to work with NTIA to promote support for such private sector testbeds in addition to government-led efforts.

⁶¹ See Section II-A *supra*; see also, e.g., AT&T Comments at 6; Intel Comments at 1.

⁶² See William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, Pub. L. No. 116-283, Jan. 1, 2021, at § 9202(a)(1)(C)(ii), public law text not yet available, see [H.R. 6395 enrolled bill](#) at pp. 1401-02.

⁶³ S. 1260, 117th Cong., S. Amdt. 1502 § 1003(a), Schumer substitute amendment, *available at* <https://www.democrats.senate.gov/imo/media/doc/DAV21A48.pdf>.

⁶⁴ *Id.* § 2520(a)(6)(A).

A. TIP’s Real-World Testing and Productization Work Will Promote Interoperability and Build Confidence Among U.S. Operators.

Many commenters urge the Commission to support testbeds of various sorts, and TIP’s Community Lab programs and other activities in recent years have been geared toward testing in various forms.⁶⁵ However, the current reality is that Open RAN deployments are already happening around the world, and building confidence among U.S. operators is one of the key places where the Commission can help.⁶⁶

With this in mind, TIP agrees with Nokia that the Commission should not just support laboratory-based interoperability testing, but also real-world evaluations that go “beyond the lab environment.”⁶⁷ As TIP explained in our initial comments, real-world productization work that goes beyond the standards process to do testing and validation are at the core of TIP’s activities.⁶⁸ TIP agrees, moreover, that these should not be solely lab demonstrations, but ideally “should vary in size and include small network deployments and multiple environments” to help increase operator confidence in adopting Open RAN.⁶⁹

TIP also agrees with Acting Chairwoman Rosenworcel – and other industry commenters – that the Commission should support *industry-led* interoperability organizations or agreements in coordination with other government partners rather than establish duplicative efforts.⁷⁰ As

⁶⁵ See TIP Comments at 39-43.

⁶⁶ See, e.g., Ericsson Comments at 4; TIP Comments at 3-9 (discussing worldwide deployments); *id.* at 32-33 (discussing the need to build operator confidence).

⁶⁷ Nokia Comments at 2-3.

⁶⁸ TIP Comments at 36-41.

⁶⁹ Nokia Comments at 10.

⁷⁰ Remarks of Commissioner Jessica Rosenworcel at Mobile World Congress Americas, Oct. 22, 2019, at 4, <https://docs.fcc.gov/public/attachments/DOC-360362A1.pdf>; see also, e.g., Samsung Comments at 5 (citing Rosenworcel remarks); Dell Comments at 8; CommScope Comments at

CommScope confirms, TIP itself sponsors programs “through which developers can collaborate in an open, vendor-independent environment to test Open RAN technology to verify and improve capabilities, interoperability, and conformity to standards.”⁷¹ We agree with CommScope that the Commission should “*supplement* these efforts,” while not “dictat[ing] specific requirements for these testbeds, which could hinder innovation.”⁷²

B. TIP’s Recently-Released OpenRAN Template RFP Will Help Facilitate Procurement of Open RAN Equipment by Operators and Integrators.

Leveraging the work of its OpenRAN project group, TIP has recently made a template OpenRAN request for proposals (RFP) available to its members. This template RFP is intended to be used by a mobile network operator, or potentially a systems integrator, seeking to procure an open solution.

The template RFP proposes detailed requirements for a disaggregated RRU, CU/DU hardware and RAN software. The RFP provides operators (and responding vendors) with specific values for elements such as frequency bands, power consumption, volume and weight requirements, power efficiency targets, electrical and mechanical requirements, interfaces, server capacity, data rates, KPI and performance requirements (including failure rates and delays in milliseconds), and many more. The RFP also prompts vendors to provide information on more software-focused topics such as NFV platform support, software lifecycle management, and various RAN software features including support for specific automation features in the RAN Intelligent Controller (RIC).

10 (“Open RAN testbeds run by the private sector show the technological advances possible when developers maintain testing flexibility.”).

⁷¹ CommScope Comments at 9-10.

⁷² CommScope Comments at 10 (emphasis added).

The new OpenRAN template RFP is another tangible example of how TIP advances real-world productization work in the RAN space by going beyond standards to help operators and vendors actually deploy disaggregated solutions. The template RFP will provide a benchmark for operators and vendors of all sizes; if adopted widely, it may help streamline the marketplace for new deployments.

CONCLUSION

The time for Open RAN and other open network architectures has arrived, and the Commission was right to begin this inquiry. TIP thanks the Commission once again, and we look forward to collaboration as the agency moves forward in the months and years ahead.

Sincerely,

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