**Written Statement**

**of**

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**Introduction: Who is TIP?**

Chairman Latta, Ranking Member Matsui, Chairwoman McMorris Rodgers, Ranking Member Pallone, and all Members, thank you for giving me the opportunity to testify on the promise of Open Radio Access Networks. I especially appreciate your leadership on this particular issue, from enacting and overseeing the Wireless Innovation Fund to holding this hearing today. I also want to commend my friends Diane Rinaldo, Jeff Blum, and John Baker for their leadership. They are not just my fellow panelists; they lead organizations – the Open RAN Policy Coalition, DISH Networks, and Mavenir – that are our partners in achieving the breakthroughs the Committee seeks.

My name is Kristian Toivo, and I am the Executive Director of TIP, the Telecom Infra Project. TIP is a U.S.-based nonprofit organization comprised of a wide diversity of hundreds of companies and organizations from across the globe. We convene industry to accelerate the development and deployment of open, disaggregated, and standards-based technology solutions and deliver the high-quality connectivity that the world needs. Our activities are industry-led and membership-driven on behalf of 600+ organizations, reflecting the demands of a large cross-section of the telecom industry.

Since early 2016, TIP has convened telecom stakeholders, including carriers, vendors, systems integrators, and policymakers, to drive the transformation of equipment supply chains in a way that facilitates the implementation of disaggregated, multi-vendor networks based on open interfaces. TIP acts as a neutral non-profit industry facilitator, bringing stakeholders together to collaborate on product roadmaps, testing of solutions against common

requirements, and sharing of knowledge and information among demand- and supply-side market participants. Our testing activities are lab-agnostic, managed within TIP Project Groups and governed by TIP's Test & Validation Committee and Board. We also facilitate knowledge sharing between testing facilitators in order to reduce duplication of efforts and facilitate validation and deployment solutions more quickly among the ecosystem.

**The State of Open RAN and the Importance of the Wireless Innovation Fund**

Based on decades of experience in this industry, I think the establishment of NTIA's Wireless Innovation Fund is a profound investment in network infrastructure that is poised to pay dividends for generations to come. The Fund has the capability to accelerate the development and adoption of open, interoperable, and standards-based networks to drive wireless innovation, foster competition, upskill the engineering workforce, and strengthen supply chain resilience. We thank Congress for explicitly recognizing TIP's leadership in the statute that created the Fund.

We are at a critical inflection point for Open RAN technology. Several wireless carriers have successfully deployed the technology in the United States and elsewhere, and others across Europe have signed an MOU indicating joint support for Open RAN adoption.

Still, although carriers today are eager to adopt and deploy Open RAN networks, several market factors have continued to impede progress, including:

- Pressure on revenues and investments stemming from increased competition and a rising demand curve in the post-pandemic environment;

- The need for significant efforts to integrate individual RAN components from different vendors into an Open RAN system, and testing of that system to meet operator quality demands;

- A heightened focus on security and resilience in the current conflict environment, increasing operator costs and limiting risk tolerance; and

- Concentrated equipment supply chains that limit the possibility of new Open RAN vendors to achieve competitive prices when volumes are still low.

The migration to 5G has also proven challenging for wireless carriers, especially as business cases are still emerging. For Open RAN technology to succeed at scale, an ecosystem of companies must address the challenges associated with building and running large-scale reliable radio networks. This is achievable.

In the coming months, we have the opportunity to fundamentally change the global market for Open RAN, thereby promoting diversity, competition, and trust in the telecom supplier market. To explain why this is the case, I want to highlight the crucial distinction between two indispensable concepts in Open RAN:

- First, component-level interoperability, which is the primary focus of the O-RAN Alliance's technical specifications. For instance, ensuring that the radio antenna at the top of the cell tower interoperates with the base station computing functions on the ground below the tower.

- Second, holistic system-level functionality and performance, which is TIP's primary focus. Here, the issue is whether the whole collection of interoperable components work together as a complex and highly functional carrier-grade RAN system.

Here is the basic distinction:  Just as consumers purchase whole roadworthy automobiles, wireless carriers like AT&T and Verizon purchase whole RAN systems.  No consumer would purchase a collection of individual components for a car, and likewise for carriers purchasing RAN.  The way Ford and GM build the "systems" (i.e. cars) that they sell to consumers is very similar to the *pre*-Open RAN model for incumbent RAN vendors selling RAN systems to carriers – fully proprietary systems whose inner workings are largely "closed" to outside vendors.  Open RAN disaggregates this proprietary approach, which requires interoperability testing and evaluation at component interoperability level and also validating the whole system for its functionality and performance.

In short, O-RAN Alliance specification ensures that the individual parts that make up the RAN system are interoperable, and TIP's system-level testing/certification ensures that the whole RAN system functions as it is supposed to.  We have largely achieved component interoperability, but system functionality and confidence in its performance are the market-changing breakthroughs that are needed.  Relatively modest public funding toward this end can make this happen.

**The Need for Systems Certification**

In an Open RAN deployment, multiple different vendors of radio hardware and software, chipsets, compute platforms and cloud orchestration software are partners to the carrier, and it can be difficult for carriers to integrate potentially dozens of vendors into a deployable carrier-grade RAN system, even if the individual components are interoperable.

System-level certification is crucial for wireless carriers to leverage integrated, tested system designs over and over in an efficient and cost-effective manner.  This challenge does not

exist in closed proprietary RAN systems since each vendor designs, builds, tests, integrates, deploys, and supports their own solutions. However, for Open RAN to flourish, we must establish a trusted, neutral, non-profit, and global systems-level certification regime. Industry has repeatedly underscored the need for an industry-led systems validation and certification process. In fact, many companies have urged NTIA to use Wireless Innovation Fund grants to establish an independent entity to perform this function, with some citing the Wi-Fi Alliance as a useful model for the systems certification regime.

TIP is seeking to leverage its experience and technical relationships to further cultivate this capability for the Open RAN industry globally. Individual carriers or individual vendors cannot perform this function because companies will not seek certified solutions from their competitors or from company-specific labs. Thus, a neutral non-profit entity with a global reach is needed to work with multiple lab partners throughout the world for a trusted systems-certification regime that can serve the global telecom market.

While TIP has made great progress in recent years through various Open RAN testing events and field trials, the Open RAN industry still lacks a deployment-ready "finish line" that establishes operator confidence. System certification is the critical missing link to accelerate Open RAN's market readiness by providing carriers with Open RAN solutions ready for their own further carrier-specific acceptance testing. There remains a window of opportunity for deployments within the remaining 5G build cycle, including in the growing domain of private networks, but industry and government must act together now. Given the long cycles of RAN development and deployment where extensive live trials and smaller scale deployments must

precede a large-scale roll-out, the need for establishing an Open RAN system certification

capability is at a critical juncture.

**Conclusion**

The Wireless Innovation Fund is poised to seize this moment with targeted investments.

As the industry continues to mature, public investment is necessary to fully realize the systems

certification model and to realize the promise of U.S. and allied trusted suppliers. I look forward

to your questions as we discuss this opportunity.