June 18, 2020

Mr. Travis Hall
Office of Policy Analysis and Development
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue NW
Washington, DC 20230

Via email to: secure5G@ntia.gov

RE:     The National Strategy to Secure 5G Implementation Plan [RIN 0660-XC04]
        Docket No. 200521-0144

Dear Mr. Hall,

The Telecom Infra Project appreciates this opportunity to provide comments to the National Telecommunications and Information Administration on the development of an Implementation Plan for the National Strategy to Secure 5G (Implementation Plan). Disaggregated, open, and standards-based solutions should play a central role in the US Government's Strategy to ensure the security of next generation wireless communication systems and infrastructure.

The Telecom Infra Project (TIP)[1] is a global community of companies and organizations working together to accelerate the development and deployment of open, disaggregated, and standards-based solutions that deliver high-quality connectivity. TIP has a diverse membership that spans hundreds of member companies across the telecommunications ecosystem – from service providers and technology partners, to system integrators and connectivity stakeholders. This global community is already designing, building, and bringing to market a portfolio of disaggregated solutions that improve flexibility, strengthen security, and drive down the costs of building telecom infrastructure.

TIP's innovative approach to telecom infrastructure is both collaborative and comprehensive, supporting Project Groups that design, build, and trial new technologies, Community Labs that test and integrate TIP technologies, the TIP Exchange marketplace that hosts TIP-incubated products, and TIP's Start Up Accelerators. Our diverse membership allows us to offer a unique perspective to inform NTIA's Implementation Plan – drawing from the broadest possible industry base.

As the US Government works to ensure the security of next generation wireless communications systems and facilitate the accelerated development and rollout of 5G infrastructure nationwide, a strategy that promotes the adoption of open, disaggregated networks will enable choice, drive competition, and enable the flexibility to rapidly improve and secure 5G networks. Below, TIP addresses key questions across the four lines of efforts raised in the May 28th request for public comments:

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[1] A full list of TIP's members is available here: https://telecominfraproject.com/members/

I.      **Line of Effort One: Facilitate Domestic 5G Rollout**

(1) *How can the United States (U.S.) Government best facilitate the domestic rollout of 5G technologies and the development of a robust domestic 5G commercial ecosystem (e.g., equipment manufacturers, chip manufacturers, software developers, cloud providers, system integrators, network providers)?*

Upgrading 5G network capabilities within a closed telecom system is both time and resource intensive. The US Government should prioritize open, disaggregated 5G networks that address the challenges of a consolidated ecosystem by providing network operators more choice and flexibility to improve network security and resilience quickly. Disaggregation — separating complex technologies into small pieces that can be combined in different ways — will allow for more flexible 5G networks that let operators develop and upgrade individual components, selecting the best technology available at any point in time for each piece of the 5G ecosystem.

Rather than sourcing integrated infrastructure solutions from a very limited set of suppliers, operators can choose from a wide range of software and hardware options that interoperate seamlessly — thereby ensuring a robust US 5G ecosystem.

Further, separating out complex technologies and ensuring interoperability means more companies, including SMEs, can compete in different parts of the technology stack — incentivizing innovation and giving network operators more choice among both incumbent and emerging solutions. This can make the process of upgrading networks — either partially or fully — easier, faster, and more cost efficient.

A dynamic US ecosystem where new suppliers can innovate, compete, and bring to market new solutions faster will expand access to 5G technologies, ensure providers are able to evolve with demand, and foster resilience throughout the entire domestic 5G ecosystem.

(2) *How can the U.S. Government best foster and promote the research, development, testing, and evaluation of new technologies and architectures?*

The US Government should fund public private partnership programs and grants to support university and community labs working to develop and bring to market open, disaggregated, and standards-based 5G solutions. The Telecom Infra Project's Community Labs in Colorado, Kansas, and California for example, are working to enable rapid real-world pilots that will lead to the adoption of new solutions at scale.

Additionally, Congress should work expeditiously to pass S.3189, the USA Telecom,[2] introduced by Sens. Mark Warner [D-VA] and Richard Burr [R-NC]. This bipartisan legislation establishes a Public Wireless Supply Chain Innovation Fund to support grants that promote competition and

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[2] S. 3189 – *A bill to use proceeds from spectrum auctions to support supply chain innovation and multilateral security*. Introduced Jan. 14th, 2020 in the 116th Congress. https://www.congress.gov/116/bills/s3189/BILLS-116s3189is.pdf

innovation in the 5G commercial ecosystem, as well as the development and deployment of open, standards-based, interoperable equipment.

Further, US lawmakers should pass the bipartisan, bicameral Endless Frontier Act[3], which authorizes $100 billion for a new Directorate of Technology within the National Science Foundation – supporting US research in key technology focus areas, including advanced communications technology. The bill will fund regional technology hubs, grow research spending for universities, provide scholarship support for students, fund the development of test-bed facilities, and support programs that facilitate and accelerate the transfer of new technologies from the lab to the marketplace. This strategic investment is key to incubating new US intellectual property and enterprises that will drive competitiveness across the entire telecom network ecosystem.

(3) *What steps can the U.S. Government take to further motivate the domestic-based 5G commercial ecosystem to increase 5G research, development, and testing?*

The US Government should encourage platforms for industry collaboration and experimentation and support innovation across the entire ecosystem, including local startups and SMEs. The Telecom Infra Project's Ecosystem Acceleration Centers (TEACs) for example, attract entrepreneurial minds and innovative investors to work together to produce breakthrough technologies that reimagine telecom infrastructure. By bringing together the key actors – operators, cutting-edge startups, and local investors – TEACs establish the necessary foundation to foster collaboration, accelerate trials, and bring deployable infrastructure solutions to the telecom industry.

(4) *What areas of research and development should the U.S. Government prioritize to achieve and maintain U.S. leadership in 5G? How can the U.S. Government create an environment that encourages private sector investment in 5G technologies and beyond? If possible, identify specific goals that the U.S. Government should pursue as part of its research, development, and testing strategy.*

In order to facilitate roll-out and development of a robust 5G ecosystem, the US Government should prioritize R&D funding to accelerate the development, deployment, and adoption of a range of disaggregated telecom network technologies, including OpenRAN. OpenRAN is the term used to describe a new way of structuring the radio access network (RAN) equipment in mobile networks. RAN equipment comprises the masts, antennas and associated parts that mobile network operators use to connect wirelessly with mobile devices like smartphones. Disaggregated approaches to RAN support more robust, resilient, and cost-effective network

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[3] S.3832 – *A bill to establish a new Directorate for Technology in the redesignated National Science and Technology Foundation, to establish a regional technology hub program, to require a strategy and report on economic security, science, research, and innovation, and for other purposes*. Introduced May 21st, 2020 in the 116th Congress. https://www.young.senate.gov/imo/media/doc/Endless%20Frontier%20Act%20Bill%20Text%205.21.2020.pdf

deployment, and enable a competitive ecosystem that can incentivize vendors to prioritize security.

OpenRAN also makes the development process more transparent and accessible. This means that independent security experts, government departments, national security agencies, and other vendors have much greater transparency into the development process, not just the subsequent performance, and can gain greater assurance.

Achievement of the full benefits of 5G depends not just on RAN equipment, but a robust set of disaggregated technology for the transport layer – through which network traffic is routed – and the core – which  coordinates how these signals are sent and received. Continued innovation in these areas will enable network operators to keep up with growing demand and provide new services efficiently and securely.

US R&D funding should promote disaggregate, interoperable technologies across three key network areas:

- **Access –** This network area includes new and innovative technologies spanning: OpenRAN, as described above; solutions for sustainable community infrastructure in rural areas; fronthaul connections between cell sites and centralized baseband units in virtualized networks; and Wi-Fi.
- **Transport –** Transport solutions work to improve the technologies that let operators route and deliver traffic across their network to satisfy ever increasing demand. TIP is currently leading several transport project groups, including Open Optical and Packet Transport (OOPT), which works to accelerate innovation in IP and Optical networks; and wireless backhaul to transmit network traffic from the edge of a network to the core more efficiently.
- **Core and Services –** Core and Services solutions help operators manage their networks more efficiently and develop new services including: edge applications; virtualization of core network functions; and end-to-end network slicing, to develop discrete, bespoke, fully virtualized specialized services within a single telecom network.

Finally, by supporting industry approaches to accelerate development, experimentation, and refining of new solutions, including OpenRAN trials, the US Government can encourage greater private sector investment in 5G and help support the development of disaggregated, open solutions that will support a secure domestic 5G ecosystem.

II. **Line of Effort Two: Assess Risks to and Identify Core Security Principles of 5G Infrastructure.**

(1) *What factors should the U.S. Government consider in the development of core security principles for 5G infrastructure?*

As the US Government works to develop core security principles for 5G infrastructure, diversity, disaggregation, interoperability, and open standards should play a central role.

- **Diversity –** The telecom industry would benefit from a greater diversity of suppliers across all areas of networks, including RAN. Greater diversity of suppliers will increase competition, accelerate innovation, and enable the development of global infrastructure that can keep up with demand. A more diverse market has direct security implications, as it provides greater incentives to compete on security and trust, as well as greater flexibility to mobile network operators to choose the solutions most appropriate to meet their needs.
- **Disaggregation –** Disaggregation means separating complex technologies into small pieces that can be combined in different ways. By separating previously integrated hardware and software, and shifting to open, rather than closed, and proprietary interfaces between components, disaggregated networks give operators (and, by extension, consumers) greater choice and flexibility, lower costs, and boost competition – generating more diverse, secure supply chains. A disaggregated network lets operators develop and upgrade individual components of the network, selecting the best, most secure technology available at any point in time for each piece of a telecom network. They can choose from a wide range of options that interoperate seamlessly, instead of having to source integrated infrastructure solutions from a very limited set of suppliers. A disaggregated telecom equipment ecosystem also boosts security by changing the development culture, as network security is best achieved through open scrutiny of development practices.
- **Interoperability –** Interoperability allows more companies, including SMEs, to compete in different parts of the technology stack — incentivizing innovation and giving network operators more choice among both incumbent & emerging solutions to choose the most secure components and solutions. This ensures the process of upgrading networks — either partially or totally — is easier, faster, and more cost efficient.
- **Open Standards –** Open standards provide transparency and certainty in what a product contains, increasing predictability and trust in supply chains. A system of open standards also increases competition and ease of market entry, creating more incentives for suppliers to invest in and ensure security and resilience.

III. **Line of Effort Three: Address Risks to U.S. Economic and National Security during Development and Deployment of 5G Infrastructure Worldwide.**

(3) *How should the U.S. Government best promote 5G vendor diversity and foster market competition?*

By supporting the development and deployment of an open, disaggregated, standards-based telecommunications ecosystem, more companies will be able to compete and operators will have greater choice and flexibility, opening space for new market entrants. Legislation like the USA Telecom Act, that fosters innovation and competition within the 5G

technology ecosystem by supporting Open RAN R&D and open-architecture wireless technologies, is key to driving vendor diversity and greater competition.

IV. **Line of Effort Four: Promote Responsible Global Development and Deployment of 5G**

(1) *How can the U.S. Government best lead the responsible international development and deployment of 5G technology and promote the availability of secure and reliable equipment and services in the market?*

Telecom equipment markets are global, and a global shift towards disaggregated approaches like OpenRAN are critical to creating a competitive ecosystem that will accelerate and scale disaggregated approaches efficiently. On the international stage, TIP believes that US government leadership is critical to enable an industry-wide shift towards open, interoperable, and disaggregated telecom infrastructure. There are concrete initiatives and pieces of legislation underway that can better position the US Government to lead the responsible international development and deployment of 5G technology if fully utilized, including:

- **Digital Connectivity and Cybersecurity Partnership (DCCP)** – USTDA, in partnership with the Department of State, USAID, the Department of Commerce, the Department of Homeland Security, and several other agencies, is working with industry to promote an open, interoperable, secure, and reliable Internet around the world. The DCCP supports communications infrastructure development through private led partnerships by promoting transparent regulatory policies for open competitive markets. DCCP also builds partners' capacity to address shared security threats, along with capacity building and commercial engagement activities. By coordinating new and existing instruments of US diplomacy and development, DCCP can mobilize private sector investment that supports not just development and opportunities for companies of the US and its allies, but a more open, robust, and competitive ecosystem. TIP urges the US Government to direct greater funding and resources to this program in order to better support the responsible international development and deployment of 5G technology and promote secure, reliable, open connectivity solutions.
- **S.3189 – USA Telecom Act [***a bill to use proceeds from spectrum auctions to support supply chain innovation and multilateral security***] –** This bipartisan legislation creates a $500 million Multilateral Telecommunications Security Fund, working with our foreign partners, to accelerate the adoption of trusted and secure equipment globally and to encourage multilateral participation. TIP urges Congress to pass this legislation and authorize explicit funding for more robust US government involvement in multilateral organizations involved in 5G technology and telecommunications policy globally.

The Telecom Infra Project appreciates the opportunity to provide comments on this critical issue and looks forward to working with the US Government as it develops an Implementation Plan for the National Strategy to Secure 5G.