June 25, 2020

BY ELECTRONIC MAIL

National Telecommunications and Information Administration

U.S. Department of Commerce

1401 Constitution Avenue NW, Room 4725

Attn: Secure 5G RFC

Washington, DC 20230

Re: Docket 200521-0144

NEC Corporation of America is pleased to submit comments regarding the National Strategy to Secure 5G and would like to highlight our contribution to mitigate the United States government's concern about new risks and vulnerabilities in the 5G era. We believe NEC may assist the United States to lead the development, deployment, and management of secure and reliable 5G communications infrastructure by taking early advantage of the benefits that this new technology offers, especially with radio access networks based on open and more interoperable interfaces.

1. Introduction

NEC Corporation, with $28 billion revenue, a presence in over 160 countries and regions, and more than 110,000 employees worldwide, is recognized in Top 100 Global Innovators and included as a Fortune Global 500 technology leader. One of the world's top patent-producing companies, NEC combines advanced technologies, services, knowledge, and its 120 years of operating expertise to help ensure safety, security, efficiency, and equality in modern society. Since the founding of the company in 1899, NEC's technologies and solutions have contributed to the development of telecommunications, including the switching systems at the very beginning, and continuing through the evolution of mobile infrastructure from the first generation of analog systems and now towards 5G. NEC also has a wide range of global capabilities from underwater sea cables and satellites in space to advanced unified telecommunications and biometric solutions across the United States and around the globe. Our North American headquarters is in Irving, Texas and has been present in the United States since 1963. Our offices span 16 states, including the Federal Operations office in Arlington, Virginia. NEC Corporation of America implements,

deploys, and supports large-scale, information technology and communications solution integrations throughout the U.S., sustaining mission-critical services to government, national security and law enforcement agencies, and commercial businesses. NEC, a member of the IT Sector Coordinating Council, is committed to providing reliable and secure solutions for our U.S. critical infrastructure customers.   NEC's business is focused around Public Safety, Social Infrastructure and Network Solutions domains toward 5G. We see the United States as strategically important in all three of these areas.

We welcomed the publishing of the National Strategy to Secure 5G and the opportunity to provide comments for the development of the Implementation Plan. This is an important turning point for the United States together with trusted partners to lead the development, deployment, and management of secure and reliable 5G communications infrastructure and remain the world leader in communications technology for years to come. Our comments revolve around two main recommended approaches in implementation 1) leading the advancement of Open RAN initiatives, and 2) working closely with allies through the execution of all lines of effort.

2. Comments

NEC is committed to continually improving our network solution technologies to provide the most innovative capabilities to the U.S. communications infrastructure industry and mitigating new risks and vulnerabilities from the advancement of 5G. One of these key technologies that we have pursued with technology partners in the United States and which will enhance national security, diversify supply chains, and improve network performance is open architecture and open radio access networks (O-RAN). This architecture fully supports the U.S. 5G strategic vision and there are a number of reasons for the U.S. to accelerate faster adoption and mitigate security risks alongside the country's closest partners and allies.

With 5G, the traditional rules of mobile architecture are changing and the evolution to open, modular software-defined and flexible architecture is underway to meet the needs of ever-increasing data traffic as well as diverse vertical markets and service requirements. O-RAN was pioneered by the O-RAN Alliance that pushes for more open interfaces in RAN equipment and is generally referred to disaggregated RAN functionality built using open interface specifications between elements such as baseband units and radio units. It can be implemented in vendor-neutral hardware and software-defined technology based on open interfaces and community-developed standards. NEC has promoted open architecture approaches and has developed radio units for 5G base stations that comply with O-RAN fronthaul specifications established by the O-RAN Alliance. This has included supporting NTT DOCOMO, which has already realized interoperability between base station equipment of NEC and other vendors with O-RAN Alliance-compliant fronthaul and X2 interfaces in their 5G commercial service. Further, NEC is mass-producing O-RAN compliant radios for Rakuten Mobile, which is now building the world's first fully virtual multi-

vendor 5G radio access network conforming to O-RAN specifications across Japan. These are just a few examples of the development of the technology for initial deployments and additional research and development can realize the full potential of these architectures.

An O-RAN-based architecture allows service providers much greater control, visibility and transparency to ensure the security of data. It also introduces interoperable components from a much wider variety of hardware (radio, server, and chip) and software (virtual RAN, orchestration, O/BSS) suppliers into the supply chain, enabling greater functionality and enhanced security in 5G systems, as well as transformational applications of this technology.

Pursing Open RAN approaches will present new opportunities for U.S companies from enterprises to start-ups to enter the market and compete. This represents a proven ability to introduce further vendor diversification in the United States providing alternatives to the existing traditional vendors. This diversity of vendors is important to avoid a situation where a service provider is completely reliant on a single vendor to maintain operations. In addition to security aspects, it allows for a far more dynamic and flexible network that can tailor specific technical requirements for different use cases from industries such as retail, manufacturing, logistics and others.

In early May, thirty-one companies, including NEC, formed the Open RAN Policy Coalition. The group's purpose is to promote policies that will advance the adoption of open and interoperable solutions in the radio access network as a means to create innovation, spur competition and expand the supply chain for advanced wireless technologies including 5G.   The formation of this coalition, and it's continued growth in membership in the intervening months, has demonstrated the broad support for this approach throughout the 5G market in the United States and internationally.

By building its 5G networks with equipment from only traditional vendors, which use proprietary technology and closed architecture, the United States and allies would not only be precluding opportunities for industries. It would also limit future opportunities to upgrade to cutting edge 5G infrastructure and pass up the chance to leverage a substantially expanded supply chain that fosters healthy competition in a more robust telecommunications market. NEC believes that we are well placed to assist in the development of 5G networks in the United States with an open ecosystem approach. Adoption of this emerging technology will enable U.S. service providers to achieve new levels of vendor diversification resulting in faster time to market, disruptive business models, and greater innovation.

In addition to developing the ecosystem of hardware and software vendors to build a complete architecture utilizing open and interoperable systems, attention must be given to the integration of these technologies

together and support to carrier network operators in fielding and supporting these solutions. There are multiple of examples of such initiatives underway, including the opportunity for U.S. firms to bring important expertise and technology to this important function of the network.

However, at present there are a number of challenges in making O-RAN technology standard that will need to be overcome by government support and initiatives, to drive fast adoption:
- Traditional network vendors are not motivated to encourage adoption of open standards.
- Time to market for new technology is protracted due to the high number of trials required.
- New technology inevitably requires more validation before it can be adopted into networks.

Due to the significant consolidation in telecommunication manufacturing towards economies of scale over the past decades, there is a tendency for service providers to remain with traditional network vendors with whom they have existing relationships. It has created a vendor lock-in situation and makes it difficult for innovative and open-architecture oriented players to enter the market. This approach would negatively impact the ability of the United States to lead in the 5G network infrastructure market.

In addition to supporting the development and deployment of Open RAN technologies, it will be important for the Unites States to work closely with allies throughout the implementation of this strategy. As the National Security Strategy outlined plans to "nurture a healthy innovation economy that collaborates with allies and partners", and the National Defense Strategy further describes plans to harness the national security innovation base by "cultivating international partnerships to leverage and protect partner investments", the implementation of the Strategy to Secure 5G presents an opportunity to demonstrate the value of this important approach. The U.S. communications technology industry will not be sufficient to tackle these challenges alone, nor should that be the intent. The United States is fortunate to have the strength of alliances that are rich in technology innovation that can be leveraged, in partnership with U.S. industry to create solutions that will make it possible to achieve the objectives of this Strategy.   The technology partnerships on which network operators in Japan are developing their 5G networks is a clear example of the value of these partnerships and the United States should encourage additional innovation and deployment of models like this.

Line of Effort One: Facilitate Domestic 5G Rollout
NEC appreciates that the United States government has indicated a willingness to work with service providers to overcome challenges with new open architectures and encourage them through various mechanisms.   NEC also appreciates that it would be beneficial for the U.S. government to facilitate an initiative to support the interoperability of O-RAN architecture and legacy networks provided by conventional network vendors. The adoption of open architecture technology will encourage significant

innovation of services through the extensive United States network of innovation hubs and start-up companies. These initiatives for facilitating a domestic 5G rollout will be best achieved through close technology collaboration between existing U.S. companies, the development of new U.S.-based technology and manufacturing, and technology partners from within the broader U.S. and allied innovation base. Together, these collaborative technology partnerships, supported by U.S. and allied government actions, will see to the effective deployment of 5G technology within the United States and the development of new technology capabilities domestically that will serve the U.S. and allies into the future.

Specifically, these efforts could be aided through funding the replacement of "covered equipment and services" under Section 4 of the Secure and Trusted Communications Networks Act. Some portion of this funding could be reserved for recipients who elect to use the funding to deploy network equipment which includes open interface standards-based compatible, interoperable equipment, such as equipment developed pursuant to the standards set forth by organizations such as the O-RAN Alliance and the Telecom Infra Project.

Additional support could include funding to support innovation by U.S. and allied country vendors of open and interoperable RAN solutions to spur research and development and pilot deployments towards open-architecture, software-based wireless technologies, and other advanced technologies in the U.S. mobile broadband market.

Line of Effort Three: Address Risks to U.S. Economic and National Security during Development and Deployment of 5G Infrastructure Worldwide.
The single most significant step the U.S. Government can take to best promote 5G vendor diversity and foster market competition is through the various efforts to promote Open RAN solutions in the market. As discussed, this will significantly expand the availability of vendors throughout the 5G architecture, resulting in increased innovation, security, efficiency and effectiveness of U.S. and global 5G network deployments.

Line of Effort Four: Promote Responsible Global Development and Deployment of 5G
We encourage the United States to play a key role in identifying and highlighting practices, supporting good governance and fair voting at international standards organizations to promote international coordination and cooperation among allies for deployment of 5G O-RAN architectures.

To effectively promote a diverse, competitive supply chain of trusted, secure, open and interoperable technologies, the implementation could consider leveraging U.S. State Department and U.S. international

funding agencies, along with partnerships with similar organizations like the Japan Bank for International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI) to include preferences for open, interoperable and standards based equipment in wireless projects that will result in the deployment of open interoperable network equipment from trusted vendors and service providers. The U.S. government can also work with allied partners to encourage deployments in other markets, fund international collaboration such as joint research and development programs, and coordinate with like-minded countries to adopt similar policies such as supporting open and interoperable RAN solutions from trusted vendors and service providers with their government funding sources.

3. Closing

Thank you for taking the time to consider these comments. The investments that NEC is making in developing a 5G O-RAN, providing secure, resilient, highly scalable networks around the world is gaining significant interest. We would be delighted to have the opportunity to support the United States government's National Strategy to Secure 5G by our open architecture approach with ecosystem partners based in the United States and provide an alternative approach to driving faster adoption of 5G than through typical traditional technologies.   This can, in turn, create new innovative business opportunities in every industry for American workers to meet the demands of a growing 5G global market. We believe that making strong investments and support by the U.S. government for O-RAN now will help ensure the U.S. remains the world leader in communications technology for years to come.

Sincerely,

Shin Takahashi
Chairman and Head of Government Relations