Before the

Federal Communications Commission

Washington, D.C. 20544

In the Matter of	)	
Applicability of Section 4 of the Secure Networks	)	WC Docket No. 18-89
Act to the Rulemaking on Protecting Against	)	DA 20-406
National Security Threats to the	)	
Communications Supply Chain	)	

Reply Comments of Blue Danube Systems, Inc.

Blue Danube Systems, Inc. (Blue Danube) files reply comments in response to the Federal Communications Commission's (FCC/Commission) Wireline Competition Bureau (Bureau) Notice regarding Section 4 of the Secure and Trusted Communications Networks Act of 2019,[1] "signed into law on March 12, 2020, applies to proposals under consideration in the Commission's *Protecting Against National Security Threats to the Communications Supply Chain* rulemaking and related proceedings (Public Notice)"[2]

In this proceeding, Blue Danube addresses the questions raised by the FCC in the Public Notice on "how should the Commission develop a list of suggested replacement communications

[1] Pub. L. 116-124, 133 Stat. 158 (2020) (Secure Networks Act).

[2] The Public Safety and Homeland Security Bureau previously sought comment on the effect of the Secure Networks Act on the initial designation proceedings of Huawei and ZTE. *See Public Safety and Homeland Security Bureau Seeks Comment on Applicability of Secure and Trusted Communications Networks Act of 2019 to Initial Designation Proceedings of Huawei and ZTE*, PS Dockets 19-351, 19-352, Public Notice, DA 20-267 (PSHSB Mar. 13, 2020); *See also, Wireline Competition Bureau and Office of Economics and Analytics Open Reporting Portal for Supply Chain* Security *Information Collection*, *Requires Eligible Telecommunications Carriers to Report Existing Huawei and ZTE Equipment and Services and Replacement Costs, W.C. Docket 18-89,* DA 20-166, (Feb. 26, 2020).

equipment and services?" Blue Danube also suggests herein guidelines that should be considered to ensure that the replacement of insecure telecommunications infrastructure equipment provides the most significant advantage to the operators and their customers. Finally, Blue Danube includes information on the need for open interfaces for all equipment to ensure technology leadership and advancements can be achieved for the United States (U.S.).

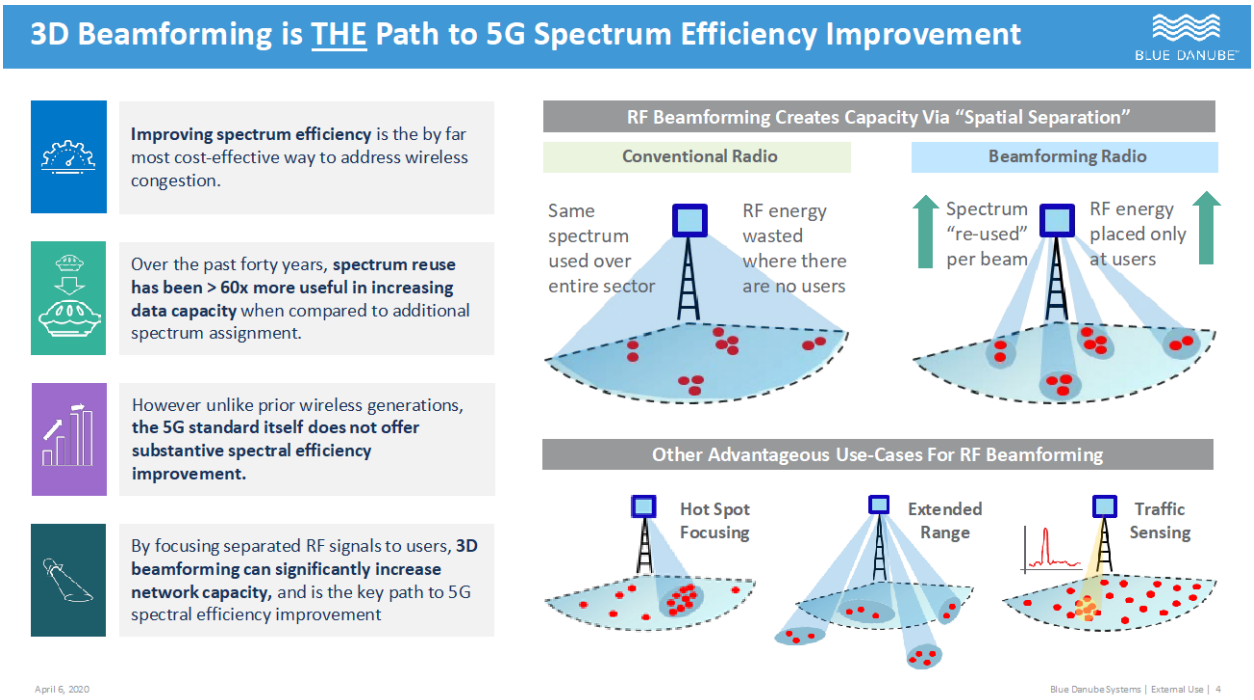
I. Background

Blue Danube is the only U.S. vendor providing advanced Phased Array Radio Antenna Systems (Massive-MIMO) solutions for LTE and 5G Networks. The company is a U.S.-headquartered small business and a supplier of advance Phased Array Radio Antenna Systems for use with both LTE (4G) and 5G. Blue Danube is U.S.-owned, and all development and manufacturing occurs in the U.S. Principal owners include Sequoia Capital, Northgate Capital, Silver Lake Capital, AT&T, Stanford University, and Blue Danube own employees.

Blue Danube has developed and is manufacturing 3D beamforming MaMIMO radios based on a breakthrough in phased arrays, similar to systems used by military and intelligence agencies, but at a much lower cost. Blue Danube builds next-generation commercial wireless solutions for mobile networks and other applications using 3D beamforming MaMIMO solution.

Our Coherent MaMIMO solution brings 5G beamforming to today's commercial and government networks, dramatically increasing network capacity and end-user experience. With a cloud-based software suite that uses Artificial Intelligence (A.I.) and Machine Learning (M.L.) techniques, Blue Danube 's technology enables up to a 10X capacity increase with today's smartphones.

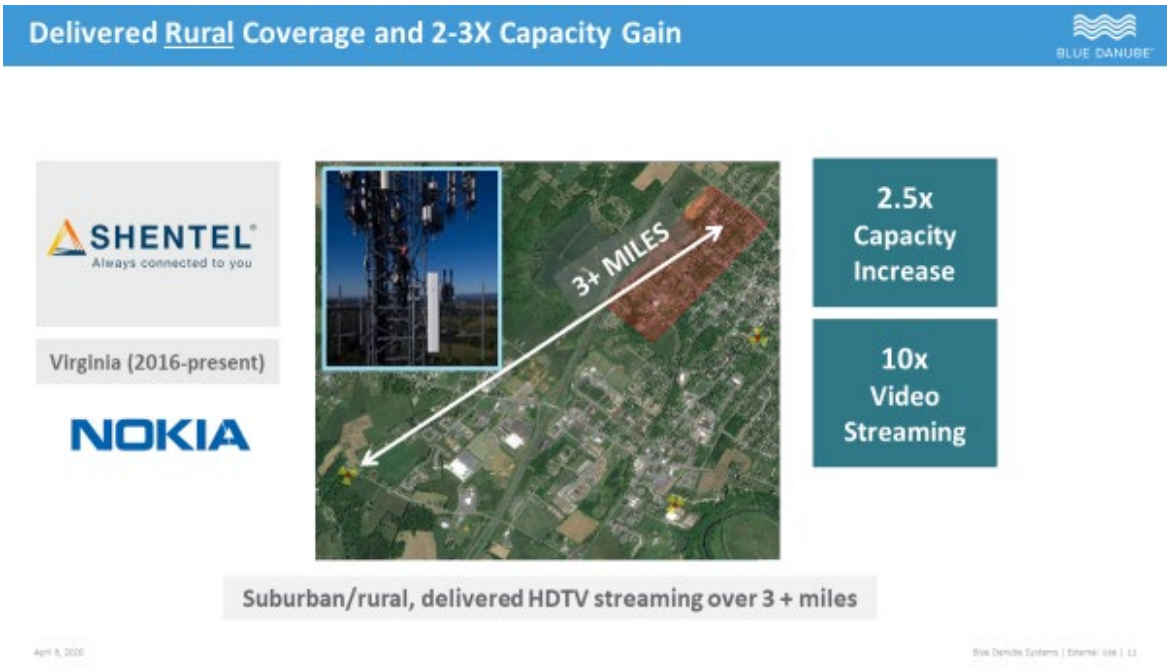
The Blue Danube solution has been proven on multiple carrier networks. It is the only MaMIMO system to improve FDD bands, representing 100% of the sub-6GHz spectrum holdings of those operators using equipment designated as a National Security Threat to the Communications Supply Chain.



Our phased array Radio antenna systems have been in commercial operation in the U.S., Mexico, Australia, and India for over 3 ½ years. In each case, the products have improved the performance and reliability of the existing cellular system. Specifically, the products have increased capacity and coverage in each mobile cellular network that we have provided equipment.

Blue Danube has deployed its network technology in dense urban deployments and solved specific coverage problems, such as the top floors of high-rise buildings and offloading low band carriers (600-800MHz). Also, the products have been used in **rural** deployments to improve coverage and increase data speeds at a distance from the cell towers. The Blue Danube products deliver R.F. energy where it is needed and when it is required.

In 2016, Blue Danube deployed its 3D beamforming MaMIMO technology in rural Virginia via the telecommunications provider SHENTEL. Working through Nokia core network equipment, we increased the capacity gain by 2.5x, as can be seen below.



Besides, increasing the effectiveness of the existing spectrum, the solution can also alleviate pressure by freeing another currently allocated spectrum, and can multiply shared capacity to minimize the effect on incumbent owners. Additionally, new network operators can deploy at vastly lower upfront costs because of improved coverage from beamforming. The MaMIMO radios can transform the way mobile network operators use their spectrum, saving money and resources, and providing a better quality of service through beamforming. This technique focuses on wireless signals toward high data traffic users, rather than having the signal spread in all directions like a conventional broadcast system normally would. The more direct connection is faster, but most importantly, the same spectrum can be reused in each beam.

II. Blue Danube Supports The Use of Several Sources to Develop a List of Replacement Equipment and Service Providers.

The Commission should seek to use the membership lists of industry Consortiums such as the ORAN Alliance, The Open RAN Policy Coalition, the National Spectrum Consortium, and 3GPP (3G Partnership Project) to develop a list of replacement equipment providers initially. We also suggest using organizations such as the IWPC (International Wireless Industry Consortium) that is a U.S. based Wireless Industry Group and has an extensive global database of providers to the wireless industry. The IWPC includes all equipment and services providers and operators. We believe that the IWPC could help screen the list of companies and add any additional missing companies from other sources.

In developing a list of service providers, the Competitors Carrier Association (CCA) is also a U.S. based group representing most of the smaller operators that are using the unsecure equipment. The association can provide advice on the specific unsecured equipment and services that are in operation in the U.S.

Precise names of equipment and services are not required, and the specific details should be chosen by the operators replacing the unsecured equipment. However, suppliers of parts of the network, including small suppliers, should have the opportunity to participate in the equipment replacement. For this reason, the network equipment can be broken into broad categories such as Radio and Antenna equipment, power-cabling-tower equipment, Baseband, and Distributed Unit equipment, EPC and Central Unit equipment, ancillary equipment such as billing systems, operational support system, packet gateways.

Suppliers of virtual network equipment and services should be included. The move to standard computing platforms and away from purpose-built platforms is an essential step toward opening up the supply chain and advancing innovation.

III. The U.S. plan to replace unsecured infrastructure equipment must provide up-to-date capabilities that, at a minimum, should be upgradeable to 5G.

The insecure equipment that is currently installed in the U.S. is of various ages and vintages. This replacement effort must include two key objectives: 1) all installed replacements should be the newest available equipment, and 2) all gear should be LTE-compatible, and at a minimum, be upgradeable to 5G. It means that all equipment can be upgraded to 5G and not require a "tower climb" or "truck roll" to accomplish the upgrade. The products should be capable of performing 3D beamforming for capacity and coverage (including **rural** areas) where required. Also, the products should use standard open interfaces (as discussed in Section IV) or be upgradeable to open interfaces, again without a requirement for a "tower climb" or "truck roll."

IV. Open Radio Access Interfaces should be mandatory; at a minimum, all products should be remotely upgradeable to Open Interfaces.

Many of the core cellular network interfaces are open. It has given several companies the ability to develop and implement products in this space. Open interfaces have driven the whole "virtualization effort." It has led to the use of standard computing platforms to perform functions that were once delivered on individual purpose-built platforms. There is one primary system interface that is still not "open" the radio access interface.

To date, the industry has almost universally implemented the Common Public Radio Interface (CPRI) to link the radio to the baseband part of the core network. While CPRI is a standard, the implementation details are not – as a result, the large OEMs have each implemented the CPRI with hundreds of different control messages, packet sequences, and timing methods. In essence, this has the effect of making this interface proprietary to each OEM. The major operators have pushed for years to have this interface documentation open, with only modest results. It has limited the ability of small companies such as Blue Danube to enter the market successfully. It has slowed the implementation of advanced technologies being developed by innovative companies in the U.S.

Key industry stakeholders are pushing once again to establish an open interface to the radio. The Open Radio Access Network (ORAN) Committee has excellent support in the industry and is working to develop a more robust open interface to the radio. Most major OEMs are participating in this effort, as well as many smaller companies, including Blue Danube. One concern that has already surfaced is the number of "optional" features in the standard. There are many "mandatory" features, but if the committee cannot agree on a feature, it is optional. This practice creates the potential that a vendor could still have a "proprietary" interface to the radio, defeating the goal of open access. Vendors must be required to provide clear and accessible documentation of any feature using the radio interface. It will allow a broader supply chain, more significant innovation, and new business models.

V. Conclusion

Blue Danube strongly supports the replacement of infrastructure equipment that is not secure. Replacement equipment should include up-to-date products and be fully upgradeable to support 5G. Advanced capabilities such as 3D beamforming should be implemented, and all

equipment should have open interfaces to the radio equipment or be remotely upgradeable to open interfaces. It will drive U.S. innovation and allow American companies and investors to develop innovative technology and business models to keep the U.S. leading the world in wireless technology for next-generation 5G broadband networks.

Respectfully submitted,

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June 4, 2020