Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
Wireless Telecommunications Bureau Seeks	)	
Comment On Potential Impact Of Global	)	Docket No. 21-195
Semiconductor Shortage	)	

COMMENTS OF THE
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

The Telecommunications Industry Association ("TIA")[1] welcomes this opportunity to provide comments to the Federal Communications Commission in response to the Public Notice[2] seeking comment on the impact the continuing global shortage of semiconductors may have on the U.S. communications sector and on FCC initiatives. This is an area of substantial interest to TIA given TIA's role as the leading voice for trusted, global manufacturers and vendors of telecommunications equipment and services. TIA member companies are the backbone of the global internet, supplying the products that allow people around the world to stay connected even as America beats back the COVID-19 pandemic.

TIA shares the Commission's concerns regarding the impacts of the continuing global shortage of semiconductors. Semiconductors are a foundational part of the technology stack for the ICT sector, powering the computation that enables ICT devices to connect people to the goods, services, and information they need. Indeed, as noted in the White House semiconductor

[1] TIA is the leading trade association for the information and communications technology ("ICT") industry, representing companies that manufacture or supply the products and services used in global communications across all technology platforms. TIA represents its members on the full range of policy issues affecting the ICT industry and forges consensus on voluntary, industry-based standards.
[2] *Wireless Telecommunications Bureau Seeks Comment On The Impact Of The Global Semiconductor Shortage On The U.S. Communications Sector* Public Notice, WT Docket No. 21-195 (May 11, 2021) ("Public Notice").

report released on June 8, the telecommunications industry drives 50 percent of all demand for semiconductors. Broken down further, 26 percent of all semiconductor end use is intended for mobile phones and 24 percent is intended for information and communications technology infrastructure.[3] Given the importance of the nation's ICT networks to American's daily lives, it is critical that the United States is able to consistently source high-quality semiconductors for telecommunications end uses even when pandemics, changing geopolitical dynamics, environmental conditions, or other external factors disrupt global trade.

A number of federal agencies have vital responsibilities with respect to ensuring a stable supply of semiconductors, and a long-term solution will also require action by Congress to promote incentives for semiconductor manufacturing in the United States. We believe that **the FCC has an important role to play here as the champion for the communications sector within the federal government, highlighting the essential role that ICT plays in supporting U.S. economic competitiveness and promoting technology-neutral policies with this in mind.**

This role as champion for the telecommunications sector is vital given the push by some industries to leverage the federal government to direct semiconductor manufacturing toward particular end uses. Government intervention in favor of any one particular end use would necessarily adversely impact other industries by diverting supply, manpower, and resources from other end uses. This would have a substantial negative impact on the American economy by:

[3] "Building Resilient Supply Chains, Revitalizing American Manufacturing, And Fostering Broad-Based Growth," 100-Day Reviews under Executive Order 14017, The White House (June 8, 2021) (*available at https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf*).

- Slowing long-term economic growth by impacting the roll-out of next-generation networks,
- Exacerbating long-term racial and economic inequality, including widening the "homework gap" that has left some children without access to school resources or reliable internet; and
- Harming efforts to respond to the COVID-19 pandemic by making efforts to expand internet access more costly and increasing the costs of certain products – including medical devices and equipment used by first responders – that use chips.

Action favoring a particular sector also has the potential to impose a direct cost on America's innovative semiconductor manufacturers and designers by distorting the market toward end uses that generate lower revenues. Such action would create further uncertainty in the chip market more broadly by introducing questions about whether market mechanisms or government action will determine semiconductor sales. Imposing these costs and uncertainty on an industry that requires substantial forward investment in R&D is not in the U.S. national interest, particularly in the context of U.S. companies racing against state-funded, global competition from America's strategic competitors.

With respect to the specific questions posed by the FCC in its request for comment, TIA offers the following responses:

I. Has the global semiconductor shortage spread to the communications sector? If so, to what segments? What are the impacts on lead times and costs of communications equipment and devices? Are there other industry trends that are relevant?[4]

[4] Public Notice at 2.

The global semiconductor shortage has impacted nearly every element of the communications sector; from the telecommunications infrastructure side with products such as routers, switches, and base stations all the way down to the user terminal side with products such as laptops, desktops, and mobile phones. Due to a combination of increased demand and exogenous supply chain shocks, companies are being forced to raise prices and lengthen product lead times. While the impact varies based on the individual product, in general companies are seeing product lead times roughly double with ICT infrastructure-side equipment going from 16-20 weeks to a 50+ week lead time in the production cycle. One TIA member in this space also reported cost increases of up to 5% due to costlier inputs, increased prices for air freight, overtime wages for workers, and premiums demanded for inventory through distribution and brokers.

II. What is the nature and extent of semiconductor shortages or shortages of other components that are critical to the communications sector? What is the short- and long-term capacity of manufacturers of semiconductors and semiconductor components to keep up with the communication sector's demand? How long is the current shortage expected to last?[5]

As noted previously, the current shortage is the result of both exogenous demand and supply shocks exacerbated in part by the COVID-19 pandemic. Demand for some products such as computers, home networking equipment, and consumer electronics spiked sharply as more people needed to work, study, and amuse themselves at home to avoid exposure to the virus. At the same time, network operators saw traffic increase by 40% year-on-year during the pandemic, increasing the need to maintain and expand networks.[6] On the supply side, natural disasters such as the drought in Taiwan and winter power failures in Texas combined with geopolitical tensions

[5] Public Notice at 2.
[6] "Our Communities Depend on a Resilient and Secure Global Supply Chain for Semiconductors," AT&T Policy Forum (May 17, 2021) (*available at* https://policyforum.att.com/2021/05/our-communities-depend-on-a-resilient-and-secure-global-supply-chain-for-semiconductors/).

and generalized supply chain disruptions due to COVID create substantial constraints on production.

TIA members estimate that shortages will continue for some time, and that in 2022 demand will be around 150% of existing fab capacity. Beyond foundry capacity constraints, access to sufficient semiconductor substrates is a major issue. Even with increased investments in this area, TIA members estimate that substrates' demand will outstrip supply at least through 2023. This will be an important corollary investment area as the U.S. government considers ways to further incentivize investment in U.S. foundry capacity. Fundamentally, if there are going to be more fabs, there must be adequate substrates to support them. Overall, substrates are currently the largest constraint, and this constraint impacts the entire ICT industry.

III. Which semiconductor technology nodes in particular have been impacted or are expected to be impacted by the shortage? Which technology nodes are important to the short- and long-term needs of the communications sector?[7]

ICT companies require access to a wide range of different chipsets – e.g. 150nm, 95nm, 65nm, 40nm, 28nm, 14nm, and below – depending on the type of ICT product that they manufacture. While the current shortage impacts all semiconductors, the short-term impact has been particularly pronounced as it applies to legacy nodes, which have suffered from underinvestment for some time due to the depreciation of investments in fabs over time and comparatively low returns on legacy chips.[8] These chips are also in high demand across both the automotive sector and the ICT sector. In the long term, sustaining supply availability and flexibility across leading edge and legacy nodes is key to American economic competitiveness.

[7] Public Notice at 2.
[8] "Chip Shortages Impact for Supply Chain Resiliency," Syed Alam, Accenture (March 12, 2021) (*available at* https://www.accenture.com/us-en/blogs/high-tech/chip-shortages-impact-for-supply-chain-resiliency).

IV. What are the impacts of these shortages on the public interest? How do these challenges affect the security of the United States and its competitiveness in the global economy? How do these challenges impact the deployment of next-generation networks and technologies? How do these challenges affect communities of color, economically distressed areas, and small businesses?[9]

These shortages are causing longer lead times on a range of telecommunications infrastructure products, potentially delaying planned network deployments. Combined with price increases and long lead times on the user terminal end, the semiconductor shortage is having ripple effects that are harming efforts to bridge the digital divide and expand access to high-speed internet to underserved communities, including communities of color and other economically distressed areas.

These shortages come at a particularly inopportune time, as the industry pushes toward widespread adoption of next-generation connectivity technologies such as 5G, Wi-Fi 6, and cable network upgrades that are integral to America's long-term economic success. According to industry reports, the deployment of nationwide 5G will increase the U.S. Gross Domestic Product by $1.5 trillion in the next five years alone.[10] The impact of 5G will hit most sectors of the economy, with industry figures showing that for every ICT sector job created will produce a multiplier effect that creates 1.8 additional jobs throughout the economy.[11] The effect of this multiplier means that early adoption of 5G technology has the potential to create or transform up to 16 million jobs across all sectors of the economy.[12] These jobs will be created nationwide, providing Americans jobs in both rural and urban states working to further connect the country.[13] The long-term economic benefits of 5G make it more important that the U.S. government take

[9] Public Notice at 2.
[10] "The Impact of 5G on the United States Economy", Accenture Strategy (Feb. 22, 2021) (*available at* https://www.accenture.com/us-en/insights/high-tech/5g-economic-impact).
[11] *Id.*
[12] *Id.*
[13] *Id.*

technology-neutral action to support the semiconductor supply chain with the ICT sector in mind.

V. What are the effects of semiconductor shortages on remote learning, telehealth, and other services that have moved online during the pandemic?[14]

Remote learning, telehealth, and other technologies rely on high-speed, cost-efficient, and secure networks to function. Without sufficiently robust access to semiconductors, these networks may not be able to support the expansion in demand for these services. Customers may also have difficulty getting timely access to the user terminals and peripherals they need to access these services, demand for which has markedly increased during the COVID-19 pandemic. The need for these services is particularly acute in remote and underserved communities underlining the importance of resolving the semiconductor shortage in a technology-neutral way that supports telecommunications end uses.

VI. What steps can be taken by the Commission, either working on its own or in concert with Federal partners, to help address these current challenges?[15]

The FCC has an important role to play in highlighting and championing the importance of the telecommunications sector to America's long-term economic competitiveness and security. TIA recommends that the FCC play a proactive role in working with Congress, the U.S. Department of Commerce, and other key stakeholders to ensure that incentives programs such as those proposed in the Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act creates capacity in semiconductor manufacturing that is relevant to the telecommunications sector.

[14] Public Notice at 3.
[15] Public Notice at 3.

VII. What steps can be taken to prevent similar challenges in the future, particularly those challenges related to unanticipated, catastrophic, global events?

This supply chain shortage has demonstrated the importance that geographic supply chain diversity plays in a resilient supply chain. Around 75% of global semiconductor manufacturing is concentrated in China and East Asia, as are many suppliers of key inputs such as silicon wafers, photoresist, and other specialty chemicals.[16] This geographical concentration helped contribute to the current shortages, and it leaves the global economy vulnerable to external supply chain shocks and natural disasters. The U.S. should provide robust incentives to diversify the semiconductor supply chain, including through the incentives outline in the CHIPS for America Act, and invest in ways to support key inputs such as substrates.

[16] "Strengthening the Global Semiconductor Supply Chain in an Uncertain Era," Antonio Varas, Raj Varadarajan, Jimmy Goodrich, and Falan Yinug, Semiconductor Industry Association (April 2021) (*available at* https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021_1.pdf).

VIII. CONCLUSION

TIA's position representing the manufacturers and suppliers of telecommunications equipment and services gives us a unique vantage point to provide input regarding the current chip shortage and the impact on America's networks. The semiconductor portion of the White House report on critical supply chains provides a useful roadmap for addressing this issue, however the ICT sector will still need a champion as the government implements policies to support the administration's overall strategy. We appreciate the opportunity to provide input to the Wireless Telecommunications Bureau on this topic, and we look forward to additional opportunities to support the FCC's work in this area.

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Filed: June 10, 2021