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STRENGTHENING AMERICAN LEADERSHIP IN WIRELESS TECHNOLOGY

THURSDAY, JANUARY 23, 2025

House of Representatives,

Subcommittee on Communications

and Technology,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to notice, at 10:01 a.m., in Room 2123, Rayburn House Office Building, Hon. Richard Hudson [chairman of the subcommittee] presiding.

Present: Representatives Hudson, Allen, Latta, Bilirakis, Carter of Georgia, Dunn, Joyce, Fulcher, Pfluger, Cammack, Obernolte, Houchin, Fry, Kean, Goldman, Fedorchak, Guthrie (ex officio), Matsui, Soto, Clarke, Ruiz, Peters, Kelly, Barragan, Carter of Louisiana, Menendez, Landsman, McClellan, Castor, Pallone (ex officio), and Hudson.

Staff Present: Ansley Boylan, Professional Staff Member; Jessica Donlon, General Counsel; Sydney Greene Director of Finance and Logistics; Calvin Huggins, Staff Assistant; Megan Jackson, Staff Director; Noah Jackson, Clerk Communications & Technology; John

Lin, Senior Counsel, Communications & Technology; Joel Miller, Chief Counsel; Elaina Murphy, Professional Staff Member, Communications & Technology; Kate Harper, Chief Counsel, Communications & Technology; Rudden Jackson, Staff Assistant; Chris Sarley, Member Services/Stakeholder Director; Emma Schultheis, Clerk, Health; Hannah Anton Minority Policy Analyst; Rasheedah Blackwood, Minority Intern; Keegan Cardman, Minority staff assistant; Jennifer Epperson, Minority Chief Counsel, Communications and Technology; Waverly Gordon, Minority Deputy Staff Director and General Counsel, Tiffany Guarascio, Minority Staff Director; Perry Hamilton, Minority Member Services and Outreach Manager; Mackenzie Kuhl, Digital Manager; Dan Miller, Minority Professional Staff Member; Michael Scurato, Minority FCC Detailee, Andrew Souvall, Minority director of communications, Outreach and Member Services; Johanna Thomas, Minority Counsel, Communications and Technology.

Mr. Hudson. Good morning, and welcome to the first hearing in the Communications and Technology Subcommittee of the 119th Congress.

I am honored to serve as the chairman of this subcommittee, where there is a rich history of identifying and addressing the most pressing issues raised in the communications and technology sectors. As technology continues to advance, this subcommittee will be at the forefront of solving tough issues.

The subcommittee has historically worked in a bipartisan manner to solve many of the issues before us, and I plan to continue that tradition by working with my ranking member, Representative Matsui, who I represent very much, and have admired her work and accomplishments as a leader in this space. And I look forward to working together and learning from Ms. Matsui.

I am grateful for the work Chairman Latta brought to this subcommittee, and I am looking forward to continuing it and learning from him as well.

I am also excited to work with my vice chairman, Mr. Rick Allen, and all of my colleagues on this subcommittee on both sides of the aisle to advance important legislation in this Congress.

Our Nation is the world's economic powerhouse, and we lead the world in innovation. America is home to the best technology companies, both large and small. These companies lead in everything from next generation wireless technology to all of the emerging technologies that rely on connectivity ranging from artificial intelligence and the Internet of Things, to Next Gen 911, and precision agriculture.

Our country's startup ecosystem is strong and should be fostered. This committee must advance thoughtful policy that continues to grow American innovation

and productivity rather than stifle it.

Next generation wireless technology supports many of these technological advancements. It impacts nearly every sector of our economy from powering everyday communications networks and advancements in healthcare and manufacturing to being used for our national defense. It is something heavily present in my district at Fort Bragg. We call it the epicenter of the universe, the home of our special forces, and the largest Army base in the world.

But if our wireless networks are going to keep pace with the speed of innovation, we need to make sure they have additional spectrum resources. Spectrum is a crucial element for wireless technology to operate. Americans depend on connected devices in their everyday lives, and the congestion on our networks has skyrocketed. Our wireless networks need to keep up.

As our wireless networks advance from 5G to 6G technology and beyond, the demand for spectrum will only continue to grow. We must remember these important resources are finite. Managing these limited resources is vital to maintaining our economic dominance and protecting our national security.

We will take a balanced approach to making both licensed and unlicensed spectrum available. This includes working with our Federal partners, such as the Department of Defense, which must have enough spectrum to defend the homeland, but also be held accountable to use their resources efficiently.

Last Congress, the Federal Communications Commission's spectrum auction authority expired for the first time due to disagreements about how spectrum resources should be allocated. These auctions have historically brought in billions to our national economy with the highest spectrum auctions raising over $80 billion from private companies.

It is simple economics. There is limited supply, unlimited demand, and a willingness to pay. We need to reauthorize the FCC's spectrum auction authority immediately.

We must also continue looking for ways to make unlicensed spectrum available. Unlicensed spectrum unlocks the Internet of Things, and smart device economy on which Americans rely, providing tremendous economic growth.

Under the first Trump administration, more than 1,200 megahertz of unlicensed spectrum was made available in the 6 gigahertz band, leading to massive opportunities for innovation for our farmers, industrialists, and communities.

These successes are just the start. However, as we progress, our adversaries are constantly trying to undermine our leadership and international standard setting bodies through IP theft, and through cyber attacks. The U.S. must remain resolute in defending our leadership to safeguard democratic values, and this happens by trusting in our private sector partners to address some of our Nation's most pressing challenges.

We recently learned about Salt Typhoon, which may be the largest Chinese-backed telecommunications hack in our Nation's history. As we deploy advanced networks and connected devices in an environment of great power competition, we have to thoughtfully secure our networks every step of the way.

At the end of last year, I was glad to see Congress fund the removal of the remaining Chinese equipment in our communications networks. China is producing cheap communications equipment at the cost of our national security and that needs to change. We need trusted alternatives.

Companies are working to develop and deploy Open RAN technology, which is intended to promote an ecosystem of trusted vendors for communication network equipment. And I look forward to hearing an update on its progress today.

The key to our success is working together with our stakeholders to deploy and secure our networks. As our adversaries seek to undermine U.S. leadership, we will continue to build a comprehensive spectrum policy in the United States and a unified position on the international stage.

I look forward to discussing these issues more in-depth with our witnesses today and discussing the future spectrum policy in the United States.

I will now recognize our ranking member of the subcommittee, the gentlelady from California, Ms. Matsui.

Ms. Matsui. Thank you very much, Mr. Chairman. And I want to congratulate you as serving as the new Communications and Technology Subcommittee chair. I look forward to working with you this Congress.

I am glad that we are starting with such a timely issue on which we have a strong bipartisan track record. The last time this subcommittee had a spectrum hearing, the FCC spectrum auction authority had just lapsed for the first time in history. Now nearly 2 years later, the FCC is still deprived of this critical tool to unlock the full potential of the spectrum airwaves leaving U.S. economic and national security at risk.

Spectrum is a key engine of wireless innovation. It supports a wide range of technologies from remote surgery to autonomous vehicles and broadband. Our consumers, businesses, and Federal agencies all stand to benefit when we maximize our spectrum use. This requires a comprehensive approach that strikes the right balance of licensed, unlicensed, and shared spectrum.

We need a bipartisan solution that not only restores auction authority, but also promotes a healthy spectrum pipeline and ensures our Federal Government speaks with one voice on spectrum policy. And we need to be forward-looking by promoting technologies that will improve spectrum sharing and efficiency. Equally critical is our

obligation to be responsible stewards of spectrum auction revenues.

As a long-time advocate for the FCC's Rip and Replace program, I am proud of our role to use spectrum auction proceeds to remove unsecured Chinese equipment from our communications networks. Spectrum is a public good, and I am dismayed to see prospects floated that would use auction proceeds to provide tax cuts for the wealthy through reconciliation.

Rather, we need to work as a subcommittee to use these funds to close the digital divide, protect national security, and support public safety communications. This includes expanding access to lifesaving technologies, such as Next Generation 911 for faster and more accurate emergency responses.

Last Congress, this committee unanimously passed the Spectrum Auction Reauthorization Act, comprehensive spectrum legislation that would have accomplished these very goals. Disappointingly, the House Republican leadership never brought this bipartisan proposal to the floor for a vote.

This Congress, we must build on our good work. I hope my colleagues will continue our history of bipartisan cooperation on spectrum.

Lastly, I would be remiss if I didn't highlight the important work of the national spectrum strategy. Even amidst an auction authority lapse, the Biden administration answered my call for a unified spectrum plan by launching the first comprehensive U.S. spectrum strategy in 6 years. This strategy offers a roadmap for securing U.S. leadership and spectrum innovation and ensuring that the Federal Government speaks with one voice.

We can't afford to throw that progress away and return to the disarray that preceded the national spectrum strategy. The U.S. needs a unified spectrum position now more than ever to fight for our interest in international negotiations and to rally

other countries to our vision. If we fail to maintain our global leadership on spectrum, we create a vacuum that China will happily fill.

The stakes are high. It is time for all stakeholders to come to the table and for Congress to pass comprehensive spectrum legislation that has substantial bipartisan buy-in.

Clearly, there is a lot of work ahead of us, but I am hopeful. This subcommittee has a proven track record of bipartisan cooperation that keeps America at the forefront of global innovation. Now is not the time to throw that aside. We have a chance to continue our tradition of working across the aisle, and I am committed to advancing solutions that secure economic growth, national security, and bipartisan funding priorities benefiting the American public.

Thank you to our witnesses for appearing before us today, and I look forward to the discussion.

And with that, Mr. Chairman, I yield back the remainder of my time.

Mr. Hudson. I thank the ranking member for her remarks.

And I now recognize the chairman of the full committee, the gentleman from Kentucky, Mr. Guthrie, for 5 minutes for his opening statement.

The Chair. Thank you, Mr. Chairman, and thank you for bringing us together for this important hearing.

And I thank you, to the witnesses, for your participation.

I look forward to the work we will do this Congress to close the digital divide, protect our critical infrastructure, and ensure Americans are prepared to outcompete the Chinese Communist Party.

I have long been an advocate for spectrum policy that serves both our national security and American innovation. I served for many years as the co-chair with my good

friend from California, Ms. Matsui. I enjoyed, always enjoyed working with you and look forward to continue working with you as we move forward this Congress.

The United States needs a spectrum agenda that enables both big and small American companies to innovate and remain competitive globally. Ensuring that the U.S. continues to be a leader in next generation wireless communications technology will create jobs and unlock new opportunities here at home as reliable high-speed connectivity supports a range of cutting-edge applications like artificial intelligence and advanced manufacturing.

We cannot, and we will not, allow our adversaries, like the Chinese Communist Party, to dominate 21st century technological battle. As a first step, we must reauthorize the FCC's spectrum auction authority. Second, we must work together with Federal agencies and stakeholders to reallocate unused spectrum. And third, we need to look at innovative tools to better utilize and manage spectrum resources.

I am looking forward to keeping our promises to Americans across the country that America is open for business, and I eagerly anticipate bold leadership across many industries ushering in the next great American century.

I will now yield to our vice subcommittee chair, my good friend, Vice Chair Allen, for a few opening remarks. I will yield my time to -- the remainder of my time.

Mr. Allen. Thank you, Chairman Guthrie, for yielding. And Chairman Hudson, thank you for holding this important hearing, and I look forward to working with you.

I am looking forward to working with this committee and this Congress to tackle the issues, the critical issues, like closing the digital divides, fighting robocalls, and strengthening our telecommunications infrastructure.

Access to telecommunications isn't just a luxury. It is something Americans depend on every single day. Students need it to finish their homework. Folks of all

ages, especially in rural communities, rely on it for telehealth visits with their doctors, and small businesses use it to reach customers and keep the doors open. And let's not forget, we all use it to stay in touch with friends and loved ones.

Additionally, when natural disasters strike, access to reliable communication becomes even more critical. Georgia's 12th District saw firsthand just how devastating this can be when Hurricane Helene wreaked havoc in our communities last September. That storm caused significant damage to our communications infrastructure, leaving our residents unable to call for help, check in with family to let them know where they were and that they were safe, and in many cases, made it impossible to receive helpful updates about accessible resources.

Thankfully, we had satellite and other resilient emergency systems in place to help fill the gap with recovery efforts and that got underway.

Spectrum is absolutely vital for the wireless services and devices we use today and for the technologies of tomorrow. If we want to maintain our leadership in the world and keep pace with China's advancements, we need to free up more spectrum for both licensed and unlicensed uses. Technology is like precision agriculture. Advanced manufacturing and next-gen wireless services all depend on it.

Again, I look forward to tackling these issues as vice chairman of the C&T Subcommittee.

Thank you, Mr. Chairman. And I yield back.

The Chair. I yield back.

Mr. Hudson. Thank you, Mr. Chairman.

I now recognize the gentleman from New Jersey, the ranking member of the full committee, Mr. Pallone, for 5 minutes of his opening statement.

Mr. Pallone. Thank you, Mr. Chairman.

And we are here today to discuss spectrum, one of our Nation's most underrated and economically valuable natural resources. Discussion of current spectrum policy debates is important to better understand how our decisions impact America's standing in the world.

But we can't ignore that this hearing comes at a time when House Republicans are considering using spectrum auction proceeds as a piggy bank to fund their costly tax breaks for billionaires and large, wealthy corporations. And I hope they reconsider going down that road because it would be a sharp departure from the way spectrum policy and auction proceeds have been handled by Congress in the past.

Spectrum is such a valuable natural resource because it is an essential building block for connecting family and friends, as well as delivering critical services, like education and health to people across the country. It is also critical to everyday safety for first responders.

Without spectrum, we would not have radio stations, smart phones, the app economy, or drones. And many of these technological advancements were developed by American innovators pushing the limits on the way spectrum could be used in new and exciting ways. But past performance does not guarantee future results. So America must remain a leader in spectrum policy.

For more than three decades, Congress has granted the FCC the authority to make spectrum available using competitive bidding or auctions and granting the FCC this authority has served both the public and the Nation well.

Today, the United States is a global leader in delivering 5G, advanced WiFi, Bluetooth, and other next generation wireless technologies to consumers across the country. At the same time, spectrum auctions, which have raised over $230 billion to the Federal Government, have helped fund important public communication priorities

including the Rip and Replace reimbursement program, the construction of FirstNet, and broadband infrastructure grants.

And that is why spectrum policy has long been an area of bipartisan agreement. In fact, we have worked closely with the Republicans on this committee for the past 3 years on bills to extend the FCC's auction authority and use spectrum proceeds to pay for bipartisan spending priorities.

And one of the areas of bipartisan agreement was the need to fund Next Generation 911. This funding would modernize our 911 networks to allow the public to use modern day communication tools, like sending text images and videos to first responders and emergency personnel. And this technology will reduce response times and equip first responders with lifesaving information before they arrive at the scene, which will better assist people in their critical time of need.

The recent devastating wildfires in California are another reminder of how vital seconds can be in an emergency. This program clearly serves the public interest, and proceeds from auction of our public airwaves are ideal to fund it.

Unfortunately, again, it seems that Republicans are now going to abandon this bipartisan work in order to march ahead to give tax breaks to the rich, and this is simply not the way these funds should be used. The auction of public airwaves should fund programs for the public good.

Republicans should keep that in mind and reject proposals that would include spectrum in any reconciliation. Instead, they should work with us to set good spectrum policy and to use auction proceeds to fund vital programs that actually serve the public and not the wealthy few.

And I don't think the stakes could be any higher. Failure to replenish the commercial spectrum pipeline risk our Nation falling behind our counterparts across the

globe, of course, particularly China, because we want to produce cutting edge consumer innovations and enhance our national security capabilities. And we can't allow that to happen.

That is why -- I mean, we can't allow to not have spectrum use for these good policy and public purposes, and that is why we should be working together.

We should also work to ensure the advancements made possible by spectrum are delivered to all Americans regardless of their income or ZIP Code. Too often rural, tribal, and low income areas are left behind as next generation technologies are deployed and have to continue to work on making these services more affordable to everyone.

So finally, I want to say, if I could take a minute, Mr. Chairman, I want to bid farewell to Jennifer Epperson who is our chief counsel on this subcommittee. She is leaving the committee after 6 years of service, and during that time, she has played an instrumental role in the historic broadband investments we made in the Bipartisan Infrastructure Law, the creation of the Affordable Connectivity Program, and our bipartisan Rip and Replace legislation that I mentioned.

And we have accomplished a lot in this subcommittee, much of it bipartisan and throughout her time. I want to thank Jennifer for helping to make that happen. So I wish her nothing but the best. Of course, I don't want her to leave, but that is the way it goes. And, you know, I want to thank Jennifer for all her contributions.

Thank you and I yield back the balance of my time.

[Applause.]

Mr. Hudson. I thank the ranking member, and I join him in thanking Ms. Epperson for your service on the committee and wish you all the best in the future.

We have now concluded our member opening statements. The chair reminds members that pursuant to the committee rules, all members' opening statements will be

made part of the record.

We would like to thank our witnesses for being here today to testify before the subcommittee. Our witnesses will have 5 minutes each to provide an opening statement, which will be followed by a round of questions from members.

The witnesses here before us today are the Honorable Michael Powell, who is the president and CEO of NCTA, the Internet and Television Association. Thank you for being here.

Mr. Brad Gillen, the executive vice president of CTIA. Thank you for joining us.

Ms. Diane Rinaldo, executive director of Open RAN Policy Coalition. Thank you for being here.

The chair would also like to recognize Cole Peterman, a special guest joining us in the audience, Ms. Rinaldo's son. Welcome, Cole.

And finally, Mr. Chris Lewis, the president and CEO of Public Knowledge. Thank you for being here today.

I would like to note for our witnesses that the timer light on the table will turn yellow when you have 1 minute remaining and will turn red when your time has expired, and then I will start tapping up here and then eventually banging, but hopefully we won't get to that point. Thank you.

Mr. Hudson. Mr. Powell, you are recognized for 5 minutes for an opening statement.

STATEMENTS OF MICHAEL POWELL, PRESIDENT & CEO, NCTA-THE INTERNET AND TELEVISION ASSOCIATION; BRAD GILLEN, EXECUTIVE VICE PRESIDENT, CTIA; DIANE RINALDO, EXECUTIVE DIRECTOR, OPEN RAN POLICY COALITION; AND CHRIS LEWIS, PRESIDENT & CEO, PUBLIC KNOWLEDGE.

STATEMENT OF MICHAEL POWELL

Mr. Powell. Thank you, sir.

Good morning, Chairman Hudson, Ranking Member Matsui, Chairman Guthrie, and Mr. Pallone and other distinguished members of this committee.

I am Michael Powell, president and CEO of NCTA, The Internet and Television Association. I thank you for the opportunity to testify today.

I am going to discuss two topics central to America's leadership in wireless technology. WiFi and shared spectrum, which is an innovative way to get more spectrum more quickly to more users.

WiFi has become the backbone of America's internet experience. It powers our homes, workplaces, schools, and public spaces, enabling nearly all modern digital interactions. WiFi allows multiple users to share a single connection and has democratized access to the internet, making connectivity more affordable and widely available.

WiFi also drives innovation. By offering open, unlicensed access, it enables entrepreneurs to create smart devices and technology, from thermostats to virtual reality. Today, the average U.S. home has 17 connected devices and is projected to have 24 by 2027. Moreover, WiFi supports critical technologies like the Internet of Things, generating $2.4 trillion in annual economic value.

The U.S. has led in WiFi innovation, creating systems that enable universal access without heavy regulation. However, to sustain this leadership, we must ensure enough spectrum for WiFi's continued growth, particularly as demand surges with emerging technologies like artificial intelligence and virtual reality.

WiFi, effectively, is the internet. It carries nearly 60 percent of all the world's data traffic. It carries 10 times more data than all other wireless networks combined, and when using our smart phones, 80 to 90 percent of our data goes over WiFi and not the cellular network.

And the best part is that WiFi is an American-led innovation. WiFi allows innovators to make devices that connect to the internet for free and without a license from the government. We, in America, harness the power of our citizens to publish, to produce, and to invent. This contrasts starkly with China who prefers to spy on its citizens rather than empower them.

WiFi brought us the future, and it will carry us into the AI intelligence age. America's spectrum policy should embrace our leadership and continue to furnish WiFi with the spectrum it needs to continue its explosive growth and meet consumers' high expectations.

Now, it goes without saying America has a spectrum problem. Put simply, demand for it is shooting up, and supply of it is falling. Nearly all mid-band spectrum that we all want to use is used by critical mission government systems, most of it in the hands of our warfighters.

Traditional approaches, clearing government health spectrum for auctions are increasingly unsustainable. We can't compromise our combat capability in the face of a dangerous world. There are fewer places to move these critical systems, and moving them is costly and time consuming.

For example, just clearing the lower 30 gigahertz band for exclusive use would take 20 years and cost $120 billion. We need a better way out of this problem. Shared spectrum is the solution. Advances in dynamic spectrum management allow government and commercial users to co-exist resolving conflicts and reducing delays.

The success of Citizens Band Radio Service, CBRS, proves this approach works. It supports a diverse range of users, including schools, factories, and even disaster recovery efforts while fostering competition and innovation.

To maintain U.S. leadership, we must prioritize co-existence in shared spectrum models. Congress should extend the FCC's auction authority while embracing both shared licensed auctions and unlicensed WiFi designations. This includes allocating more spectrum for WiFi and exploring shared models in critical mid-band ranges like the three gigahertz and seven gigahertz bands.

By adopting forward-looking spectrum policies, we can accelerate deployment of technologies like 5G, 6G, WiFi 7 and 8, strengthen national security, and sustain our global wireless leadership and our innovation.

This committee has always embraced innovation, and we are on the cusp of a great innovation revolution, and we need an innovative spectrum policy to meet the moment.

Thank you for the opportunity to speak today.

[The prepared statement of Mr. Powell follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. Thank you.

Mr. Gillen, you are recognized for 5 minutes for an opening statement.

STATEMENT OF BRAD GILLEN

Mr. Gillen. Good morning. Thank you and congratulations, Mr. Chairman. Ranking Member Matsui, members of this subcommittee, it is a privilege to be with you.

Mr. Hudson. Is your microphone on? I want to make sure.

Mr. Gillen. It is a privilege to be with you, a privilege to be here on behalf of the wireless industry, 4.58 million jobs strong across this country. We invest $30 billion a year to make this and so much more better.

And I really want to echo your opening comments. This is a conversation around spectrum, but it is a lot more than that. It is about economic opportunity for all. It is about our national security. It is about our global competitiveness. And it really comes back to connectivity drives so much of this conversation, particularly 5G connectivity. And spectrum, at its core, is our oxygen.

I was here 2 years ago asking for more spectrum. I am back today and that ask is more urgent because we have stood still as a country the last 2 years. The rest of the world is moving forward aggressively, and so, too, are our American consumers, who use more and more of this each and every day, and we want to make sure we continue to meet that demand.

Now, our screens today aren't 5G enabled, so we are going old school with pictures, but it is easier to explain through pictures. So if you think about how much traffic has been on wireless networks the last few years, this is where we have been.

When I was here last time, we were in the orange. I actually bragged about just

how much traffic was being carried on these 5G networks. We are now just 2 years later here, 100 trillion megabits of traffic on these networks, almost doubling in only 2 years of time. I think the economists call that kind of growth bananas.

We just don't see that kind of growth, and we were able to do that only thanks to the leadership of this committee. It was the auctions that you directed in 2020 and 2021 that gave us the oxygen in spectrum to actually meet that moment.

So when you look forward to the next couple years, by the end of the generation, by the end of the decade, we are going to have almost three times more traffic on our networks than we do today. And the challenge we face right now is we don't have new auctions right now. The FCC doesn't have auction authority to meet that moment.

So how do you actually meet that consumer demand? Part of it is our responsibility. We need to invest, and we do, each and every 20- or $30 billion, to make our networks denser, to have more facilities throughout the country. We have 40 percent more than we did a generation ago.

We also, all of us, need to be more efficient with this finite resource. We are very proud of our record in doing that. We are 42 times more efficient with the technology we use on a per megahertz basis than we were a generation ago. All of that is necessary but it is not sufficient.

If you plug that all in the traffic models, it reveals that we need roughly 400 more megahertz of spectrum by 2027 and over 800 by 2029. Where does that spectrum come from? The Federal Government today reserves roughly two-thirds of this asset, the mid-band spectrum we are talking a lot about today, for their own use.

So if you look at the slide in terms of who has mid-band right today, the Federal Government has 600 percent more than we do today. We are in the teal on the bottom, 450 megahertz. Unlicensed WiFi has 300 percent more than we do, thanks to the 6

gigahertz decision you alluded to.

What is happening in the rest of the world? They see this same type of growth curve that we see, and they are building -- they are getting access to spectrum more quickly. Nowhere is that more true than with respect to China. In 2023, we were roughly even with China in terms of mid band access. Looking forward now to where we will be in 2027. They will be in a position to have four times more than us. That is untenable from a global-competitiveness standpoint.

So what do we need? We would love this committee's help. Over the last 30 years, the committee, on a bipartisan basis, has provided FCC auction authority, and each time you do that, you provide a plan, a roadmap of what you expect them to do with that authority and that is critical.

And now, this conversation gets very jargony fast. I am extremely guilty of that. But at its core, what this conversation is about, why we really care about spectrum, why we are excited about what wireless could be is because we have a role to play in almost everything you came to Washington to work on. Everyday household costs, we can help. Beating China, creating jobs.

A new study just released this morning from NERA said for every 100 megahertz of mid-band spectrum released for 5G creates 1.5 million jobs rippling throughout the economy, both those building those networks all across the country, but also those innovating on top of that.

And we also just want to close with there is a huge role here for the digital divide and the role of spectrum to play, both connecting Americans on the mobile and the home broadband side. This is too important technology for not everyone to be involved. So we want to partner with you to make sure that this resource is available to all Americans, that everyone has a fair shot at this.

Greatly appreciate you including us, and I look forward to your questions.

[The prepared statement of Mr. Gillen follows:]

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Mr. Hudson. Thank you.

Ms. Rinaldo, you are recognized for 5 minutes for an opening statement.

STATEMENT OF DIANE RINALDO

Ms. Rinaldo. Thank you.

Chairman Hudson, Ranking Member Matsui, and esteemed members of the committee, thank you very much for the opportunity to testify on America's leadership in wireless innovation. This hearing and topic are vital to the national and economic security importance to the United States, and I welcome the committee's interest on this subject.

And also, thank you for recognizing my 10-year-old son Cole. He is a budding telecom engineer. We take workforce development very serious at the coalition.

So I have had the distinct pleasure of serving this body in a couple of different capacities. I was the lead cybersecurity and tech telecom staffer at the House Intelligence Committee. I was also the acting administrator of NTIA in the executive branch.

Today, I serve as the executive director of the Open RAN Policy Coalition, a coalition that promotes to drive the adoption of open and interoperable solutions in the radio access network. Our coalition represents a diverse group of communication and technology companies unified under a common goal, policy that can help dismantle technological and market barriers to cultivate competitive, secure, and resilient marketplace.

Since the launch of the Open RAN Policy Coalition, ORAN has experienced tremendous growth with more than 100 global deployments. From the world's largest

right here in the United States with 100 percent Open RAN 5G network that Dish's Boost Mobile has deployed nationwide, Open RAN has achieved its initial goal of providing additional vendor choice for mobile operators.

This Congress and the new administration assume office at a pivotal time in the wireless communication space. The next 2 to 4 years are critical to ensuring our country's continued leadership and competitiveness in the global contest with the People's Republic of China.

Beijing's efforts to dominate the wireless space are simultaneously wide-ranging, prolific, and focused. The PRC seeks to supplant the United States as the world's leader in wireless innovation and market leadership. This is not about free market competition, but about state-sponsored market manipulation. Put simply, the PRC does not want to compete. It wants to rig the game to win.

Throughout my testimony today, I will return to three critical themes. First is the pivotal role of U.S. in pioneering wireless innovation. The second is the necessity of leadership in spectrum policy. And lastly is the importance of public-private policies. We truly do need to work together.

The United States has had a proud legacy of leadership in wireless technology from the groundbreaking development of 4 and 5G networks to the creation of global positioning systems, an innovation that transferred global navigation and timing. Our country has consistently been at the forefront of wireless advancements.

These technologies have driven economic growth and job creation, contributing billions of dollars annually to our economy. Industries such as healthcare, transportation, and manufacturing have been revolutionized by wireless innovation enabling new applications for remote surgery, autonomous vehicles, and smart factories. For example, estimates indicate that 5G alone will create millions of jobs and contribute

over $1.5 trillion to global GDP by 2035.

Looking ahead, the opportunities are boundless. However, achieving these advancements depend on one critical factor: secure and efficient access to spectrum.

Now, the PRC's ascendancy is by no means destined for success. The strengths of America remain and have the potential to grow provided they are carefully stewarded, encouraged, and, indeed, unleashed. It is Silicon Valley, not Shenzhen to which innovators and industry flock.

How can Congress and the Federal Government help maintain this edge? By fostering an environment conducive to innovation, remaining roadblocks for growth, and aligning policies to facilitate the expansion. One fundamental element underpins all our aims, and that is spectrum leadership. Spectrum is the lifeblood of wireless communications driving innovation and economic growth and national security.

In closing, the United States is at a pivotal moment. We are the world's leader in wireless innovation, but maintaining this position requires sustained effort, investment, and collaboration. By prioritizing superiority in optimizing spectrum, strengthening partnerships, and enhancing our participation in global forums, we can ensure that American innovation continues to define the future of connectivity.

Thank you for the opportunity to testify today, and I look forward to your questions.

[The prepared statement of Ms. Rinaldo follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. Thank you.

Mr. Lewis, you are recognized for 5 minutes for an opening statement.

STATEMENT OF CHRIS LEWIS

Mr. Lewis. Thank you, Mr. Chairman. Ranking Member Matsui, I appreciate you inviting me here today representing public knowledge on a topic that I agree is jargony but wonderfully nerdy, and in public knowledge, that is always a compliment, so thank you.

Over the last 30 years, the United States has led the world in wireless technology, and this leadership is no small measure due to the innovative and bound spectrum policies that have carried out a bipartisan basis -- on a bipartisan basis over these decades. I will highlight three key factors from my written testimony that have led to this success and then I look forward to the discussion.

First, our system has managed spectrum, the public airwaves as a public asset and in the public interest all while encouraging private investment and innovation. Other governments effectively nationalize their spectrum. Only the government could operate broadcast radio or authorize new uses of spectrum. These governments acted through ministries under the direct control of the country's chief executive.

The United States, we went a different way. We created an independent agency to oversee spectrum use designed to strike the right balance between the many users of spectrum, such as public safety, local governments, broadcasters, to encourage innovation and private investment. Most importantly, Congress recognized that spectrum represents a unique, non-renewable public resource.

Congress enshrined the Communications Act, but the FCC managed the public

airwaves for the public interest. This means that no one can own the public airwaves, policy on licensees are balanced with public needs and come with public interest obligations, and that spectrum policy, including auction design and proceeds, should make efficient use of the spectrum allocations and benefit the needs of the public under the FCC mandate to connect all Americans.

Today's public needs to connect all Americans include deploying Next Gen 911, supporting infrastructure needs, and especially supporting digital inclusion funding needs in local communities. Local digital inclusion efforts actually lower the cost of deployment for broadband providers while giving communities, large and small, the support to realize the full potential of those infrastructure deployments.

Second, the FCC has, with congressional authority, experimented with new regulatory models to create competitive opportunities in the market and foster innovation. There is no greater example of regulatory innovation than the success of WiFi.

WiFi technology was invented in the 1980s when the FCC opened unlicensed spectrum for experimentation by engineers and inventors. These unlicensed spectrum bands allow anyone to use any device for any purpose under rules authorized by the FCC to avoid interference with licensed services.

WiFi carries 53 percent of all internet traffic and almost 90 percent of wireless internet traffic. Without supporting WiFi and unlicensed spectrum innovation, we would not have the mobile communications revolution we now enjoy.

In this century, newer regulatory models for spectrum access, like CBRS sharing models, are increasing access for small community institutions, rural and tribal communities, and other private industry outside of the big wireless carriers.

Third and finally, Congress has carefully divided spectrum between Federal and

non-Federal users at NTIA and the FCC respectively, requiring cooperation between agencies and between Federal and non-Federal users.

The public may not follow the day-to-day operation of NTIA and the FCC, but they do put their trust in government to make sure this resource and the technologies that use it work efficiently. Thankfully, NTIA and FCC have worked to develop more than one MOU to support cooperation between agencies and, therefore, processes the balance Federal and commercial use needs. Without this coordination, we would return to chaos and governmental infighting.

If America is going to continue its leadership in wireless technologies, we must continue to follow these proven principles that led to our success to date. Congress can lead in this direction by permanently restoring auction authority at the FCC. This is critical for enabling effective coordination between Federal and commercial users, driving efficient use of the public airwaves, and delivering public interest benefits that connect all Americans to secure, reliable, and affordable communications.

Thank you and I look forward to your questions.

[The prepared statement of Mr. Lewis follows:]

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Mr. Hudson. Thank you, Mr. Lewis.

We will now begin questioning, and I will recognize myself for 5 minutes.

Listen, economic security is national security, and to lead in technology as a Nation, I believe we need a balanced spectrum policy that benefits both licensed and unlicensed use of spectrum. Making licensed spectrum available is more difficult, but I don't think we should resort to making everything unlicensed just because of the challenges associated with it.

Mr. Powell, recognizing that your companies primarily utilize unlicensed spectrum, would you talk a little bit about what advancements in technology happening in your industry that might increase a demand for unlicensed spectrum?

Mr. Powell. Thank you for the question.

It is interesting to note that the cable industry pursued the convergence that we all dreamed of in the '96 Act. It uses all forms of spectrum to compete. It uses WiFi. It uses shared licensed spectrum, and we also use exclusive licensed spectrum, which has allowed us to become the fifth -- fourth most significant mobile service provider in the country offering competition.

So we believe that going forward, you have to be creative in using all forms of spectrum allocation in order to be effective. And we look forward -- we see a continuing conflict with what is available for the market to use quickly and the processes we are using to allocate that spectrum, which is why we are committed to advancing and advocating shared spectrum models.

Those models now use very sophisticated, dynamic spectrum technology in order to coordinate and manage among uses and competing uses and it works quite effectively.

Mr. Hudson. Thank you.

Artificial intelligence has been a topic receiving a lot of attention recently because

it is revolutionizing so many of our industries. As a result, it is also putting significant demand on our Nation's resources.

Mr. Gillen, does artificial intelligence require more bandwidth? And if so, will it need to be licensed spectrum?

Mr. Gillen. We are going to need more bandwidth, period. When you think about what AI promises, it really is a good frame for this entire conversation, the ability of AI to help all sectors, much like 5G can help all sectors. But they really need to work together.

When you think about -- the Vodafone CEO of Europe talks about the risk in Europe of AI bottleneck because there is not enough cellular capacity to meet the data needs of AI.

So absolutely, when you talk about the growth curves we are talking about, AI growth, we need to make sure our networks are strong enough to carry that, to drive that innovation. We want that innovation to happen here. And if that innovation is going to happen globally, who has the best networks? That has always been us, and we are in a great place on WiFi to continue to be the best. We need to do the same in 5G as well.

Mr. Hudson. Thank you.

Congress and the White House need to take a leadership role in repurposing Federal spectrum for commercial use. Access to spectrum by Federal and commercial users is necessary to protect our national security, but Federal agencies are not actively looking for ways to be more efficient with their spectrum.

Ms. Rinaldo, as a former acting administrator of NTIA and in your current role, you were responsible for managing spectrum used by Federal agencies while also looking for opportunities to repurpose spectrum for commercial use. What are the biggest challenges presented by agencies when trying to make spectrum available?

Ms. Rinaldo. Thank you, sir.

Yes. So as an example, when I was at NTIA in August of 2019, I sent a memo to all of the Federal agencies asking them to do an assessment of their spectrum needs. And just today in 2025 are those bands finally being studied. So I would say it is just time. We need to make decisions a lot sooner in order to deploy.

Mr. Hudson. Thank you.

I will pose this question to everybody. So we will go down the line. But how does spectrum policy disputes domestically affect America's leadership on the global stage? And let's go in reverse order. Mr. Lewis, I will start with you.

Mr. Lewis. I am sorry. How does spectrum policy what?

Mr. Hudson. So disputes that we have here domestically, how does that impact our leadership on the global stage?

Mr. Lewis. You know, I think history has proven that when we try to path, that promotes innovation and promotes meeting a variety of needs with our spectrum policies that the world follows us. And so, you know, debate might be good, but I think disputes that frees us picking a direction that continues to promote those values in our balance spectrum policy can hold up our opportunity for leadership as we look at the next generation of wireless technologies like WiFi 7 and 6G.

Mr. Hudson. Thank you.

I am about to run out of time here.

Ms. Rinaldo. He is absolutely right. Debate has a type of purpose, but we need to be decisive when we go into standards bodies. We need to speak with one voice.

Mr. Hudson. Thank you.

Well, my time has expired. Mr. Gillen and Mr. Powell, if you all want to submit something.

Mr. Gillen. I just think our adversaries are unified. Their government, military, and industry are working together. We need to be, too, to compete.

Mr. Hudson. Good point.

All right. Thank you all.

Mr. Powell. I just think it was delay.

Mr. Hudson. Thank you.

My time has expired, and I can't hold my committee members accountable if I don't hold myself accountable. So I will stop.

At this point, I will recognize Ms. Matsui for 5 minutes of questions.

Ms. Matsui. Thank you, Mr. Chairman.

Before the Biden administration's national spectrum strategy, the United States went 6 years without any comprehensive spectrum strategy. During those 6 years, drowned out spectrum disputes compromised our ability to maximize our use of this vital resource. If America is to remain the pace center for global innovation, we need to maintain consistency in our spectrum policy.

Mr. Lewis, how is the national spectrum strategy keeping the U.S. on track to lead on their wireless technologies? And why is it important, critical to continue its work?

Mr. Lewis. Yes, Congresswoman. The spectrum strategy was an important step forward. It laid a path for us to follow in studying five spectrum bands that could create a pipeline in the future. It talked about long-term planning and research into technological developments like dynamic spectrum sharing that could make the use of those bands more efficient and hopefully also points in the direction of continued cooperation between Federal and non-Federal users.

Ms. Matsui. Okay. Thank you.

Mr. Lewis. So it is an important step forward. We need to continue to move

on.

Ms. Matsui. Continue it. Thank you.

Mr. Gillen and Mr. Powell, can the United States afford to delay studies of spectrum bands and undo the national spectrum strategy's progress in increasing spectrum access?

Mr. Gillen. Absolutely, no.

Ms. Matsui. Okay.

Mr. Powell. I agree with Mr. Gillen. It is important to quickly study these bands and get them into the market.

Ms. Matsui. Okay. Thank you.

I have been a strong advocate for modernizing our telecommunications network through open interoperable solutions that diversify our supply chains and create new opportunities for American innovators to compete in the market.

Ms. Rinaldo, the DOD has partnered with members of the Open RAN coalition to leverage commercial wireless technologies for secure, resilient networks. What next steps should U.S. spectrum policy take to ensure we can continue to enhance national security through commercial innovation?

Ms. Rinaldo. Yes. Thank you. Absolutely.

The DOD has been incredibly bullish on Open RAN, interactively working with my member companies to deploy 5G around the world. Unfortunately, their budgets continue to get cut. So in 2025, I think people would be shocked how little 5G is deployed at our DOD bases around the world.

So I would say continued funding, continued partnership. And it is great to see the two sides, the commercial side and the public side working together to deploy commercial technologies.

Ms. Matsui. Certainly. Thank you.

Spectrum demands continue to grow, and there is no more easy spectrum to access. We must have a unified Federal spectrum policy to continue the work towards sustainable spectrum pipeline that benefits the American people.

Mr. Lewis, how have American consumers and innovators been harmed in the past when the Federal Government fails to speak with a unified voice on spectrum policy?

Mr. Lewis. I think our innovators are looking for reliability on where they can design, and so, the national spectrum strategy that you mentioned and setting up a clear path forward on what bands can be used in the future is important for providing that certainty for innovators.

Ms. Matsui. Okay. Thank you.

Mr. Gillen, I have worked collaboratively across the government for years to advance America's spectrum policy. Can you tell me why it matters that the government speaks with one voice, and why it matters what other nations do with spectrum?

Mr. Gillen. For us to succeed, we need one voice. And I really appreciate your leadership, really pushing NTIA to be at the forefront. We need the expert making these calls and to get rid of some of the turf wars we are fighting.

When you think about it, the U.S. is a big market, but we are only 4 percent of all the global wireless connections in the world. So in order to succeed, we need to amplify our voice. We need to make sure other countries are using our equipment, are using our spectrum, like Ms. Rinaldo said. So it is critical that we lead and we lead first.

Ms. Matsui. Thank you.

Cutting edge technologies like dynamic spectrum sharing hold great promise in efficiently using our finite spectrum resources. There are a number of possibilities to

leverage emerging technologies like artificial intelligence to better manage spectrum, as published in the National Spectrum Research and Development plan.

Mr. Powell and Ms. Rinaldo, how can -- quickly answer -- investments in emerging technologies like AI improve spectrum efficiency and management? Mr. Powell?

Mr. Powell. I think it is critical. I mean, you can bet on technological innovation to resolve conflict, or you can rely on political regulatory conflict to resolve conflict. We think there is stunning advances in the ability to use spectrum more efficiently and, more importantly, to allow multiple users to use the same bands simultaneously without interference, allowing greater competition and greater innovation.

Ms. Matsui. Ms. Rinaldo, you have got 7 minutes -- 7 seconds.

Ms. Rinaldo. Absolutely. I think with Open RAN, the use of AI, you are going to see a lot of use cases, especially in spectrum management.

Ms. Matsui. Okay. Thank you very much.

Mr. Hudson. The gentlelady yields back.

The chair will recognize the chairman of the full committee, Mr. Guthrie, for 5 minutes to ask your questions.

The Chair. Thanks, Mr. Chair, for the recognition.

And Ms. Rinaldo, it is great to see Cole here. Not many of us on this committee remember when you used to work for a member of this committee, and it is hard to believe I have been here that long because he is 10 years-old now. I remember when you were having him.

So my question is -- I know we have newer members and some of us need a refresher as well. So NTIA, which you were leading in the previous administration -- well, now, I don't even know if it is still previous -- 45 -- it manages the Federal spectrum, but a lot of agencies try to manage their own Federal spectrum.

Can you explain how that is not supposed to work and the problems of how it -- what that causes when that happens?

Ms. Rinaldo. Absolutely.

So fragmentation is one of the worst things that we could do to move things forward. You would lose everything from the efficiencies that you gave through the IRAC where all the Federal agencies come together and discuss management of spectrum to national security concerns. Can you imagine if each agency was responsible for cybersecurity of their individual bands? It would be disastrous.

The Chair. But some agencies try to do that, right?

Ms. Rinaldo. Some would like to use, yes.

The Chair. Okay. So all right.

So we heard Chair Hudson and Ranking Member Matsui talk about disputes going into these international bodies. And just kind of a refresher for some, and some are new to the committee. So we were at the 2023 World of Radio Communication Conference. There were disputes that went in that made us less effective.

So if you would talk about what those -- I know there were several, but kind of highlight a couple of the disputes, why that made us ineffective or less effective, and if we go into those international groups less effective, how China will take advantage of that.

Ms. Rinaldo. Absolutely.

So there is a lot of prep work that goes into these events years ahead of time. We work with others around the world to ensure that we can have a unified response, not just the U.S. but our partners as well. And so, if we are still arguing over policy decisions as we go into the standards bodies, then we are not able to speak with a unified voice.

The Chair. So what kind of policy discussions were happening? What were we

arguing over?

Ms. Rinaldo. Spectrum bands.

The Chair. Spectrum bands?

Ms. Rinaldo. Yes. So the adversary wants the chaos because if there is chaos internal amongst us, that means we are not fighting them for our strongest hand and our position.

The Chair. So these international standards setting bodies that the standard -- because, obviously, spectrum knows no border because it is physics, in the air only. I know Mr. Obernolte can explain it. I can't.

But we do know that it crosses borders. And so, what advantage does China have if they get the leverage? What could they do with having the leverage? What kind of standards could they influence that is negative to us and positive to them?

Ms. Rinaldo. So it does advantage their vendor community a great deal. It is incredibly expensive to put together a radio. And so, if you are walking in and if you are standards-accepted, you are going to have the first movers advantage, and that is what we want.

The Chair. So like what kind of standards? I mean, just kind of more details.

Ms. Rinaldo. Yes. So whatever bands. So you are going to have transistors in all of your radios, and so that becomes incredibly expensive. You are going to want to ensure that you have -- so other countries around the world are on the same bands that China is, and so that is what their aim is, is just to coalesce everyone together.

The Chair. So it is kind of like if they become the dominant player, then everybody else has to play. If you want to be interoperable, most people want to be interoperable with the dominant player.

Ms. Rinaldo. Correct. You want to be the leader.

The Chair. And so, if they become the dominant player, then we have to follow them instead of them follow us?

Ms. Rinaldo. Correct.

The Chair. Well, thank you very much. I appreciate that.

I do have another minute if anybody wants the time. If not, I will yield back. I will yield back.

Mr. Hudson. Thank you, Mr. Chairman.

The chair will recognize the ranking member of the full committee, Mr. Pallone, for 5 minutes to ask your questions.

Mr. Pallone. Thank you. Thank you, Mr. Chairman.

I am concerned by reports suggesting that Republicans would rather spend $70 billion in spectrum auction proceeds on tax cuts for the rich instead of investing this money in bipartisan public safety priorities, such as Next Generation 911, which is going to save the lives of a lot of Americans, including first responders.

But let me go to Mr. Lewis. To the best of your knowledge, has Congress ever directed spectrum auction proceeds to pay for tax cuts for billionaires?

Mr. Lewis. Not to my knowledge.

Mr. Pallone. All right.

And why is using spectrum auction proceeds to deploy NG911 networks a worthwhile investment, if you would?

Mr. Lewis. I view NG911 as an important public interest need that makes all Americans benefit from secure networks, faster emergency services, and it matches the mandate of the Communications Act that says that we should push to have all Americans connected to reliable, secure, affordable communications.

Mr. Pallone. Well, thank you.

I mean, obviously, I am very proud of the fact that we have used spectrum in the past for public purposes and don't want it to be just used for tax cuts for, you know, corporate or billionaires.

You know, we are debating spectrum policy, but -- here in this committee, but as far as the people in my district are concerned, they just want to know what we are doing to make their monthly bills more affordable. That is what they care about, you know. The bottom line, you know, they can't afford things. They want us to bring prices down.

So, Mr. Lewis, do you think that the FCC should require through licensing or other means wireless service providers to offer an affordable service option, that we should require that, if you will?

Mr. Lewis. I think that would be okay. I don't think it would be a substitute for restoring the low-income subsidy for broadband that we lost last year. Even with a low-income option, there is a cost to low-income people in every State and every district. So, yes, but it is not all we would need.

Mr. Pallone. You think some of those other things are just as important, certainly?

Mr. Lewis. I think the subsidies are very important. It was proven. You know, over 20 million people signed up for it before it went away, and folks are making difficult budgetary choices without it.

Mr. Pallone. Yes. I certainly agree with you that that was a major accomplishment, and we should try to continue or expand it.

The last question I wanted to ask, and I could ask it to both Mr. Lewis and Mr. Powell possibly, too, if you would like. The Biden administration made great strides in advancing the U.S. spectrum policies by adopting the national spectrum strategy, which got bipartisan support in this committee. And this strategy requires the Federal

Government to undertake studies of certain spectrum bands before making any final decisions on whether or how they should be made commercially available.

So let me start with Mr. Lewis and then Mr. Powell. We have got a couple minutes. Will completing these studies allow us to more effectively compete against China and other countries, and, if so, how?

If you could take a minute and we will ask Mr. Powell.

Mr. Lewis. I would say yes, actually, for some of the reasons that Ms. Rinaldo was talking about, to point in a unified direction instead of the disputes we had between different agencies in the past. The studies can really set what the scientific facts are about how different bands will work and the technologies using it and then, hopefully, coordination can be built off of those scientific facts.

Mr. Pallone. Okay.

Mr. Powell?

Mr. Powell. I would just quickly say that the bands that were being evaluated are the very bands that all of us are sitting here asking for the government to get into the market. We all have acknowledged those bands are heavily encumbered, and so there are complex questions associated with the current users and potential commercial use.

So at some level, no matter what form it takes, there has to be continued evaluation of the viability of doing that and the appropriate approach to doing that.

Mr. Pallone. All right. Thank you both.

Thank you, Mr. Chairman. I yield back.

Mr. Hudson. Thank you, Mr. Pallone.

The chair now recognizes the vice chair of the subcommittee, Mr. Allen. You are recognized for 5 minutes.

Mr. Allen. Thank you, Chairman Hudson for yielding, and now we will get back to

the subject we came to talk about.

Mr. Powell, can you explain why it is important to our strategic competition with China for your members to have more spectrum made available for their use?

RPTR SEFRANEK

EDTR ROSEN

[11:01 a.m.]

Mr. Powell. Yes, sir. You know, I think attacking China is a multifront war, and I think, you know, to follow the advice of Sun Tzu, don't attack where they are strong, attack where they are weak. Our innovations in WiFi are unprecedented in the world. China does not appreciate or embrace that technology or approach, because it would empower their citizens in a way that they are unwilling to do in their Communist system. And this gives America an enormous competitive advantage because we harness the innovation potential of every one of our citizens, and they don't. They have a command-and-control exclusive license regime because they want to maintain control --

Mr. Allen. Right.

Mr. Powell. -- of that regime. And they want the world to use their approach as well.

Mr. Allen. Good. Thank you. Ms. Rinaldo, what -- can you give me an answer to that question about why it is important for your members to have more spectrum to compete with China?

Ms. Rinaldo. Absolutely. So if you want to get Open, RAN, deployed, we would need new spectrum to bring online. It is updating networks. It is U.S. and our allied friends around the world, innovation that is coming to bear.

Mr. Allen. Okay. Today, I will be introducing the Spectrum Pipeline Act which was originally co-led last Congress by Senators Cruz and Thune. This bill is designed to ensure the efficient allocation of mid-band spectrum, a resource critical for the advancement of 5G and next generation technologies.

While this communications technology is a cornerstone of our strategic

competition with China, this bill lays out a path for us to promote wireless innovation while protecting national security interests.

Mr. Gillen, can you explain why the Spectrum Pipeline Act is needed and how it would benefit the Nation's economic and national security interests?

Mr. Gillen. Absolutely. And thank you for your leadership and for the bill. It is a really important thing to address a lot of the challenges we are talking about, that we -- we need to move quickly, we need to move decisively, and it is Congress' role to set that direction. And that structure you propose is flexible.

It allows the agencies to actually determine which bands are right, that we need to do together. But ultimately, when we are trying to talk about China, in our view, we need to be the best in the world in our license, and we are today. We also need to be the best in the world in 5G. We shouldn't be choosing. We need to do both, and we need to have the innovation available on both of those platforms.

And so your bill would help equalize that imbalance we have right now on the 5G side to put us in a position. We lead the world today in unlicensed spectrum. We can again in 5G with this kind of bill. Thank you.

Mr. Allen. Thank you. Mr. Gillen, my rural district still does not have consistent mobile phone service.

What assurances can you give me that your member companies are making the necessary investments in upgrading their cell towers and building new ones as necessary?

Mr. Gillen. Absolutely. It is a project every day that we continue to build. It is one of the things why it is important when we talk about what kind of spectrum is available, why full-power spectrum matters. If you think about some of the models, the sharing models we are using, you need seven times more the facilities to cover this in geography.

So when we are trying to get out beyond Augusta, what are we trying to do? How far that signal goes matters. There is also a role for the government, the 5G fund at the SEC, to help supplement and complement those places to help us push out faster.

But absolutely, we need to get further than we are today.

Mr. Allen. Is there anything Congress can do to help us -- help companies build more towers in the rural areas of the country?

Mr. Gillen. Certainly continued work on permitting reform would help, to help cut down -- modernize that process to let us build faster and get to more places and more full-power spectrum. It would be both.

Mr. Allen. And then finally, I have got about a minute, can you explain the difference in the approach of a spectrum policy between the first Trump administration and the recent Biden administration, and what exactly needs to happen to get spectrum policy out of the gutter and back on track, and how long will it take?

Mr. Gillen. We saw great success. The first Trump administration released more spectrum than any other administration, particularly some of the mid-band spectrum we are talking about under the Trump direction and Ms. Rinaldo's leadership. We saw 380 megahertz of spectrum -- mid-band spectrum auction for over $100 billion.

The spectrum directly adjacent to both of those is prime spectrum for that same opportunity again. So it came down to -- we had a lot of -- we were speaking with one voice, and the White House pushed us all forward with a good plan.

Mr. Allen. So it is important that this committee understand that we have got to move quickly with this, and we need to move in a bipartisan way and quit talking about political issues, and let's get this done and so we can lead -- lead the world in communications technology.

And I want to thank each one of you for your being here today and for your input

on this important subject, and please help us get this done. Thank you.

Mr. Hudson. I thank the gentleman for yielding back.

I will now recognize the representative from Florida, Mr. Soto, for five minutes to ask your questions.

Mr. Soto. Thank you, Mr. Chairman. Spectrum is one of our most valuable commodities, our information superhighway. When I think about all the uses from cell phones and getting to 6G to AI and commercial rockets in Central Florida, by the way, telehealth streaming, gaming, internet, e-commerce, one of the greatest economic inefficiencies we have is buffering, the dreaded spinning wheel. I even remember when it used to be an hourglass. A lot of you may remember that.

And so, it is critical for us to ensure access to spectrum for these commercial and technical uses. Unfortunately, Congress allowed the SEC's auction authority to lapse back nearly 2 years ago. And we saw, you know, the Department of Defense, our military, they need to defend the Nation. But with nearly 2 years of this lapsing authority, we need to work out these differences.

There has been a history of using this funding for public safety, for national security that is communications-related, whether it is FirstNet, Rip and Replace broadband, and the new infrastructure law. I could tell you in rural places in my district, like South Osceola and East Orange, where they have ranches and farms and groves, using this funding in a related way to communications not only makes sense, but it is the just thing to do.

Communications are only going to require more investment as technology and competition advance, especially making our telecom system more resilient to cybersecurity hacks, like Salt Typhoon, which has been mentioned a bunch of times here.

So we need to make sure we are reinvesting these in the telecom system and not

seeing tax cuts for billionaires that will siphon this off.

Most Americans and American small businesses will suffer identity theft, ransomware, spying, if we don't continue to reinvest.

So first, Mr. Gillen, I was shocked to see -- we would see -- China, over the last 3 years nearly four times the amount of mid-band spectrum for commercial use unleashed. And just so we are clear, there has been a bipartisan opposition in the Senate, through DOD, through Senator Rounds, I see Senator Hirono, too, who helped slow this down.

How do we -- what are the consequences if this continues to happen?

Mr. Gillen. Thank you for the question. I thought the consequences is where you started. It is the buffering hourglass. And when we talk about what these networks can do, it is inconvenient on a phone call when we want -- with 5G, and we want connectivity to do in manufacturing and healthcare and transportation. We need these to be heavily reliable and resilient networks. So it has to work.

And so, ultimately, at its core, that advantage in China is giving them a legs-up in their ability to innovate. There are 14 times more 5G connected factories in China than are in the U.S. You can draw a direct line back to our spectrum policy. They are continuing to move forward. There is forward global bands for 5G right now. They support three. We support zero.

We need to get on the playing field. We need to start competing again.

Mr. Soto. Ms. Rinaldo, you were head of NTIA. When you worked with the DOD on these issues, What was their hesitancy? I feel like there is -- I get it. There is national security implications to this.

But what are some of the things you can disclose of why there is still that tension there that is blocking a lot of this from coming forward?

Ms. Rinaldo. Yes. I feel that there is a lack of trust. They, of course, have

national security aims that they need to protect, and the industry wants those protected, too. But there is so many efficiencies coming online. How can we ensure all users, public and private, are taking advantage of these efficiencies?

And so I think that is what we really need to get back into this conversation, is how do we get the trust back? We are all one country.

Mr. Soto. Thank you. Mr. Lewis, if you could have a top three reinvestment in a telecom and in communications systems with the proceeds of spectrum sales, what would it be?

Mr. Lewis. Top three. Definitely NG911, which we have talked about; number two would be digital inclusion efforts on the ground, Congress' investment in the Bipartisan Infrastructure Law. And digital inclusion efforts on the ground was a first of its kind, but it is not permanent. Spectrum Auction Authority could create a permanent fund.

And then other infrastructure needs, resiliency, there may be others. But spectrum auction proceeds are hard to predict as well. Those auction centers, no greenfield space come with costs as well, so it would -- prioritizing would make sense.

Mr. Soto. Thanks. And I yield back.

Mr. Hudson. I thank the gentleman.

The chair now recognizes Mr. Latta for 5 minutes to ask your questions.

Mr. Latta. Well, thank you, Mr. Chairman, and thanks to our witnesses for being with us today. This is really a great conversation.

Our national security depends on the United States maintaining an edge in advanced technologies. This committee has acted decisively over the years to meet this goal. At times, the legislation securing Americans' data from Communist Chinese collection and advancing spectrum policies like the Beat China for 5G Act of 2020.

The expiration of the FCC Spectrum Auction Authority is not something I take lightly. An auction authority remains crucial for wireless technologies to have the ecosystem developed and thrive in the United States.

If I could start my questioning with Mr. Powell. And there has been a lot of discussion back and forth, but I am going to get your -- get your thoughts on this. In your testimony, you speak to the American innovations that have come to -- thanks to unlicensed spectrum availability.

Do you expect that, as technology continues to develop, coexistence of some sort of sharing in a band will be easier or have less interference?

And before you answer -- you really went in-depth in your testimony on shared spectrum. And -- but the question -- we have been going around and around on this for -- oh, since I have been on this committee for almost 15 years, especially with DOD. And we just heard from Ms. Rinaldo talking about, you know, having some kind of working relationship back and forth and having that trust. But how do we get there? Because we can do a lot of talking, but how are we going to get that? Because we are going to have to have this spectrum.

Mr. Powell. Yeah. I think if you look at the examples of WiFi and the CBRS spectrum, you will look at dramatic increases in our ability to utilize advanced technologies to allow conflicting uses to coexist cooperatively. That allows you to get the spectrum out, have all users who need it have access to it, and be able to provide services in new and innovative ways.

I think one of the trust problems is that the Defense Department and others believe -- I have worked with for them for many years, including when I was chair of the FCC. They lose trust when they feel like people are hunting to take the spectrum completely away from them and not offer them an alternative. They are charged

constitutionally with protecting our borders, protecting United States national security.

And I can tell you, a cash -- a flipping hourglass while you are watching a video is one thing. A loss of three milliseconds on a missile intercept means you miss. That is a very fundamental loss of capability. So you can understand the conflict. It takes talented leaders and policymakers to bring that trust back.

But I would argue, looking more fully at shared spectrum models would allow them to see a future which they can continue to operate while coexisting with commercial users.

Mr. Latta. Thank you very much.

Ms. Rinaldo, similar to conversations we have had in the past related to the benefits ORAN networks, how does having a diverse spectrum ecosystem strengthen our national security and protect against foreign cyber attacks?

Ms. Rinaldo. You never want an overreliance on a single band. That is why it is important to diversify. I think all you have to do is look to GPS where it is incredibly vulnerable because all of our eggs in one basket. You don't want to create a high-value target.

Mr. Latta. Thank you.

In your testimony, you mentioned that the United States cannot and should not try to act more like China when it comes to spectrum management. What are some of the areas we should be looking at to encourage that innovation here while spreading American wireless values abroad?

Ms. Rinaldo. So they operate by fiat. They have a handful of companies as opposed to us. We have hundreds of companies in this space, so it is important to bring them together to collaborate, multistakeholder through government, public/private partnerships. And so that is where we do have the innovative edge.

Mr. Latta. Thank you.

Mr. Gillen, are there bands that have already been studied by NTIA that should be part of the spectrum pipeline?

Mr. Gillen. Our studies have studies. Absolutely. When you -- the structure really -- there is many different ways you can structure the bill. You can direct -- in the past, you have directed, you must auction this particular band. Sometimes it is a matter of spectrum within a range.

The clear priority for us is that -- that you include a plan with auction authority, and there is lots of different ways it can do it. In terms of specific bands, absolutely. The 3 gigahertz band and the 7, 8 gigahertz band are two global bands that are both identified by the national spectrum strategy. We think those are key parts of the roadmap going forward.

Mr. Latta. Well, thank you very much. And in this Congress, we have got to do, as I mentioned a little bit earlier, on our Spectrum Auction Authority to get this done, you know, it is just not for making sure that we have dollars coming in to the -- on the Federal side, but it is also absolutely essential that we get the spectrum out there.

So, Mr. Chairman, I hope we can get this done this Congress. And I yield back the balance of my time.

Mr. Hudson. I thank the gentleman.

I will now recognize the representative from California, Mr. Ruiz, for 5 minutes to ask your questions.

Mr. Ruiz. Thank you, Mr. Chairman. It is an honor to serve on this subcommittee. I represent California's 25th District, the southeast corner of California, where far too many of my constituents are dealing with persistent issues of limited broadband access, inadequate cell coverage, and aging infrastructure. It is one of the

most under-resourced rural communities in the State of California.

And in communities like mine, the lack of reliable high-speed internet creates obstacles. Students are unable to fully engage in online education, small business struggles to remain competitive, and families are disconnected from critical services. The need to expand broadband access to Tribal Nations is particularly pressing because they face some of the lowest connectivity rates in the Nation.

And addressing this digital divide will not only ensure equitable access to education and economic opportunity, it would also provide essential services, like telehealth, to communities that need it most. And especially our vulnerable communities during the pandemic, we saw that the lack of access made them even more vulnerable.

And we must prioritize modernizing our telecommunications infrastructures to close this gap and build a stronger, more connected future for all Americans.

Mr. Lewis, could you speak to how the absence of broadband access affects the community and, in particular, what the national security implications might be?

Mr. Lewis. I think you started with some great explanations. I saw some of those examples firsthand. I served on the school board in Alexandria for 6 years and saw students who did not have connectivity and how it impacted their ability to -- to compete and to get a full education.

Broadband connectivity promotes economic development and the opportunities to reach a global marketplace for adults as well, and is incredibly important for communities.

Mr. Ruiz. Thank you.

Mr. Lewis. And, you know, we are here talking about spectrum policies. There are so many different ways to serve rural communities like yours. And certainly the

investments in the BEAD program that get fiber hopefully out to as many communities as possible is important for wireless because you can't have wireless connectivity and towers without the fiber backbone that those towers connect to.

And then finding other ways to use different, sort of, spectrum deployments, whether it is licensed spectrum, whether it is shared spectrum, whether it is WiFi, like unlicensed spectrum, like TV white spaces, the spaces between the channels -- the TV channels is used for broadband performance. So there is so many different ways to --

Mr. Ruiz. And we need those during disasters for --

Mr. Lewis. Yes.

Mr. Ruiz. -- one of the critical things that we need them for.

So these connectivity gaps also pose critical risks during emergencies where reliable communication networks are essential for delivering timely information, ensuring the safety of all Americans.

Last week, on January 10, 2025, due to various reasons, 911 outages were reported in the Coachella Valley where I represent, particularly in Cathedral City and Indio. Residents who relied on AT&T and Frontier Services were unable to reach 911 for several hours.

First responders directed people to call alternate numbers or text 911, which are not always available or reliable options. And this is not the first time people in my district have experienced this.

As an emergency physician, I have witnessed firsthand how every second counts during an emergency. Not being able to reach first responders is simply unacceptable.

In the 118th Congress, this subcommittee, on a bipartisan basis, made significant strides towards providing Federal and State governments with the resources necessary to transition to nationwide IP-based next generation 911 systems. This technology will

modernize our outdated 911 infrastructure and will allow texts, photos, and videos to be sent to 911, improving communication during emergencies, and location tracking, and ensuring better coordination during natural disasters like the ones we experienced, Tropical Storm Hilary, and then also the L.A. wildfires.

So could you elaborate, Mr. Lewis, on the specific benefits, investments NG911 will bring to our communities?

Mr. Lewis. I think it starts with the idea that when an emergency happens, what do a lot of us do? We grab our phone, we take it with us. It is our -- it is our lifeline to emergency services and our families.

Mr. Ruiz. People are more likely to die when they are having a cardiac arrest and they can't get the paramedics to their home to help them because of lack of N11.

So I think when we are looking at spectrum option, we should be using the funds to expand NG911 and help save everyday American lives rather than trying to use those funds to give millionaires and billionaires more tax breaks, people that need it the least. We should be serving the American people who need it the most. Everyday, middle-class, hard-working Americans who rely on 911 systems to save lives.

Thank you. I yield back.

Mr. Hudson. Thank the gentleman for yielding back.

I now recognize the representative from Florida, Mr. Bilirakis, for 5 minutes to ask your questions.

Mr. Bilirakis. Thank you, Mr. Chairman. I appreciate it very much and congratulations. You are going to make a great chairman.

I have to admit, though, I was surprised that Congress let Spectrum Auction Authority lapse, let alone for two years. At least we can say that the House did its job in trying to reauthorize spectrum auctions last Congress.

But this clearly remains a top priority for members of this committee on both sides. As we move forward, we shouldn't just be simply thinking about reinstating auctions, but also consider process reforms. In the past, Federal agencies have attempted to stymie auctions, sometimes even after an auction is held and bidders have won provisional licenses.

Mr. Gillen, how does the uncertainty of post auction agency meddling impact the value of a spectrum license, and what can Congress do to address these problems in the future?

Mr. Gillen. Thank you for the question. You are exactly right. Bidders hate uncertainty. Capital hates uncertainty. And therefore, asking companies to spend tens of billions of dollars on an asset, there is expectation that they are going to be able to quickly then use that to deliver service to consumers. Unfortunately, that has not always been the case recently.

I think it comes back to some of what Ms. Rinaldo said about the need for one voice at NTIA to make those calls. And ultimately, agencies and industry and everyone needs to live by that decision, and we need to get back to that place that you can help empower the spectrum experts at the FCC, at NTIA to be the ones that have to make the hard choices, how all of us want spectrum to be used.

Mr. Bilirakis. Thank you very much.

Mr. Powell, in the aftermath of the historic double hurricanes that slammed Florida and North Carolina and other parts of the south, and the wildfires that destroyed cities in California, these communities need to rebuild from scratch. How will permitting policies impact rebuilding efforts, and what can Congress do to more quickly and cost effectively rebuild robust networks in these areas, potentially allowing them to achieve a citywide network like Charter has done in Charlotte, North Carolina? If you could

answer that, I would appreciate it.

Mr. Powell. Yes. I think you mentioned most importantly that efficient receipt of permitting is essential. Our members often, in communities, run into situations which they are ready to lay fiber across an enormous expanse of rural and you have been waiting for a permit for 2 years. This happens at both the Federal and the State level.

I think there are other things about recovering infrastructure in disasters, like in Florida and North Carolina. For example, how do we get poles back up, and what quality poles do we put? Are we just going to put the same poles that blew down and broke, or are we going to improve those? Not only for withstanding the elements, but also being able to handle the expansion of broadband that we are all looking for in the BEAD program.

We have had companies like Charter who have been on the ground in -- both in L.A. and North Carolina who have learned a lot about how we improve coordination with power companies and utilities to avoid infrastructure being cut after it has been restored, which is something we run into a lot in these situations.

So I think Congress and local governments can play a major role in improving the way we recover from these disasters.

Mr. Bilirakis. Thank you very much.

During his first term, President Trump signed an executive order that streamlined environmental permitting processes for infrastructure projects, particularly highlighting projects that increase public safety. Due to this executive order, Pasco County, Florida, which is in my congressional district, was able to finally get a project shovel-ready after nearly 25 years of bureaucratic red tape, if you can believe it.

This streamlining was eventually rolled back by President Biden. On Tuesday, President Trump once again signed an executive order significantly streamlining the

environmental permitting process for infrastructure projects. Some experts are even suggesting this order could cut down permitting timelines from the better part of a decade down to one year, or under one year.

Mr. Gillen, historically, about how much time and money is spent on the environmental review process as opposed to physically building the networks to reach new customers and/or improve service for existing customers?

Mr. Gillen. According to the Commerce Department stats, it can take well over 2 years, which an often case is a decision of whether or not we are going to build or not. Particularly when we have the conversation, you dovetail spectrum policy, we are not getting spectrum out quickly and then how quickly can we actually deploy it on the permitting side to get sites built to build networks further out, and then oftentimes, the cost is considerable, but the time is really what hurts and our ability to actually build out those facilities as quickly as we want to.

So I think any steps to modernize those permitting programs to allow us to do that more quickly with more certainty, transparency, can be a game changer in terms of how quickly we can amplify what you do on spectrum.

Mr. Bilirakis. Very good. Thank you.

I yield back, Mr. Chairman.

Mr. Hudson. Thank the gentleman for yielding back.

I now recognize the representative from California, Mr. Peters, for 5 minutes to ask your questions.

Mr. Peters. Thank you, Mr. Chairman. I am looking forward to working with you on this subcommittee.

It is the first time I have been on this subcommittee. One of the benefits of seniority besides creaky knees is, when the third committee comes around, you can

choose -- choose a new one. So I am happy to be here.

And throughout my time in Congress, I have prioritized some of the main pillars of our economy in San Diego, two of which I think are directly implicated here, just science and innovation, and also our military presence.

In San Diego we take pride that our industries are at the forefront of innovation. Qualcomm is headquartered at my district. It plays a pivotal role in the progress of 5G and 6G technologies, and what we can achieve with a balanced spectrum policy.

Common complaint I hear from innovators like Qualcomm is that more spectrum is needed to meet demand from an increasingly online population, and to be able to compete with competitors abroad, and we have already talked extensively about that in some ways.

Mr. Gillen, can you describe a little bit about the increasing demand for low cost -- low-cost, high-quality broadband services and how that relates to the need to make spectrum more commercially available?

Mr. Gillen. Absolutely. One of the exciting things 5G has created is our ability to compete in the home broadband market. So we can now provide an option in both rural areas and areas where we have not had as much competition as you have, traditional mobile space. But we have seen that to be a greatly attractive product. Ten million households have signed up to that product.

But ultimately, at the end of the day, the ability to deliver that service, the promise of $8 billion by one study is savings to households if we could roll that out. We don't have enough spectrum to actually keep delivering that everywhere. We already have a company with a million-person waiting list. More spectrum means that person has broadband.

Mr. Peters. Right. How efficient would you say the wireless industry is with the

current spectrum holdings and what opportunities are there for the Federal Government to be more efficient with the spectrum that it uses?

Mr. Gillen. It is a critical question. We all need to be more efficient. I think, if you think about it from our perspective, 20 years ago, this was cutting-edge wireless technology. We reinvent every 10 years. Our network gets created. We get more efficient. We are 42 times more efficient. We have government systems from the 1970s still out there.

So it really is a matter for all of us to be in a position to make sure that those equipment -- that we get the government better resources, better tools to be as efficient as we can be as well.

Mr. Peters. I used to carry around a slide rule. That is really going back.

The IIJA, the Infrastructure Investment and Jobs Act, directed the Department of Defense to study and plan for making specific segments of spectrum available for shared Federal and non-Federal use to potentially identify frequencies for auction.

Mr. Powell, given your service in the military and as a former chairman of the FCC, can you tell me why it is important for the Federal Government to take a comprehensive approach, including national security implications, when studying spectrum currently used by DOD for potential commercial use?

Mr. Powell. Yeah. I think we have all celebrated the value of spectrum, but we need to understand it is valuable for multiple important public uses. Not only commercial uses for consumers and businesses, but critical systems this Nation relies on, everything from NASA to OSHA to -- the Oceanographic isn't what I meant -- and our national security.

I was a soldier in the field. I was a cavalry scout, and you know what I was trained to do when the Russians come through the gap? Find the antennas. I mean, it

is critical to shut down command-and-control systems in the military because that spectrum is essential to their ability to operate. Similarly, that spectrum is essential to intercepting intercontinental ballistic missiles like the dome over Israel, for example. You imagine if they didn't have the effective spectrum for that system; things would be very, very different in that community.

So it is essential with the military, and we have to work it out. There is no, Just take it from them and we will be fine, right? We have to have a public answer to how we replicate anything we compromise.

And so the EMBRSS process in which -- the EMBRSS report, in which the DOD studied the feasibility of sharing came to the conclusion that it was possible to share.

And, frankly, if we had accepted that recommendation then, we would be well on our way to providing a spectrum to market under a shared spectrum model. But for whatever reason, including opposition by the wireless industry, it got restudied by the NTIA because somehow people didn't like the answer. But if we really wanted the spectrum, we could have moved off of that report.

Mr. Peters. Well, I am looking forward to talking more about this with you. I have the military in my ear and Qualcomm in my ear --

Mr. Powell. Yes.

Mr. Peters. -- and I think the people do send us here to work things out. And so that is what I like to do and look forward to working with you all.

I yield back.

Mr. Hudson. Thank the gentleman for yielding back.

I will now recognize the representative from Florida, Mr. Dunn, for 5 minutes to ask your questions.

Mr. Dunn. Thank you very much, Mr. Chairman. As a returning member of the

subcommittee, I want to remind my colleagues, what we map out for national spectrum usage sets the stage for all telecommunications nationally, and importantly, for the entire world.

I would like to emphasize the advantages that we enjoy in this particular Congress. We not only have Republican control of the House, Senate, and the administration, but we have a President who actually understands spectrum policy, and was very successful in spearheading some innovative and competitive policies in his first term.

I am going to read a statement from Brendan Carr, Chairman Carr, that highlights the successes. From 2017 through 2020, the FCC freed up roughly 6,000 megahertz of spectrum for licensed use alone, plus thousands of additional megahertz for spectrum for unlicensed use. The Trump administration put four times as much spectrum into the commercial marketplace for consumer use in one term than the last administration studied to put into use.

Two years ago, Congress allowed Spectrum Auction Authority to lapse for the first time in three decades. This is while China edges into the lead on spectrum occupation and the offerings of its associated technologies. It is the members of this committee in this room to lead on spectrum policy, to direct or authorize the FCC to enact authorization to auction these critical and finite resources.

And it starts by asking one general question: How much spectrum does the American need for commercial use and how much do we need for government use, and can they share the resource? And next, what are our licensed versus unlicensed needs for the commercial sector to innovate and grow? Can we strengthen sustained U.S. leadership in the field, or will we continue to lose ground in China?

Three years ago -- several years ago, the U.S. lagged as a country in adopting 3G technology. Europe got ahead of us. The tables turned when we switched from 3G to

4G, and America was ahead. So now as we get to 5G and 6G, we are competing with a cutthroat adversary, China.

And I want to caution us that, as Americans, we may feel entitled to win every big tech race and advancement, but that is by no means guaranteed unless we protect the telecommunications infrastructure wireless ecosystem. And that includes working with the ITU and the World Radio Conference. It also includes addressing priorities like diversifying spectrum uses for streamlining, for satellites, space, AI, et cetera.

All of this, you know, to keep foreign adversaries out of our telecom. And I believe, by the way, our adversaries have proven their hostile intentions by disrupting at least six submarine cables in the last few months alone.

With my esteemed colleagues on this subcommittee, enjoying bipartisan pro-American approach to technological innovation, which is fundamental in finding solutions to inner agency debates and political disputes standing in the way of America's global competitiveness, and I look forward to finding solutions. And I trust this panel to help us.

Ms. Rinaldo, I was fascinated by your testimony. In your opinion, what is the safest and most secure path for the expansion of commercial use of spectrum bands, and given your expertise in Open RAN space, can you tell us what you see in the future for that technology where expanding the usage of Open RAN and where we go from here?

Ms. Rinaldo. Well, if I could give you one little quick vignette to really get your mind wrapped around it. Canada in 2022 banned Huawei. They are going to be replaced just like we are. One of the executives at Telus has publicly said by 2029, they are going to be 100 percent Open RAN because he never wants to be in this position ever again.

Vendor lock is such a big part of this. So we talk about vendor diversity, but it is

also about the vendor lock.

It is going to allow you to be nimble, make updates as needed. So it really does have the power of national security concerns, as well as commercial connectivity.

Mr. Dunn. Thank you very much for that. You know, I am looking at a list of questions here. I know I am going to run out of time before I get there, but I am going to submit questions to everyone on the panel. And all too often, we do not get responses -- I will say that -- when we ask for written responses.

This is not a gotcha moment. This is a chance for you to educate Congress, improve your government, and I am sure you recognize the need for that. So please think of us as a receiving antenna and not a -- not a nosey imposing government.

And so with that, Mr. Chairman, I will yield back.

Mr. Hudson. Thank the gentleman for yielding back.

I will now recognize the representative from Illinois, Ms. Kelly, for 5 minutes to ask your questions.

Ms. Kelly. Thank you, Chair Hudson, and thank you for the peanuts, and Ranking Member Matsui for holding this morning's hearing, and thanks to all of our witnesses for participating.

You have heard some concerns already about how spectrum auction proceeds will be spent. I think Congress should invest its money in ways that benefit local communities and public interest objectives. For instance, last Congress in our bipartisan spectrum bill, some auction revenues were directed towards HBCUs and other MSIs to help them increase broadband adoption in their local communities.

As one of the co-chairs of the predominantly Black institution or PBI caucus, I know such funding would have enormous benefits, as these communities are too often under-resourced and lack affordable, reliable internet connectivity.

Mr. Lewis, do you agree that directing revenues towards expanding broadband adoption in communities served by HBCUs and MSIs is a worthwhile investment, and if so, why?

Mr. Lewis. I would say yes. When I talked about digital inclusion efforts on the ground, many of them are being led by folks in and of specific communities, whether it is the Black community or Hispanic community, at HBCUs or MSIs. And so, yes, I think those dollars are incredibly important to -- to support folks who know the local community well in getting people connected.

Ms. Kelly. And my district is urban, suburban, and rural, and I have 4,500 farms in my district. So I can relate to what my colleagues on both sides have been saying about their constituents.

The expiration of the Affordable Connectivity Program, or the ACP, poses a significant challenge for low-income households that depended on it to afford internet services. Unlicensed spectrum technology such as WiFi has provided connectivity across all income levels due to its wide distribution and deployment. We have seen schools and libraries utilize WiFi to help connect their students and patrons.

Mr. Lewis, can you talk about the role WiFi can play in connecting the unconnected, particularly with the expiration of ACP?

Mr. Lewis. It is a powerful tool. You see libraries and schools loaning out WiFi hotspots for students who don't have connectivity at home. I know we did that years ago in Alexandria when I was on the school board.

The unlicensed is also important for continuing to support the next generation of diverse scientists and engineers. You talk about HBCUs. They are generating the vast majority of Black scientists and engineers in this country. If those schools don't have access to unlicensed spectrum to -- to study new innovations and develop new devices

and new innovations, then they miss out on those opportunities.

Ms. Kelly. Thank you. Mr. Powell, your written testimony notes that shared spectrum models are the key to meeting our growing wireless needs, and you go on to list some of the advantages of shared spectrum.

What is it about these shared spectrum bands that make them attractive to a wide range of different entities, including ISPs, schools, libraries, and manufacturers?

Mr. Powell. I think the important thing to emphasize is when you do shared spectrum like we did in CBRS, you attract a whole bunch of bidders who win licenses, not just a single company or couple of companies.

So, for example, in CBRS, 228 companies, or entities, won licenses. And when you use those licenses, they are lower power, smaller geography, so it allows innovation in communities to set up their own wireless networks.

For example, you referenced HBCUs. Howard University is using shared CBRS spectrum on its campus today as a consequence of the shared spectrum policy and the CBRS option. You mentioned agriculture. There are places all over the country that are using CBRS to manage moisture control, automatic temperatures.

These are bands that they would have never had access to, but for the shared model.

Ms. Kelly. You kind of -- my next question was, how has the development of CBR service or CBRS advanced precision agriculture, you know, how has that been affected?

Mr. Powell. Yeah. As I mentioned, you know, there is a company called Hurst Greenery in Missouri that has 600 acres of greenhouses, and they use CBRS shared spectrum in order to control fertilizer feeds in order to check moisture of -- moisture in the soil, as well as to automatically control temperature control. And they were able to access that as a consequence of that FCC auction.

Ms. Kelly. My increase in farms join me to join my colleague, Rep Latta, in leading the House past Precision Agriculture Satellite Connectivity Act, which asks the FCC to review its rules for certain satellite services to see if there are rule changes that can be made to promote precision agriculture.

So thank you, Mr. Chair, and I yield back.

Mr. Hudson. Thank the gentlelady for yielding back.

The chair now recognizes the representative from Pennsylvania, Mr. Joyce, for 5 minutes to ask your questions.

Mr. Joyce. Thank you, Chairman Hudson and Ranking Member Matsui for holding this hearing and to our witnesses for testifying.

I appreciate that this subcommittee is starting with a topic that is clearly at the top of everyone's mind, and that is spectrum. The Energy and Commerce Committee has a long-standing commitment to smart, bipartisan policies that both modernize and govern spectrum use. Our jurisdiction is on the issue, and it has a storied history. And I am looking forward to working with my colleagues on both sides of the aisle on this issue.

Spectrum is a finite resource, and we must ensure that we are being innovative and thoughtful when forming any spectrum legislation moving forward. Solving this Spectrum Auction Authority lapse and generating new spectrum policy is my top priority on this subcommittee, and I look forward to working with Chairman Hudson on getting this across the finish line.

Mr. Powell, speaking of innovation, your members have leveraged spectrum and its high-speed broadband networks in many groundbreaking ways and are becoming fast-growing, mobile providers. Can you describe this incredible growth and competition and the role that unlicensed and shared spectrum have been playing?

Mr. Powell. Yes. You can look at how we innovatively use the spectrum that

was available to enter the mobile telephone market as the fourth major player. So we use WiFi where 80 to 90 percent of our traffic goes over that infrastructure. We should remember, 90 percent of the time human beings are indoors, and so they have access to that spectrum.

And then we use shared spectrum and we use exclusive license spectrum. And by doing that, we have been able to create a service that is dramatically cheaper than other wireless plans. Plans from the cable companies on mobile services, on average, save consumers up to $700 a year on their mobile wireless services being offered by cable companies.

Mr. Joyce. Mr. Gillen, can you speak to the ways in which your members have utilized licensed spectrum to innovate in the wireless space and to what extent that -- has the lapse in auction authority affected your ability to innovate?

Mr. Gillen. It is a great question. I think we talked a little bit about 5G home, an example of providing the second or third choice in home broadband right now, thanks to the power of 5G home. The 20 percent of those subscribers are new to broadband altogether as an ability of wireless to get deeper in those communities makes a big difference, and the differences can be stark. It is up to $8 billion in savings to consumers thanks to that competition.

As a practical matter, we already have companies out there that have waiting lists because there is not enough spectrum to continue to feed that competitive spirit. And so across the board, the more spectrum we have, the better we can compete both in the mobile space and in the fixed space.

Mr. Joyce. And continuing, Mr. Gillen, during the first Trump administration, 100 megahertz of prime mid-band spectrum was auctioned in the 3.45 into 3.55 gigahertz band for $22 billion. Estimated relocation costs by DOD were over $13 billion, but

according to NTIA, less than $300 million have been spent.

Is that band currently operational by commercial users, and if so, are they currently operating with incumbent DOD operations?

Mr. Gillen. Absolutely. I think when we talk about shared spectrum, there is different types of shared spectrum. There is dynamic sharing where it is actually real time and preemptible. That makes it hard for us to be used reliably.

There is other spectrum like you are alluding to. Some systems are moving out their government system; some stay. And the best thing we can do is get engineer to engineer together as to which systems belong here, which systems can be used more smartly elsewhere.

I think one of the auctions you just referred to is one of those places that the money that is left over right now is earmarked for the Navy to design a better radar that could help in the drone environment. And so, part of the magic of auctions is the Spectrum Relocation Fund Congress created creates win-win opportunities that we can actually help the government get the tools they need for the modern warfare environment that we have now.

So how do we get smarter? How do we share better? And we have a lot of tools available that we actually know can work, both the military radars can work, and we can coexist with 5G.

Mr. Joyce. Do you think, Mr. Gillen, that the innovation that can occur with the United States Navy and other military is a byproduct of the additional funds that occur through spectrum auction?

Mr. Gillen. Absolutely. This is a key piece of the puzzle to help them continue to advance and improve what they need us -- what we all need them to do, keep us safe.

Mr. Joyce. Ms. Rinaldo, what policy priorities should Congress have when

addressing development spectrum policies in this Congress? Are there issues in spectrum with your experience, what you bring to the table, that have not been addressed and you want to be seeing in this Congress occurring?

Ms. Rinaldo. So I would say, first and foremost, good oversight. We need a plan, we need to implement that plan, and we need to make sure that we have oversight to hold everyone's feet to the fire.

Mr. Joyce. Thank you.

Mr. Chairman, again, thank you for holding this important spectrum hearing today.

Mr. Allen. [Presiding]. Thank you, Dr. Joyce.

And now I recognize Representative Barragan from California for 5 minutes for questioning.

Ms. Barragan. Thank you, Mr. Chairman, for holding this hearing on American Leadership in Wireless Technology. I would love to hear about the bipartisanship, and there is bipartisan agreement on the importance of extending Spectrum Auction Authority to support our wireless networks and further innovation.

However, I think it is critical the American people know how we plan to use tens of billions of dollars that will be raised from the spectrum auction, and I also have concerns about reports that Republicans may propose to use the revenue from spectrum auctions to give out tax cuts to billionaires and corporations. Instead, I believe that we should be using those dollars, investing in things to benefit all Americans such as through broadband and through public safety initiatives.

Mr. Lewis, I am going to start with you. After witnessing firsthand the devastating impacts of the recent wildfires in the Los Angeles area, it is clear how important it is to have a strong emergency communication when disasters strike. We

often hear about people on the wrong side of the digital divide and how they miss out on essential education, health, and commerce opportunities, and you touched upon this topic briefly, but you kind of ran out of time. So I want to follow up.

If you could talk more about what it means when entire communities still have old, out-of-date 911 systems.

Mr. Lewis. I think without NG911 you have less -- you have slower responses. You have missed opportunities to get location information from people's mobile devices, other communication beyond phones, like texting, that help people reach emergency services faster.

And so it is incredibly important that we continue to deploy NG911 everywhere.

Ms. Barragan. Thank you. I think that is one of the reasons we should invest money from things like spectrum auctions and important communications priority like the Next-Gen 911.

Mr. Gillen, I want to follow up with you. How do wireless networks support public safety communications and emergency alerts, and are there any additional measures we should consider to ensure people in emergencies receive timely life-saving information to improve response efforts?

Mr. Gillen. Thank you for the question. And I think the last few weeks have reinforced the importance of that program.

The wireless emergency alerts, we have sent over 84,000 during that program. And one of the things we have learned recently is we have continued to add more functionality to that program. So before it went out through a broad area, we increasingly allow smaller geographic areas to go out, we give options as to how often a message is broadcast in your community in case your phone is off or other things.

I think some of the challenges we saw the last few weeks underscores that we

need to partner with those public safety originators who actually start the alert process as to how the tools work and what actually happens. But I think at its core, it is a critical functionality that we are proud to be able to help.

We need to always continue to work to make that program stronger both in terms of how the originators add to it and the functionality we create both for consumers and for the public safety.

Ms. Barragan. Thank you.

Mr. Powell, there is a significant workforce shortage across the telecommunications sector with tens of thousands of skilled workers needed to meet current and future demands. What steps are the companies you represent taking to address the shortage, and particularly through workforce development and engagement with under-represented communities?

Mr. Powell. Yeah. This actually is a very serious problem. It is one of the big problems with the BEAD infrastructure program. Our expectations of what we are going to be able to build falls short of the amount of workforce available to build it.

Consequently, our companies have focused on a number of significant workforce training programs. Some of them include particularly programs targeted at veterans. We have some programs targeted at young people to help them learn the skills and develop engineering talents that allow them to move into the cable industry. And we have very ongoing efforts daily in order to bring people into a company and train them.

This is not simple cut-and-paste work. It is important high-quality work, and we are committed to continuing to build a workforce that can allow us to bring broadband to every corner of the country.

Ms. Barragan. Thank you.

Mr. Gillen, is there anything you want to add about what -- the companies you

represent, what they may be doing, any policy recommendations, how Congress can help fill the gaps?

Mr. Gillen. I echo everything that Chairman Powell said. We need to be in a position to have the workforce ready. I think the Wireless Industry Association is a great apprenticeship program. I think we are all working together to get people into this. These are good-paying jobs. These are good opportunities.

I think one of the things Congress can do is if we know over the next 5 to 10 years when spectrum is coming -- those tower companies know when the work is coming. So right now when you talk about gaps in time between auctions and everything else, we don't know when the next one is coming. And so I think when you are looking at companies with tower builders across this ecosystem, the more certainty we can provide is a roadmap to, like, I can hire because I know the work is going to be there.

So I think the more certainty you can provide, but we would welcome your support because the workforce is critical to achieving everything we are doing.

Ms. Barragan. Great. Thank you.

I yield back.

Mr. Allen. Thank you, Representative Barragan.

Now, I recognize Representative Fulcher from Idaho for 5 minutes for questioning.

Mr. Fulcher. Thank you, Mr. Chairman. To the panel, thank you for being here today. We always learn something, and every time I listen to you all talk, I realize that I know about a fraction of what I need to know about some of these things. And so thank you for being here.

A couple of questions just for clarification. Mr. Gillen, I come from a State with a lot of space. There is a lot of rural area in Idaho, but it is growing. And the needs are growing rapidly. It is a fast-growing State, a lot of open space, a lot of Federal land, all

that.

We have touched on some of this, but just for clarification purposes, would you just share, what is the cost of us doing nothing? What if we do nothing in regard to licensed spectrum shortage, identifying that? What is the cost of that?

Mr. Gillen. The cost of it is, at its core, at some point this is going to stop working the way that you expect it to work. A lot of the innovation and expectations we want to talk about, whether it is AI or anything else, isn't going to have that platform to ride on. So that we are going to need to make sure from a licensed perspective and an unlicensed perspective, we have enough spectrum to actually meet our daily needs.

The first thing you notice in high-traffic areas, you are going to see slowing down. And that is going to get progressively worse. But really is, we are accustomed to our wireless service getting better each and every year. Without more spectrum, that can't happen.

Mr. Fulcher. Thank you for that. So that just shows the urgency that we are under here. I wanted to clarify that.

Mr. Powell, good to see you again. Thanks for joining us here today. On a similar topic, let's go to WiFi just for a moment. I would like to get your input. WiFi handles, as we have talked about, a lot more traffic than any other wireless technology. WiFi 7 is coming. Can you touch on that and just tell us what -- what from your vantage point, what is that going to bring, and what does this mean for spectrum policies as we advance WiFi?

Mr. Powell. Yeah. If you had walked the floor of the Consumer Electronics Show this past January, you would have seen a ton of emphasis on WiFi 7. WiFi 7 is a next-generation technology that, in short, allows faster -- faster use, faster data rates and wider channels.

One of the things we are having to manage in the home is an explosion of devices that need to be utilized on the same network. So when you get wider channels, you are able to get applications that require lower latency. So, for example, 4K or 8K video, or another example would be virtual reality systems of any type, and gaming.

So WiFi 7 is essentially critical to the kind of devices that are coming into the home and coming into the market as we continue to innovate.

Mr. Fulcher. And also important for research, research development, being unlicensed spectrum?

Mr. Powell. Oh, 100 percent. You know, we continue to use WiFi in research environments, medical environments, environments that have heavy reliance on it. And the more we have these advanced systems, the better we will be.

Mr. Fulcher. Thank you for that.

Ms. Rinaldo, I would like to steer a question to you. The Open RAN situation is an exciting one. Personally, as I hear you talk and as I just think through some of the things we have been through, I am concerned about equipment made by some of our adversaries. You mentioned the Huawei and some of that. Some of those things that, quite frankly, at least some of us don't think can be trusted.

What steps, if any, do you think that we should be taking in a leadership role to encourage trusted equipment, American equipment, whether it is American or anybody else, but trusted equipment? What steps should we be taking?

Ms. Rinaldo. So the two biggest things that we face right now is lack of the deployable spectrum here in the United States; how do we get spectrum authority back up and going, how can we make more spectrum available.

Also, as we look internationally, I would say how we use our investments, our international assistance programs. For instance, EX-IM Bank, they have risk caps

associated with, and telecom is such an infrastructure-heavy industry, we always bump up against those caps, and so no telecom projects are able to get funded.

So we are currently working with Congress on legislation that would allow EXIM to waive risk if we are going up against a Huawei or a ZTE. So those are a handful of items that could really help make a difference in getting Open RAN deployed around the world.

Mr. Fulcher. Great. Thank you for that.

Mr. Chairman, I do have more questions, but not enough time to ask them, so I am going to put those in written form. With that, Mr. Chairman, I yield back.

Mr. Allen. Thank you, Representative Fulcher, for yielding.

RPTR KERR

EDTR HOFSTAD

[11:59 a.m.]

Mr. Allen. Next is Representative Menendez from New Jersey.

You have 5 minutes for questioning, sir.

Mr. Menendez. Thank you, Mr. Chairman.

Spectrum is one of our most valuable public resources. It has become a cornerstone of modern life for American families, enabling smartphones, navigation systems, telehealth services, emergency alerts, aviation systems like air traffic control, and the list goes on.

How we manage our radio airwaves has a propound impact on access to and affordability of essential services, technological innovation, and digital inclusion, so it is vital that Federal spectrum policy is designed to support and benefit all Americans. This requires a range of spectrum access regimes that include both exclusive and shared-use licenses for reliable networks and access to unlicensed spectrum that supports innovation. Achieving the right balance is critical.

Mr. Lewis, would you agree that if we use auction proceeds to invest in our digital infrastructure and programs that serve the public interest, we can further unlock the next generation of American innovation and close the digital divide?

Mr. Lewis. Yes. I think it meets the mission of the Communications Act to do so and fills the gaps that we have in making sure that everyone is connected.

Mr. Menendez. Great. And I agree. That is why I join Ranking Member Pallone in his concern of reports that our Republican colleagues are instead preparing to use reconciliation to put spectrum auction proceeds towards funding tax breaks for corporations and wealthy Americans.

This is while we have heard a lot of talk from Republicans about affordability and putting America first. And here we are with a clear opportunity to invest in the public good in a way that will have a real impact on our constituents' access to affordable wireless services and on our Nation's ability to lead the world in wireless innovation.

So this is a moment of truth, and I invite my colleagues across the aisle to make good on their promises and join us in making life more affordable for American families, to make our communities safer by improving FirstNet, and to maintain America's leadership in technological innovation.

Mr. Lewis, I believe Federal spectrum policies must serve the public interest first and foremost. As we discuss extending the FCC's auction authority, we must be intentional about how licenses can provide the maximum benefit to our constituents.

How should the FCC design spectrum licenses to ensure that wireless services are more accessible and affordable for our constituents?

Mr. Lewis. I think it starts by using the new spectrum access models that have been studied to get the greatest benefit and the greatest efficiency of the use. We have heard at this hearing just how different bands can be used for multiple uses at the same time, including the military, while the mobile license carriers are using it, as well as unlicensed smaller power uses, all at the same time and managed through dynamic spectrum sharing.

So finding the most efficient uses, I think, is incredibly important and then, after that, running auctions with the authority from Congress, hopefully, that produce additional public-interest benefits like NG911.

Mr. Menendez. That is great.

And, building on that, how can licenses be structured to ensure that communities that tend to be underserved by commercial licenses are not deprived of digital

opportunity?

Mr. Lewis. I think the opportunity comes from those sharing examples. We have already seen some of this happen. You know, in the CBRS band, there are great opportunities for some of the most unconnected communities in rural areas -- Tribal areas, especially, are our most unconnected -- to use spectrum that is not being used, that may have licenses, but -- prioritized, but creates opportunities for them to have community-owned built networks. And I think that is in the spirit of some of the relationships we have with our Tribal communities.

So that is one example. There are many others.

Mr. Menendez. Yeah. That is great. And I would love to continue the conversation, but I am down to the last minute.

In your past testimony, you noted that auctions, if designed correctly, have the potential to reshape the workforce. How can licenses be structured to promote a robust and diverse spectrum workforce and increase supplier diversity?

Mr. Lewis. We have seen the FCC meet their statutory mandate to promote vendor diversity.

They have the Office of Communications Business Opportunities that helps connect women and minority vendors to opportunities to work with larger carriers and big providers.

They have created the ECIP program, which promotes taking licensed spectrum but creating a secondary market so that, if it is not being used by the large carriers, other groups can come and get access to that spectrum.

So there are great opportunities if we design it and continue those programs.

Mr. Menendez. That is great.

I appreciate you all so much for being here.

And I yield back.

Mr. Hudson. [Presiding.] I thank the gentleman for yielding back.

I now recognize the Representative from Texas, Mr. Pfluger, for 5 minutes to ask your questions.

Mr. Pfluger. Yeah, thank you, Mr. Chairman. And I appreciate the opportunity to have this hearing.

I will start with Mr. Gillen.

I would like to talk about the EMBRSS report. And, basically, DOD, NTIA concluded that the 3-gigahertz band couldn't be cleared for exclusive use. So I kind of want to talk through a sharing model or a segment model.

And, really, what I want to hear is what needs to happen, especially from DOD. What do we need DOD to come back with? How do we need to work together? What settings are we expecting that to happen in?

I am familiar with this band, I have used it in my professional career, and kind of want to get to the bottom of where we need to go process-wise.

Mr. Gillen. Absolutely. And I think there has just been a misunderstanding amongst everybody as to what our goal here is.

You think about the lower 3-gigahertz spectrum; it is 350 megahertz. That is almost as much spectrum as 5G has available for it. No one thinks all those radars should go away. That is a bad idea. And too much of this conversation is, "Oh, we need $200 billion and 20 years" to do something that no one is asking them to do. Ultimately, we need to get to a place that we have engineer-to-engineer.

We think segmentation makes the most sense around what is happening globally. So, if you look at just the top 150, and then in that top 150, what are those systems? There are systems -- there is a missile defense facility in Alaska. No one should move

that. There is no need to move that. There is AWACS, there is the airborne system out there [that is|that has] going to get replaced by Wedgetail in 2032. So let's talk about what is available in 2032.

There are other systems -- let's say it is using Channel 5. It is like an old TV. Can it work on Channel 3? Other systems, can we talk about -- can we use it, smaller channels, if we actually invest? Some of the money from the last auction is going to the Navy to move S radars to X radars that are actually better in a drone environment.

So we think that we have to get away from a binary choice, it is either the military or wireless. We need both. We just need to be smarter and more efficient.

Mr. Pfluger. Yeah.

Mr. Gillen. And we need to start with getting engineers talking on a system-by-system basis, understanding your needs, understanding our needs, and making everybody stronger.

Mr. Pfluger. Well, I couldn't agree more. And I think, working together -- and I used those AI radars. I flew those aircraft. I used the services of aircraft like AWACS. And I think the time and geographic -- the ability to bifurcate those and to separate -- so I want to explore more on the segmentation process.

Mr. Powell, I will let you answer there, and I have a question for Ms. Rinaldo after that.

Mr. Powell. Well, I think I can only incrementally add that, I mean, the answer we just heard sounded a little bit like finding ways to share. And that is exactly what we are supporting.

I think the big conflict is, are we going to move forcefully in that direction, following the examples and precedents we have had in the past to do so, or are we going to continue to fight over how much we can actually take away for full power and

exclusive use by the commercial industry?

I mean, I appreciate that you could go through system by system, but I think we also have to respect the military experts' judgments on what they need and how they need it. Those of us in industry, engineers or otherwise, aren't necessarily the best people to make those national-security decisions.

Mr. Pfluger. Do you feel like that we have been together in the right rooms at the right classification level to understand each other?

Mr. Powell. I probably don't have enough direct experience to answer that question, but I would say, look, there is a component of what happens on the military side that stays behind the confidential curtain. You have to trust that people are protecting things that must be protected. But, typically, we learn enough about what they are doing to have a pretty good appreciation of what the, sort of, range of possibilities is.

Mr. Pfluger. I am convinced that we can share. I am convinced that there is a plan that we can make work. And, actually, the benefit will be innovation, and that will benefit DOD as well. It is a finite band.

Ms. Rinaldo, I will come to you. In your testimony, you talk about the role of standards-setting bodies, such as the World Radio Conference -- Radio Communications Conference, and what that plays in shaping technology.

I think there are some concerns about that process and concerns about getting to that conference and having the U.S. take a leadership role. What needs to change in that process? And how do we affect it better beforehand?

Ms. Rinaldo. So I think there has been a lot of chaos going into the WRC. And it is so incredibly important that we go in and we have debate, right, we have the fight in the room. That is where great ideas happen.

But then when we leave that room, we need to have a decisive decision, and people need to stick to that decision. And that has been the breakdown. So, if we are at WRC and we are still fighting, then our adversary is winning.

Mr. Pfluger. Mr. Chairman, great hearing today. Our national security depends on this. I am convinced that innovation will result from moving forward with an auction.

I yield back.

Mr. Hudson. I appreciate the gentleman yielding back. And I appreciate your perspective on this. I think your experience in the military uniquely qualifies you to help us figure this out. And I think this committee is determined, on both sides of the aisle, to figure this out. So thank you.

The chair now recognizes the Representative from Virginia, Ms. McClellan, for 5 minutes to ask your questions.

Ms. McClellan. Thank you, Chairman Hudson and Ranking Member Matsui, for convening today's hearing.

As many of you know, I began my legal career a little over a year after the Telecommunications Act of 1996 passed. That is how I started as a lawyer. I ended as a lawyer, right before coming here 2 years ago, figuring out how to implement the BEAD program and to expand broadband.

I have witnessed first- -- I had a front-row seat at the table, witnessing the transition of the telecom industry from regulated monopoly, where mainly landline was the form of communication, to now a WiFi-based, wireless-based, data-based industry. And I have seen firsthand the explosion in the use of and the demand for more bandwidth, for more and more data, growing at an explosive rate.

So I am very excited that my first hearing as a member of this committee has brought me back home, dealing with issues that I have dealt with since I was a baby

lawyer.

And, with that, I would like to first focus on the discussion we have had about spectrum being a finite natural resource that does form the foundation for technical innovation in our dramatically increasing digital world. Its allocation and utilization carries significant potential to either bridge or widen the digital divide, particularly for our rural, under-represented, and marginalized communities.

And so, for Mr. Powell and Mr. Lewis, could you elaborate on the benefits of unlicensed spectrum, including how it has historically driven innovation and expanded connectivity, especially in underserved, rural, and Tribal communities?

Mr. Powell. Thanks. I am happy to go first.

I would say a couple things real quickly.

First of all, it is important to understand how much value WiFi brought to the typical American family over the way the internet first unfolded. When I was first at the FCC, you paid $60, you got a single connection, and you got one computer to operate on that connection. Today, that price is about the same and every single person in the house can use it. So you have dramatically increased the value and the affordability of the service for all communities.

Secondly, the thing that we are learning is WiFi is very effective as a public resource. Anybody can get on it -- in the airport, in the public park, in the library, in the famed McDonald's parking lots where students have studied at times. During the pandemic, we wouldn't have survived without WiFi being able to allow us to operate at home.

The other thing is, as we move to share models, we are learning that people can take matters into their own hands. I have a great respect for the wireless industry. They are great, but they have challenges in building out infrastructure. But we, with

CBRS, we empower local communities to set up their own wireless networks. We have small utilities who are able to use CBRS and provide services to their communities. We have small wireless internet service providers who use these bands that they are able to get at low cost to provide services to rural communities.

So one thing to remember in the models that we are championing is that you allow anybody to take delivering wireless service into their own hands and use it privately -- in manufacturing facilities, in stadiums, in football fields. The NFL is going to use it for all of their 24 stadiums. So it is a democratizing approach. And I think we think we see a lot of benefits that come from that.

Mr. Lewis. Just to add on, it is democratizing in how it impacts folks who then get to innovate on unlicensed spectrum. We talked earlier about, you know, the important research that can be done to build new devices, and we want to see that happen everywhere, whether it is, you know, on HBCU campuses or in high schools around the country.

It is benefiting in both rural and urban areas. You see WiFi create local networks in urban areas, like Harlem, and the most remote rural areas. Tribal communities are building on multiple bands. There is, in California, the EnerTribe, serving the Yurok and Karuk and Hoopa Tribes -- Hoopa Tribes; I might have mispronounced it -- where they have built their own networks using the shared CBRS structure but on the unlicensed level.

Ms. McClellan. Thank you, Mr. Chair.

In my last 10 seconds, I would just like to ask, for Mr. Powell and Mr. Gillen, if you could share in written response back what steps Congress can take to ensure that vital programs like the now-expired Affordable Connectivity Program can foster greater competition in the wireless market and to drive down prices, while also ensuring

providers have the resources necessary to deploy and maintain the networks that are necessary to provide those services.

And, with that, I yield back.

Mr. Gillen. We will do that. Thank you.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. Thank you.

The gentlewoman yields back.

The chair now recognizes the Representative from Georgia, Mr. Carter, for 5 minutes to ask your questions.

Mr. Carter of Georgia. Thank you, Mr. Chair.

And congratulations to you, Mr. Chair, on your chairmanship of this subcommittee. It is a great subcommittee, and I served as vice chair for a while last session. I will tell you, they have a great team too. So you have surrounded -- they have surrounded yourself with good people. And we appreciate it, because it is extremely important. This area, as we all know, is extremely important.

Mr. Gillen, I want to start with you. You said today that we, as the U.S., are watching other countries, whether it is allies or rivals, make more 5G spectrum available for their 5G networks than it is in the U.S.

Can you talk more about that and why other countries are doing -- what they are doing with spectrum, why it matters? And specifically about China.

Mr. Gillen. Absolutely. Thank you for the question, Congressman.

You go around the world; England has twice as much of the spectrum that we do. Japan has three times as much. There has just been a recognition when you look at these demand curves, what are we going to need to actually meet that moment and also to create innovation.

If you think about all the innovation in the sharing economy, all those apps, they happened in the United States because 4G was the best in the world in the United States. And we need to get back to that place in 5G.

What we see in China is, both domestically they want to be able to deliver innovation, manufacturing -- their pushing forward of the smart

manufacturing -- leveraging that spectrum. They also want to -- as Ms. Rinaldo has talked about, they want to export their values, their equipment through spectrum policy.

So, right now, globally, there are four 5G spectrum bands out there for the globe to use. China supports three of them. We support zero of them for 5G. We are not in the game right now to be able to help shape where our allies -- where we go, which impacts our manufacturing base to have someone to sell equipment to. It impacts our ability to innovate. So --

Mr. Carter of Georgia. Okay.

Mr. Gillen. -- the faster we get back to more spectrum, the better off we will be.

Mr. Carter of Georgia. Great. Thank you for that explanation.

Mr. Powell, how will the unlicensed and the shared community help us address the China threat as it was just explained?

Mr. Powell. Thank you for the question.

One example I would like to share, which is Georgia-based, is the United States Marine Corps at the Logistics Base in Albany, Georgia, is using CBRS shared spectrum right now to advance our warfighters' abilities to use robotics on the battlefield.

I think it is important to remember that, you know, China is a threat on multiple fronts, and if they invade Taiwan, we are going to find out the most important one is whether we are able to meet that threat. So CBRS shared spectrum has been a solution on a number of military bases to allow them to set up their own private networks in order to train and operate equipment.

Mr. Carter of Georgia. Good. Thank you for that.

Mr. Gillen, I want to go back to you. As you know, I introduced the American Broadband Deployment Act that takes steps to eliminate the bureaucracy and the red tape.

And I will tell you, that is one thing we are -- the Trump administration is going to address, is just all the permitting, all the regulations that go throughout all of our economy. I don't care if you are talking about healthcare, if you are talking about technology or energy; everywhere I go, everybody is telling me: permitting, regulation is crushing us, crushing us.

So, obviously, in the previous Trump FCC, they made great strides in this area, and Chairman Carr's leadership has been needed. I am wondering, do you think it is important to codify those changes, and should we go even further?

Mr. Gillen. Yes. I think your bill is a key companion to this conversation around spectrum, that in order -- particularly as we are waiting years to get spectrum access, we need to hit the ground running. And I think what Chairman Carr did previously on permitting reform, we need to do more. We need to go beyond small cells to macro cells; how do we get to Federal land.

So I think your legislation is a key piece of how do we actually codify that commonsense modernization that we need to actually get people out building again.

Mr. Carter of Georgia. Do you think spectrum would be more valuable if broadband permitting was faster and more transparent at the local and the State level?

Mr. Gillen. Yes. It gives us a roadmap to how quickly we can build; if you buy that asset, how quickly can you put it on the towers across the country, actually delivering service to consumers.

Mr. Carter of Georgia. I think that is very important, and I hear it all the time as well, about problems not only at the Federal level but at the State and local level as well, and we need to be assisting them in that as well.

Mr. Gillen. Absolutely.

Mr. Carter of Georgia. Mr. Chairman, thank you very much.

And thank all of you for being here. Again, this is extremely important. We all know that, and we recognize that. So your input is very valuable, and we appreciate you taking time out to spend with us.

Thank you, Mr. Chairman. I yield back.

Mr. Hudson. The gentleman yields back.

The chair now recognizes the Representative from New York, Ms. Clarke, for 5 minutes to ask your questions.

Ms. Clarke. Thank you.

Good afternoon, everyone.

And thank you, Chairman Hudson, and thank you, Ranking Member Matsui, for convening this important hearing.

Let me also thank our panel of experts for joining us this afternoon.

Finally, my warmest regards and welcome to all of my new colleagues on the subcommittee and the Energy and Commerce Committee.

Spectrum policy is such an important part of this committee's jurisdiction and a fitting topic for our first subcommittee hearing of the 119th Congress, particularly given the continued lapse in the FCC's spectrum auction authority.

While I am disappointed the Senate was unable to follow our lead in the 118th Congress on auction authority, I am proud of the work this committee has done in recent years on spectrum policy.

The need to advance and enact legislation that reinstates auction authority and thoughtful spectrum policy is more important than ever, given the multiyear lapse, but it is equally important that we get it right.

Spectrum is a public resource and must be treated as such. Our spectrum policies must carefully balance the needs of both Federal and non-Federal users while

fostering new innovations that maintain our global leadership. Spectrum auction proceeds must also be reinvested for the public good and not as a pay-for for additional tax cuts for billionaires.

This committee has historically shown an ability to work in a bipartisan manner to establish a creative regulatory framework that fosters the kind of innovation and competition that made us global leaders in the first place. CBRS is a prime example of the kind of creativity that we can achieve when we work together. And I believe that, together, we can break this logjam and advance innovative spectrum policies that serve the public interest.

At the heart of this impasse is the fundamental tension between critical national-security needs and the priorities of wireless carriers. Reauthorizing spectrum auction authority requires addressing this tension head-on. And a successful framework must enable technologies to coexist, ensuring that neither side feels the need to obstruct future attempts to reauthorize the authority.

Having said that, Chairman Powell, in light of your response to Rep. Pfluger, what are your thoughts on spectrum-sharing frameworks like CBRS? And how can this help us chart a path forward?

Mr. Powell. Yes. Thank you.

Think about just the number of top-line benefits when you pursue spectrum in this way. Number one, you help resolve the conflicts we have all been talking about. Rather than having a tug-of-war between two different important interests, we find a way to have them share.

Secondly, it tracks a lot more investment. So, you know, when you had CBRS, you had 228 winners, not 1 or 2. They are all able, then, to provide a whole range of diverse services. You could provide wireless high-speed service, precision agriculture --

Ms. Clarke. Uh-huh.

Mr. Powell. -- new networks for your school. And you allow people to do that without further permission from the government. These are enormous benefits.

So, you know, I think, when you add that all up, it is a very important tool in the quiver of Congress and the United States Government as it tries to think about a forward-looking spectrum policy.

Because, no matter what, when we resolve this band, we are going to be here next year and the year after talking about wanting more, and it is going to get harder and harder. The more we squeeze, the more we try to get more juice out of the lemon, you know, we are going to get to the pit. And we are going to have to find some new, creative way to continue to have spectrum roll off the assembly line and into the market.

Ms. Clarke. Very well. Thank you very much.

As we all know, different communities have different needs when it comes to connectivity.

Mr. Lewis, can you discuss whether and how different spectrum access models affect the ability of people from different backgrounds, regardless of socioeconomic status, to access the latest wireless technology?

Mr. Lewis. Each community can use unlicensed spectrum in different ways. And we are seeing some of those different access models allow for that flexibility.

In rural areas, we have seen the use of TV white spaces to get broadband deployment out to communities that don't have it. We have seen -- I have talked about the Tribal communities, but also we have seen in urban areas folks build co-ops using unlicensed spectrum because of both sharing models as well as broad unlicensed bands that the FCC has reserved. We need to continue to do that.

I can't over-exaggerate, I think, the importance of WiFi 7 that was talked about

earlier, the broad channels that are needed to make that happen so that, when we get 6G, when we get, you know, gigabit broadband to a lot of places, you don't want to have that slowdown when you get to the modem inside the building. WiFi 7 allows for that.

So all these different sorts of access models are just critically important to keep everyone connected, whether you live in urban areas, densely populated areas with co-ops and mesh networks, or rural areas with white spaces and community-built networks.

Ms. Clarke. Very well.

I yield back. Thank you, Mr. Chairman.

Mr. Hudson. Thanks.

Ms. Clarke yields back.

The chair now recognizes the Representative from Florida, Mrs. Cammack, for 5 minutes to ask your questions.

Mrs. Cammack. Well, thank you, Mr. Chairman. And congratulations on the new role. It is so great to be back at work on so many important issues with our colleagues.

And, of course, spectrum, as we know, is critical to our economic and national security. And it has never been a partisan issue, which is honestly why I was so disappointed to hear the ranking member and several of my colleagues on the other side of the aisle attempt to assert that spectrum auction authority will be used as a means, in his words, to, quote/unquote, "give tax cuts to billionaires" by extending the tax cuts from the Trump tax cut plan.

Now, that is clearly a hyper-partisan and false attack, and I highly doubt that the constituents of the ranking member's district in New Jersey 6 would appreciate the 19-percent annual tax increase across the board on working-class families, nor would the

98,800 families in his district appreciate their family's Child Tax Credit getting cut in half if we do not, in fact, extend the Trump tax cuts.

A similar comment was echoed by my Democratic colleague from California, Ms. Barragan -- which, again, I don't think that her constituents in California's 44th District would appreciate a tax increase, on average, of $1,621 annually.

So, Mr. Chairman, I felt it appropriate to set the record straight, seeing as how we are only a few hours into the first hearing of the 119th and attempts are already being made to turn this vital issue of both economic and national importance into a political wedge.

So I am sure their constituents, just like mine, care deeply about the national and economic security and would appreciate folks staying focused on the primary mission here rather than partisan attacks.

So, Ms. Rinaldo, you had started down a line of answering Representative Joyce's questions, and you had mentioned oversight, talking about what you would like to see Congress do more of in this space. Please elaborate on the oversight elements that you were alluding to.

Ms. Rinaldo. Yeah. So sometimes through -- we have seen in the past, through an interagency process, the failure to come to a decision, and then you just get to a stalemate. I think when you are talking about these issues, it is so incredibly important to continue to move the ball forward. You, as Members of Congress, can provide that oversight to hold feet to the fire to make sure that we are able to move forward.

Mrs. Cammack. Can you give any examples of a particular stalemate where a decision has kind of lingered?

Ms. Rinaldo. Yeah. So I think somebody else asked about -- oh, actually, it was Chairman Guthrie -- asked about other agencies looking to separate out of the IRAC

system, which is the management of all spectrum management. That is so incredibly important, to keep that group together. You lose all efficiencies, and it does have national-security implications, if agencies are protecting on their own terms and not through the collective good of the entire ecosystem.

Mrs. Cammack. So, a little bit in that same vein, you started discussing -- I think it was Representative Fulcher who started talking about this -- you started talking about the risk caps and how telecommunications infrastructure typically gets excluded, because it is so capital-intensive, from funding opportunities.

Obviously, that hinders our ability to compete with China, as you started talking about. Can you continue down that line for me?

Ms. Rinaldo. Sure. So Ex-Im Bank -- we have the tools. They already exist. We don't need to recreate the wheel. We just need to retool them to ensure that we are able to get capital out.

So, again, the legislation would just allow -- it doesn't require -- would allow them to waive the risk caps if a company was up against Huawei.

Mrs. Cammack. Now, let's say beyond Ex-Im, I mean, is the Development Finance Corporation also an area where this is a problem?

Ms. Rinaldo. Correct. Absolutely.

Mrs. Cammack. Okay.

Now, talking a little bit more in the Department of Defense realm, how can we -- I know, obviously, you talked about the risk caps. What other ways can DOD and others -- can we be competitive and support operations abroad?

Ms. Rinaldo. Yeah. So, again, I would say that DOD needs to be fully funded at their 5G department. The Open RAN Coalition, we have an excellent relationship with the 5G office and the FutureG office, but their budgets continue to be cut in half so they

are unable to deploy 5G around the world.

Mrs. Cammack. Do you feel that in the previous radio conference the United States was adequately represented?

Ms. Rinaldo. I think there are lots of leadership changes that led to disorganization.

Mrs. Cammack. And how would we address that disorganization going forward?

Ms. Rinaldo. Again, it is ensuring that we get people identified and in position earlier.

China has an advantage. They rule by fiat. But we go in through a multistakeholder process. Our process, at the end of the day, is going to create a broader, more impactful decision, but it does mean that we have to start earlier and we have to work harder.

Mrs. Cammack. Excellent.

My time has almost expired. I will submit the rest of my questions in writing.

[The information follows:]

******** COMMITTEE INSERT ********

Mrs. Cammack. Thank you to all our witnesses for appearing before us. And I am so sorry, it is freaking freezing in here.

Mr. Landsman. It really is. Amen.

Mrs. Cammack. Can we do something about that?

Mr. Landsman. So cold.

Mrs. Cammack. It is freezing.

Mr. Hudson. Well, the gentlelady has --

Mrs. Cammack. I yield.

Mr. Hudson. -- yielded back.

I will assure you, it is colder outside than it is inside.

The chair now recognizes the Representative from Florida, Ms. Castor, for 5 minutes to ask your questions.

Ms. Castor. Well, thank you, Mr. Chairman. I am so looking forward to working with you and Ranking Member Matsui on this important subcommittee. It is really critical to innovation, keeping WiFi and the internet affordable for our families and small businesses, and to our national security.

And I know this subcommittee did a lot of good bipartisan work last year, and you passed a spectrum auction bill unanimously out of committee.

Why didn't it -- why wasn't it brought to the floor? I would ask -- I am just curious. What is your view on that, Mr. Powell?

Mr. Powell. What is your view of that?

Ms. Castor. Mr. Gillen?

Just quickly.

Mr. Powell. You know, I think I would stand with our -- we have been -- we have all so forcefully seen the value of the FCC spectrum auction. I stewarded that

responsibility at the FCC. I think it was a tragedy that we lost it.

It is important to remember, when the FCC has auction authority, it is not just that they can move forward with an auction. They are empowered to find bands and spectrum to bring to auction. So they are stalemated in playing the leading role that they have always played.

I think, unfortunately, we get back to this issue: There is a lot of conflict about how these bands should be used and who should be using them. And if people believe it is a political opportunity to bias the outcome of that study in a way that they might want or to protect constituencies, even those protecting the Defense Department, it can lead to political stalemate.

Which is why we continue to believe that we have to start looking toward technological solutions like CBRS and shared spectrum to try to resolve those conflicts, as opposed to have them always thrown at your doorstep and ask lobbying and advocacy to produce spectrum policy.

Ms. Castor. And you all have talked about it before, on the lack of trust. Is there something else that I was missing on all that, why it didn't -- broadly bipartisan.

Just quickly. Just quickly.

Mr. Gillen. No, I think Chairman Powell covered it.

Ms. Castor. Okay.

Mr. Gillen. A lot of the conversation right now is -- we are having conversations around winners or losers, and we need to get to a place that these are win-win opportunities.

Ms. Castor. Yeah. I agree with that.

Mr. Gillen. And so I --

Ms. Castor. And that is one reason why we are concerned that spectrum

proceeds could be used to fund tax cuts, whereas -- Mr. Lewis started off, this is in the public interest. You use those proceeds in the public interest.

And why we are bringing it up is, now, the chairman of the Budget Committee -- there is a list and a paper out on the street that has it pegged, spectrum proceeds, as a possible pay-for. And that is why we are very concerned. It shouldn't go to fund tax cuts for big corporations and millionaires and billionaires. It needs to stay in the public realm.

And I can tell you, back home in the Tampa Bay area, as we recover from the most damaging and costly hurricane season and we look out at the other damage across North Carolina, to our neighbors across -- fellow Americans in southern California, no place has been immune to these extreme climate catastrophes. But, you know, we are learning a lot in the aftermath. In the aftermath, we learn how to better prepare and respond.

And the Florida Department of Emergency Management and the University of Florida piloted a new tool to provide emergency responders and local governments with a dependable means to share alerts. I mean, information is critical during emergencies. They have the new Broadcast Emergency Alerting and Communication Operational Network, BEACON, that uses AI to quickly convert text into speech for AM radio broadcast, and it has the ability to translate into different languages.

Automating these kind of critical safety broadcasts before, during, and after a disaster, they really help the first responders. They help get critical information to neighbors at a time of need. Cell phones go down; you lose the internet. And this is the kind of critical infrastructure that spectrum supports and that Congress should be encouraging.

Mr. Lewis, in your written testimony, you say that spectrum policy is about innovation and connectivity and that revenue raised should serve the public interest. Is

this the kind of thing you were talking about?

Mr. Lewis. It is.

You know, just with the public safety and emergency alert systems, when I was growing up -- I am 45 years old. When I was growing up, emergency alerts came over the television. Now they come over your phone. And so, whether you are in your home or you are on the move, receiving those is critical, and so we want to support those and continue to build them.

NG911 is a part of that --

Ms. Castor. Right.

Mr. Lewis. -- as well as other resiliency and infrastructure supports that we have talked about as public-interest needs.

Ms. Castor. Good. And I hope that is the tack we can take.

Thank you, Mr. Chairman. I yield back.

Mr. Hudson. The gentlelady yields back.

The chair now recognizes the Representative from South Carolina, Mr. Fry, for 5 minutes to ask your questions.

Mr. Fry. Thank you, Chairman. And congratulations on your chairmanship.

I will note just for the record that I appreciate North Carolina peanuts, and they are good, but South Carolina peanuts might just be a little bit better.

But thank you.

This is a crash course, as a new member, into spectrum and what that means for the country, and I really appreciate the discussion today. I am glad that this is a largely bipartisan affair.

Mr. Gillen, earlier, you talked about China a little bit and the risks that they pose in this space of spectrum. What are the consequences of China taking a lead in making 5G

spectrum available to their carriers?

Mr. Gillen. Thank you for the question.

As someone with teenagers, I spend my weekend talking about TikTok. And, ultimately, at the core, that is China exporting technology. You know, if you go back to 4G, 3G, that was the U.S. in that position. That is TikTok.

Now, imagine, extrapolate from that impacts on manufacturing, on ports, on how we are doing so many other different things. It is that innovation runs to connectivity, it runs to capacity. And so, really, it is, all the things we want to lead in going forward is going to go where the capacity and the connectivity are.

Mr. Fry. Thank you for that.

Chairman Powell, obviously, the internet economy has drastically changed over the last 12 years. Everything is different. The way we communicate is different. The amount of video content that we absorb is different. The way consumers use wireless technology is vastly different.

How might our -- other than -- I think we have talked about auctions a lot. How might our policies change as well, given how the world is changing?

Mr. Powell. Yeah, I think one of the things that I would recommend to the committee is to keep the consumer at the center of the focus of the policy. How do Americans really use spectrum? What do they most depend on?

I think one of the reasons we celebrate the WiFi story is that the vast majority of Americans' interaction with the internet goes over that infrastructure. We spend 90 percent of our days indoors, and when we are indoors, we are utilizing those services. If you are watching Netflix tonight, you are on WiFi. Frankly, if you are using your cell phone, 80 to 90 percent of the time you are also using WiFi, not even the cellular network. It is the, sort of, workhorse of the entire internet economy.

So, as you focus and align your spectrum policies, I think just keeping in mind the rapid innovation, the way consumers are evolving. You mentioned 12 years ago. The stuff in my house today, as opposed to 12 years ago, that expects to find and utilize my network is stunning compared to 12 years ago.

Mr. Fry. Thank you for that.

Ms. Rinaldo, how does access to spectrum allow innovative companies like those in the Open RAN Policy Coalition to continue to lead on the design of the next-generation networks?

And, as a followup, as the spectrum environment gets more congested, could new technologies like AI-driven network management help manage the spectrum issues and lead us to more commercial spectrum on the market?

Ms. Rinaldo. So I would say that Open RAN is a nascent concept, really first rolled out by Rakuten and Japan in 2017. So we kind of missed the 5G wave. And so, as new spectrum bands come on line, we are able to build out using Open RAN. I would say, other than Dish, who has deployed 20-plus-thousand -- AT&T has made an investment of $14 billion in Open RAN -- we are really focused internationally at this point. So more bands, more Open RAN.

And, as far as AI, it has been a great story for the telecommunications industry. We can use it for everything from management of spectrum, energy efficiency. And there is a lot of talk these days, as you can imagine, with concerns around drones, can we do detection using AI.

Mr. Fry. Thank you for that.

And this is a broader question, I think, for the panel, but we will just go down.

What specific actions would you recommend for us, as Congress, to take? I mean, obviously, we talked about some of the legal problems, some of the regulatory

hurdles, some of the outdated regulations that may exist. What would you share with Congress about ways that we can modernize our system?

We will start with you, sir.

Mr. Lewis. I think we all agree, I hope auction authority is where you start.

Mr. Fry. Correct.

Mr. Lewis. And I would say, make it permanent. Provide the reliability that the FCC has the power to do it. And then how that then impacts band planning in the future.

Mr. Fry. Okay.

Ms. Rinaldo. Auction authority, RNG, and then just working with our allies around the world to deploy safe and secure networks globally.

Mr. Fry. Okay.

Mr. Gillen. Same. Auction authority with a plan associated with it, and permitting reform.

Mr. Fry. Permitting reform. Okay.

Mr. Gillen. Yeah.

Mr. Powell. I would agree with that. I think auction authority, improvement in the interagency coordination process with appropriate congressional oversight, and assistance to the administration on developing uniform and single-voice policies when we appear at the next WRC in 2027.

Mr. Fry. Thank you for that.

Mr. Chairman, I yield back.

Mr. Hudson. The gentleman yields back.

The chair now recognizes the Representative from Ohio, Mr. Landsman, for 5 minutes to ask your questions.

Mr. Landsman. Thank you, Mr. Chair and Ranking Member, for this incredibly important hearing.

The broadband/WiFi work that we do, probably one of the most important things we have to get right nationally. And, obviously, Congress has to play a big leadership role in that. And this has been, as one of my colleagues said, largely a bipartisan discussion, because it is a bipartisan issue.

I mean, there are two pieces that are really important, that stand out for me.

One is just the relevancy, the impact it has on our economy. I mean, growing economies are economies where there are massive investments in infrastructure and education. And broadband is obviously a huge, huge piece of the infrastructure, and it is core to our global competitiveness.

The second is just the impact it has on our daily lives, which, Chairman Powell, you have talked a lot about. I represent southwest Ohio. It is a city, suburbs, rural Ohio. And it is one of the most important things that we do, to make sure that everyone has access, because of how important it is to their healthcare, to their education, to their connection to the world and to each other.

Two big questions have emerged here for me. One has to do with reauthorization and, you know, how we divvy up the spectrum capacity. And the second has to do with what we do with that revenue, right? Those are two big questions that I think we will sort out in a bipartisan way.

Let me start on the reauthorization question. Maybe each one of you could just talk a little bit about -- give one big -- I have heard a little bit from each of you about priorities, but one big priority. You know, I am new. So, if there is one thing you want us to really nail as we work on reauthorization, what would it be?

Mr. Gillen. For us, it is key, when you go back, each time Congress has done

this -- 1997, 2005, 2012 -- it has always been authority-plus.

Sometimes you direct specific auctions. Sometimes you say, you need to auction a certain amount. But particularly because the government controls so much of this, if you give the FCC, an independent agency, authority to auction without something to sell, it can be an empty tool.

Mr. Landsman. Got it.

Mr. Gillen. And so, for us, it really is that connection.

Mr. Powell. I think the authority is important, but I would slightly disagree with Mr. Gillen. You know, the FCC, when it has plenary auction authority, it has the authority to find an auction spectrum without further direction from Congress. So I wouldn't want to leave you with the impression that you have to tell them what spectrum to authorize. They have been doing that for the better part of this century. So I think that is important.

And I also think that if you entertain the idea of assigning specific spectrum bands, then you have to wrestle with the conflict we have spent all morning talking about; you have to figure out how you are going to resolve the complexity of the Defense Department systems. That needs to be done by experts down at the agency --

Mr. Landsman. Yeah.

Ms. Rinaldo. So I would say that the NTIA Administrator needs to be an Under Secretary. And government titles matter, and it makes a huge difference. If you are the NTIA Administrator, you are having to brief the Deputy Secretary to talk to --

Mr. Landsman. Yeah.

Ms. Rinaldo. -- you know, an agency about an issue that they know nothing about.

Mr. Landsman. Mr. Lewis?

Thank you.

Mr. Lewis. I would agree with that.

Mr. Landsman. Yeah.

Mr. Lewis. And with auction authority, I would say -- I would agree with the former chairman. You don't have to be prescriptive, because there is not a lot of new spectrum bands out there. Letting Ms. Rinaldo's old agency, the NTIA, and the FCC do the studies that point in the right direction is important. And preserving the balance of licensed, unlicensed, and sharing, WiFi 7, is a great opportunity but requires 360 megahertz of spectrum band. Yeah.

Mr. Landsman. And then the second piece is on the revenue. Obviously, there is some consternation, some worry, because of a document that came out that maybe these dollars could be used for pay-fors.

And on the tax piece, you know, I think there is broad support for tax relief for working folks, middle class, small businesses. It is the top 1 percent that I think folks like me struggle with.

The revenue, assuming it stays here -- and anyone, but, Mr. Lewis, start with you. Just -- you mentioned a few big things. I mean, again, if you had to pick one major investment, I am assuming it is the expansion and then the inclusion, but I am curious what piece -- where do those dollars need to go?

Mr. Lewis. I usually highlight two. Definitely digital inclusion work on the ground needs long-term funding, as do other broadband -- other --

Mr. Landsman. That is really just making sure that more people have it.

Mr. Lewis. Yeah, addressing all three drivers of the digital divide -- not just infrastructure, not just affordability, but adoption and helping people get it.

But if I picked a second, NG911. I mean, kudos to the chairman and former

Congresswoman Eshoo for leading on the NG911 bill last year.

Mr. Landsman. Thank you.

I yield back.

Mr. Hudson. I thank the gentleman for yielding back.

The chair now recognizes the Representative from New Jersey, Mr. Kean.

You are recognized for 5 minutes to ask your questions.

Mr. Kean. Thank you, Mr. Chairman.

And thank you to all of our witnesses for being here today.

Mr. Powell and Mr. Gillen, my district boasts some of the most capable innovators in the world. It also has areas that still face gaps in connectivity.

How can technologies using licensed and unlicensed spectrum both supercharge our existing industries and generate growth in more rural areas?

Whichever one of you would like to go first.

Mr. Gillen. Thank you for the question.

The power of wireless, particularly full-power 5G wireless, gives you the opportunity to push out broadband to other places.

Rappahannock County, Virginia, rural Virginia, there is no terrestrial fiber cable services. Right now, because of broadband auctions you made possible, there is now 5G home service available. So roughly 20 percent of those new customers had never had broadband before, because that is an ability to scale and move quickly.

So I would offer, it is one of the places that you can push out beyond where we are today.

Mr. Kean. Thank you. Thank you.

Mr. Powell?

Mr. Powell. I think one of the challenges in rural is always infrastructure. One

of the challenges the wireless companies have is, in order to serve those communities effectively, you have to densify the network. You have to go out there and spend the money to put up towers to concentrate. That is expensive. That is a big capital expense for them. And so that has been slow.

If you look at shared spectrum on CBRS, it covers 70 percent of all unserved rural areas. That is why you are seeing projects that allow communities to take matters into their own hands. And in your own State, CBRS spectrum is being used at Newark International Airport without having to await the use from a commercial service.

Mr. Kean. Thank you.

Ms. Rinaldo, can you speak to the effect that adoption of Open RAN technologies could have on our supply chain and strengthening American wireless competitiveness globally? And can you also provide an update on where the development and deployment of these technologies now stand?

Ms. Rinaldo. Absolutely.

I think one of the biggest concerns is that we wake up one day and there is only one vendor for the entire world. So the concept of Open RAN, I believe, has been so successful because we have gone from a handful of vendors now to hundreds -- a lot here in the United States, but also Japan, Taiwan, and Europe.

So, since we launched this coalition, there are now over 100 global deployments. I mentioned Tellis earlier. Tellis, they are going to deploy 100 percent by 2029. Viettel in Vietnam is deploying using Qualcomm and DeepSig to ORPC members.

Palau, a small island in the South Pacific, they just put out an RFP, and the number of proposals they received were astonishing, because the competitiveness of Open RAN does allow more vendors to participate in the market. So it is really a win-win.

Mr. Kean. Thank you.

And then, Mr. Powell and Mr. Gillen, can you both speak to how licensed and unlicensed spectrum are used in emergency response in cooperation with first responders? And what needs to be done to make sure that spectrum is used as effectively as possible to keep Americans safe in the event of an emergency or a disaster?

Mr. Powell. I think both are critical. I want to say that.

I have been involved in these situations. I will give you an example just in the L.A. wildfire situation. Charter was able to open 35,000 WiFi hotspots immediately to try to improve communications when other infrastructure had been devastated.

You know, that is really important, to be able to use every technological resource to get a network up quickly in these communities, often ones that are suffering without power as well as communications infrastructure.

Mr. Kean. Thank you.

Mr. Gillen?

Mr. Gillen. I agree with the chairman. This is a disaster; we all need to be working together, and all these technologies can complement each other.

In terms of wireless, we are proud that 80 percent of 911 calls are made on a smartphone today. The amount that we have invested to make sure that first responders can find you when you make that call with location accuracy. And the power of wireless emergency alerts to be an amplifier to voice -- and Mr. Lewis talked about how far we have come in that program.

And then in terms of the disaster recovery themselves, the technologies that we are leveraging now, there are COWs and COLTs -- we put cell phones on wheels, we put cell phones on trucks -- to go into an area to immediately have coverage. Because it is so critical. You have lost everything. You need that connectivity.

And so we take that responsibility very seriously. And that situation -- you know,

we can disagree on a lot of things. When it comes to disaster relief, we all come together to serve customers.

Mr. Kean. Thank you to all of our witnesses.

And I will yield back.

Mr. Hudson. I thank the gentleman for yielding back.

The chair now recognizes the Representative from Indiana, Mrs. Houchin, for 5 minutes to ask your questions.

Mrs. Houchin. Thank you, Chairman Hudson and Ranking Member Matsui.

And thanks to the witnesses for your testimony and for speaking with us today.

I want to start my remarks first by saying how excited I am to be here as a member of the Energy and Commerce Committee. This is my first hearing as a member of E&C, and I look forward to working on the issues under this committee's jurisdiction.

Back home, as a State senator, I worked on expanding broadband access, particularly in rural areas. I was proud to lead that fight, and it is a fight that I am excited to continue at the Federal level.

I look forward to certainly working with each member of the committee, Mr. Chairman, on our shared priorities and hope that we can find some common ground to bring real and positive results for the American people.

And I am glad we are starting this work this Congress on this issue of importance of both national security and global competitiveness, and that is spectrum.

While we may not realize it, spectrum directly impacts the ways in which millions of Americans go about their daily lives, both at home and at work. From listening to the radio to watching television, to using cell phones and browsing the internet, spectrum determines how these devices carry data.

That said, it is a limited resource. And I recognize that the United States must

play a leading role in innovation relative to spectrum to maintain our position as the world's leader in new technology.

So my first question is for Mr. Gillen.

My district in southern Indiana is largely rural, made up of small towns and cities. And I am certainly proud of the work that we did in the State senate to level the playing field for rural parts of the State, but the truth is, we continue to lag behind the coasts and urban areas in access to the internet and the tools that spectrum can provide.

How can your company's use of spectrum help with closing the digital divide for rural America?

Mr. Gillen. Thank you for the question.

NERA, earlier today, released a report that said, for every 100 megahertz of new spectrum available, it can help create access for 275,000 households that don't have it today. And so the opportunity, particularly with the 5G home product, to get to places that home broadband hasn't gotten to yet -- that the benefit of that opportunity, we can see that happen in real-time.

Accenture says that we can get to roughly 40 percent of houses without any help. And then the question is, where does the help come, whether it is the 5G fund at the FCC or the BEAD fund at NTIA? We are going to need the government's help. But with spectrum, we can continually provide more and more coverage throughout the area.

Mrs. Houchin. Great.

Mr. Powell, do you have anything in addition to that to add about how the company's use of spectrum can help close the digital divide?

Mr. Powell. Yes. As we talked about earlier, when you use some of the CBRS shared spectrum, you are allowed to let communities take matters into their own hands and build networks while they are awaiting commercial systems to come and densify

their network.

I also want to put a plug in, because it is equally in this committee's jurisdiction: It is getting the fixed infrastructure out there too. A lot of wireless needs fixed infrastructure in order to put those signals into the ground pretty quickly.

So, with the BEAD investments that we are making, and the companies that I represent are deepening their penetration into rural America, these things have to be seen as complements. One will not survive without the other.

Mrs. Houchin. Thank you.

We have talked a little bit -- my colleague from New Jersey talked about Open RAN. So I want to ask a few questions about that.

I am excited by the prospects there to potentially increase vendor diversity, both in the United States and with our trusted partners around the globe, to open the door for new entrants into radio access and to the network marketplace.

So, Ms. Rinaldo, how can ORAN technology help us stay competitive with China?

Ms. Rinaldo. So, for so long, especially -- so I used to work for the House Intelligence Committee when they wrote the Huawei report and then at NTIA. And it was the policy of the United States to go around the world and say, "Don't use Huawei. It is a security concern."

Open RAN is the, "If not them, then who?" We give people something to run to, as opposed to run away from. And I believe that is why it has been so incredibly successful.

So, as we have 5G and as we look to 6G, it is software-defined networks and virtualization.

I will use an example about Tellis. Tellis is ripping and replacing right now, and an executive said they are going to move to Open RAN because he never wants to be in a

position of vendor lock ever again. So we are bringing that national-security supplier diversity as well as the opportunity that Open RAN can bring.

Mrs. Houchin. Well, that lends particularly to my next question. Does the deployment of 5- to 6G help with deployment of Open RAN? I think the answer to that is yes.

Are there any barriers that do stand in the way of deploying the networks currently? And when do you believe we might expect more widespread development?

Ms. Rinaldo. Yeah, so the inability to auction new spectrum and make new spectrum bands available, that is going to impact deployment.

As well as, as we look internationally, I think it is important that we use diplomacy as much as possible to ensure that we are getting a supplied telecommunications chain out there.

Mrs. Houchin. Thank you.

Thank you for your testimony.

I yield back.

Mr. Hudson. The gentlelady yields back.

The chair now recognizes the Representatives from Texas, Mr. Goldman.

You are recognized for 5 minutes to ask your questions.

RPTR SEFRANEK

EDTR HOFSTAD

[12:57 p.m.]

Mr. Goldman. Thank you, Mr. Chairman. Thank you very much.

I had about 100 questions that have all been asked already. But I do appreciate you all's time today and for being here today. I will ask a couple of quick questions, and we will move on to my colleague from North Dakota.

This is both for Ms. Rinaldo and Mr. Powell.

Ms. Rinaldo, if you will go first.

How can we protect important national-security missions while also fostering innovation? And how do shared spectrum approaches help us avoid those national-security risks while still helping us find new spectrum for commercial use?

Ms. Rinaldo. Yeah. So there is currently an ongoing multistakeholder process that I am participating in that brings the private sector as well as the public sector together. They are going to start classified sessions soon.

And so I think as has been mentioned, you bring the engineers in the room, and then we can get things moving a little faster. So it is, how do we take the emotion, take the policy out of it, and get the engineers to, you know, pave the path forward?

Mr. Goldman. Understood. Thank you.

Mr. Powell?

Mr. Powell. I think the quick answer is coexistence. How do you allow people to live together and both be able to do and operate and provide the services that are critical, whether they are military/national-security services or commercial services.

Many of the bands we have had in the past have pioneered approaches to sharing. There are a lot of bands. Even in the CBRS band, we have protection of incumbent

military systems, particularly naval, coastal systems. And it allows them to operate effectively while we are able to offer a commercial service.

Mr. Goldman. Great. Thank you very much.

And, Mr. Gillen, your testimony notes that significant demand for wireless networks and more commercial licensed spectrum is necessary to keep pace with that demand.

Can you explain how the various types of spectrum auctions the FCC has used over the last decade work and how those address the American consumer needs?

Mr. Gillen. Absolutely.

The FCC has auctioned both commercial spectrum and government spectrum over the last 10 years, particularly in the 3-gigahertz range. A lot of the spectrum we are talking about is midband spectrum today. We were able to work through a process with the military to auction 100 megahertz for $22 billion in 3.45. And then C-band was satellite spectrum that we were able to repurpose for 5G.

And that is the -- you know, we have had 87-percent growth at our networks over the last 2 years. It was those spectrum bands that made it possible for us to have the capacity to meet that demand. And so, when we look at what is coming next, it is: How do we replicate the successes of those, and where do we find that spectrum? And we think both of those bands adjacent to it, we can run that same playbook in an effective way.

Mr. Goldman. Interesting.

Thank you all again very much.

Mr. Chairman, I yield back the rest of my time.

Mr. Hudson. Thank you.

The Representative yields back.

The chair now recognizes the Representative from North Dakota, Mrs. Fedorchak.

You are recognized for 5 minutes to ask your questions.

Mrs. Fedorchak. Thank you, Mr. Chairman. Thank you for organizing this great hearing today.

As a Representative from North Dakota, I am big into natural resources and resources. And spectrum is a very important national resource. So I appreciate the opportunity this hearing has to talk about how to best manage this resource for the benefit of American citizens.

I will have to say that, you know, to the extent that managing this resource results in additional funding for the Federal Government, I am really confident that my host colleagues, especially in this committee and on the Republican side of things, are committed to putting any additional revenues that might be generated from the sale of those to the benefit of everyday Americans -- the farmers, the ranchers, the coal miners, the oil field workers, teachers, nurses, those folks from North Dakota and throughout the country who are hard at work. I know that we will be very diligent to use those resources appropriately.

So, for all of you, thank you for your time. You have been sitting here a long time now. You probably are thinking about lunch and bathrooms and other things, so I promise I will be -- I just have two questions. But your expertise is really vital to helping us make the best decision on how to use these resources.

So, quickly, I wanted to ask Mr. Gillen: Help me understand the need for the dedicated spectrum and what sort of uses you use in that space that can't be done in the open, the unlicensed spectrum, and what the interference is that is created in the unlicensed that causes problems for you.

Mr. Gillen. Yeah. Thank you for the question.

I think, when we pick up our phones, we want that reliability. And what interference protection gives you is the security that you know that when we are going to build out that spectrum -- $30 billion last year -- we know that we control that spectrum and that our neighbors or others can't use that same spectrum. And so the certainty or reliability that you rely on every day comes from that licensed spectrum.

And I think a lot of the conversation today -- all spectrum is shared at some core. There is no cleared spectrum, really. It is just a matter of what different tools of shared spectrum you are using and whether or not government has preemptable rights, whether or not you have full-power ability to do it.

So, for a lot of these conversations, it is, how do we work around the government, how do we work with systems to make sure that it is something that works for us to be able to compete against China but also safeguard incumbent users as well.

Mrs. Fedorchak. Okay. Thank you. That is helpful.

And then the second question is to both you and Mr. Powell. If you were designing the proper mix between licensed and unlicensed, how would you do that? How would you separate it out?

Mr. Powell. For my mind, as a former policymaker, I would evaluate the demand uses that American citizens make of the spectrum.

It is not a simple matter of comparing who has how many megahertz versus who else has how many megahertz. You have to assign weights to that. You know, if 60 percent of all data is going over unlicensed networks and WiFi, if 80 to 90 percent of that cell phone data is going over WiFi, then it is a false equivalency to say they have exactly the same amount. You need to allocate more toward the highest and greatest demands.

Now, I think there is a -- just so I am not misunderstood -- there is a place for

exclusive licensing and high-powered spectrum. It is about getting that right. But I think that we have underappreciated the significant uses that Americans make, and I would focus more on how to find shared solutions.

Mrs. Fedorchak. Okay.

Mr. Gillen. You will be surprised to know I have a slightly different take.

So, for our perspective --

Mr. Powell. Really?

Mr. Gillen. -- we absolutely need both. And we lead the world today in WiFi access, and I think we need to get back to there on 5G.

And so I think, in our minds, you look at where the data growth is on our networks, what the congestion is. I think the congestion and how much actual capacity challenges should dictate a lot of this conversation.

And I think, absolutely, we use WiFi a lot on this device. Because when we are at home, we love these devices. You are not plugging into a desktop. So a lot of these statistics, no matter -- you know, when you are out of your house, it is not on WiFi; you are on this. And we need both of them to work.

So I think we need to work towards a policy that we are the best at both of these things.

Mrs. Fedorchak. Awesome. Thank you.

Mr. Chairman, I yield.

Mr. Hudson. I thank the gentlelady for yielding back.

And I want to welcome Representative Miller-Meeks from Iowa to the subcommittee.

And you are going to bring us home here. I recognize you for 5 minutes for your questions.

Mrs. Miller-Meeks. Thank you, Mr. Chairman. Thank you, Chairman Hudson. It is wonderful to be back on this committee -- and Ranking Member Matsui, as well, for allowing me to waive on to this critically important hearing today -- critically important because, as the chairman said, I am from Iowa, and I also happen to be a military veteran. So, both from the national-security and the connectivity viewpoint, this is an important hearing today.

And I also want to thank our witnesses for testifying before the subcommittee. You have been here a long time, so I will try to be brief.

I am just going to make a mention of something Mr. Gillen just said. We don't want you to work around the government. That has a different context, when we say that. We want you to work with the government. Because we know that the DOD needs access to this spectrum and they may need to preempt other uses.

In Iowa, our farmers depend on the latest technology to make their operations more efficient. Think: precision ag. And I think you mentioned that, Mr. Powell. Our schools, our healthcare facilities rely on strong connectivity for educational tools and telemedicine. And businesses across the State need access to cutting-edge communication systems to remain competitive in the global market.

When as a State senator in Iowa I passed broadband bills, I lovingly named these "Please get Dr. Miller-Meeks better internet connection so her children will come home for more than a day." That is how bad it was. And I cannot tell you how many WiFi providers I switched, so -- or satellite providers.

Spectrum, which makes all of this possible, is a finite resource that must be responsibly managed.

Mr. Powell, in your testimony, you point out that the U.S. could potentially fall behind in 5G and 6G deployment. And when I have traveled overseas, I would echo that

sentiment.

Without embracing shared spectrum policies, what safeguards do you propose to ensure that critical national-security infrastructure and government operations are not jeopardized in the process?

Mr. Powell. Yeah, I think the whole predicate, why we are champions of this spectrum policy approach, is that it fundamentally presumes that we will work together and share with those systems, as opposed to displace them or to minimize them.

That doesn't mean that is always possible, but we think that is the going and effective approach when we know both have equally compelling uses. You should try to figure out if there is a way for them to coexist first.

Mrs. Miller-Meeks. Mr. Gillen, you noted that 5G is helping to create high-paying jobs and economic opportunities in manufacturing and agriculture.

And as an advocate for U.S. industry, as we both are, can you explain how 5G is specifically contributing to the growth of these sectors -- you might have in your posters --

Mr. Gillen. Yes.

Mrs. Miller-Meeks. -- particularly in the context of rural economies like Iowa's, and what additional spectrum could do to accelerate these benefits?

Mr. Gillen. So, on the first piece, I think manufacturing is one of the places that we really feel opportunity. How do you bring manufacturing back? And you look at -- Ericsson has a plant in Texas that has 120 percent employee productivity improvement. So it is one of those opportunities that is a roadmap for how we can do this.

In terms of a rural, it really is a matter of: The 5G home product is beginning to make a dent to the challenges that you faced in the State legislature. And the more spectrum gives us the ability -- it is a capacity-starved service, and so you need to

have -- like, more capacity lets us do it for more people. So one provider has a million people on the waiting list right now. We could make those subscribers with more spectrum.

Mrs. Miller-Meeks. Ms. Rinaldo, in your testimony, you mention the PRC's aggressive efforts to dominate wireless technologies and markets through state-sponsored corporate theft and market manipulation.

How do you propose the U.S. respond to these efforts? And what role can American companies and policymakers play in countering this state-driven competition?

Ms. Rinaldo. Help support vendor diversity, and work with our partners around the world to do the same.

Mrs. Miller-Meeks. And given the ongoing cybersecurity threats from adversaries such as the PRC, what specific policies or investments would you recommend to enhance the security and resilience of the U.S. wireless network, particularly in protecting our vital communications infrastructure?

Ms. Rinaldo. So Congress needs to reauthorize the Cybersecurity Act of 2015, which allows information-sharing. It needs teeth.

Mrs. Miller-Meeks. I was plugging that for you.

Ms. Rinaldo. Thank you.

Mrs. Miller-Meeks. Thank you very much, Mr. Chair. I yield back.

Mr. Hudson. I thank the Representative for yielding back.

Seeing that there are no further members wishing to be recognized, I would like to thank our witnesses for being here today and staying for over 3 hours.

I ask unanimous consent to insert in the record the documents included on the staff hearing document list.

Without objection, so ordered.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. I will remind members that they have 10 business days to submit questions for the record, and I ask the witnesses to respond to the questions promptly. Members should submit their questions by the close of business on Wednesday, February 6th.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Hudson. Without objection, the subcommittee is adjourned.

[Whereupon, at 1:10 p.m., the subcommittee was adjourned.]