

REPURPOSING THE C-BAND TO BENEFIT ALL AMERICANS

HEARING BEFORE THE SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY OF THE COMMITTEE ON ENERGY AND COMMERCE HOUSE OF REPRESENTATIVES ONE HUNDRED SIXTEENTH CONGRESS

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C O N T E N T S

	Page
Hon. Mike Doyle, a Representative in Congress from the Commonwealth of Pennsylvania, opening statement	1
Prepared statement	3
Hon. Robert E. Latta, a Representative in Congress from the State of Ohio, opening statement	6
Prepared statement	7
Hon. Bill Johnson, a Representative in Congress from the State of Ohio, prepared statement	8
Hon. Frank Pallone, Jr., a Representative in Congress from the State of New Jersey, opening statement	9
Prepared statement	10
Hon. Greg Walden, a Representative in Congress from the State of Oregon, opening statement	11
Prepared statement	13
Hon. Anna G. Eshoo, a Representative in Congress from the State of California, prepared statement	92

WITNESSES

Ross J. Lieberman, Senior Vice President, ACA Connects–America’s Communications Association	14
Prepared statement	17
Answers to submitted questions	147
Jeff Campbell, Vice President, Government Affairs, Cisco Systems, Inc.	26
Prepared statement	28
Answers to submitted questions	149
Deborah S. Collier, Director of Technology and Telecommunications Policy, Citizens Against Government Waste	30
Prepared statement	32
Answers to submitted questions	152
James B. Frownfelter, Chairman and Chief Executive Officer, ABS Global	42
Prepared statement	44
Answers to submitted questions	154
Phillip Berenbroick, Policy Director, Public Knowledge	49
Prepared statement	51
Answers to submitted questions	156

SUBMITTED MATERIAL

Letter of October 28, 2019, from Mr. O’Halloran, et al., to Ajit Pai, Chairman, Federal Communications Commission, submitted by Mr. O’Halloran	94
Letter of October 29, 2019, from Tim McCleese, Vice President, Legislative Affairs, Aerospace Industries Association, to Mr. Pallone, et al., submitted by Mr. Doyle	96
Letter of October 28, 2019, from Grover Norquist, President, Americans for Tax Reform, to subcommittee members, submitted by Mr. Doyle	98
Letter of October 29, 2019, from Peter Pitsch, Executive Vice President, Advocacy and Government Relations, C-Band Alliance, to Mr. Doyle and Mr. Latta, submitted by Mr. Doyle	100
Report of Citizens Against Government Waste, “The Race to 5G: Protecting Taxpayers through Spectrum Auctions,” by Deborah Collier and Thomas Schatz, submitted by Mr. Doyle	109
Blog post of October 7, 2019, “Analyzing Plans To Reallocate C-Band for Deployment,” by Will Rinehart, American Action Forum, submitted by Mr. Latta	122

VI

	Page
Blog post of October 25, 2019, “Progress on the C-Band,” by Joan Marsh, Executive Vice President of Federal Regulatory Relations, AT&T, submitted by Mr. Latta	136
Press release of October 28, 2019, “C-Band Alliance Proposes to Clear 300 MHz of Spectrum for Nationwide 5G Deployment,” C-Band Alliance, submitted by Mr. Latta	138
Ex Parte Submission, GN Docket No. 18–122, October 28, 2019, C-Band Alliance, submitted by Mr. Latta	140
Fact sheet, “C-Band Alliance Proposes Clearing 300 MHz of C-Band Spectrum,” C-Band Alliance, submitted by Mr. Latta	143
Letter of October 29, 2019, from Steve Pociask, American Consumer Institute, et al., to Mr. Walden and Mr. Latta, submitted by Mr. Latta	145

REPURPOSING THE C-BAND TO BENEFIT ALL AMERICANS

TUESDAY, OCTOBER 29, 2019

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON COMMUNICATIONS AND TECHNOLOGY,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:01 a.m., in room 2322 Rayburn House Office Building, Hon. Mike Doyle (chairman of the subcommittee) presiding.

Members present: Representatives Doyle, McNerney, Clarke, Loeb sack, Veasey, Soto, O'Halleran, Eshoo, Butterfield, Matsui, Welch, Schrader, Cárdenas, Pallone (ex officio), Latta (subcommittee ranking member), Kinzinger, Bilirakis, Johnson, Long, Flores, Brooks, Walberg, Gianforte, and Walden (ex officio).

Staff present: AJ Brown, Counsel; Jeffrey C. Carroll, Staff Director; Parul Desai, FCC Detailee; Evan Gilbert, Deputy Press Secretary; Waverly Gordon, Deputy Chief Counsel; Tiffany Guarascio, Deputy Staff Director; Alex Hoehn-Saric, Chief Counsel, Communications and Consumer Protection; Jerry Leverich, Senior Counsel; Dan Miller, Senior Policy Analyst; Phil Murphy, Policy Coordinator; Joe Orlando, Executive Assistant; Alivia Roberts, Press Assistant; Michael Engel, Minority Detailee, Communications and Technology; Margaret Tucker Fogarty, Minority Legislative Clerk/Press Assistant; Theresa Gambo, Minority Financial and Office Administrator; Peter Kielty, Minority General Counsel; Tim Kurth, Minority Chief Counsel, Consumer Protection and Commerce; Kate O'Connor, Minority Chief Counsel, Communications and Technology; Evan Viau, Minority Professional Staff Member, Communications and Technology; and Nate Wilkins, Minority Fellow, Communications and Technology.

Mr. DOYLE. The Subcommittee on Communications and Technology will now come to order.

The Chair now recognizes himself for 5 minutes.

OPENING STATEMENT OF HON. MIKE DOYLE, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF PENNSYLVANIA

Thank you, all of you that are here today, and thank you to the witnesses that are appearing before us today. Today, our subcommittee is holding an important legislative hearing entitled "Repurposing the C-Band to Benefit All Americans."

The C-band is a block of spectrum currently used by satellite companies for the long-distance distribution of cable and broadcast

video programming like NBC, ESPN, and HBO, as well as audio programming, like NPR and LDS radio. More than 100 million Americans receive content every day that is distributed through this band.

More than 2 years ago, the C-band satellite providers began to suggest that they could relinquish a portion of the band in exchange for incentive payments and that, in turn, the spectrum could be used for 5G mobile wireless. In the wake of the incentive option, it is good to see incumbent spectrum right holders come forward and offer to work with the Government to free up spectrum. I think that tells us that the incentive model can work.

However, a number of these incumbent satellite companies have come together to propose a private transaction in the band whereby they sell the rights to spectrum they didn't purchase and that they keep the lion's share of the profits and that they may—may—give some of the money back to the U.S. Treasury on a voluntary basis.

There is a lot about this proposal that is deeply concerning. I have seen a number of reports that suggest that auctioning this spectrum could raise \$60 billion or more. This spectrum is so valuable because it will be essential for our Nation's deployment of 5G services. It has the capacity and the propagation characteristics to usher in a newer era of innovation and economic opportunity. We need to get this right because this is a precious natural resource, and the way this spectrum is deployed in the marketplace will determine our Nation's wireless future.

That is why, last week, I introduced H.R. 4855, the Clearing Broad Airways for New Deployment Act, or the C-BAND Act, along with my colleague Subcommittee Vice Chair Doris Matsui, who is a leader on this issue and with whom I have been working closely, along with our colleagues Congressman Bill Johnson and Congressman Greg Gianforte.

This legislation would require the FCC to hold a public auction to sell between 200 and 300 megahertz of C-band spectrum. It would require the Commission to protect incumbent C-band-dependent users who rely on this service to provide millions of Americans with video and radio services, and it requires the Commission to clear this spectrum and sell it within 3 years. This legislation would also create a golden opportunity to raise revenue and pay for many of our shared priorities.

We can fix problems we have talked about for a decade, colleagues, such as rural broadband deployment, which I know is near and dear to my colleagues Mr. Johnson and Mr. Gianforte. I know they care deeply about that. Rural telehealth, public safety communications, Next Generation 9-1-1, digital opportunity and inclusion and closing the digital divide—we have the opportunity with this legislation to address these critical needs.

Colleagues, we are never going to get an opportunity like this again. If we do nothing and tell our constituents that we gave away \$60 billion to a handful of foreign satellite companies and left the folks back home high and dry, this is something the American people are never going to forget. And no member of this committee or in the House of Representatives ever, ever talk about the need to do rural broadband deployment when this is our first and only

chance to have a pay-for. So this is an important piece of legislation.

As I said, there is no other sources of revenue to do this. How often in this committee have we talked about infrastructure, about broadband deployment, and the 800-pound gorilla in the room has always been, how are we going to pay for it? Well, this is a way to pay for it.

Now, on our panel today, we have a broad group, some for, some against this private or public auction. I don't normally associate myself with the Taxpayer Protection Alliance or the Citizens Against Government Waste. I checked my rating. It is 7 percent. I suspect some of you guys over there have a little higher rating than I do with Citizens Against Government Waste. But I will tell you what, I am happy to have them testifying here today.

At the Senate Appropriations hearing 2 weeks, Mr. Williams, president of the TPA, described the CBA plan for a private sale was one of the top 10 taxpayer rip-offs he has ever seen, up there with the bridge to nowhere.

The C-band legislation we have introduced is a win-win for everyone. It will ensure that the band is auctioned in a transparent and accountable fashion that results in the maximum return for the American people.

It also ensures that incumbent services that over 100 million Americans rely on continue to operate and are protected through the transition. And, finally, it gives us the opportunity and the ability to address critical needs in our country and close the digital divide.

I encourage all of my colleagues to support the C-BAND Act, and I look forward to today's discussion on this important issue.

[The prepared statement of Mr. Doyle follows:]

PREPARED STATEMENT OF HON. MIKE DOYLE

Thank you all for being here today, and thank you to the witnesses for appearing before us.

Today the subcommittee is holding an important legislative hearing entitled "Repurposing the C-Band to Benefit All Americans."

The C-band is a block of spectrum currently used by satellite companies for the long-distance distribution of cable and broadcast video programming like NBC, ESPN, and HBO—as well as audio programming like NPR and LDS radio. More than a hundred million Americans receive content every day that is distributed through this band.

More than 2 years ago, C-band satellite providers began to suggest that they could relinquish a portion of the band in exchange for incentive payments, and that in turn the spectrum could be used for 5G mobile wireless.

In the wake of the incentive auction, it is good to see incumbent spectrum rights-holders come forward and offer to work with the Government to free up spectrum. I think that tells us that the incentive model can work.

However, a number of these incumbent satellite companies have come together to propose a private transaction in the band whereby they sell the rights to spectrum they didn't purchase, and that they keep the lion's share of the profits, and that they may—MAY—give some money back to the US Treasury on a voluntary basis.

There is a lot about this proposal that is deeply concerning.

I have seen a number of reports that suggest that auctioning this spectrum could raise \$60 billion or more.

This spectrum is so valuable because it will be essential for our Nation's deployment of 5G services.

It has the capacity and propagation characteristics to usher in a new era of innovation and economic opportunity.

We need to get this right, because this is a precious national resource, and the way this spectrum is deployed in the marketplace will determine our Nation's wireless future.

That is why last week, I introduced H.R. 4855, the Clearing Broad Airwaves for New Deployment Act or the C-BAND Act, along with my colleagues Subcommittee Vice Chair Doris Matsui, who is a leader on this issue and with whom I have been working closely, Congressman Bill Johnson, and Congressman Greg Gianforte.

This legislation would require the FCC to hold a public auction and to sell between 200 and 300 megahertz of C-band spectrum.

It would require the Commission to protect incumbent C-band-dependent users who rely on this service to provide millions of Americans with video and radio services.

And it requires the Commission to clear this spectrum and sell it within 3 years. This legislation would also create a golden opportunity to raise revenue and pay for many of our shared priorities.

We can fix the problems we have talked about for a decade—such as rural broadband deployment, which I know my colleagues Mr. Johnson and Mr. Gianforte care about, rural telehealth, public safety communications, Next Generation 9–1–1, digital opportunity and inclusion, and closing the digital divide.

We have the opportunity with this legislation to address these critical needs.

Or we can do nothing and tell our constituents we gave away \$60 billion to a handful of foreign satellite companies and left the folks back home high and dry.

That doesn't sound like "America first" to me!

There are no other sources of revenue on the horizon to pay for these priorities, and as we have talked about time and time again, these are not problems private-sector actors have an incentive to address on their own.

Now, I don't normally associate myself with the comments of groups like the Taxpayer Protection Alliance or Citizens Against Government Waste, which I am happy to see is testifying here today.

But at the Senate Appropriations hearing weeks ago, Mr. Williams, the president of TPA, described the CBA plan for a private sale as one of the top ten taxpayer rip-offs he has ever seen—up there with the "bridge to nowhere"!

The C-band legislation we have introduced is a win-win for all Americans. It will ensure that this band is auctioned in a transparent and accountable fashion that results in the maximum return for the American people.

It also ensures that the incumbent services that over a hundred million Americans rely on continue to operate and are protected through a transition.

And finally it gives us the opportunity and the ability to address critical needs in our country and close the digital divide.

I encourage all my colleagues to support the C-BAND Act and I look forward to today's discussion on this important issue.

Mr. DOYLE. And I see that Mr. Walden and Mr. Pallone are here. And before I recognize our subcommittee chair, I want to recognize Mr. Pallone for a brief statement.

Frank.

Mr. PALLONE. Well, I just wanted to say that I was not happy to hear that Mr. Walden was retiring. He called me yesterday and told me. And I know that he is going to listen to me about the issue, but—he never does anyway. No, I am kidding.

But I just wanted to say, Greg, that it is just—I mean, obviously, we are still here for another—I don't know—16 months or whatever it is. But you have just been outstanding in terms of, you know, your principles and what you stand for and fighting for the things that you believe in, but at the same time, always willing to work with us.

Because I think you said many times that the main thing is to see if we can get some legislation passed and if we can come to an agreement. Failing that, then, you know, we can fall back and, you know, say what our positions are and if we disagree. But you are always—always—reaching out to the other side of the aisle and trying to think of ways that we can actually accomplish things for the American people.

And I just wanted to commend you for that and say that, as much as I regret the fact that you announced your retirement, we will still work together over the next year or so and beyond as well.

So I yield back.

Oh, I yield to the gentlewoman, yes.

Ms. ESHOO. Thank you for yielding, Mr. Chairman.

I echo your sentiments. Greg left a message for me yesterday. My heart sank when I listened to it and then read the reports. We have had and continue to and I think always will have a wonderful friendship and mutual regard for one another. And you have practiced that, Greg.

So, you know, we celebrate what you have accomplished, we celebrate the person that you are, and I am just glad that we have—what—15, 16 months to go together. So let's cook up some new stuff and get it done.

But Greg served as the chairman of this subcommittee, and I was the ranking member. And we are talking about auctions today. On our watch, we did a gigantic one when no one even recognized that a penny would be raised.

So there are opportunities. But you have represented your party, obviously, to the best of your ability. But I think you are going to be remembered as a person of integrity, a real patriot, and that you have always been value added to the House of Representative.

Thank you.

Mr. DOYLE. Greg, I just want to say that you—all of the Members on this side of the aisle hold you in high regard, and we have tremendous respect for how you have chaired the committee when you were the chair. And I want to say, on a personal level, that it has been a pleasure to work with you. And I think this should require a vote of the committee before you can retire.

Mr. WALDEN. We had that vote. My wife won. And by the way, it was unanimous between the two of us.

Mr. DOYLE. OK. Would you like to say anything before I recognize the ranking member?

Mr. WALDEN. Just take a second. We have got important witnesses and work to do here. But it has been a great joy and privilege to serve with all of you and some who aren't here at this subcommittee certainly as well.

And this is a wonderful institution. Sometimes it gets a little rocky. Sometimes it gets a little off the rails, but it is the best around. And it is about the people. And the great staff we all get to work with, they are all family. I think the hardest thing for me yesterday was breaking the news to my personal staff and then my district staff. And by the time I got up here to the committee staff, I was pretty much a blubbing mess.

But it is a great committee. We all know that. And we have had a lot of fun together. And it is interesting, we are talking auctioning spectrum one way or another here today. As Anna knows—and we fought that battle—CBO told us the AWS-3 spectrum was never going to happen, never auctioned, gave us a zero for the score. It sold for \$40 billion, which, by the way, makes this subcommittee and our full committee probably the biggest single payer down of debt because the extra proceeds all went to buy down the national debt. So you can put that in your brochure, if needed, with

your bad Citizens Against Government Waste score to overcome that.

No, it has been a great privilege and joy. And with all of these wonderful comments today, whenever my memorial service actually does get scheduled sometime, you don't have to come now, you know.

But thank you. I yield back.

Mr. DOYLE. The gentleman yields back.

The Chair now recognizes Mr. Latta, our ranking member of the subcommittee, for 5 minutes.

Mr. LATTA. Mr. Chairman, if I could, just on a point of personal privilege, before my time starts, if I can just also thank Greg for his great service to this committee and the House. He had great trust in me when he was the chairman of this subcommittee, when I was his vice chair, and then also having me as one of the subcommittee chairs in the last Congress. And I will never forget it. So I really appreciate your leadership and your friendship. And best of luck to everything to come. So thank you very much.

**OPENING STATEMENT OF HON. ROBERT E. LATTA, A
REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO**

Well, Mr. Chairman, thank you very much for holding today's hearing, and thank you very much to our witnesses for being here for our second hearing on C-band spectrum. It is very important for us to consider that before us today.

The FCC has signaled an intent to show progress on C-band in the near future, which will make critical mid-band spectrum available to 5G. However, a debate lingers on the best path forward to serve the public interest and encourage U.S. leadership in 5G.

In a world with a greater innovation and a growing appetite for wireless technology, an equation for making new spectrum available has become increasingly challenging. While bipartisan, market-based principles have led us well over the last two decades, it is important not to rest as other countries continue to feel free to continue adding additional spectrum for commercial use.

Taking bold steps have led us to success in the past like we saw in 2012 when we pioneered a new reverse auction, the fruits of which are now being deployed in low-band 5G spectrum.

I am pleased to have worked with Chairman Doyle on the SHARE Act to facilitate a system for Federal users on how to better share their spectrum and thus optimize its use, but there is an impending need to clear more spectrum now.

That brings us to today's topic, how to clear C-band spectrum for 5G deployment from willing sellers. Without question, when it comes to more technically, legally, and economically complex spectrum bands like this one, we should be encouraging industry and the FCC to work together on innovative approaches to spectrum management that serves the public interest.

In today's legislative hearing, we will discuss a bipartisan proposal on this important swath of spectrum. But I understand there are other views on the committee from both sides of the aisle.

To be clear, all of these views have merit. Each provides an important stakeholder perspective from the terms of current occu-

pants and users of C-band to how to best expedite its clearing so that it may quickly be deployed.

As our witnesses know, and will hopefully help us better understand today, there are several complex issues that present challenges for clearing C-band spectrum for mobile wireless service. We must consider the technical steps necessary to protect the incumbent programming services, how to best get cleared spectrum into the hands of those who will deploy it, how to ensure a fair and transparent process, how to promote participation of small rural users, and how to avoid costly court challenges that put a strain on U.S. 5G leadership at a time when our economic and national security interests are in the balance.

Our main objectives, no matter the approach, should be to get the spectrum to market quickly, fairly, and transparently.

With very few legislative days left in this session, time is running out to legislate the type of detail that was necessary to unlock the spectrum identified in the 2012 Spectrum Act. However, there is clearly a role for Congress to play in ensuring the public interest is served through effective spectrum policy and its related revenues.

I look forward to hearing more about those issues from our panel today. And, again, I want to thank our witnesses for being here.

[The prepared statement of Mr. Latta follows:]

PREPARED STATEMENT OF HON. ROBERT E. LATTA

Welcome to the second subcommittee hearing on C-band spectrum and thank you to the witness panel for being here today.

The FCC has signaled an intent to show progress on C-band in the near future, which will make critical mid-band spectrum available for 5G. However, a debate lingers on the best path forward to serve the public interest and encourage U.S. leadership in 5G. In a world with more innovation and a growing appetite for wireless technology, the equation for making new spectrum available has become increasingly challenging. While bipartisan, market-based principles have led us well over the last two decades, it's important not to rest as other countries continue to free additional spectrum for commercial use. Taking bold steps have led us to success in the past like we saw in 2012 when we pioneered a new, "reverse" auction—the fruits of which are now being deployed in low-band, 5G spectrum.

I'm pleased to have worked with Chairman Doyle on the SHARE Act, to facilitate a system for Federal users on how to better share their spectrum and thus optimize its use, but there is an impending need to clear more spectrum now. That brings us to the topic today—how to clear C-band spectrum for 5G deployment from willing sellers. Without question, when it comes to more technically, legally, and economically complex spectrum bands like this one, we should be encouraging industry and the FCC to work together on innovative approaches to spectrum management that serve the public interest.

In today's legislative hearing we will discuss a bipartisan proposal on this important swath of spectrum, but I understand there are other views on this committee from both sides of the aisle. To be clear, all these views have merit, and each provides an important stakeholder perspective from the terms of current occupants and users of C-band to how to best expedite its clearing so that it may be deployed quickly.

As our witnesses know, and will hopefully help us better understand today, there are several complex issues that present challenges to clearing C-band spectrum for mobile terrestrial wireless service. We must consider:

- the technical steps necessary to protect incumbent programming services,
- how best to get cleared spectrum into the hands of those who will deploy it,
- how to ensure a fair and transparent process,
- how to promote participation of small, rural users, and
- how to avoid costly court challenges that could put a strain on U.S. 5G leadership at a time when our economic and national security interests are in the balance.

Our main objectives—no matter the approach—should be to get this spectrum to market quickly, fairly, and transparently.

With few legislative days left this year, time is running out to legislate the type of detail that was necessary to unlock the spectrum identified in the 2012 Spectrum Act. However, there is clearly a role for Congress to play in ensuring the public interest is served through effective spectrum policy and its related revenues. I look forward to hearing more about those issues from the panel.

Thank you again to our witnesses for being here, and with that I yield the remainder of my time to my friend from Ohio, Mr. Johnson.

Mr. LATTA. And, at this time, I want to yield the remainder of my time to my friend, the gentleman from Ohio, Mr. Johnson.

Mr. JOHNSON. Well, thank you. Thank you to my colleague for yielding.

And to Chairman—or used to be Chairman Walden, thank you for all your leadership. And I have enjoyed working with you. It is a sad day to hear the news that you are leaving.

Well, look, this is a very important hearing today. The question is not whether this important mid-band spectrum should be repurposed but what process the FCC should use to transition C-band spectrum from satellite to terrestrial wireless broadband use, enabling 5G services, and importantly, greater broadband deployment to rural areas.

As a lead sponsor of the C-BAND Act, it is clear that I prefer the FCC conduct a public auction. In my view, this would enable a transparent and competitive process and ensure the taxpayers are the primary beneficiary from any auction or sale of this national resource.

I am hopeful that today's hearing will provide a thoughtful discussion on all of the FCC's options for repurposing C-band spectrum. I am particularly interested in hearing what resources Congress could provide the FCC to best enable a fast and efficient release of this vital mid-band spectrum in addition to how best the spectrum can be used to meet the needs of rural America.

It is important that we get this right. A timely and competitive process is critical, as is the accountability and transparency provided by an FCC-led effort.

And, with that, I thank you for the time, and I yield back.

[The prepared statement of Mr. Johnson follows:]

PREPARED STATEMENT OF HON. BILL JOHNSON

Thank you, Chairman Doyle and Ranking Member Latta for holding today's important hearing.

The question is not whether this important mid-band spectrum should be repurposed, but what process the FCC should use to transition C-band spectrum from satellite to terrestrial wireless broadband use—enabling 5G services and—importantly—greater broadband deployment to rural areas.

As a lead sponsor of the C-BAND Act, it's clear that I prefer that the FCC conduct a public auction. In my view, this would enable a transparent and competitive process, and ensure the taxpayers are the primary beneficiary from any auction or sale of this national resource.

I'm hopeful that today's hearing will provide a thoughtful discussion on all the FCC's options for repurposing C-band spectrum. I am particularly interested in hearing what resources Congress could provide the FCC to best enable a fast and efficient release of this vital mid-band spectrum, in addition to how best this spectrum can be used to meet the needs of rural America. It's important that we get this right; a timely and competitive process is critical, as is the accountability and transparency provided by an FCC-led effort.

Thank you, and I yield back.

Mr. DOYLE. The gentleman yields back.

The Chair now recognizes Mr. Pallone, chairman of the full committee, for 5 minutes.

OPENING STATEMENT OF HON. FRANK PALLONE, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you, Chairman Doyle.

Today, we are discussing how to reallocate the C-band in a way that benefits all consumers and helps us invest in connecting more Americans to better technology.

C-band spectrum is essential mid-band spectrum that can be used to speed up our efforts to implement new wireless technologies. Currently, the spectrum is underutilized, but it is not unused. Right now, in fact, it hosts satellite services that provide important services across the country, including the delivery of news and entertainment content to rural America.

In July, we had a hearing to discuss the country's spectrum needs where we discussed C-band at length, and we heard from a group of satellite service providers called the C-Band Alliance. The Alliance advocated for taking the lead and selling the spectrum privately to wireless carriers of their choosing and then made the argument that a private sale may make the spectrum available for 5G faster than a public auction would.

I don't think that is necessarily true. And what is more, the proceeds from that sale would mostly go to the foreign satellite companies that make up the Alliance. Their recent offer to make a voluntary payment to the Treasury from their multibillion-dollar private sale raised novel enforcement and transparency issues.

And this would be an unprecedented departure from the way Congress has instructed the FCC to reallocate spectrum in the past. Under the Communications Act, we required the FCC to run auctions that provide revenues to the Treasury, which is critical to ensuring the American people benefit from these auctions, and the revenues could go a long way in helping us invest in high-speed broadband in unserved and underserved areas and next generation 9-1-1 as we do in the LIFT America Act. Some estimates indicate the C-band auction could yield as much as \$60 billion to fund those priorities.

A public auction conducted by the FCC would also ensure that the process is fair, transparent, and competitive. And, furthermore, the FCC has the experience and the expertise to carry out this auction. After all, it has conducted over a hundred public spectrum auctions that have already earned \$120 billion.

So, last week, Chairman Doyle and Representatives Johnson, Matsui, and Gianforte introduced the C-BAND Act, which would require the FCC to conduct a public auction of the C-band. I will let them explain it, but this bipartisan effort is a powerful step towards using our public airways to benefit all Americans. We can't afford a delay in making this important spectrum available for 5G, and we can't afford to give away billions of dollars that could be used for improving public safety and connecting Americans to broadband.

[The prepared statement of Mr. Pallone follows:]

PREPARED STATEMENT OF HON. FRANK PALLONE, JR.

Today, we are discussing how to reallocate the C-band in a way that benefits all consumers and helps us invest in connecting more Americans to better technology. C-band spectrum is essential mid-band spectrum that can be used to speed up our efforts to implement new wireless technologies.

Currently, this spectrum is underutilized but it is not unused—right now, in fact, it hosts satellite services that provide important services across the country, including the delivery of news and entertainment content to rural America.

In July, we had a hearing to discuss the country's spectrum needs where we discussed C-band at length, and we heard from a group of satellite service providers called the C-Band Alliance. The Alliance advocated for taking the lead in selling the spectrum privately to wireless carriers of their choosing. They made the argument that a private sale may make the spectrum available for 5G faster than a public auction would. I don't think that's necessarily true, and what's more, the proceeds from that sale would mostly go to the foreign satellite companies that make up the Alliance. Their recent offer to make a voluntary payment to the treasury from their multibillion-dollar private sale raise novel enforcement and transparency issues.

This would be an unprecedented departure from the way Congress has instructed the FCC to reallocate spectrum in the past. Under the Communications Act, we required the FCC to run auctions that provide revenues to the Treasury, which is critical to ensuring the American people benefit from these auctions. And the revenues could go a long way in helping us invest in high-speed broadband in unserved and underserved areas and Next Generation 9–1–1 service, as we do in the LIFT America Act. Some estimates indicate the C-band auction could yield as much as \$60 billion to fund those priorities.

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We can't afford to delay making this important spectrum available for 5G, and we cannot afford to give away billions of dollars that could be used for improving public safety and connecting Americans to broadband.

Mr. PALLONE. And, with that, I would like to yield the 2 and a half minutes left to Representative Matsui.

Ms. MATSUI. Thank you very much.

And I would also like to say to Mr. Walden, the ranking member, how much I appreciate working with him on the full committee and the subcommittee and look forward to completing the work ahead. So thank you very much.

Thank you, Chairman Doyle, for holding this important and timely hearing on repurposing the C-band. As the United States works to establish itself as a world leader in 5G and beyond, I remain committed to advancing policies that would promote better utilization of spectrum to meet the growing demand for wireless services and strengthen our economy.

I am pleased to join Chairman Doyle and Representatives Johnson and Gianforte in introducing the C-BAND Act. This bill is an important part of discussion about the future of 5G and represents bipartisan agreement that the FCC must pursue an open and transparent auction process that respects American taxpayers.

The C-BAND Act would build on the progress of my WIN 5G Act, which will help ensure the U.S. wins the race to 5G and beyond while also making needed investments in rural broadband. The approach contained in these bills is an important part of ensuring

this valuable public resource is made available—5G—quickly, equitably, and transparently.

Our FCC-led public auctions have been successful in bringing spectrum to market. I am concerned that the Commission may be pursuing alternatives to public auctions that would field proceeds to private parties, rather than taxpayers, and trigger time-consuming legal challenges. That is why I recently sent a letter to Chairman Pai reiterating my belief that the Chairman does not have the authority to conduct a private auction of the C-band and must use the auction authority provided by Congress through an FCC-led public auction.

Abandoning this proven model could lead to protracted litigation, causing unnecessary delays in making this 5G spectrum available and shortchange the American taxpayer.

I would like to thank the witnesses here today for appearing before this committee, and I look forward to this very important discussion about the future of C-band.

And, with that, I yield back to the chairman.

Mr. DOYLE. The chairman yields back?

Mr. PALLONE. I yield back.

Mr. DOYLE. The chairman yields back.

The Chair now recognizes Mr. Walden, ranking member of the full committee, for 5 minutes for his opening statement.

OPENING STATEMENT OF HON. GREG WALDEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. WALDEN. Well, good morning, Mr. Chairman.

And thanks, again, to all of you for your very kind and generous comments.

I want to welcome our witnesses today to this hearing. Before diving into the debate over how to best clear up a portion of the C-band and 5G deployment, I want to emphasize the goals I believe every Member here shares.

First, the process must lead to auction revenues and spectrum allocations benefiting Americans in all parts of our country. I think we can agree to that.

Second, we must preserve spectrum for those that are reliant on the current C-band services now and into the future.

Third, we must take interference concerns into account when re-deploying spectrum. I think that is essential.

And, fourth, we should seek to make this critical mid-band spectrum quickly available for 5G.

Fifth, this process should not overlook the opportunity to also facilitate resources for connecting rural communities with broadband and upgrading our emergency call centers to Next Generation 9-1-1, all without any deficit spending. So, to your point, Mr. Chairman, there is a pay-for here that we can all see, and we have a lot of work to do in the country.

So, lastly, the process has to be fair, open, and transparent.

So, with that in mind, I know there are differences of opinion from our various stakeholders of how the FCC may proceed. And I would expect the Commission is taking a hard look at weighing the ramifications of each option.

To further facilitate that public conversation and to ensure our discussion moves to the next level without ceding the point on an auction mechanism, I am pleased to see a legislative proposal for today's hearing.

Mr. Chairman, as I have said since the very first hearing you chaired, we remain committed to working with you to find bipartisan solutions. And I think we have proven that on both sides with passage of the robocall legislation and soon moving on the broadband mapping and supply-chain-related measures. Those are both important, and we are making progress on those. And now I think we all know there is this little one that still begs for us to get involved and solve. The court kind of ruled in kind of—and I won't say net neutrality, but eventually we might get to that one, too. But that is a little more problematic.

With that said, we all agree we must make this critical mid-band spectrum available, and do so quickly. If we are questioning on how the Commission may act, then I think we have an obligation to clear that up so the FCC has clear direction from us on how to accomplish our shared goals. If there is a concern over the timeframe it would take to complete a public auction due to outdated software that can't run multiple or complex auctions, then we should take up authorizations for the FCC and NTIA so they have state-of-the-art tools for their respective spectrum management roles going forward.

Let me raise another point that bears review. In our recent legislative hearing on the supply chain bills, we heard from our witnesses about the stark competitive implications for trusted equipment vendors and the pressures they face to lower prices, especially to appeal to rural providers in hard-to-reach areas, like places in my district in Oregon.

While those bills are important for addressing our current frame network vulnerabilities and understanding future risk, we can do so significantly more through market incentives to give rural providers options that may be more cost-competitive. That can only happen when trusted vendors have a market for mid-band equipment, and we know that freeing up C-band holds the key in that regard.

If we don't, there could be potentially serious long-term implications for the trusted vendors we rely upon now.

So, to put an even finer point on it, our failure will worsen the digital divide for rural constituents who can benefit the most from propagation aspects in mid-band spectrum that could come online.

We are all Americans. I know we can work together to beat the command-and-control markets dictated by some countries to protect and expand their homegrown vendors' base for world dominance. That is a big statement. So, on this and other priorities I outlined, we would be remiss to let this opportunity pass by.

Please see Chairman Pai's commitment to deliver this mid-band spectrum to market fairly, transparently, and expeditiously, and I look forward to a thoughtful discussion today on how to achieve our common goals.

With that, Mr. Chairman, I thank you again and look forward to working with you.

I yield back. Before I do, just so the committee knows, we have got another subcommittee I have to go to as well, but I will be bouncing back and forth.

So, again, thank you very much for participating in our witness panel, and I yield back.

[The prepared statement of Mr. Walden follows:]

PREPARED STATEMENT OF HON. GREG WALDEN

Thank you, Mr. Chairman. I want to welcome our witnesses to this hearing.

Before diving into the debate over how to best clear a portion of the C-band for 5G deployment, I want to emphasize the goals I believe every Member here shares:

- First, the process must lead to auction revenues and spectrum allocations benefiting Americans in all parts of our country.
- Second, we must preserve spectrum for those that are reliant on the current C-band services now and into the future.
- Third, we must take interference concerns into account when redeploying the spectrum.
- Fourth, we should seek to make this critical mid-band spectrum quickly available for 5G.
- Fifth, this process should not overlook the opportunity to also facilitate resources for connecting rural communities with broadband, and upgrading our emergency call centers to Next Generation 9-1-1 (NG911)—all without any deficit spending.

• Lastly, the process must be fair, open, and transparent.

With that in mind, I know there are differences of opinion from various stakeholders on how the FCC may proceed, and I would expect the Commission is taking a hard look at weighing the ramifications of each option. To further facilitate that public conversation, and to ensure our discussion moves to the next level without ceding the point on an auction mechanism, I'm pleased to see a legislative proposal for today's hearing.

Mr. Chairman, as I have said since the very first hearing you chaired, we remain committed to working with you on finding consensus solutions. This subcommittee can be a haven for bipartisan solutions, where we don't let the politics of the day determine outcomes for sound policy. I have first-hand experience from sitting where you are that spectrum policy has been an area for such bipartisanship. I believe House passage of robocall legislation, and us moving soon on broadband mapping and supply-chain-related measures are further testament to that.

With court decisions begging us to solve one particular issue that has thus far vexed this subcommittee, my hope remains that with this we can demonstrate our ability to reach sound, bipartisan solutions again and solve this issue for good.

With that said, we all agree that we must make this critical mid-band spectrum available—and do so quickly. If we are questioning how the Commission may act, we have an obligation to clear that that up, rather than direct fire at Chairman Pai, so the FCC has clear direction from us on how to accomplish our shared goals. If there is a concern over the timeframe it would take to complete a public auction due to outdated software that can't run multiple or complex auctions, we should take up reauthorizations for the FCC and NTIA so they have state-of-the-art tools for their respective spectrum management roles going forward.

Let me raise another point that bears review. In our recent legislative hearing on the supply-chain bills, we heard from our witnesses about the stark competitive implications for trusted equipment vendors, and the pressures they face to lower prices, especially to appeal to rural providers in hard to reach areas like my district in Oregon. While those bills are important for addressing our current network vulnerabilities and understanding future risk, we can do significantly more through market incentives to give rural providers options that may be more cost-competitive. That can only happen when trusted vendors have a market for mid-band equipment, and we know that freeing up C-band holds the key in that regard. If we don't, there could be potentially serious, long-term implications for the trusted vendors we rely on now.

To put an even finer point on it, our failure will worsen the digital divide for rural constituents who can benefit the most from the propagation aspects of the mid-band spectrum that would come online.

We are all Americans, and I know we can work together to beat the command-and-control markets dictated by some countries to protect and expand their home-grown vendor base for world dominance. So, on this and other priorities I outlined,

we would be remiss to let this opportunity pass us by. I'm pleased to see Chairman Pai's commitment to deliver this mid-band spectrum to market fairly, transparently, and expeditiously, and look forward to a thoughtful discussion today on how to achieve our common goals.

Thank you.

Mr. DOYLE. I thank the gentleman. The gentleman yields back. The Chair would like to remind Members that, pursuant to committee rules, all Members' written opening statements shall be made part of the record.

So I would now like to introduce our witnesses for today's hearing.

First, Mr. Ross Lieberman, senior vice president, ACA Connects—America's Communication Association. Welcome.

Next, Mr. Jeff Campbell, vice president, government affairs technology policy, with Cisco. Welcome.

Ms. Deborah Collier, director of technology and telecommunications policy, Citizens Against Government Waste. Welcome.

Mr. James Frownfelter, chairman and chief executive officer, ABS Global. Welcome, sir.

And, finally, Mr. Phillip Berenbroick, policy director with Public Knowledge.

We want to thank all of the witnesses for joining to us today. We look forward to your testimony.

At this time, the Chair will now recognize each witness for 5 minutes to provide their opening statement.

Before we begin, I would like to explain our lighting system. In front of you is a series of lights. The light will initially be green at the start of your opening statement. It will turn yellow when you have 1 minute remaining. Please start to wrap up your testimony at that point. And when the light turns red, your time has expired.

Mr. Lieberman, you are recognized for 5 minutes.

STATEMENTS OF ROSS J. LIEBERMAN, SENIOR VICE PRESIDENT, ACA CONNECTS-AMERICA'S COMMUNICATIONS ASSOCIATION; JEFF CAMPBELL, VICE PRESIDENT, GOVERNMENT AFFAIRS, CISCO SYSTEMS INC.; DEBORAH S. COLLIER, DIRECTOR OF TECHNOLOGY AND TELECOMMUNICATIONS POLICY, CITIZENS AGAINST GOVERNMENT WASTE; JAMES B. FROWNFELTER, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, ABS GLOBAL; AND PHILLIP BERENBROICK, POLICY DIRECTOR, PUBLIC KNOWLEDGE

STATEMENT OF ROSS J. LIEBERMAN

Mr. LIEBERMAN. Thank you.

And we, too, were saddened by your announcement of your retirement, Congressman Walden. The members of ACA Connects have appreciated your leadership on so many vital telecommunications issues that affect them.

So thank you for the opportunity to share ACA Connects' ideas on how to reallocate C-band spectrum for 5G, protect consumers, and deliver broadband for all Americans.

We appreciate Chairman Doyle, Representatives Gianforte, Congressman Johnson, and Congressman Matsui, for introducing the

C-BAND Act, a bipartisan bill that includes many elements that are essential to achieving these goals.

Today, C-band satellites are the best way for ACA Connects members to receive the cable programming networks that their customers demand. The C-band works especially well for rural operators because nationwide satellite transmissions that originate from studios in New York City and Los Angeles can reach their remote systems.

Over time, our members have invested over hundreds of thousands of dollars in their—per cable headend to use the C-band. While large cable operators are switching to fiber as their delivery path for video programming, this is not an affordable option for many ACA Connects members today.

So who are ACA Connects members? They are people like Patty Boyers, president of BOYCOM in Poplar Bluff, Missouri, who I assume you remember from her colorful and compelling testimony before this subcommittee in June. Most of our members, like her, are family businesses, with fewer than 10 employees and fewer than 1,000 customers who operate in small towns and rural areas. These are the very communities that broadband mapping and other rural broadband initiatives are intended to help.

So how would these communities fare if the FCC repurposed 300 megahertz of C-band and packed existing users into what remains, as the satellite industry's C-Band Alliance proposes? Simply put, without a fiber alternative, our members and their customers will be stuck with higher prices to use a less reliable C-band that is more prone to interference and unable to meet future demands.

Lacking any details, the CBA outlined its plan only yesterday evening.

But it is clear that ACA Connects members would need to execute a grueling series of tasks, installing filters, repointing dishes, and replacing dozens or even hundreds of pieces of equipment in each of their 2,000-plus headends. It would be all pain and no gain. That sure doesn't sound like a win for rural America.

ACA Connects shares the committee's goal in making 5G a reality, but we must be careful to avoid imposing real harms on rural Americans in the process.

So is there a way to clear C-band spectrum that avoids these harms? The answer is yes. ACA Connects and its allies have a plan that would clear 370 megahertz of the band. Our 5G Plus Plan would do this by migrating video traffic off the C-band and onto fiber, enabling small and rural operators to upgrade to the next generation technology that is already becoming the standard for larger operators.

Auction proceeds would cover all transition costs, including to deploy 120,000 fiber route miles to connect the rural systems that will need it. This would deliver a tremendous economic boost to rural America and help close the digital divide.

To boot, the 5G Plus Plan would clear more spectrum than other proposals, and it would do so in the same timeframe in which others have proposed clearing a far less amount.

The 5G Plus Plan also protects consumers. The plan would use a public auction to reallocate C-band spectrum and bring in tens of billions of dollars to the U.S. Treasury. The satellite industry, by

contrast, has proposed a legally unsound private sale from which they could reap a windfall of \$60 billion or more, without spending a single penny on rural broadband. Surely, auction proceeds are better spent on new fiber infrastructure and other public benefits for Americans.

Indeed, our 5G Plus Plan presents a rare opportunity to deliver a triple win for America: new spectrum for 5G, greater connectivity in rural areas to close the digital divide, and substantial revenue for the Treasury.

In closing, I appreciate the opportunity to be here today on behalf of ACA Connects. We know we are just the small businesses in rural America in this debate. But our members and, most importantly, their customers in rural America have a great deal at stake.

Thank you, and I look forward to your questions.

[The prepared statement of Mr. Lieberman follows:]

**Written Statement of Ross J. Lieberman
Senior Vice President of Government Affairs,
ACA Connects – America’s Communications Association**

**Before the House Energy and Commerce Committee
Subcommittee on Communications and Technology**

“Repurposing the C-Band to Benefit All Americans”

October 29, 2019

Chairman Doyle, Ranking Member Latta, and Members of the Subcommittee, I am Ross Lieberman, Senior Vice President of Government Affairs for ACA Connects – America’s Communications Association, a trade association that represents more than 700 small and medium-sized independent providers of broadband, cable television and other communications services. Thank you for inviting me to share the perspective of ACA Connects members on this issue of great significance, especially to rural America.

The subject of today’s hearing is repurposing the 500 megahertz “C-Band” to benefit all Americans. This task presents great challenges, but, as I will explain below, it also presents a great opportunity to deliver a “triple win” for the nation—5G, fiber, and funds for the U.S. Treasury.

Today, the C-Band is used primarily by cable programmers to deliver video to cable operators. Indeed, C-Band earth stations are the core infrastructure used by cable operators, including ACA Connects members, to receive these video feeds that they in turn deliver over their cable systems to customers’ living rooms. Popular channels like ESPN, HGTV, the Discovery Channel and HBO, and hundreds more, traverse the C-Band to reach over 90 million households nationwide. And, while cable operators in urban areas can use fiber as well as satellites to receive this programming, for most of the small and rural cable operators that ACA Connects represents, the C-Band is the only viable option.

Who are the ACA Connects member companies that rely on the C-Band? They are small businesses, often family-owned and -operated, and in many cases passed down from one generation

Written Statement of Ross J. Lieberman
October 29, 2019
Page 2

to the next. Most serve fewer than 1,000 customers. These businesses are deeply rooted in their communities, in small towns and rural areas across America. They continually reinvest in their networks, ensuring that their customers – who are neighbors, friends, and family – have access to the latest broadband, video and voice services at reasonable costs. They operate with ten or fewer employees in most cases without a dedicated engineer. To survive in a highly competitive landscape, they have learned to be nimble, creative, and devoted to their customers.

A perfect example is BOYCOM, based in Poplar Bluff, Missouri. BOYCOM's President, and ACA Connects' Chairman of the Board, is Patty Boyers, who testified before this subcommittee in June on the topic of STELAR and retransmission consent. She works tirelessly every day to deliver the best service to her customers, and as the Ranking Member of the full committee put it, "she knows her numbers." It's entrepreneurs like Patty that you should take into account when considering how best to reallocate C-Band spectrum.

For years, BOYCOM and hundreds of other ACA Connects members have relied on the C-Band for cost-efficient and reliable transport of the video programming that is the core of their video offering. The broad geographic reach of C-Band satellites allows video programmers to distribute their feeds to thousands of earth stations simultaneously, including in rural and remote areas. In a sense, the C-Band is a great "equalizer"—it is no more difficult or costly to beam signals to earth stations in Montana than in Manhattan, so cable operators in rural America have access to the same programming services as those in the city.

ACA Connects members have found the C-Band to be a reliable and efficient way to receive video, and it has enabled them to incorporate new technologies, such as HD feeds, into their offerings. Recognizing these benefits, ACA Connects members have invested hundreds of thousands of dollars per earth station to use the C-Band. In addition to constructing and maintaining satellite

Written Statement of Ross J. Lieberman
October 29, 2019
Page 3

dishes at their earth stations, they have purchased and installed equipment necessary to receive and process C-Band satellite signals in their headends. They also make continual changes and upgrades to this equipment as necessary to receive more and better programming over the C-Band.

For most ACA Connects members, alternative forms of receiving video, such as by terrestrial means, are not realistic options today. ACA Connects members have deployed substantial fiber in their networks to provide broadband service to their customers' homes, but the scale of their business does not support the construction of redundant "pipes" that would be large enough to transport all video traffic from dozens of programmers across the country to their systems. Nor is such connectivity typically available for lease from third parties. In the most sparsely populated areas that ACA Connects members serve, there is no business case to make the substantial capital investment necessary to build it. Thus, most of them rely exclusively on the C-Band.

The C-Band has served ACA Connects members well. However, the Federal Communications Commission (Commission) has proposed reallocating a significant portion of the C-Band (as much as 200 or even 300 megahertz) for 5G mobile wireless deployment, and by all accounts the agency is expected to move forward with a final decision soon. This prospect raises significant concerns for ACA Connects members. Reducing the supply of C-Band spectrum available for video transport will diminish the band as a pipeline for video delivery. It will become less reliable, less capable, and less affordable. There will be less spare capacity available to avoid outages caused by malfunctioning satellites that affect consumers. Furthermore, permitting wireless carriers to use the repurposed C-Band for 5G services will introduce new risks that video programming traveling on the C-band will suffer interference. In addition, the spectrum reclaimed for 5G will not be available to accommodate higher-resolution video feeds, such as 4K or Ultra-HD, not to mention other video offerings of the future. Maintaining demand for capacity and reducing

Written Statement of Ross J. Lieberman
October 29, 2019
Page 4

supply will also lead to price increases for programmers, and those costs will be passed through to cable operators through programming fees.¹

The smaller cable operators that ACA Connects represents – and their customers – are at heightened risk of harm in any transition of the C-Band. At minimum, they will need to install filters to protect their systems from interference, and in some cases they will need to repoint satellite dishes or replace them altogether. Tasks of this nature are particularly burdensome for ACA Connects members given their limited personnel and resources. And if ACA Connects members encounter interference or other complications during or after the repack, the steps necessary to resolve the problem quickly would impose additional burdens that could be difficult for a small company to bear. Unlike large operators in densely populated areas, ACA Connects members are not currently able to avoid these harms entirely by resorting to an alternative for video delivery, like fiber. This means that smaller cable operators will be unable to take advantage of any higher-definition programming that the diminished C-band cannot support and that is made available over fiber only.

The more spectrum that is repurposed for 5G, the greater the risk of harm to ACA Connects members. By many accounts, the Commission may seek to reallocate as much as 300 megahertz of the band, which would leave existing users with a mere 40 percent of the band for satellite service. There is no doubt that reducing the supply of C-Band capacity this sharply would lead to even less reliability, less capability of the band, and greater price increases, inhibiting the future growth of ACA Connects' members businesses further. Also, the more tightly existing C-Band users are repacked within the band, the more operationally complex and technologically ambitious the job of

¹ Whereas large programmers with popular content can pass these costs on in the form of higher programming costs to cable operators and their customers, independent programmers will likely have to bear this burden alone.

Written Statement of Ross J. Lieberman
 October 29, 2019
 Page 5

accommodating such a repack becomes, especially for small cable operators. The satellite industry's C-Band Alliance (CBA) has floated the idea of using video compression technologies, as well as encouraging programmers to drop their standard-definition feeds, as techniques to clear 300 megahertz of the band for 5G. This would be an arduous undertaking for cable operators.² It would involve a labor-intensive series of tasks, including the installation of dozens or even hundreds of pieces of new equipment at more than 2,000 cable operator earth stations across the country. For small cable operators in particular, this would be a grueling exercise, consuming hundreds of hours of staff time that would significantly detract from their efforts to improve and expand their broadband networks. And at the end of it all, ACA Connects members would be left worse off – the transition would be “all pain, no gain.”³

As of the time this testimony is being submitted, CBA has not submitted details of any plan to clear more than 200 megahertz of the C-Band, let alone 300 megahertz. While CBA has engaged extensively with large programmers and others to accommodate their concerns in any future plan,

² As AT&T puts it: “To date, the transition process as proposed by CBA has focused doing what would be necessary to clear 200 MHz—repacking transponder use in the C-band, coupled with the launch of new satellites, to rearrange and consolidate FSS use. This process might entail the installation of some new earth stations or repointing, but largely is concerned with the installation of earth station receiver filters to avoid harmful interference from parts of the C-band that would be occupied by 5G transmitters. In contrast, to clear 300 MHz will likely require the elimination of SD and the universal adoption of more efficient HEVC encoding. This process will require significant and difficult hardware installation and configuration at thousands of affiliate reception sites—installations that vary in significant details from provider to provider and even within the various head-ends of a single provider.” AT&T Oct. 23 Ex Parte Letter at 2, <https://ecfsapi.fcc.gov/file/10232042413472/2019-10-23%20ATT%20C-band%20Content%20Ex%20Parte%20-%20FINAL.pdf>.

³ Such a transition would similarly impose disproportionate harms on independent programmers with limited staff and resources. Free-to-air independent programmers, who offer their programming in an unencrypted form that allows any person with the appropriate receiving equipment to receive and view the signal without a subscription, would likely suffer worst of all. These programmers, which are often religious organizations, would face heightened logistical challenges, in part because they often lack a complete inventory of the earth stations that receive their free programming. Thus, they cannot effectively inform those who are receiving their signal of the need to take steps to continue to receive it. Even if these earth station users could be identified, some that receive the signal today may decide that the work necessary to continue receiving the free-to-air signal is not worth it and drop carriage of the signal altogether.

Written Statement of Ross J. Lieberman
 October 29, 2019
 Page 6

CBA has largely ignored ACA Connects and its members, who are the users that will be most burdened by any transition of the band and who are essential participants in completing any such transition on a timely basis. ACA Connects recently raised this lack of communication with CBA publicly, but was dismissed with the quip that CBA has “spent at least one hour” in the ACA Connects conference room.⁴ At any rate, as a matter of both law and public policy, CBA must put its plan on record, and parties must be given sufficient time to evaluate and comment on the plan and respond to the comments of other parties. CBA has thus missed its opportunity to submit a new plan the Commission could incorporate into rules adopted by the end of the year, which is barely two months away.

Does this mean the Commission needs to wait on CBA? Not at all. The Commission can act immediately to repurpose C-Band spectrum for 5G, while also protecting existing users of the band. The way to do it is to migrate video programming to a different transmission medium — fiber — which has the same or better video delivery characteristics as the C-Band but without the capacity constraints. Cable operators and programmers are widely distributing video programming via fiber today.⁵ It is not only as good as the C-Band, but can actually provide a superior product in terms of quality, reliability, and capability. If Congress and the Commission are sincere in making users

⁴ “MR. ROSS LIEBERMAN: I mean, I would say that there hasn't been a lot of communication between the satellite industry and the cable industry, particularly smaller cable operators in rural areas who would be impacted by this plan to migrate to higher compression and other things like that. We would welcome that outreach so that [we] can understand what it would mean, but we just haven't received it, unfortunately, and we would welcome it.

MR. PETER PITSCHE: Ross, I don't know how you can say that. I've spent at least one hour in your conference room.

MR. ROSS LIEBERMAN: Point taken: one hour.” Capital Forum, “C-band Conference Policy and Legal Merits: Is a Court Fight Inevitable? Transcript of Panel 1: FCC and Congressional State of Play,” Vol. 7 No. 370, Oct. 15, 2019.

The one hour meeting mentioned by Mr. Pitsch occurred on April 17, 2019. It fell well before CBA was openly considering plans to clear more than 200 MHz, and there was no discussion of any plan along those lines.

⁵ Many large and medium-sized cable operators transport the video feeds they receive from programmers over the C-Band via fiber to their systems nearby that lack earth station receive facilities. All large pay television operators get some or all their video feeds via fiber directly from programmers.

Written Statement of Ross J. Lieberman
October 29, 2019
Page 7

whole, then cable operators, those that are using more than half of the C-Band today, must be given the option to transition to fiber.

ACA Connects and its allies have put a plan on record that achieves this necessary migration of video programming to fiber, and in doing so it would clear at least 370 megahertz of C-Band spectrum for 5G – an amount that exceeds CBA’s most ambitious plans. Under our “5G Plus Plan,” auction proceeds would be set aside to compensate all parties for their transition costs, including the costs to deploy fiber to reach cable systems in rural America. The plan contemplates a build out of 120,000 route miles of fiber in rural areas where this infrastructure does not exist, which would deliver extraordinary benefits beyond video. The newly deployed fiber is essential to deliver backhaul for 5G wireless service to ensure that the next generation of connectivity is available to consumers in big cities and small rural towns alike. It would also enhance residential broadband service and provide needed connectivity for hospitals, libraries, schools, and businesses. This buildout project is also projected to create more than 200,000 direct and indirect jobs over five years, offering a tremendous economic boost to rural America. And it can bring spectrum to market in many areas within 18-36 months, a timeline comparable to what CBA has proposed.⁶

Moreover, the 5G Plus Plan delivers for the American taxpayer. The plan would use a transparent, public auction to reallocate C-Band spectrum for 5G as required by the Communications Act. This transparent, market-based mechanism to put spectrum to its highest and best use has been successfully administered by the FCC for decades and has been replicated around the world to allocate spectrum. In the case of the 5G Plus Plan, some of the proceeds would flow to a transition

⁶ Moreover, because the 5G Plus Plan relies on the established process of a public, Commission-led auction to repurpose spectrum, it would not introduce the same degree of litigation risk – and potential for delay – as the “private sale” that CBA advocates.

Written Statement of Ross J. Lieberman
 October 29, 2019
 Page 8

administrator, which would be responsible for ensuring that all parties are appropriately compensated for their transition costs. The administrator would also provide substantial incentive payments (not to exceed a set amount) to certain parties, including satellite companies, in exchange for maintaining satellite service for C-Band users remaining on the band without price increases. The remaining auction proceeds (not to fall below a set amount) would go into the U.S. Treasury or be used as directed by Congress.

The satellite industry, by contrast, has proposed an unproven, private sale of C-Band spectrum in which it could reap a windfall of \$38 billion⁷ or more. ACA Connects strongly disagrees with that approach. The majority of the proceeds from the auction of C-Band spectrum, a public resource, would be better spent on infrastructure to make C-Band users whole, to connect rural America and to deliver other benefits to the public, rather than to serve the private interests of a few large satellite companies that do not own the spectrum in the first place.

In short, we are hopeful that policymakers will seize the once-in-a-generation “triple win” opportunity that the 5G Plus Plan presents: unleashing a large amount of spectrum for “5G” broadband services to consumers; enhancing fiber transport to rural areas throughout the country, which would help close the digital divide; and bringing in tens of billions of dollars for U.S. taxpayers.⁸

I commend Chairman Doyle and Representatives Gianforte, Johnson and Matsui of this Subcommittee for their introduction of the C-BAND Act, a bipartisan bill that incorporates many of

⁷ “Our base case assumes that the C-Band process generates \$50BN in gross proceeds, with \$12BN paid for clearing costs and the government’s take (which we assume is 20%), with \$38BN going to CBA members.” New Street Research, “Investors are Underestimating Demand for C-Band,” at 2, Sept. 16, 2019.

⁸ Copies of ACA Connects filings that articulate the details of the 5G Plus Plan are enclosed with this testimony. I welcome the opportunity to answer any questions about the plan.

Written Statement of Ross J. Lieberman
October 29, 2019
Page 9

the principles I have outlined in my testimony, including a public auction and ensuring that ACA Connects members receive the same or better service after any reallocation of C-band spectrum.⁹ I look forward to continuing to work with members of the Subcommittee on this issue and other matters of public concern.

The race to 5G is underway, and no doubt the C-Band has an important role to play in ensuring that the United States comes out on top. ACA Connects strongly supports this objective and has put forward a detailed and realistic plan to accomplish it in a transparent manner that protects existing uses of the C-Band, including the delivery of video programming that informs and entertains millions of Americans each day, and helps ensure rural America is not further left behind in the digital age. Thank you for allowing me to share the perspective of ACA Connects and its members on how best to achieve these goals.

⁹ If cable operators encounter any reduction in reliability, capability or quality of that service, or any increase in costs, it is competition and consumers that will ultimately suffer, especially in rural America. To head off these concerns, it is important that any C-Band transition fully compensate cable operators for any costs they incur in opening up the band for 5G, and that cable operators can choose to receive programming via fiber instead of satellite.

Mr. DOYLE. Thank you, Mr. Lieberman.
Mr. Campbell, you are recognized for 5 minutes.

STATEMENT OF JEFF CAMPBELL

Mr. CAMPBELL. Mr. Chairman, Ranking Member Latta, and members of the committee, thank you for the opportunity to testify this morning on the topic of how to transition a key part of the 3 gigahertz band from one commercial use to another.

Cisco is a San Jose, California-based company that produces a wide range of technologies that address both the needs of service providers, government, and private enterprise. Cisco CEO Chuck Robbins has called 5G a step change in networking technology, but one that requires additional spectrum allocations. Cisco believes that the 3 gigahertz band should be opened as promptly as possible.

For several years, Cisco has been involved in the effort to open mid-band spectrum for terrestrial mobile services. Early on, we took the view that the private-auction approach held promise as a faster mechanism than any other transition mechanism available to the FCC, and we urged its consideration.

To be clear, we are not wedded to any particular mechanism for the transition of spectrum from one use to another. We do believe that, historically, Government-led spectrum transitions have been tremendously difficult and slow, and that in the case of 3 gigahertz, the United States needs to put a priority on dispatching this work at a faster clip.

Why do we believe this? Well, one reason is consumers. Cisco has forecast that the mobile services traffic will rise fivefold through 2022, reflecting both continued use of powerful 4G networks and the initial deployment of 5G networks and devices. A lesson learned here: If you build it, they will come.

But a less obvious reason is that national economic interests are also at stake, to the level of potentially affecting our GDP. Unlike previous mobile technologies, 5G technology for the first time makes possible a ubiquitously available set of wireless capabilities that can make our economy work better by facilitating operations that are data-driven and more efficient. In some cases it enables a wireless solution where one does not exist, while in others it makes a wireless solution easy to utilize relative to existing solutions.

For example, today you can automate the timing of traffic signals and change the timing from a central control room. But without having data about the density and speed of traffic, how do you make informed decisions about how to set the timers? There is no wireless technology available today that would give you that data. But 5G will.

A farmer today can use existing sensor technology and Wi-Fi to create critical data about his or her crops and soil conditions, but that requires spending some portion of the workweek managing the farm's IT. What if the farm were blanketed by 5G and the same data is delivered to the farmer from his service provider?

Or what if a trucking company that specializes in food distribution wants to monitor its vehicles comprehensively for route efficiency, refrigeration temperature, and time spent loading or un-

loading? There is no single technology today that can perform all of those functions. However, 5G could.

Three gigahertz spectrum is important to 5G, because spectrum is available in bands wide enough to address these and many other use cases. The spectrum is capable of being deployed across wide areas. It goes through walls, and it can be deployed in small cells to enable dense coverage.

That is why the speed of this transition is important. Networks built on 3 gigahertz spectrum can flexibly address the many use cases that networks will need to support.

We must recognize that the business applications for 5G do not exist today for the most part. They have to be defined, and the networks must be configured to support them. That is a big challenge for the mobile industry, so there is a lot to learn. The sooner that service providers and businesses can get to work defining these new services, the better our economy will run. That means spectrum must get into the hands of people who will build 5G networks with it.

Other nations are moving quickly, very quickly, recognizing this dynamic as one that could boost their prospects globally or leave them behind. At best, a Government-run auction would likely occur sometime in 2021, and the C-band bill puts this date sometime in 2022. That compares to the CBA's view that it could run an auction by mid-2020.

In short, the value of an auction is that it puts a useful resource in the hands of those who will generate great economic activity from it, and that is what boosts national economies and competitiveness. Auction proceeds capture headlines but are dwarfed by the underlying benefits of putting spectrum to productive use. And in the case of 5G technologies in the 3 gigahertz band, there are national competitive interests at stake which we believe mitigate moving expeditiously.

Thank you very much.

[The prepared statement of Mr. Campbell follows:]

**HOUSE ENERGY AND COMMERCE COMMITTEE
Subcommittee on Communications and Technology**

“REPURPOSING THE C-BAND TO BENEFIT ALL AMERICANS”

October 29, 2019 10:00am

2322 Rayburn House Office Building

**TESTIMONY OF
JEFF CAMPBELL
VICE PRESIDENT, GOVERNMENT AFFAIRS
CISCO SYSTEMS, INC.**

Thank you for the opportunity to testify this morning on the topic of how to transition a key part of the 3 GHz band from one commercial use to another. Cisco is a San Jose, California-based company that produces a wide range of technologies that address both the needs of service providers, government, and private enterprise. Cisco’s CEO Chuck Robbins has called 5G a “step change” in networking technology, but one that requires additional spectrum allocations.

Cisco believes the 3 GHz band should be opened as promptly as possible.

For several years, Cisco has been involved in the effort to open mid-band spectrum for terrestrial mobile services. Early on, we took the view that the private auction approach held promise as a faster mechanism than any other transition mechanism available to the FCC, and we urged its consideration.

To be clear, we are not wedded to any particular mechanism for the transition of spectrum from one use to another. We do believe that, historically, government-led spectrum transitions have been tremendously difficult and slow, and that in the case of 3 GHz, the US needs to put a priority on dispatching this work at a faster clip.

Why does Cisco believe this?

One obvious reason is consumers. Cisco has forecast that mobile services traffic will rise five-fold through 2022, reflecting both the continued use of powerful 4G networks and the initial deployment of 5G networks and devices. A lesson learned – if you build it, they will come.

But a less obvious reason is that national economic interests are at stake, to the level of potentially impacting GDP. Unlike previous mobile technologies, 5G technology for the first time makes possible a ubiquitously available set of wireless capabilities that can make our economy work better, by facilitating operations that are data driven and more efficient. In some cases, it enables a wireless solution where one does not exist, while in others, it makes a wireless solution easy to utilize relative to existing solutions.

For example, today you can automate the timing of traffic signals and change the timing from a central control room. But without having data on the density and speed of traffic, how do you make informed decisions about how to set the timers? There is no wireless technology available today that would give you that data. But 5G can.

A farmer today can use existing sensor technology and Wi Fi to generate critical data about his or her crops and soil conditions, but that requires spending some portion of the workweek managing the farm's IT. What if that farm were blanketed by 5G, and the same data is delivered to the farmer from his service provider?

Or, what if a trucking company that specializes in food distribution wants to monitor its vehicles comprehensively – for route efficiency, refrigeration temperature, and time spent loading or unloading? There is no single technology today that can perform all of those functions. However, 5G could.

3 GHz is important to 5G because spectrum is available in bands wide enough to address these, and many other, use cases. The spectrum is capable of being deployed across wide areas; it goes through walls; it can be deployed for small cells to enable dense coverage. From a network designer's point of view, 3 GHz is all purpose.

That's why the speed of this transition is important. Networks built on 3 GHz spectrum can flexibly address the many use cases that networks will need to support.

What we must recognize is that business applications for 5G do not exist today for the most part. They have to be defined, and the networks have to be configured to support them. That's a big challenge for the mobile industry, which up until now has made its living from selling a limited set of services – namely, wireless broadband to people. So, there is a lot to learn. The sooner service providers and businesses can get to work defining these new services, the better our economy will run. That means spectrum must get into the hands of people who will build 5G networks with it.

Other nations are moving quickly, recognizing this dynamic as one that could boost their prospects globally or leave them behind. At best, a government-run auction would likely occur sometime in 2021, and the C-Band bill puts the date sometime in 2022. That compares to CBA's view that it could run an auction by mid-2020.

In short, the value of an auction is that it puts a useful resource in the hands of those who generate economic activity from it – and it is that which boosts national economies. Auction proceeds capture headlines but are dwarfed by the underlying benefits of putting spectrum to productive use. And in the case of 5G technologies in the 3 GHz band, there are national competitive interests at stake that we believe mitigate moving expeditiously. Thank you.

Mr. DOYLE. Thank you, Mr. Campbell.
Ms. Collier, you have 5 minutes.

STATEMENT OF DEBORAH S. COLLIER

Ms. COLLIER. Thank you.

Mr. Chairman, Ranking Member Latta, and members of the committee, since its inception in 1984, CAGW has been in the forefront in the fight for efficiency and accountability in government. With more than 1 million members and supporters nationwide, CAGW has helped save taxpayers \$1.3 trillion through the implementation of Grace Commission findings and other recommendations over the last 35 years.

The organization's mission reflects the interest of taxpayers and covers a wide variety of issues. The sale of Federal assets, including spectrum, has been a part of CAGW's agenda for many years.

The widespread use of wireless 5G will dramatically change mobile communications across the Nation and lay the groundwork to support new technical innovation in communications, healthcare, transportation, and the Internet of Things.

However, for 5G to be most effective, spectrum must be available in high-band, mid-band, and low-band ranges. Mid-band has unique properties that allows data signals to travel through a larger range of spectrum, and its wide channels provide for high-speed data transfers, making it a sweet spot for 5G deployment.

Access to mid-band spectrum has been more difficult to achieve, in part because of the number of incumbent users already in the spectrum range.

The focus of this hearing is the C-band spectrum for 3.7 to 4.2 megahertz. This 500 megahertz of prime mid-band spectrum is currently accessed by satellite owners, video content providers, and satellite phone service providers, to name a few, all across the country. They access this through a full-band, full-arc access, which allows for the transmission of data signals between satellites and Earth stations. Therefore, it cannot be licensed for 5G communications until the Federal Communications Commission reallocates the band for licensed flexible use. Every Earth station and satellite accessing this band receives authorization from the FCC to transmit data through this spectrum, but authorization to access the spectrum does not constitute ownership. The only clear ownership within the band is that of the taxpayer, as represented by the U.S. Government.

In April 2019, CAGW published a report, "The Race to 5G: Protecting Taxpayers Through Spectrum Auctions." I ask that this report be included, along with my written testimony, for the record.

Mr. DOYLE. Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Ms. COLLIER. The underlying legal authority for an FCC auction of spectrum is found in section 309(j) of the Communications Act of 1934. Section 309(j)(c) provides for—and I quote—the "recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource."

As noted by FCC Chairman Ajit Pai during the October 17th hearing in his testimony before the Senate Appropriations Subcommittee on Financial Services and General Government, the agency is required by law to deposit all proceeds generated from a spectrum auction into the Treasury, unless Congress specifies use of the proceeds for other purposes.

For example, Subcommittee Chairman John Kennedy has proposed using proceeds from the C-band spectrum auction to provide additional funding for broadband deployment in rural America. There will be costs associated with vacating portions of the C-band spectrum, including installing new hardware and reconfiguring thousands of affiliate reception sites to accommodate more efficient encoding, compression, and modulation technologies. An auction of C-band spectrum has a potential value of between \$11 billion and \$60 billion, depending on exactly how much spectrum is made available for sale.

CAGW appreciates the introduction of H.R. 4855, the C-BAND Act, which clearly designates the FCC as the only appropriate entity for reallocating this spectrum for broadband internet access services and conducting a public auction of the spectrum.

Since the beginning of the discussions over C-band, CAGW has maintained that it is a public asset and only the FCC has the authority to reallocate an auction of this spectrum for flexible terrestrial use.

Again, thank you for the opportunity to testify, and I look forward to any questions you have.

[The prepared statement of Ms. Collier follows:]

Testimony of
Deborah S. Collier
Director of Technology & Telecommunications Policy
Citizens Against Government Waste
Before the House Energy and Commerce
Subcommittee on Communications and Technology

October 29, 2019

My name is Deborah Collier, and I am the Technology and Telecommunications Policy Director for Citizens Against Government Waste (CAGW). CAGW was founded in 1984 by the late industrialist J. Peter Grace and nationally-syndicated columnist Jack Anderson to build support for implementation of President Ronald Reagan's Grace Commission recommendations and other waste-cutting proposals. Since its inception, CAGW has been at the forefront of the fight for efficiency and accountability in government. CAGW has more than one million members and supporters nationwide, and, over the past 35 years, the organization has helped save taxpayers \$1.3 trillion through the implementation of Grace Commission findings and other recommendations.

CAGW does not accept government funds. The organization's mission reflects the interests of taxpayers and covers a wide variety of issues, including technology and telecommunications. The sale of federal assets, including spectrum, has been part of CAGW's agenda for many years.

The October 25, 2018 Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America's Future made it clear that access to spectrum is a critical component to maintaining America's lead in next generation technologies, particularly

5G network deployment.¹ The widespread use of wireless 5G will dramatically change mobile communications across the nation and lay the groundwork to support an increasing number of Internet of Things applications and devices. While 5G networks are currently being deployed using high-band millimeter wave and low-band spectrum, deployment of 5G using mid-band spectrum is essential. CAGW appreciates the Subcommittee on Communications and Technology for its leadership in ensuring that taxpayers are protected throughout the process of determining how to make as much mid-band spectrum as possible available for this purpose.

Mid-band is considered the sweet spot of spectrum, with unique properties that make it especially effective for 5G infrastructure deployment. According to an August 2, 2017 Intel blog, “Mid-Band spectrum is especially well suited for mobile broadband due to its wide coverage, and potential for low latency, and high reliability.”² Mid-band spectrum is critical for 5G deployment because data signals can travel through a larger range within the spectrum, and its wide channels provide for high-speed data transfers.

The economic impact of mid-band spectrum utilization was examined in a February 2019 Analysis Group study, which found that reallocating 400 MHz of spectrum in the 3.45 to 4.2 GHz range for licensed mid-band spectrum would lead to

¹ The White House, “Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America’s Future,” October 25, 2018, <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-developing-sustainable-spectrum-strategy-america-future/>.

² Peter Pitsch, “5 Reason Why We Need Mid-Band Spectrum for 5G,” Intel, August 2, 2017, <https://blogs.intel.com/policy/2017/08/02/5-reasons-need-mid-band-spectrum-5g/#gs.9d7indu>.

\$154 billion in capital expenditures by wireless providers for 5G networks over seven years, add \$274 billion to U.S. GDP, and create 1.3 million new direct and indirect jobs.³

On July 12, 2018, the Federal Communications Commission (FCC) adopted an Order and Notice of Proposed Rulemaking on Expanding Flexible Use of the 3.7 to 4.2 GHz Band (GN Docket No. 18-122) to review the potential for using this mid-band spectrum range, also known as the c-band, for 5G deployment.⁴ This 500 MHz swath of prime mid-band spectrum is currently used by satellite and video content providers for content distribution across the country, and satellite phone service for those areas where existing landline or cellular capabilities are non-existent or unreliable.

An auction of c-band spectrum has a potential sale value of between \$11 billion to \$60 billion, depending on the amount of spectrum made available for sale and the amount of net proceeds available following reimbursement for the cost of vacating and reallocating the spectrum.⁵ Proceeds from the sale of portions of c-band could be used for deploying broadband throughout rural America if Congress provides the authorization for such use, and auction revenues are deposited into the Treasury.

The underlying legal authority for an FCC auction of spectrum is found in section 309(j) of the Communications Act of 1934, which provides the authorization for the FCC

³ David W. Sosa, Ph.D., and Greg Rafert, Ph.D., “The Economic Impacts of Reallocating Mid-Band Spectrum to 5G in the United States,” Analysis Group, <https://api.ctia.org/wp-content/uploads/2019/02/The-Economic-Impacts-of-Reallocating-Mid-Band-Spectrum-to-5G-1.pdf>.

⁴ Federal Communications Commission, “In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band,” GN Docket No. 18-122, Order and Notice of Proposed Rulemaking, Adopted July 12, 2018, <https://docs.fcc.gov/public/attachments/FCC-18-91A1.pdf>.

⁵ Deborah Collier and Thomas Schatz, “The Race to 5G: Protecting Taxpayers through Spectrum Auctions,” Citizens Against Government Waste, April 2019, <https://www.cagw.org/reporting/race-to-5g>.

to conduct a competitive bidding process for any initial license or construction permit that involves the use of the electromagnetic spectrum. Section 309(j)(C) also provides for the “recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource.”⁶

Since 1994, the FCC has conducted 102 spectrum auctions, generating more than \$122 billion for taxpayers.⁷ It has been suggested by the C-Band Alliance (CBA) that FCC spectrum auctions take on average around 13 years. This figure relies on a July 20, 2015 CTIA report entitled, “From Proposal to Deployment: The History of Spectrum Allocation Timelines.” However, if one averages the amount of time all the spectrum auctions and allocations took since 1994, it would probably come out to an average of about 13 years, but using this timeframe is disingenuous since successive spectrum auction for the past five to six years has taken less than this amount of time to complete, and each auction is different depending on its complexity.

Since the CTIA report was released, the FCC has conducted five spectrum auctions, including the Advanced Wireless Services - 3 (AWS-3) Auction #97 and the Incentive Auction #1000, as mandated by the Middle Class Tax Relief and Job Creation Act of 2012 (Jobs Act of 2012).⁸ In the AWS-3 auction, the FCC sought comment on the auction process in May 2014, and completed the auction on January 29, 2015, generating

⁶ The Communications Act of 1934, as amended, Section 309(j), page 151.

⁷ Federal Communications Commission, “Auctions Summary: Completed Auctions,” July 17, 2019, <https://www.fcc.gov/auctions-summary>.

⁸ Ibid.

almost \$45 billion in gross bids and providing funding for the nation's FirstNet first responder communications network.⁹

The Broadcast Incentive Auction was a much more complicated process that required both a reverse auction (#1001) where the broadcasters sold their spectrum rights back to the government, a spectrum repack of the licenses, and a forward auction (#1002) selling the repacked spectrum licenses to mobile providers.¹⁰ Bidding in the auction began on March 29, 2016 and ended on March 30, 2017, repurposing 84 MHz of spectrum; 70 MHz for licensed use, and 14 MHz for wireless microphones and unlicensed use. The auction yielded \$19.8 billion in revenue, including \$10.05 billion for the winning broadcast bidders and netting more than \$7 billion for the U.S. Treasury. The allocation of this spectrum for mobile use is already well underway. Given this track record of success, it is difficult to see why any entity other than the FCC should be permitted to conduct the c-band spectrum auction.

Repurposing the c-band spectrum from satellite use to terrestrial flexible use will be similar to the Broadcast Incentive Auction. Primarily, satellite operators conduct operations over this band to deliver data to and from earth stations. These earth station operators could be cable operators, broadcasters, streaming video service providers, and remote telephone service operators. There have been 688 comments, ex parte letters, reply comments, and technical reviews filed in this proceeding.

⁹ Federal Communications Commission, Auction 97: Advanced Wireless Services (AWS-3), August 18, 2015, <https://www.fcc.gov/auction/97>.

¹⁰ Federal Communications Commission, Broadcast Incentive Auction and Post-Auction Transition, May 9, 2017, <https://www.fcc.gov/about-fcc/fcc-initiatives/incentive-auctions>.

Several solutions have been offered to reallocate the c-band spectrum and get it into the hands of mobile broadband providers to move forward with 5G deployment, including by some of the witnesses at today's hearing.

Because the c-band spectrum has been set aside by the government for terrestrial to satellite use as a full band/full arc access, it cannot be licensed for 5G communications until the FCC reallocates and re-ports the band for licensed flexible terrestrial use. Every earth station and satellite using this band obtains authorization from the FCC to use this spectrum, including those owned by the three foreign satellite companies who make up the C-Band Alliance (CBA). But authorization to use the spectrum does not constitute ownership. The c-band spectrum is unique, because the only clear ownership within the band is by the federal government.

One proposal for the c-band is to use the incentive auction authorization provided by the Jobs Act of 2012, which included provisions to increase the amount of spectrum available for mobile use by allocating additional federally held unused spectrum to be auctioned by the FCC.¹¹ This law also provides authorization for the FCC to conduct reverse incentive auctions to make additional spectrum available to mobile providers.

If this process was used for c-band, satellite owners and their customers would be reimbursed for vacating a certain amount of spectrum through a reverse auction, and then the FCC would repackage the vacated spectrum and sell it in a forward auction to mobile

¹¹ "H.R. 3630 (112th): Middle Class Tax Relief and Job Creation Act of 2012," govtrack.us, February 22, 2012, <https://www.govtrack.us/congress/bills/112/hr3630>.

carriers. Another proposal recommends increasing the amount of available c-band spectrum to at least 370 MHz of spectrum by suggesting that the net proceeds from an FCC conducted c-band auction be used to bring the content carried over satellite back to earth by building out fiber across the country to deliver the data between the broadcast stations. Both options likely need authorization by Congress to permit the use of funds to reimburse incumbents within the spectrum for the costs associated with vacating the portions and using the proceeds to provide funding for additional fiber build-out to deliver content terrestrially instead of through satellite transmissions.

Regardless of which path is eventually chosen, CAGW believes only the FCC may legally conduct any auction of publicly-held spectrum, including spectrum repurposed from the c-band.

In reviewing the proposals being filed at the FCC, the CBA's second-price, sealed bid auction proposal is exceptionally complex and lacks transparency in how winning bids would be determined, creating uncertainty for mobile providers. The novelty of the CBA proposal would also require additional time as bid evaluation metrics are developed and auditing and transparency protocols are created to ensure a fair bidding process. Potential bidders must also be educated on how such a sale would be conducted. Yet, the CBA claims its process would be more efficient and faster than an FCC auction because its members could quickly move their customers to the higher portions of the spectrum.

There has been a lot of discussion about the CBA's "voluntary contribution" to the Treasury following the private sale of the spectrum under their plan. It is unclear if that

will be a dollar, a hundred dollars, a billion dollars, or some other amount. But if the FCC conducts the auction, the agency cannot retain any of the money as “profit” for the sale, and a larger portion of the potential \$60 billion in proceeds will go to the taxpayers than under the CBA plan. There have also been some concerns raised about speed versus return to the taxpayers. At the October 17, 2019 hearing before the Senate Financial Services and General Government Appropriations Subcommittee hearing, FCC Chairman Ajit Pai and Chairman John Kennedy (R-La.), agreed that an FCC-run auction would take no more than three years, responding at that time to CBA’s comments it would take seven years. Chairman Kennedy also alluded to the potential for litigation delaying any private sale of the spectrum.¹²

CAGW agrees that in its race with China and other countries to deploy 5G, any delay in the sale of the spectrum is a luxury the U.S. government does not have. The FCC-conducted public auction process is well-documented and administratively simple, encouraging a broad spectrum of bidders from a variety of incumbents and new entrants.

During the July 12, 2018 FCC meeting, Commissioner Michael O’Rielly said, “any reallocation must fully protect the incumbent users that currently use the c-band to bring many services to consumers. ... That does not mean they all must be

¹² U.S. Senate, Subcommittee on Financial Services and General Government, Senate Appropriations Committee, “Sen. Kennedy Chairs FSGG Subcommittee Hearing on C-Band Spectrum Auction, October 17, 2019, <https://www.appropriations.senate.gov/hearings/oversight-of-the-fcc-spectrum-auctions-program>.

accommodated on remaining c-band spectrum, but their ability to offer services cannot be disrupted.”¹³

Due to the questions about property rights associated with this spectrum and the broad experience of the FCC in conducting public auctions, CAGW believes that only an FCC-led public auction can provide the best and most objective outcome for all interested parties, including satellite operators, cable operators, broadcasters, and programmers. As FCC Commissioner Brendan Carr noted during the FCC’s April 12, 2019 meeting, the agency’s auction proceedings are “a model for the world.”¹⁴

Report language has been included in the fiscal year 2020 Senate Financial Services Appropriations Act that suggests only the FCC should conduct a public auction of the c-band spectrum: “The Committee encourages the FCC to prioritize resources toward exploring opportunities for spectrum to help accelerate the deployment of 5G to rural communities. The mid-band spectrum, specifically the C-band, is particularly well-suited for 5G services. However, the Committee remains concerned by proposals that entail limited FCC oversight and public input, and contain no guarantee that taxpayers and the U.S. Treasury benefit from revenues generated by the sale of 5G licenses. The airwaves are a public resource, and the Federal Government has a responsibility to

¹³ Federal Communications Commission, “Statement of Commissioner Michael O’Reilly, Re: Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122; Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183; Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission’s Rules to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band, RM-11791; Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service, RM-11778, July 13, 2018, <https://docs.fcc.gov/public/attachments/DOC-352520A3.pdf>.”

¹⁴ Federal Communications Commission, “Statement of Commissioner Brendan Carr, Re: Incentive Auction of Upper Microwave Flexible-Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz for Next-Generation Wireless Services, AU Docket No. 19-59,” April 12, 2019, <https://docs.fcc.gov/public/attachments/DOC-356984A3.pdf>.

exercise appropriate oversight of its allocation. Therefore, the Committee encourages the FCC to conduct a public auction of the c-band spectrum that is fair, open, and transparent.”¹⁵

CAGW agrees with the Senate’s report language, which sends a strong message to the FCC that the airwaves are a public resource and any sale of c-band spectrum should be conducted through an FCC public auction to protect the taxpayers’ interests.

I would like to thank the Chairman Doyle and Ranking Member Latta for your strong leadership in ensuring that as much spectrum as possible is made available for 5G and other mobile and Wi-Fi uses, and the proceeds from the sale of any publicly-held spectrum benefits taxpayers, the economy, and U.S. global technological leadership. I appreciate your invitation to testify and I am prepared to answer any questions you may have.

¹⁵ Senate Committee on Appropriations, “Financial Services and General Government Appropriations Bill, 2020,” September 19, 2019, <https://www.appropriations.senate.gov/imo/media/doc/FY2020%20FSGG%20Appropriations%20Act.%20Report%20116-111.pdf>.

Mr. DOYLE. Thank you, Ms. Collier.
 Mr. Frownfelter, you are recognized for 5 minutes.

STATEMENT OF JAMES B. FROWNFELTER

Mr. FROWNFELTER. Chairman Doyle, Ranking Member Latta, and distinguished members of the subcommittee, I am Jim Frownfelter, chairman and chief executive officer of ABS Global.

Earlier in my career, I was president of PanAmSat, the company responsible for privatizing the satellite industry, and then president at Intelsat when the two companies merged in 2006.

I am here today speaking for my company, ABS, and two other small satellite operators, Hispasat and Claro. We call ourselves the small satellite operators, or SSOs, representing three of the current eight satellite operators who are licensed to serve the United States using C-band.

We have invested collectively about \$750 million to build and deploy advanced satellites with C-band payloads designed to serve the U.S. market.

From the beginning of the FCC proceedings, we have supported repurposing C-band spectrum for 5G terrestrial services in a reasonable and balanced way.

We believe the FCC, or Congress, should repurpose 300 megahertz of C-band for 5G by using off-the-shelf compression technology, which we believe can be done in 18 to 36 months; permit a transparent and efficient private-sector auction under FCC rules that fairly and equitably compensate all FCC-licensed satellite operators whose C-band spectrum use rights will be reduced; mandate multibillion-dollar payments to the Treasury from such an auction; and, finally, to set forth financial incentives for U.S. Earth station operators to install the compression equipment in a timely manner, thus facilitating a fast C-band transition, maximizing the amount of frequency spectrum to be repurposed, and expediting rollout of 5G services.

Some have argued that C-band spectrum should simply be taken from satellite operators without compensation and auctioned. Confiscating spectrum rights in this way would not only be a disaster for us, it would be a disaster for investment in all wireless services. As we sit here today, companies are investing billions of dollars in new global satellite networks and in new 5G terrestrial networks. But they do so only because they have confidence that the FCC won't simply take their licenses away.

If the FCC or Congress simply confiscates our spectrum rights, that confidence would be irrevocably shaken, with, I assure you, a disastrous impact on future investment.

It is also important to emphasize that the impact on future investment will be felt even, as the CBA has proposed, if you simply confiscate the spectrum rights of companies that did not earn U.S. revenues in 2017.

Take my company, ABS. My colleagues and I acquired it in 2010, intending to transform it from a regional satellite operator into a global one. To be a global player, which is required to be a successful satellite services provider today, coverage of the United States is essential. So we designed a satellite that was built by Boeing and launched by SpaceX, specifically to serve the United States.

We spent almost a quarter of a billion dollars seeking and receiving an FCC authorization to use C-band in April of 2017.

How can someone reasonably argue, after we spent almost \$250 million on this satellite that was designed to serve the United States, after we did everything required to obtain an FCC authorization, and after we finally received that authorization, that most of our spectrum can be confiscated simply because we didn't illegally build a revenue base prior to receiving that authorization in 2017? Why would we, or anyone else for that matter, invest that kind of money in reliance on U.S. law and FCC rules ever again?

The SSOs have active, valid FCC authorizations. They have invested a fortune in reliance on FCC rules and have done everything right. We hope that the FCC and Congress will do right by us, too.

Thank you for your time, and I look forward to answering your questions.

[The prepared statement of Mr. Frownfelter follows:]

Statement of James B. Frownfelter

Hearing on Repurposing the C-Band to Benefit All Americans

**Before the Subcommittee on Communications and Technology of the United States House
of Representatives Committee on Energy and Commerce**

October 29, 2019

Chairman Doyle, Ranking Member Latta, Members of the Subcommittee:

Thank you for inviting me to testify today on repurposing the C-band. I do so as the Chairman and CEO of ABS Global, and on behalf of Hispasat and Claro. These three companies, known as the Small Satellite Operators (SSOs), are three of the eight satellite operators authorized by the FCC to serve the United States in the C-band. Another three of the eight operators are in the so-called C-band Alliance (CBA), while the other two operators are not associated with either group.

By way of background, I was President and Chief Operating Officer of PanAmSat, the company responsible for privatizing the satellite industry, and then I was President and Chief Operating Officer of Intelsat, one of the CBA companies. I helped to build the C-band market as it exists today, and was responsible for the development, launch, and operation of many of the satellites currently operating in the United States in C-band.

From the beginning of the FCC proceeding on C-band, the SSOs recognized the need not only to repurpose satellite spectrum quickly for 5G, but to do so in a way that was fair to all of those affected. Satellite operators would be impacted by the repurposing, to be sure, but so would C-band earth station operators. The SSOs also took the position, from the beginning, that U.S. taxpayers were entitled to receive a significant amount—in the billions of dollars—from any auction of C-band spectrum rights.

Compared to the long-established satellite operators in the CBA, the three SSOs are relatively new entrants in the U.S. C-band market, creating competition in satellite services to the benefit of the U.S. consumer of broadcast video and telecommunications. Each of the SSOs invested large sums of capital to launch satellites designed to serve the U.S. market in C-band. The cost of developing, manufacturing, insuring, and launching these satellites was almost \$250 million dollars each, with most of that money spent on U.S. satellite manufacturers and U.S. launch providers.

My company, ABS, has a history that illustrates the path of the new entrant. After a group of us acquired ABS in 2010, we embarked on an aggressive expansion of our network through the launch of new satellites. Our newest, ABS-3A, provided us with the missing link to complete our global network needed to compete against the two big players in our business, Intelsat and SES—U.S. coverage. *ABS-3A was built by Boeing, launched by SpaceX, and received FCC approval to serve the United States in 2017*—just a few months before the Commission proposed to repurpose this spectrum. The satellite is basically brand new, and is expected to remain in orbit and in service until 2042.

Hispasat operates 11 satellites, primarily in Europe and the Americas, including Amazonas-3. Like ABS-3A, Amazonas-3 is a newer satellite, and should continue in orbit and in service until 2031. Hispasat built Amazonas-3 to cover the entire continental United States in C-band and it is currently transmitting from Puerto Rico to earth stations across the United States.

Claro, the remaining SSO, operates 7 satellites primarily in the Americas. The one licensed to serve the U.S. was deliberately designed to allow the transmission of programming

into the United States in C-band—and it already transmits programming from Brazil to the U.S. for distribution all across the country.

Some have suggested that the FCC should simply evict all satellite operators from some or all of C-band to make room for 5G services. Others have suggested that we should look backward, rather than forward, and compensate only those satellite operators which had U.S. generated C-band revenues in one arbitrary year, 2017.

Evicting any satellite operator from some or all of its licensed C-band without compensation would be unfair, possibly unlawful and, more importantly, unwise. Each of the eight satellite operators has invested hundreds of millions of dollars in one or more satellites designed to serve the U.S. market in C-band—and each has an FCC license in good standing to do so. Were the FCC to confiscate—without compensation—most of the C-band spectrum these satellites have been licensed to use, it would violate all FCC precedent, reduce the value of all spectrum licenses, and undermine future investment (including through auctions) in spectrum licenses.

We are at the dawn of a new era in both satellite and terrestrial wireless communications. Vast new global satellite constellations have just been licensed by the FCC. New terrestrial 5G services are just around the corner, but need new spectrum licenses from the FCC. The investment required both in space and on earth is vast. But this requires investors to have confidence that the FCC won't simply take their valid licenses away without compensation—whether or not they have already begun service.

ABS-3A shows why. As noted above, we just invested nearly a quarter billion dollars in a U.S.-built and U.S.-launched satellite. We were scant months away from beginning U.S. service. Nevertheless, some suggest that we (a new market entrant) should have a large portion

of our spectrum rights confiscated, dramatically limiting our future revenues and reducing the value of our new asset, while our well-established competitors are allowed to sell their spectrum rights for billions of dollars—further entrenching their market dominance.

The same is true for Hispasat, whose C-band satellite was also recently licensed by the FCC. The satellite spent its initial years providing capacity to an existing, overseas client, but that is a very common—and often necessary—approach for new entrants, who need guaranteed revenues to finance construction. It doesn't mean that Hispasat will not lose dearly from a repurposing—again, that satellite has full mainland U.S. coverage and more than a decade left in orbit. And both Claro and Hispasat already transmit C-band content *into* the United States—it's just that the revenues from those transmissions are derived overseas.

If ABS, Claro, and Hispasat can have their spectrum largely confiscated without compensation, it can happen to anyone who, like us, has already invested—or to anyone who is about to invest—in a newly licensed wireless network. The adverse impact this would have on investment in wireless networks cannot be overstated.

It should also be noted that any proposal to confiscate the SSOs spectrum without compensation, simply because they do not have past U.S. C-band revenues, would be both anticompetitive and economically nonsensical.

It would be anticompetitive because it would grant the two largest satellite operators billions of dollars which they can use to increase their stranglehold on the U.S. market—while economically devastating the smaller new entrants to the market. It would needlessly enshrine a C-band duopoly.

It would be economically nonsensical because repurposing the C-band will have, obviously, no impact on past earnings. It will only limit future earnings and, thus, the value of the satellites that were built to generate those earnings. Indeed, the CBA's own economist has said on the record that the CBA's members deserve compensation for any lost spectrum rights based only on the loss of future earnings—past revenues are irrelevant.

For this same reason, confiscating the SSOs' spectrum rights because they have not previously earned C-band revenue in the US would be just plain arbitrary. The CBA and the SSOs have exactly the same rights to use spectrum in the C-band. And, in fact, a repurposing will impair our rights for a much longer period of time, since our satellites are, on average, much, much newer, and have had much less time to earn a reasonable return on their initial investment.

There really is a middle ground solution to repurposing C-band in a way that makes spectrum for 5G services available to the public quickly and treats all parties, including the taxpayers, fairly— and does not disrupt the FCC precedent that has encouraged investment in both satellite and terrestrial wireless networks. Simply put, the FCC or Congress should:

- Repurpose 300 MHz of C-band for 5G, which we believe can be done rapidly by using off-the-shelf compression technology.
- Mandate multi-billion-dollar payments to the Treasury from an auction.
- Set forth financial incentives for U.S. earth station operators to install the compression equipment in a timely manner, thus facilitating a fast C-band transition, maximizing the amount of frequency spectrum to be repurposed, and expediting roll-out of 5G services.
- Permit a private sector auction under FCC rules that fairly and equitably compensate all FCC licensed satellite operators whose C-band spectrum use rights will be reduced.

I look forward to answering any questions you might have.

Mr. DOYLE. Thank you, Mr. Frownfelter.
And, finally, Mr. Berenbroick, you are recognized for 5 minutes.

STATEMENT OF PHILLIP BERENBROICK

Mr. BERENBROICK. Thank you.

Chairman Doyle, Ranking Member Latta, and members of the subcommittee, thank you for the opportunity to testify about how to best repurpose the 3.7 to 4.2 gigahertz band, otherwise known as the C-band.

It is critical that Congress and the Federal Communications Commission ensure the public airwaves are used efficiently and in ways that best serve the public interest.

I am the policy director of Public Knowledge, a nonprofit public-interest organization that advocates for free expression and public access to information, affordable communications tools, and creative works. PK has a long track record working with the Energy and Commerce Committee and the FCC on spectrum policy issues. Our advocacy aims to increase public access to the public's airwaves, encourage innovative, efficient use of spectrum that advances the public interest in wireless communications and promotes procompetitive spectrum policies to ensure broadband is affordable and accessible for all.

Public Knowledge is a member of the broad-based public-interest spectrum coalition that includes national consumer, civil rights, education, rural broadband, and social justice organizations, and we are also a member of the Broadband Access Coalition, a coalition of rural broadband providers, equipment manufacturers, technology companies, and consumer and public-interest groups that support more efficient use of the C-band to help close the digital divide.

Public Knowledge supports repurposing portions of the C-band for wireless use. To this end, Public Knowledge supports the bipartisan, commonsense legislation introduced last week by Chairman Doyle, Representatives Johnson, Matsui, and Gianforte. H.R. 4855, or the C-BAND Act, promotes the speedy repurposing of C-band spectrum for the deployment of next-generation 5G networks, protects incumbent users and their customers, and ensures reallocation of C-band licenses occurs via public auction that will serve the public interest and that—that proceeds significant revenues that can be used to benefit the public.

Reallocation of the C-band has the potential to efficiently put all 500 megahertz of C-band spectrum to use for mobile and fixed wireless service. To be clear, the benefits of any reallocation of the public's airwaves in the C-band must flow to the public. Repurposing portions of the C-band for wireless broadband use presents unique opportunities to advance multiple goals simultaneously.

First, unleash hundreds of megahertz of mid-band spectrum for next-generation mobile broadband networks; second, dramatically upgrade efficient use of the C-band in ways that spur more widespread availability of high-speed fixed wireless broadband in rural and other unserved and underserved areas; and, third, recoup tens of billions of dollars for the Treasury that could then be allocated

to provide substantial benefits to the public, such as closing the digital divide.

First, the FCC should modify C-band spectrum licenses under section 316 of the Communications Act, to permit flexible use of the spectrum and hold a public auction of those licenses, using its authority under section 309(j) of the act. This public auction is what is prescribed by the C-BAND Act.

This process is the fastest, proven, and legal approach available for the Commission to free up significant C-band spectrum for 5G deployment. A public auction process would also ensure there is transparency for the public and auction participants, prevent collusion and anticompetitive conduct, reduce the risk of a failed auction, and make certain that auction revenues can be put to work to serve the public interest.

With specific regards to speed, a traditional FCC ascending clock auction could be scheduled quickly. The Commission should also set a date certain by which the repack of C-band incumbents would occur, which would create certainty for when the auction portions of the C-band will be made available for new licensees to commence deployment.

Second, the Commission should promote point-to-multipoint fixed wireless operations in the C-band. Fixed wireless services can help close the digital divide by using underutilized spectrum to reduce the economic barriers to deploying in rural areas.

Fixed wireless services could operate in the repacked upper portion of the C-band without harmful interference to incumbents and would bring high-speed fixed wireless broadband to tens of millions of households.

Finally, proceeds from the public auction of C-band licenses could be allocated by Congress to address priorities, such as deploying high-speed fixed broadband to unserved and underserved areas. This proposal has a dual benefit. It would make fixed high-speed broadband accessible in communities that currently lack access. It would also provide the necessary fixed backhaul that 5G and future generations of wireless networks will need, improving the economic conditions for deployment in communities that are otherwise unlikely to see 5G service for the foreseeable future.

Again, the C-band represents unique win-win-win opportunity for policymakers.

Thank you for the invitation to testify here today. I welcome the opportunity to answer your questions.

[The prepared statement of Mr. Berenbroick follows:]



Testimony of Phillip Berenbroick
Policy Director
Public Knowledge

Before the
U.S. House of Representatives
Committee on Energy & Commerce
Subcommittee on Communications & Technology

“Repurposing the C-Band to Benefit All Americans”

Washington, DC
October 29, 2019

**HEARING ON
“REPURPOSING THE C-BAND TO BENEFIT ALL AMERICANS”**

Phillip Berenbroick
Policy Director
Public Knowledge

Chairman Doyle, Ranking Member Latta, and Members of the Subcommittee, thank you for the opportunity to testify about how to best repurpose the 3.7-4.2 GHz band, otherwise known as the “C-Band.” It is critical that Congress and the Federal Communications Commission ensure the public’s airwaves are used efficiently, and in ways that best serve the public interest.

I am the Policy Director of Public Knowledge, a non-profit, public interest organization that advocates for free expression and public access to information, affordable communications tools, and creative works. Public Knowledge has a long track record working on spectrum policy issues to promote public access to the public’s airwaves; innovative, efficient use of spectrum; and pro-competitive spectrum policies to ensure broadband is affordable and accessible for all. Public Knowledge is a member of the broad-based Public Interest Spectrum Coalition that includes national consumer, civil rights, education, rural broadband, and social justice organizations.

The benefits of any reallocation of the public’s airwaves in the C-Band must flow to the public. Repurposing portions of the C-Band for wireless broadband use presents the unique opportunity for policymakers to: 1) unleash hundreds of megahertz of mid-band spectrum for next-generation mobile broadband networks, 2) dramatically upgrade efficient use of the C-Band in ways that spur more widespread availability of high-speed fixed wireless broadband in rural and other unserved and underserved areas, and 3)

recoup tens of billions of dollars for the Treasury that could then be allocated to provide substantial benefits to the public, such as closing the digital divide.

The Commission Should Repurpose Portions of the C-Band Spectrum for Wireless Broadband Services

In July 2018, the Federal Communications Commission issued a Notice of Proposed Rulemaking seeking comment on proposals to allocate the 3.7-4.2 GHz spectrum band for wireless broadband services, promoting more efficient and intensive fixed use of the C-Band on a shared basis, while also protecting incumbent users of the spectrum and their customers.¹ Public Knowledge supports efforts to reallocate portions of the C-Band for wireless use. This reallocation has the potential to efficiently utilize all 500 megahertz of the band, putting it to work for deployment of 5G wireless networks and to help close the digital divide.

Reallocating Lower C-Band Spectrum for Mobile Broadband Will Unleash Mid-Band Spectrum for 5G Networks

Spectrum is the invisible infrastructure that carries wireless communications. Next-generation, 5G mobile broadband networks will rely on a mix of low-, mid-, and high-band spectrum. The C-Band has been globally harmonized for wireless use, and the Commission's ongoing C-Band proceeding seeks to free up a significant swath of airwaves for 5G mobile broadband. Public Knowledge supports the Commission's proposal to reallocate C-Band spectrum for mobile broadband use, and supports holding a public auction for a segment of the lower portion of the band.

¹ See Expanding Flexible Use of the 3.7 to 4.2 GHz Band, et al, GN Docket No. 18-122, et al, *Order and Notice of Proposed Rulemaking*, 34 FCC Rcd 6915 (2019).

A public auction will make certain that the allocation of C-Band licenses serves the public interest by providing agency oversight of the auction process to prevent anti-competitive behavior and collusion, and auction rules to enhance competition and ensure that small and diverse bidders have the opportunity to acquire the spectrum they need to bring connectivity to the communities they serve. FCC-led auctions provide transparency, due process, economic opportunity, and fairness to the public and to auction participants. There is no evidence that an untested approach, such as the unique “private auction” proposed by the C-Band Alliance, would achieve the same benefits of the Commission’s tried and proven auction framework.

A public auction of a significant portion of C-Band spectrum would not only free up airwaves for 5G mobile broadband, but would also generate substantial revenues that Congress could allocate to address pressing national needs – such as closing the digital divide, investing in Enhanced 9-1-1, and promoting digital equity and inclusion. Commission leadership has long identified closing the digital divide as the central priority of the FCC.

According to the FCC, broadband is not deployed to around 25 million Americans. As Members of this Committee are aware, the true number of those without broadband is likely significantly higher than the FCC’s projections. In 2017, the Commission’s Office of Strategic Planning and Policy Analysis (“OSPPA”) reported that fourteen percent of the approximately 160 million residential and small and mid-sized business locations across the U.S. lack access to the internet at broadband speeds. OSPPA concluded that increasing access to ninety-eight percent of residential and business locations with fiber to the premises would cost \$40 billion, and reaching the final two

percent – those locations in the most remote areas and those with the most challenging terrain – would cost an additional \$40 billion.² Further, earlier this year, Chairman Pallone, Chairman Doyle, and numerous Members of the Energy & Commerce Committee introduced the Leading Infrastructure for Tomorrow’s America, or LIFT America Act (H.R. 2741). The LIFT America Act proposed to allocate \$40 billion for broadband infrastructure investments to connect unserved and underserved communities.³ Analysts estimate that an auction of C-Band spectrum licenses could generate upwards of \$50 billion. Those revenues are significant, and following a public auction in which those funds are deposited in the U.S. Treasury, they could be used to address priorities such as closing the digital divide.

It would be a mistake for Congress or the Commission to introduce unnecessary uncertainty into this process by opting for an untested and illegal “private auction.” All stakeholders agree that freeing up a substantial amount of C-Band spectrum is essential for 5G deployments. Relying on an unproven private auction process – one that offers no benefits over the Commission’s traditional, proven public auction – introduces the potential for a failed auction, reduced public interest benefits, significant delay, and unnecessary legal risk. These risks are unjustified given the importance of successfully reallocating hundreds of megahertz of C-Band spectrum for 5G mobile broadband.

The C-Band Alliance’s proposed private auction of C-Band licenses would violate Section 309(j) of the Communications Act. Section 309(j) requires the Commission to auction licenses when there are multiple applicants for a license. Repurposed C-Band

² Federal Communications Commission, Office of Strategic Planning and Policy Analysis, *Improving the Nation’s Digital Infrastructure 2-3* (2017), *available at* <https://docs.fcc.gov/public/attachments/DOC-343135A1.pdf>.

³ Leading Infrastructure for Tomorrow’s America Act, H.R. 2741, 116th Cong. (2019).

licenses are certain to attract interest from multiple applicants given the intense demand for mid-band spectrum from national, regional, and rural mobile carriers. Unlike a traditional secondary market spectrum transaction where a license changes hands but the new licensee operates under the existing license rule, in this case the Commission would modify the existing satellite licenses so the spectrum can be repurposed for “flexible use” – most likely use for mobile wireless services. The Commission must also ensure that rules are in place to prevent harmful interference between the different licensed services operating adjacent to one another. This process, which will include the creation of new licenses, requires the Commission allocate these new licenses via a “system of competitive bidding” under Section 309(j)(1). Further, a private auction of new C-Band licenses would run afoul of past precedents where Congress has stepped in to prevent the Commission from proceeding with similar schemes that would enrich a small set of stakeholders at the expense of the public.

A private auction is also likely to distort competition in the mobile wireless market because it would likely exclude small and rural broadband providers – the same providers that are most likely to offer service to consumers in rural communities. Rather than running an auction designed to serve the public interest and promote competition and transparency, the incumbent licensees would have strong incentives to run a private auction designed primarily to maximize profits, while ignoring other important considerations. Further, authorizing a private sale would set a dangerous precedent for the repurposing of future spectrum bands. Inefficient users of valuable airwaves will demand they receive windfall profits to improve their efficiency and free up spectrum. This precedent would encourage hold outs, delaying repurposing of spectrum for new uses,

and diverting revenues that customarily have flowed back to the Treasury to benefit the public.

The fastest, most straightforward, legally sound way to repurpose C-Band spectrum for mobile broadband use is for the Commission to hold a traditional forward auction, repack incumbent satellite users into the upper portion of the band, and require auction winners to reimburse incumbents for eligible and reasonable costs.

Authorizing Point-to-Multipoint Fixed Wireless Service in the C-Band Would Bring High-Speed Broadband to Rural, Tribal, and Other Unserved Areas

Public Knowledge also strongly supports opening unused frequencies in the C-Band for point-to-multipoint (“P2MP”) fixed wireless service. Allowing P2MP use of the band would put finite public spectrum resources to more efficient use, and help close the digital divide by allowing fixed wireless broadband providers to extend high-speed broadband to rural and tribal areas, small towns, and other unserved or underserved communities.

The Commission should permit P2MP wireless broadband providers to coordinate shared use across the upper portion of the C-Band, in the frequencies that incumbent satellite operators are repacked into. Additionally, the Commission should authorize opportunistic access of P2MP operations to vacant frequencies in the lower portion of the C-Band until licensees of the repurposed frequencies are ready to commence service. Use of an automated frequency coordination system will permit the Commission to maximize efficient use of the C-Band in a manner similar to the approach adopted for General Authorized Access use of vacant Priority Access License spectrum in the Citizens Broadband Radio Service spectrum (3.550-3.700 GHz). A technical study by Professor

Jeff Reed of Virginia Tech conclusively found that P2MP fixed wireless service can coexist with incumbent satellite users in the C-Band with no harmful interference to the incumbent licensees, and that these P2MP services could deliver high-speed fixed wireless broadband to more than 80 million Americans.

Permitting P2MP fixed wireless service to operate in vacant portions of the lower C-Band on a “use or share” basis and on a shared basis in the upper portions of the band will help deliver high-speed, fixed wireless broadband to rural and Tribal communities and small towns quickly, efficiently, and inexpensively. Fixed wireless service provides a cost-effective method of deploying high-speed broadband to hard-to-serve rural areas. Lower costs improve the economics of deploying to these areas; additionally, those cost savings may be passed on to consumers in the form of lower prices, making broadband more widely available and more affordable.

Public Knowledge Supports the C-Band Act

Last week, Chairman Doyle, Congressman Johnson, Congresswoman Matsui, and Congressman Gianforte introduced common sense, bipartisan legislation that would ensure speedy access to the C-Band spectrum for deployment of next-generation wireless networks, as well as ensuring that the proceeds from the sale of the public’s airwaves benefit the American public. H.R. 4855, the Clearing Broad Airwaves for New Deployment Act, presents the fastest, most legally sound way for the FCC to repurpose a significant portion of C-Band spectrum for 5G deployments, while also returning tens of billions of dollars of estimated auction proceeds to the Department of the Treasury.⁴ Congress could then allocate those funds to address pressing national priorities, such as

⁴ Clearing Broad Airwaves for New Deployment Act, H.R. 4855, 116th Cong. (2019).

closing the digital divide. Public Knowledge supports this legislation and hopes to see it move forward.

5G Mobile Broadband is Unlikely to Benefit Rural Areas and Tribal Lands Without Addressing the Lack of Fixed Broadband Infrastructure in those Communities

While there is considerable excitement and anticipation regarding the eventual deployment of next-generation 5G wireless networks and making new spectrum allocations available for 5G use, communities that currently find themselves on the wrong side of the digital divide are unlikely to benefit from these networks – at least for the foreseeable future. In fact, the prospect of greater consolidation in the mobile wireless market (e.g., the proposed merger between T-Mobile and Sprint) is likely to exacerbate the divide between rural and urban areas; creating stronger incentives for the remaining firms to invest even more heavily in densely populated and wealthy areas, further delaying deployment of 5G networks in exurban areas, small towns, and rural communities.

There is every reason to be skeptical that nationwide wireless carriers will prioritize deployment of 5G technologies to rural communities. These areas have low population density and high per-consumer costs, and therefore have historically lacked the economies of scale needed to attract strong investment from Sprint, T-Mobile, Verizon, and AT&T. Mobile 5G service will likely be a modest, incremental improvement over LTE speeds, particularly in areas where the cost of network densification is prohibitive.

Even if mobile 5G is ultimately deployed on a widespread basis, the simple fact is that the spectrum frequencies that promise to deliver speeds and latency comparable to

fixed networks are unlikely to be able to penetrate buildings in a manner that makes 5G wireless services competitive with fixed broadband. Indeed, mobile 5G networks will rely heavily on fixed broadband networks for backhaul support to quickly deliver vast amounts of data, similar to current mobile wireless technology. An estimated 60 percent of mobile data traffic is currently offloaded onto fixed networks, and that number is increasing annually.⁵ However, wireless companies touting the benefits of 5G have typically failed to explain where they will find this fixed backhaul support in rural, less densely-populated areas. Mobile 5G networks will need more than wireless systems to function, since the gigabit capacity over mobile wireless that has been promised requires proximity to fixed-line backhaul that can itself support gigabit speeds. These are the very high-capacity wired networks that are in short supply in lower-income and less densely-populated areas, and areas with challenging terrain.

Further, based on the history of prior mobile wireless technology upgrades and the technical characteristics of mid-band and millimeter wave spectrum, mobile 5G deployments will likely focus on the nation's most urban, affluent areas and do little for rural America. In all likelihood, the nation's largest wireless carriers will continue to focus on the same markets they do today, with true 5G networks utilizing low-, mid-, and high-band spectrum limited to an even smaller subset of wealthy and densely populated areas that already have sufficient fixed infrastructure. To bring high-speed broadband to unserved and underserved areas, as well as make it more realistic that small towns have access to 5G wireless services, the proceeds from a public auction of repurposed C-Band

⁵ See Cisco, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021(2017), <https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.pdf>

licenses should be reallocated by Congress to deploy future-proof fixed broadband infrastructure in communities that do not have access to the high-speed broadband infrastructure that can provide fixed backhaul for next-generation wireless networks.

Conclusion

Repurposing C-Band spectrum for mobile broadband use via a public auction and authorizing fixed P2MP use of the band provides an elegant, win-win-win solution that addresses the need to free up additional mid-band spectrum for 5G deployments and helps close the digital divide in rural and Tribal areas. First, modifying and repurposing spectrum in the lower C-Band and publicly auctioning that spectrum would ensure spectrum is allocated for 5G mobile broadband use quickly and efficiently.

Second, a public auction would ensure transparency, prevent anti-competitive conduct, reduce risk of a failed auction, and make certain the auction serves the public interest. Revenues generated from the auction of the C-Band licenses would be returned to the Treasury. Congress should then allocate those revenues for the deployment of future-proof, high-speed, fixed broadband infrastructure in unserved and underserved communities, along with funding digital inclusion and digital literacy initiatives like those in the Digital Equity Act (H.R. 4486 and S. 1167). The fixed broadband infrastructure funded by revenues generated from the C-Band public auction would provide substantial economic benefits to the residents of those communities. Permitting P2MP fixed wireless use of the C-Band would deliver high-speed fixed wireless broadband to millions of unserved and underserved households, helping to close the digital divide. Third, the existence of high-speed fixed broadband infrastructure would make it more likely that 5G and future generations of wireless networks are deployed

more quickly to these previously unserved areas, leading to even greater potential economic benefits for those communities.

Again, thank you for the opportunity to testify today on how to best repurpose the C-Band to benefit all Americans. I am prepared to answer any questions you may have.

Mr. DOYLE. OK. Thank you to all of the witnesses for your opening statements.

We are going to now move to Member questions. Each Member will have 5 minutes to ask questions of our witnesses. And I will start by recognizing myself for 5 minutes.

Mr. Frownfelter, under the CBA proposal, your company, ABS, and other small satellite operators in the C-band would potentially stand to receive no incentive or relocation funds from a private sale, and you would be required to relinquish access to the same spectrum rights as CBA members.

Is that correct?

Mr. FROWNFEILER. That is correct.

Mr. DOYLE. Thank you. Let me follow up.

If the FCC approves that CBA plan and you are hung out to dry, do you think it is likely that you or other affected SSOs will sue the FCC?

Mr. FROWNFEILER. Yes, I do.

Mr. DOYLE. Thank you.

Mr. Berenbroick, do you think lawsuits from ACS or other SSOs, or to be honest, from any of the other parties impacted by a private sale, will slow the process down? Don't you think that any of the imagined benefits of a private sale disappear pretty quickly when you think of the mountain of lawsuits that would pile up from this \$60 billion giveaway?

Mr. BERENBROICK. Yes, Congressman, I think—or Chairman—I think that is right. You know, I think the—you know, as Mr. Frownfelter mentioned, you are likely to see litigation, you know, if the FCC authorizes the CBA proposal.

Secondly, the FCC simply doesn't have the authority under the Communications Act to delegate its authority to run an auction to a private party. So, yes, you will see litigation, and that will dramatically slow down the perceived benefits of the CBA plan.

Mr. DOYLE. Mr. Lieberman, if CBA was responsible for facilitating a transition in the C-band, what recourse do your members have if CBA makes mistakes? For instance, would your smaller members—like Ms. Boyers, who testified before our committee—would she need to call Luxembourg to get tech support? I mean, who would be accountable?

Mr. LIEBERMAN. This is a big problem with the CBA plan. I mean, I would first say that the C-band plan is 3 pages at this point, for an FCC that wants to adopt this in December. So we really have no details whatsoever.

They have discussed the plan with small cable operators not at all. We have not had a single conversation. They have not come to us and said, "This is what it is going to mean for you." So, to be honest, we don't really know what it is going to mean, but I do know that they have a strong incentive to do it on the cheap because whatever they don't give to us means that their foreign—you know, foreign investors get to keep that money.

Mr. DOYLE. Ms. Collier, how profound a waste do you think it would be if the Government simply allowed a small handful of foreign satellite companies to walk away with potentially \$60 billion for something they don't even own? And what kind of opportunity is Congress missing if we don't try to use that revenue to address

pressing national needs, like deploying broadband, funding public safety, or closing the digital divide?

Ms. COLLIER. If the CBA is allowed to sell this spectrum and retain all of the proceeds, the taxpayer is not going to see 1 cent out of this. They claim that they are going to give a voluntary contribution, but what is that? A dollar, \$10, \$100, a million dollars? There is a potential for \$60 billion here that would be walking away from this country.

This funding, portions of which could be used to reimburse the cost of, you know, making the transition to cable operators, and other users of this spectrum. For the cost of the transition, part of the proceeds could be used for deploying rural broadband, expanding our 9-1-1 system, and doing further development in bridging that digital divide that we are also focused on. We wouldn't have that opportunity if the CBA was permitted to sell this spectrum.

Mr. DOYLE. Thank you.

I am going to yield back my remaining 46 seconds and yield to my good friend from Ohio, Mr. Latta, for his questions.

Mr. LATTA. Well, thank you, Mr. Chairman.

And, again, thanks to our witnesses for being here today and your testimony.

Mr. Frownfelter, if I could begin my questions with you. What is the range of the FCC's legal options for enforcement mechanism to ensure private or hybrid approach meets its conditions for the public interest, such as money going to the taxpayers, transparency on process, or how the licenses—or the license sizes would end up?

Mr. FROWNFEILER. Yes, sir. We have proposed for the FCC what we consider to be a neutral third way of approaching the overall auction process.

As I mentioned in my opening statement, we are advocating a private sale with governance, guidelines, and oversight by the FCC to make sure that that process is transparent. And we do that because we think that is the quickest way to get us to 5G.

But the proceeds from that auction, we believe, should be distributed across three different tranches. The first tranche is to incentivize U.S. Earth station operators. These are teleports, cable headends in rural facilities that connect our satellite capacity to the end user and incentivize them to install the latest technology and compression equipment so that we can quickly transition the C-band, free up the maximum amount of spectrum to be repurposed for 5G, and to expedite the rollout of 5G services.

The second tranche, which we have advocated from the beginning of this process, said a significant amount of the proceeds would be mandated by the FCC to go directly to the U.S. Treasury. In discussions that we have had with your staff on the Hill over the last couple of months, and as we have reported back to the FCC, we think the right amount is about 25 percent of the proceeds to go directly to the Treasury.

It is important to point out that, through the combination of these two tranches, depending on how much frequency spectrum is reallocated, 40 to 45 percent of the proceeds would immediately be reinjected back into the U.S. economy.

And then the final tranche would be distributing what we call our distribution and scoring model, which is a fair and equitable

distribution system that would compensate the existing licensees for the modifications that would occur to their license and to compensate them for the capital that they have deployed and the loss of potential future revenue. And all eight licensees would be compensated in a fair and equitable manner.

From our perspective, this approach gets you to 5G the fastest. And doing it in a fair and equitable way, where we are recognizing all of the constituents, including the U.S. taxpayers, we minimize the potential for litigation and give us the best chances of rolling out 5G as soon as possible.

Mr. LATTA. OK. Thank you.

Mr. Berenbroick, what are your thoughts? My understanding is, from your testimony, you support a public auction. But do you think it is possible to do a private approach that has these important conditions attached?

Mr. BERENBROICK. Thank you for the question, Ranking Member Latta.

To be honest, given that the private-auction proposal is relatively unprecedented—it is an untested, unproven model—I don't know what sort of public-interest protections and oversight the FCC can exercise through to that process.

A traditional public auction ensures there is transparency, accountability, accounts for competition issues, a diverse range of bidders and auction participants get a seat at the table. We think those are critical pickup interest protections and benefits.

There is no way to account for that in a private auction. It is—there is complete uncertainty.

Mr. LATTA. Well, thank you very much. Mr. Lieberman, if we go to the public option route with an option under section 309(j), what is the legal recourse for satellite operator incumbents to challenge the modification of the license?

Mr. LIEBERMAN. There is a process that is available to them to challenge it and if they have concerns with what the FCC has done.

Mr. LATTA. Thank you. Mr. Campbell, we are focused today on getting license spectrum cleared for 5G, but as a cochair of the Wi-Fi Caucus, I am aware that we also need that unlicensed spectrum to reap the full benefits of the next-generation mobile network. Would you explain how Wi-Fi fits into the race to 5G?

Mr. CAMPBELL. Yes, Mr. Latta. Wi-Fi is an important complement to 5G. Currently if you think about most of the mobile use that goes on, actually occurs more on Wi-Fi than on the licensed networks. About 68 percent of current mobile traffic is actually carried by Wi-Fi. And so it is a complement.

So, when you are in a Wi-Fi signal area, most devices will switch to Wi-Fi. Wi-Fi is now moving on to a new generation of Wi-Fi called Wi-Fi 6, which, think of it as 5G for Wi-Fi, which will have many of the same features as 5G.

And so we are looking to a point where devices that move between Wi-Fi and 5G will be able to provide the same kind of functionality to the users, and we need to make sure in these spectrum discussions that we are thinking of spectrum for both 5G and for Wi-Fi going forward.

Mr. LATTA. Well, thank you very much. Mr. Chairman, my time is expired, and I yield back.

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Mr. McNerney for 5 minutes.

Mr. MCNERNEY. I thank the chair.

I thank the witnesses for your testimony this morning.

Mr. Berenbroick, in your testimony, you noted that, quote, “the C-band spectrum is essential for 5G deployment. I think that is pretty well understood,” unquote. Given the importance of this band, we must use the time-tested methods of allocating the spectrum in the way that is transparent and fosters competition.

Has there ever been a private auction of spectrum approved by the commission in a way described by the C-Band Alliance?

Mr. BERENBROICK. No, Congressman, not that I am aware of. It is an entirely untested, unproven proposal.

Mr. MCNERNEY. Could allocating the C-band using an untested, private sale slow down 5G deployment because of legal challenges?

Mr. BERENBROICK. Yes, Congressman. I think—you know, we discussed earlier, the litigation risk is significant. And that could in itself delay the process.

But, you know, frankly, I think, as Mr. Lieberman alluded, you know, the C-band proposal, the current version of it was just filed last night, and it is all of three pages. And they also have not updated their proposal for how the auction would work. When the FCC took comment on that auction proposal over the summer, it was panned as overly opaque, as complex, as creating significant risk of auction failure. That, you know, auction failure would delay availability of 5G licenses as well.

So litigation risk is one risk of delay, but simply put, the auction design and the untested nature of this proposal also creates significant delay risk.

Mr. MCNERNEY. Thank you. Ms. Collier, I know the FCC has strong experience and proven expertise in conducting auctions. Is there an entity that has as much experience as the FCC when it comes to conducting auctions?

Ms. COLLIER. As far as spectrum auctions, no. The FCC has been conducting these auctions since 1994, 102 spectrum auctions under their belt, more than \$120 billion to the U.S. Treasury. This is quite a record. And they recently completed in 2017 the broadcast incentive auction, which has to be one of the most complex auctions of spectrum to date.

Mr. MCNERNEY. Has the C-Band Alliance conducted any auctions to date?

Ms. COLLIER. No.

Mr. MCNERNEY. Mr. Lieberman, under the private-sales model, if the transition gets off track and problems arise, who would the Earth station operators turn to?

Mr. LIEBERMAN. It is not clear. And the CBA and satellite industry have had experience with repointing and installing filters, but never before has the satellite industry been involved in swapping out equipment of the scope that they are proposing today, and we think it is prone to failure and certainly delay.

Mr. MCNERNEY. Thank you.

I recently introduced the Digital Equity Act, with Representatives Luján and Clarke. This legislation would establish two Federal grant programs to close the gap in broadband adoption and digital literacy.

We need to be proactive about closing these gaps. 5G has the risk of widening the digital divide. Combined, the two grant programs in my legislation would cost a little over \$1 billion over the 5 years.

Mr. Berenbroick, could this auction revenue be used to pay for funding authorization of the Digital Equity Act?

Mr. BERENBROICK. Yes, Congressman, it could.

You know, I think the auction is projected to, depending on what is made available, to raise upwards of, you know, up to about \$50 billion. So, yes, the Digital Equity Act, which I think is, you know, funded at \$1.25 billion, could easily be funded.

Mr. MCNERNEY. Thank you.

Ms. Collier, I am going to ask about something you said, that licenses do not signify ownership. Could you expand on that a little bit?

Ms. COLLIER. It is more that authority to operate in a space does not constitute ownership. The C-band spec—and this is very unique to the C-band spectrum—the C-band spectrum, by its very nature, is rather open access to those that are authorized to use it. Where it is full band, full arc, meaning that a satellite company and the Earth stations have access to the entire 500 megahertz of spectrum, so that they can point their dishes to the best satellite to get the best signals.

A license usually is a partitioned section of spectrum, and that is something that is bought and sold through these spectrum auctions, like the mobile broadband, or the mobile licenses that telecommunications providers purchase through the auctions. They bought these licenses, and then they can sell them on the secondary market. Because of the very nature of a full arc, full band, nobody has ownership of license to a particular portion of that spectrum.

Mr. MCNERNEY. Right.

Ms. COLLIER. Everybody has equal access.

Mr. MCNERNEY. Thank you. My time is expired, Mr. Chairman—

Mr. DOYLE. Yes.

Mr. MCNERNEY [continuing]. As you have noticed. I yield back.

Mr. DOYLE. The gentleman yields back. The Chair recognizes Mr. Walden.

Mr. WALDEN. The subtle hand on the gavel.

Thank you, Mr. Chairman, and I want to thank our witnesses.

Mr. Lieberman, I want to start with your proposal, which calls for a public auction of 370 megahertz of C-band spectrum. Under this proposal, all the parties would be compensated for their transition costs, including the cost to deploy 120,000 new miles of fiber. And as you know, I represent some pretty challenging geographical areas for deployment.

Do you believe that the auction will bring in the revenue necessary to cover the cost of deploying this additional fiber? And I worry about the timeline. That is a lot of miles.

Mr. LIEBERMAN. The estimate for the fiber deployment is 6 to 7 billion dollars. The auction proceeds are expected by, for instance, New Street Research, to raise \$50 billion. I don't think we are going to have a problem raising enough money.

Mr. WALDEN. And we never have a problem spending it. So how confident are you this new funding would be complementary to existing or proposed programs like CAF II, the World Digital Opportunity Fund, USDA's Reconnect Program, and potentially others, and how do you envision tracking the money to ensure it is all being used efficiently?

Mr. LIEBERMAN. Well, our plan, first of all, calls for no overbuilding.

Mr. WALDEN. Good.

Mr. LIEBERMAN. So the total amount of fiber that would be necessary is 420,000 fiber route miles in order to transport the programming over it; 300,000 of that fiber route miles already exists in the ground. So we would be just leasing IOUs or doing—you know, using that.

It is the 120,000 fiber route miles that are probably going to a few cable systems in your market that don't have that.

Mr. WALDEN. And I will hear from them if we don't get it right. Mr. Frownfelter, I know you have held some senior positions with some of these satellite companies, and given your expertise on how satellites operate, how confident are you that satellite operator incumbents could transition 300 megahertz of spectrum in a timely manner in a private-auction approach?

Mr. FROWNFEILER. Thank you, sir. I am very confident. In fact, as Mr. Berenbroick just mentioned, last night the CBA issued a new ex parte filing and a new proposal to the FCC, where after careful discussion and consideration with the broadcasters and the U.S. teleports throughout the United States, they are now signing up for transitioning 300 megahertz of spectrum, using advanced compression technology.

The first 120 megahertz, particularly at urban population centers, would be done in 18 months, and the entire United States done in 36 months. The main difference between their proposal and ours is that they do not incentivize the Earth station operators, they don't incentivize these rural communities to implement the latest technology at each of their facilities, which the SSOs have been advocating for from the very beginning of this process. And we believe that if you incentivize them, you could actually get this done in a much faster timeframe than even the CBA is projecting from last night.

Mr. WALDEN. OK. Another question to you. Does the law permit this private approach, specifically in referring to section 309(j)(6)(e), which clarifies that the Commission try other means besides auctions, like negotiations, to make spectrum available?

Mr. FROWNFEILER. Well, sir, I am an executive, not a lawyer but—

Mr. WALDEN. That is two of us. I am not burdened with a law degree either, but—

Mr. FROWNFEILER. But from our perspective, we are not adamantly against a public auction, but we see two potential issues. I think one is speed of execution. We think based on past history,

it is very difficult to argue that a private auction wouldn't be faster, potentially much faster than a public auction.

And second, as I indicated in my opening statements, you know, when we look at the proposals, including the bills that were submitted last Friday, what we don't see is any compensation for the incumbent licensees for modifications to the existing licenses, and we think that sets an awful precedent going forward that would impact future investment in wireless services.

So in our proposal we have put together what we think is a very fair and equitable compensation for all of the constituents, including those Hearst station operators, teleports, cable headends in rural communities, in order to effectuate 5G rollout as quickly as possible and minimize the potential for litigation.

Mr. WALDEN. All right. Thank you. Mr. Lieberman?

Mr. LIEBERMAN. Yes, it is bold for the satellite industry to be saying that it can be done quick when the majority of the work is going to be having to be done by smaller cable operators and having to do it in 3 years.

And I can tell you that their incentive to do it fast is not going to exist. Their priority is providing broadband services to their customers, not switching out a whole bunch of equipment in order to be left with a C-band that is less reliable, less capable, and less affordable. So I think we need to take that into account: who is going to be doing the work.

Mr. WALDEN. Thank you, Mr. Chairman. Thank you all.

Mr. DOYLE. The gentleman yields back.

The Chair now recognizes Mr. Soto for 5 minutes.

Mr. SOTO. Thank you, Mr. Chairman. At stake here is a lot—5G, nearly \$60 billion, and a whole host of different proposals on how to address this. I wanted to start by asking Mr. Lieberman, has there been any precedence for a private auction, as been proposed by some on the panel, in the past with regard to other spectrum?

Mr. LIEBERMAN. None. Completely novel, subject to legal challenge.

Mr. SOTO. Mr. Frownfelter, would you agree with that, or has there been precedence before?

Mr. FROWNFEILER. I would agree with that, sir.

Mr. SOTO. OK. It would be great to hear from each of you just a bit on what infrastructure is going to be required. Let's say we sell all this bandwidth, and we are developing 5G across the Nation. What is the basic infrastructure we are going to need?

And we will start with you, Mr. Lieberman, and we will go across the panel.

Mr. LIEBERMAN. For cable operators, it is going to essentially be replacing hundreds of pieces of equipment in their headends, because the CBA proposal is suggesting that they should use a higher compression.

In their headends today, they have equipment for the current compression. So they are going to have to replace that out, and it is not going to be able to be done all at once. It is going to have to be done in sequences.

Mr. SOTO. Thank you. My time is limited. Thank you.

Mr. Campbell, what needs to be done to deploy 5G, what type of infrastructure?

Mr. CAMPBELL. For the 5G portion of this, we are looking at, you know, radio towers, replacing that. We are going to have a lot of small cells as well, which you can think of as similar to Wi-Fi type devices that will be in denser areas to get higher deployments. And then all those things need to be connected by high speed, you know, physical connections, whether it is—probably fiber, but other methods in order to connect them back to the internet for them to work most effectively.

Mr. SOTO. Ms. Collier, would you agree with that? What do we need to get to 5G?

Ms. COLLIER. Yes. I am not an engineer, so I am not sure the—

Mr. SOTO. Just generally.

Ms. COLLIER. But in general, as I noted in my testimony, there are going to be costs associated with transitioning to help the companies that are involved do more efficient encoding. They are going to need compression and modulation technology changes. They need to add in more advanced computing technology just to deploy into the new regions that they are being pushed into.

Mr. SOTO. Thank you.

Mr. Frownfelter, what is going to be required of us to get to 5G should all the auction be done already?

Mr. FROWNFEILER. I agree with Mr. Campbell's statements, but I do disagree with what Mr. Lieberman had to say. Having been the president of PanAmSat, and I think more relevant than privatizing the satellite industry, we were the company that built and rolled out the current C-band service in the United States from scratch.

And in 2001, we had to dramatically expand that service because of the imminent rollout of HD. And to do so, we had to package complete antenna systems, required new foundations to be laid at all of these teleports and Earth stations. We had to ship them, and each of these teleports, and even in the rural areas, had to install each of these antennas in order to expand the system significantly. That effort is extensively more complicated than what we are talking about here in terms of upgrading equipment to the latest compression technology.

And even back then, when we didn't have the communication capability of web pages and the internet, we were able to complete that entire process across much more Earth stations than we have today in the United States. We were able to complete it in 3 years.

Mr. SOTO. Thank you, Mr. Frownfelter. My time is limited. Thank you.

Mr. Berenbroick.

Mr. BERENBROICK. Briefly, you know, Mr. Campbell is absolutely right. You need—for 5G deployments, not only do you need the licensed spectrum, but you also need significant, fast, fixed broadband networks for backhaul in the low-income communities and urban areas. And in rural and exurban communities, we don't have that fix to backhaul that is available that can support 5G speeds.

Secondly—Mr. Campbell alluded to this earlier too—you need significant swaths of unlicensed spectrum. You need unlicensed spectrum channels that are wide enough to support offload from 5G networks. We don't have that right now.

Mr. SOTO. Well, thank you all for enlightening us. You know, it is going to be complicated. It is going to take all of your help. It doesn't look like one particular area of this industry is going to be doing this on its own.

And so that is very helpful as we are looking to have a collaborative way to get to 5G, and thank you all for your testimony.

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Mr. Kinzinger for 5 minutes.

Mr. KINZINGER. Thank you, Mr. Chairman. I will add to the missing Greg stuff. However, we all get to move up one, so—

Mr. WALDEN. Yes, everybody to my left is happier about this, because they move up in seniority, so.

Mr. KINZINGER. We will miss you, though.

Mr. WALDEN. What was that guy's name again, from Oregon?

Mr. KINZINGER. Waldsman? I forget. But thank you.

We have a difficult issue before us in C-bands, obviously pretty much the only game in town in terms of ensuring ample mid-band spectrum available for the deployment of 5G. It is highly valuable, and there is a multitude of stakeholders that need accommodating, not the least of which are the American taxpayers. So we will get right to it.

Mr. Campbell, you have stated that repurposing the spectrum is in our national security and economic interests. I have a real focus on security policy, international affairs, and I actually think this committee intersects quite well with that, so I can appreciate that point. Can you expand a bit more on the importance of moving quickly? And where does the U.S. stand in comparison to Europe and China?

Mr. CAMPBELL. Well, I think it is very important to recognize that technology is as important to national security as many of the traditional things we think of when we think of our defense. And we need to have the most advanced technology, both in the information world but in every other part for a very strong and secure national defense. That means maintaining world-class networks. That means being at the forefront of all new technologies as we develop them. We have been pretty good at that for quite some period of time.

But we look at a situation like this, where we are looking at mid-band spectrum for 5G, and the Europeans are moving swiftly on this, the Chinese are moving on this, other east Asian nations as well. If we don't make spectrum available in this space, we are not going to be operating in the optimal space as quickly as others.

Mr. KINZINGER. Well, let me add to that, and then I will let you continue with that, but I also have a follow-on to that, because I think we take for granted a lot of the times that we are technology leaders. And so we can slow things down here, because we forget that there is really good competition out there.

So if other nations leap ahead, doesn't that mean that foreign equipment manufacturers can also find themselves well ahead, and further, for instance, if Chinese manufacturers are among those surging and gaining outsized market share, what does that mean for the national security posture of the U.S. and our allies?

Mr. CAMPBELL. Well, that can be very challenging for our country, and we have to make sure that we are at the forefront of all

the technologies on this front. A 1-year or a 2-year delay in this process, you know, sometimes people think, oh, it is just a year. In the technology world, a year is a generation. And we really have to be up there as quickly as we can, which is why when we look at this question of what to do with this spectrum, we are very concerned about the speed at which we bring things to market as being much more important than worrying about the immediate Treasury impact. Because the economic impact is so much larger than the Treasury impact—

Mr. KINZINGER. So I remember when I was 18, I had visited Germany, and everybody had these cell phones that I guess the cool thing was texting at the time. It was new to me. And Europe was really leading in kind of cell technology, and then we have caught up obviously and are in the position we are in because of that ability for our companies to breathe and move quickly.

Let me also ask you, you obviously know the C-Band Alliance has proposed the private auction, which we have been talking about, as the mechanism to facilitate the sale. While your company, Cisco, is not part of the C-Band Alliance, you have stated that your top priority is getting it started and finish as quickly as possible, and you support the CBA's plan because you feel it is the fastest mechanism.

But let's hypothesize that the FCC determines that the best mechanism is something that more closely resembles a public auction, but they incorporate a lot of the provisions to streamline compliance with the Administrative Procedures Act, expediting the procurement of auction software and generally cut redtape away.

Setting aside that this is a hypothetical and that Congress would likely need to approve most or all of these, would you then support this type of a modified public auction, and do you feel it adequately expedites proceedings while appropriately balancing public interest?

Mr. CAMPBELL. We would support any process that would move towards a faster resolution of transitioning the spectrum, and if that is the fastest—that is why we are not ideological about this. We think moving the spectrum is more important than anything here, and therefore, if through congressional action we can speed this process, that would be great. If the FCC can speed this process, that would be great.

One aspect that ought to be considered too, in looking at this question of a private auction or not, is that it does send signals to other current licensees that in other bands that are going to need to be transitioned for other uses in the future, that there might be some incentives for them to work cooperatively to want the transitions to happen. I mean, this worked in the TV band very effectively in the past, and I think we want to make sure that we make sure there are both carrots and sticks in this process.

Mr. KINZINGER. So I think to close I will just say this. I think, you know, obviously this hasn't been done before, and we don't know what this ends up looking like in finality, but I think it is really important for us, Mr. Chairman, to discover these kind of different options as we rethink government and how we do things.

So with that, I will yield back.

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Ms. Matsui for 5 minutes.

Ms. MATSUI. Thank you very much, Mr. Chairman. Now, as Congress moves toward a solution for the C-band, I believe we need a comprehensive approach that advances 5G while also making investments that will strengthen rural broadband. My Win 5G Act would establish a new rural broadband deployment fund to be used by the commission to expand rural broadband access with proceeds generated by the auction.

Mr. Lieberman, moving forward, do you support the inclusion of a rural broadband deployment fund to support investments in rural broadband infrastructure? And that could be a yes or a no.

Mr. LIEBERMAN. Yes.

Ms. MATSUI. Ms. Collier, my Win 5G Act also includes a provision to explore reallocating the 3.4 to 3.5 megahertz band. Do you support efforts like this to make additional federally held spectrum available for commercial use?

Ms. COLLIER. We do support reallocating spectrum for 5G deployment. We are still looking at your proposal, the Win 5G Act. But we haven't determined how—

Ms. MATSUI. Certainly.

Ms. COLLIER [continuing]. What our position is.

Ms. MATSUI. You are looking at it. That is fine.

Ensuring that the maximum amount of spectrum in the C-band is made available for 5G, while respecting the needs of incumbent users, should be a shared principle in our approach to this issue.

My Win 5G Act includes incentives to maximize the amount of C-band spectrum thus ultimately made available. A commission-led public auction as required by the C-BAND Act will help ensure that the market, not private actors, will dictate the amount of spectrum made available.

Mr. Berenbroick, do you have concerns that the operators of a private sale may not have an incentive to maximize the amount of spectrum that is ultimately made available for 5G?

Mr. BERENBROICK. Thank you for the question. Yes. I think there are some concerns that the overriding incentive of satellite providers seeking to have a private auction is maximization of revenue that they would intend to told onto, rather than the broader public—

Ms. MATSUI. Well, what do you believe is a minimum amount of C-band spectrum that will need to be made available in order to have a meaningful impact on the deployment of 5G?

Mr. BERENBROICK. So, Congresswoman, we have not taken a position on the amount that needs to be made available, but what we have taken a position on is that what is made available should optimally, it would be auctioned in a single tranche and that there would be auction rules in place that promote competition and access to that spectrum by a diverse range of bidders and small businesses.

Ms. MATSUI. OK. In the recent testimony before the Senate Appropriations Committee, Chairman Pai reiterated that the C-band spectrum in question is ultimately a public resource as owned by the American people. It is my belief that, above all, we should be striving to provide the benefits of this taxpayer-owned resource of

the American public. I have significant concerns that the Commission may be pursuing alternatives to public auctions that could divert proceeds from American taxpayers to private corporations.

Ms. COLLIER. Are there any guarantees under a private-sale model that would ensure that operators return the maximum amount possible to the U.S. Treasury? That could be yes or no.

Ms. COLLIER. No.

Ms. MATSUI. OK. Do you believe that the FCC has the necessary authority to establish safeguards under a private sale regime?

Ms. COLLIER. A private sale is unprecedented.

Ms. MATSUI. OK.

Ms. COLLIER. You know, the entire idea that the FCC is going to abdicate its authority to a private entity to sell a public resource is mind-boggling.

Ms. MATSUI. OK. All right. While we are discussing the deployment of 5G here today, we must not forget that there are still millions of Americans caught on the wrong side of the digital divide. Our focus on 5G cannot come at the expense of real students, businesses, doctors, and farmers that still need reliable, high-speed broadband. As I mentioned, my Win 5G Act would establish clear guarantees that auction proceeds are used to help support the deployment of rural broadband infrastructure.

Mr. Berenbroick, in addition to the C-band proceeds, what role could a rural deployment fund play in expanding and strengthening broadband networks in rural areas in future auctions?

Mr. BERENBROICK. Thank you for the question. So, you know, in addition to the C-band revenue, a rural fund could ensure that there are fixed broadband capabilities in rural communities that can serve as the fixed backhaul that is necessary for next-generation 5G and future generations of wireless networks.

Ms. MATSUI. OK, fine. Well, I have run out of time, so I yield back. Thank you very much.

Mr. DOYLE. The gentlewoman yields back. The Chair now recognizes the gentleman from Ohio, Mr. Johnson, for 5 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman, and again, this is a critically important hearing. You know, here are the facts. One, we have a public asset: wireless spectrum. And two, we have spectrum licenses which under the Communications Act does not confer a property right.

And the issue is how best to transfer those licenses. It should not come as a surprise that my focus is on how to leverage a valuable asset to deliver broadband to unserved rural communities like the ones I represent in eastern and southeastern Ohio.

Last week, I saw a CNBC report suggesting half of the United States could have 5G coverage by sometime next year. This is good news, and it is critically important that America leads the world in 5G deployment. I am an IT guy with nearly 40 years in the industry. I know how important it is that we capture the high ground on 5G, so that the Chinese and the Russians and others that might think that they can beat us there don't do that. So I am all behind 5G deployment.

However, I am focused on the other half right now who probably won't have 5G after next year and many of whom do not have basic broadband access even today. The lack of broadband is hollowing

out communities throughout rural America. Communities like, again, I represent in eastern and southeastern Ohio.

If we don't solve that problem over the next 20 years, there is not going to be a rural broadband problem to solve, because people aren't going to live there. They are going to leave. You know, I have grown tired and weary of the talk. I have been dealing with this now for 9 years. It is time for some action, and I am committed to fighting to solve this basic infrastructure need in rural communities, to keep them alive, and to bridge the digital divide. There is ingenuity and creativeness that exists in the people of rural America. There is intellectual capital there that is untapped. It is alive in these small communities, and it comes from self-sufficiency, family, and knowing your neighbors.

This uniquely American way of life is at risk if we do not connect these rural communities to broadband, high-speed access very soon. So, Ms. Collier, of the two plans before the FCC, which makes the most impact and commitment to investing in rural broadband? And explain your answer, please.

Ms. COLLIER. There is actually more than just two plans before the FCC. However, it is our view that in order for—

Mr. JOHNSON. Well, public auction versus private sale.

Ms. COLLIER. Oh, public auction—clearly the public auction is going to provide the most revenue for the taxpayers, and that can be assigned by Congress to bridge that digital divide.

I am from rural Ohio, near the very region you represent, sir, and I know firsthand the difficulty for those communities to access broadband. So getting money into the the Treasury and Congress allocating funding to help bridge those communities that don't have service, and there are a lot out there that do not have service at all. Some people are still on dial-up in rural Ohio. And so—

Mr. JOHNSON. And some don't even have that.

Ms. COLLIER. And some don't even have that, right. So getting that, the funding available, I think the public transparent auction process that the FCC has time and again proven worthwhile is the best option.

Mr. JOHNSON. OK. Mr. Berenbroick, do you have any suggestions on what additional tools or resources Congress can provide the FCC to ensure a faster process for releasing this C-band spectrum?

Mr. BERENBROICK. That is a good question. I think the C-BAND Act is a good step in that direction. You know, the C-BAND Act specifies to the FCC to stop dithering and to move forward with a public auction process. This is what the commission should have done more than a year ago. The FCC has clear and straightforward authority to modify licenses and to auction those licenses under section 309(j). It should do that, and it should do it now.

Mr. JOHNSON. OK. All right. Thank you, Mr. Chairman, I yield back.

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Mr. O'Halleran for 5 minutes.

Mr. O'HALLERAN. Thank you, Mr. Chairman. First of all, I want to follow up on Mr. Johnson's statements and say I agree with each and every one of those. My frustration has only been for about 3 years versus his 9, but it is the same exact frustration for rural America. And we are going to lose a lot of people out of there. We

are losing our children from rural America as we speak, because they don't have access to this type of technology.

For holding today's—I thanked the chairman for that already. I am committed to helping rural communities maximize their potential in order to achieve the goal. Access to fixed and wireless broadband is necessary. And a potential spectrum union of this magnitude, auction of this magnitude, has the potential to help bridge the digital divide. I strongly believe in accountability and transparency, to the public.

I am concerned that proposals regarding the C-band auction would allow for a privately run sale. Spectrum auction authority is a responsibility delegated to the FCC under section 309 of the Communications Act. And any deviation from the current law would invite litigation and could limit transparency to the public.

There is no doubt this auction is complicated. However, the FCC should lead the charge towards 5G innovation, rural broadband development, and ensuring users of the C-band are protected, not by private satellite companies.

Mr. Lieberman, my district is one of the most rural and underserved in the country. In the FCC's 2019 broadband and deployment report, only 39 percent of rural Arizona has standard internet access. Most of that's in my district. One of the C-band proposals submitted to the FCC—could you comment on how these plans offer an accountability and promote the public interest? And you had mentioned earlier that it is only three pages long.

You know, I get—I have to answer questions sometimes with more than that on a minor issue. So I can't imagine how this is representative of what good government should be doing.

Mr. LIEBERMAN. Well, first, let me say that I appreciate your comments about rural America and the lack of broadband connectivity and the problem that it is causing for it and as well Congressman Johnson. I mean, my members live and work in these areas. They are providing service there. They are taking their limited money and plowing it right back in there to provide service to these customers as best they can, and there are challenges to doing so.

And that is why, when we looked at this proposal for clearing spectrum, we said, "Is there a way that we can clear as much spectrum as possible and as well provide fiber to the—do fiber deployments to the areas where these cable operators would need to have an alternative source for the C-band?"

And that is where we came up with the 5G Plus Plan. It would—because you don't have—people have to understand, 5G isn't just the spectrum. You need the fiber backhaul to go with it, and that is the real deficiency when it comes to the CBA plan. It is just the spectrum. Rural America will be still left behind the times having this capacity, having this spectrum without having the fiber backhaul, and our plan would provide that.

Mr. O'HALLERAN. Well, actually, it will increase the gap.

Mr. LIEBERMAN. Oh, absolutely.

Mr. O'HALLERAN. Tremendously, I think.

Mr. LIEBERMAN. I mean, I will just say it. This CBA plan is going to result in a major loss of investment from rural areas to urban

areas, from small businesses to large businesses, and from U.S. taxpayers to—

Mr. O'HALLERAN. I need to move on to my next question.

Mr. LIEBERMAN. Yep.

Mr. O'HALLERAN. Ms. Collier, in your testimony, you highlight the potential 5G technology that could be realized with more mid-band spectrum made available to the industry, while also highlighting the FCC's recent track record. How would a privately run sale be inclusive of small carriers, seeking to bid for licensees to serve rural communities?

Ms. COLLIER. This is a huge concern about the CBA plan, is that it is not transparent. We don't know who is going to be providing the bids into their sealed-bid auction. We don't know if small carriers are going to be able to compete for this spectrum.

Mr. O'HALLERAN. My time is running short. You have said enough. Mr. Chairman, I would like to enter into the record a letter to the FCC signed by eight members of this committee, dated October 28th, 2019.

Mr. DOYLE. Without objection, so ordered.

[The information appears at the conclusion of the hearing.]

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Mr. Long for 5 minutes.

Mr. LONG. Thank you, Mr. Chairman, and I think that everyone realizes the goal here today of the hearing is to get 5G done and get it done right, and get it done as soon as possible.

That is kind of—you know, I was a professional auctioneer for over 30 years before I came to Congress, and auctioneers are used to doing things fast. And, you know, I think to cut to the chase, that is kind of, you know, we all should acknowledge that that is what we are here for today.

And, Mr. Campbell, what could the impact be to the American economy and the American taxpayers the longer it takes for wireless carriers to acquire spectrum and use it to deploy 5G?

Mr. CAMPBELL. Well, it is, you know, it is hard to quantify in actual numbers, but it is enormously significant that we are talking about a generational shift here in mobile technology, from 4G to 5G, that is incredibly important to the competitiveness of all of our economy, because everyone's going to be using this.

And we shouldn't just think about it as, you know, consumers watching videos on their phones, which of course they will do, but it is also going to affect the efficiency of manufacturing, of mining, and energy industries, of agriculture, all across the whole economy here.

And so if we are slow to get this, it is going to impact our GDP growth over time, and that hits the Treasury in actually a much more significant way over time than one single auction.

Mr. LONG. There are 435 Congressmen, when we have a full complement of Congressmen, so let's say 435. And with the opioid crisis, 435 of the Congressmen will swear to you that their congressional district has the worst opioid problem in the country.

And I think that about 95 percent of those folks would swear to you that their rural areas suffer the most from not having 5G. And I am glad that you brought up agriculture, because that is something that people don't realize how much the farmers depend on

good access, and 5G would, you know, greatly augment that situation.

Not to mention the kids in rural communities being able to do their homework and being able to not have to drive out to McDonald's or Starbucks or wherever, 20, 30, 40 miles away just to be able to do their homework like kids that live in the urban areas.

Mr. Campbell, staying with you here. The United States is in, as we have heard several times today, a global race to 5G with other industrialized nations, China among them, of course. And we all want to make sure we put our country in the best possible position to win this race. Are there other countries already utilizing the 3 gigahertz band?

Mr. CAMPBELL. Yes. In Europe, China, other parts of Asia, all in this band, which is a reason why we need to act expeditiously here.

Mr. LONG. So there are several currently?

Mr. CAMPBELL. Yes.

Mr. LONG. OK. And with that, Mr. Chairman, I yield back.

Mr. DOYLE. The gentleman yields back. The Chair now recognizes Mr. Welch for 5 minutes.

Mr. WELCH. Thank you very much, Mr. Chairman, and I thank you and my colleague Ms. Matsui and my Republican colleagues who are sponsoring your legislation.

Mr. Frownfelter, I want to talk to a little bit. Faster is better than slower, right? That is what—

Mr. FROWNFEILER. Yes.

Mr. WELCH. OK. So I am going to go back to you, Mr. Campbell. You were just talking about faster versus slower, I mean, there is no reason, if there is agreement and consensus, that we can't have a public auction faster rather than slower, right? Mr. Campbell?

Mr. CAMPBELL. Oh, yes, in theory.

Mr. WELCH. Well—

Mr. CAMPBELL. But as of today, you know, we are talking about a public auction in 2022, and, you know, look, I am not here to say that the CBA proposal is the best plan or anything like that.

Mr. WELCH. No, I want to—

Mr. CAMPBELL [continuing]. Considered when they said that think that in 2020.

Mr. WELCH. Let me go back. All right. Cisco is, you know, a fantastic company, and you are going to be a big part of this, obviously, and you have been indicating faster is better than slower. I think we all agree with that. But having the money from a public asset go to private gain, do you have any argument that that makes any sense?

Mr. CAMPBELL. Well, look, we think that obviously there needs to be significant money that goes to the Treasury from any transition like this.

Mr. WELCH. Yes, but we have got to—let's get real here. All right? When "significant" is undefined, what do you think the outcome's going to be? That is a serious question. So this is not la-la land here.

Mr. CAMPBELL. The FCC, if they go down this path, is going to have to make those determinations, and we think that they can and will—

Mr. WELCH. Well, the CBA proposal is vague, right? They do the selling, and they get the money, and then they decide how much they want to give to rural America through the Treasury.

Am I wrong on that, Mr. Chairman?

Mr. CAMPBELL. As I said, look, we are not defending specifically that plan, but we think that we should consider all the options, including those that would provide fast——

Mr. WELCH. All right. Here is what would be terrific. It would be for you to give concrete recommendations how we could proceed faster rather than slower. Because I think all of us here would want to do that.

What we want, like Mr. Gianforte, in his State, incredibly rural, that is the truth here. And as the chairman said in the beginning, we have got some money that may finally allow us to get rural America out. And by the way, I just ask a question for anybody.

At a lot of these private auctions, the companies bid and they have some minimal obligation through the FCC to start spreading it out to all the customers in the bidding area. But it is a big area, so they essentially slice off the rural areas and they make their big money in the urban areas. We are getting hammered constantly.

So what is the position people have about having these auctions be smaller so that the companies that bid on them actually are going to implement the build-out in those rural areas?

Mr. Lieberman?

Mr. LIEBERMAN. Well, there is no plan right now for how that auction is going to occur. The CBA has put together something that has been widely panned, and there has been nothing further in the record to describe how its public auction would occur, and it would likely result in some of—the concerns that you are raising are real risks without knowing what it would be.

Mr. WELCH. Well, you know, I think we should start as a committee with Ms. Collier, who says, “Why waste this money that belongs to the public?” I mean, thank you for your work in saying the obvious.

And second, we have got a consensus here. We want to build out in rural America. That affects us, red State, blue State, red district, blue district.

And three, we have got to have this on the level and learn from experience, where the winner of the auction is actually going to serve all of the people in the auction area that the bidder won.

Does anyone disagree with that?

Sir?

Mr. BERENBROICK. Yes, I think that is exactly right. I think one issue, you know, especially with mid-band spectrum, the propagation of that spectrum is going to be such that smaller license sizes are actually optimal, which would actually go toward solving the problem you are alluding to. Licensees could acquire licenses and then serve almost all of their license area, rather than, you know, having a very large license area, in which they only serve population centers.

Mr. WELCH. Well, I want to thank all of the witnesses.

Mr. Chairman, our colleagues, we have an opportunity finally to do something good for all of our communities, because they all need it. And they will figure out how best to use it.

So anything, Mr. Campbell, you can suggest to help us move along with the FCC and get it done sooner rather than later, I think every one of us wants that, but I think we also want the public to get the benefit, and we want rural areas to get the service.

I yield back.

Mr. DOYLE. The gentleman yields back. The Chair recognizes Mr. Flores for 5 minutes.

Mr. FLORES. So thank you, Chairman. I want to thank the FCC and Chairman Pai for their work and the administration to close the digital divide to cut bureaucratic redtape and to continue bringing more spectrum to the market.

It is my hope that, as the Commission moves forward with plans to repurpose the C-band, that they will do so in a way that represents taxpayer interest, that they ensure adequate levels of oversight and transparency in the auction process, that they protect incumbent broadcaster programming customers, and that they secure sufficient commitments to the U.S. Treasury.

And now for my questions. This follows up on a line of questioning from Chairman Doyle with respect to satellite companies suing the FCC. I would like to ask each of you witnesses if they or their stakeholders would likely pursue litigation if the FCC undertook an approach arbitrary to the position,

Starting with Mr. Lieberman, would your organization pursue litigation if the FCC went opposite of your position?

Mr. LIEBERMAN. We are going to see what the FCC does, and we will decide on what the best approach is.

Mr. FLORES. OK. Mr. Campbell?

Mr. CAMPBELL. No.

Mr. FLORES. OK. Mr. Frownfelter?

Mr. FROWNFEILER. We would look to see what the FCC would come up with and then make a determination.

Mr. FLORES. OK. And I guess for the sake of fairness, I need to ask Ms. Collier. I am assuming you would, but—

Ms. COLLIER. No. No, we don't typically engage in litigation.

Mr. FLORES. OK. Mr. Berenbroick?

Mr. BERENBROICK. I think we would look at whatever the FCC comes up with to determine whether the Commission operated appropriately within its legal authority and then make a decision.

Mr. FLORES. OK. But so there could be a possibility for your organization. OK.

Mr. Frownfelter, having spent a considerable amount of time in the satellite industry, I am sure that you are well versed in logistical operational challenges that follow potential repurposing of spectrum. As you know, Congress had to step in to correct a few logistical issues during the TV broadcast incentive auction repack. One of those changes involved a provision that I had authored as part of RAY BAUM'S Act, to ensure that stations received compensation for the cost of the repack.

Since we are shifting into a different technological space, what sort of logistical or operational challenges might arise from satellite operators' perspective when moving to a different frequency?

Mr. FROWNFEILER. Sir, are you asking if you moved out of C-band into a different frequency?

Mr. FLORES. Correct, yes.

Mr. FROWNFELTER. I think that it would be a very long process. We had talked about changes would have to be made at all of the Earth station operators with teleports and rural facilities and so forth. So you would be looking at changing out all of the antennas and potentially a significant amount of the equipment, depending on what frequency band you were shifting to.

Today we do provide KU band services over the United States as well, and there is available spectrum there where some of the services could be transitioned over a significant amount of time. They could be transitioned to those frequencies.

But in terms of providing services that are consistent with what is provided today in C-band, I don't believe there would be enough spectrum in KU band to fulfill all of that and the existing services. You would have to look at a new band that is currently not utilized by commercial satellite operators in the United States in order to meet all of the demand.

Mr. FLORES. OK. And what steps would satellite operators need to take in order to mitigate interference for your customers?

Mr. FROWNFELTER. Interference from other satellite operators? I am sorry, can you clarify the question, sir.

Mr. FLORES. Well, if the C-band is repurposed to other uses, what sort of logistical challenges would your—what would your—what would satellite operators need to do in order to mitigate interference for your customers?

Mr. FROWNFELTER. I see. So, from our perspective, you would be looking at, you know, expansion of additional satellites, billions of dollars of investment in order to transition those services over from C to KU band. And you would also be looking at, you know, significant amounts of investment throughout all of these terrestrial facilities.

Mr. FLORES. OK. Ms. Collier, I appreciate the great work that your organization does. You have done a great analysis of this particular issue. Have you all stepped back from the forest to look at if there was any sort of a hybrid public approach—you know, a hybrid between a public auction and a privately facilitated transaction? Is there anything that we need to be doing in terms of thinking out of the box like that?

Ms. COLLIER. We haven't really looked at a hybrid approach, per se. One thing that we do need, that Congress and the FCC needs to be coherent on, is that there are currently incumbent users, both are stations and satellites, that are not all part of the CBA Alliance that need to be ensured that their interests are protected even through the transition.

So there is going to be costs associated with the transition, and there needs to be a way for them to pay for those transition costs.

Mr. FLORES. OK. All right. I have another question—

Mr. DOYLE. The gentleman's time is expired.

Mr. FLORES [continuing]. For the record. Thank you.

Mr. DOYLE. I thank the gentleman. You want to enter something into the record?

Mr. FLORES. I have a question for the record, but I will do that later.

Mr. DOYLE. OK. I thank the gentleman. The CShair recognizes Mr. Veasey for 5 minutes.

Mr. VEASEY. Mr. Chairman, thank you very much. I wanted to specifically ask about the auction format, and maybe, you know, Mr. Berenbroick or Mr. Lieberman or Ms. Collier could answer the questions that I have for me.

I wanted to sort of talk about the framework of putting together an objective private auction, because I know that there has been a lot of discussion about that, whether we should have one that is public or private. And is it possible to put together something that is fair and transparent as far as a private auction is concerned when there are already alliances that have sort of been formed with the foreign investors, with the foreign satellite operators, with some of the players that are involved in this?

Because I think that the most important thing is, we want to make sure that we are yielding everything that we can from the taxpayers' standpoint. You want it to be able to be deployed as quickly as possible. And just wanted to just maybe sort of get one of your opinions on that.

Ms. COLLIER. First off, this is a public resource. It is a public asset. Even FCC Chairman Ajit Pai said a couple weeks ago, this is a public asset. You cannot have a secondary private entity taking on the role of the FCC in selling a private asset—or a public asset. It is just not something that I believe can legally be done.

You know, section 309(j) is very clear on this. It is the FCC's responsibility and the FCC's role to conduct auction of a public asset, namely spectrum.

Mr. VEASEY. The C-Band Alliance is saying that they could deploy this technology as quickly as, I want to say, maybe 18 months, if they were to be able to go through the framework of a private auction. And what sort of time frame are we talking about, if it were to be a public auction?

Ms. COLLIER. You know, I am not even sure that they can deploy that in 18 months, because if it is a private auction that is finally determined by the FCC, we have heard from the other witnesses here today that there are going to be some legal ramifications to that and delays caused by court cases.

So, you know, I don't see a private auction taking any less time than a publicly held, transparent, Federal Communications Commission-held auction.

Mr. VEASEY. Mr. Berenbroick?

Mr. BERENBROICK. Thank you. You know, the C-Band Alliance's proposal, you know, and I think the claim that they can, you know, make some of the spectrum available within 18 months, that is sheer conjecture. You know, those are claims based on an unprecedented auction proposal, an untested model, an entity that has never run a spectrum auction before. So I think we take those claims with a grain of salt.

Additionally, you know, there are significant public-interest oversight responsibilities the FCC has when it runs an auction—transparency, accountability, promoting competition, ensuring that small businesses and diverse bidders are able to participate. Those benefits are all compromised by taking the FCC out of the process.

This is an entirely unprecedented proposal, and there is no track record for this working. There is no track record for this serving the public interest.

Mr. VEASEY. Yes. So in your opinion, there is really no possible path to put together the framework possible to make it transparent and fair for the public the way that you are talking about if it were done under the structure of a private auction?

Mr. BERENBROICK. Yes. I think in order—the benefits of speed that CBA has claimed, the best way to get those benefits with the public-interest benefits we usually see from a public auction is for this committee and for the Congress to weigh in and push the FCC to move quickly in a public auction.

Mr. VEASEY. OK. Mr. Campbell, I know that you have been sort of objective and haven't had a lot on this. I was just curious, do you have any opinions on it whatsoever, as far as my question is concerned, about just a private auction being able to have the substance of having something fair and transparent?

Mr. CAMPBELL. Well, I think that, you know, any private auction that would occur would be under the auspices of FCC rules and controls, because you are going to have to change the licenses and issue licenses. So it is not like it is going off, you know, on the side.

It is going to be more akin to transferring existing licenses and, you know, if you are a radio station or something. You know, people have private transactions. They must be approved by the regulator to transfer the license, and there are things that are overseen in that. And I think we could see the same thing in this situation if there were a private auction.

I am not sure that one or the other is the perfect way to do this. I just think that we need to focus on which is going to provide the spectrum and make it available for use the fastest.

Mr. VEASEY. All right.

Mr. DOYLE. The gentleman's time is expired. The Chair recognizes the gentleman from Florida, Mr. Bilirakis, for 5 minutes.

Mr. BILIRAKIS. Thank you, Mr. Chairman. I appreciate it.

And I will follow up on Mr. Kinzinger's questions with regard to South Korea and China. The last time we had a hearing involving mid-band spectrum, I brought up an issue recently published—an article published about South Korea making moves to serve 90 percent of its population with 5G by the end of the year.

Now another recent article shows the progress our competitors are making. The Korea Herald published an article last week entitled "South Korean mobile carriers attack global market with 5G tech," unquote.

This article references the international partnerships South Korea is making in 5G. And last Friday, a Bloomberg article reveals that China is going to begin offering 5G services in Beijing starting November 1st, with a goal of reaching 340 cities by 2020. We are on the path where Asia will set the global standards on 5G networks.

Mr. Lieberman and Mr. Frownfelter, if the plan you endorse was approved by the FCC, how would that get us back on a path to beating our international competition?

You can start first.

Mr. LIEBERMAN. The 5G Plus Plan that we have proposed calls for a market-by-market clearing of 370 megahertz, far more than the CBA plan, and does it on a market-by-market basis. So in urban areas, we can clear—where fiber is already available, we can

do it in 18 months. For the rest of the country, where only a modest amount of fiber would be needed, would be done in 3 years. And in the rural areas that are harder to reach, where 5G is going to take longer to get to anyway, it would be 5 years. We think it is very much consistent with the rollout that is going to happen with 5G, and you get the added benefits of 370 megahertz.

Mr. BILIRAKIS. All right.

Sir, would you like to respond to—yes, just give me your position on this. Where do you—

Mr. FROWNFEILER. Yes, so our position is that we need to incentivize your station operators to integrate the latest compression technology in order to maximize the amount of spectrum that can be repurposed in the fastest amount of time.

And by putting together a framework for a plan that equally compensates, or appropriately compensates on an equitable and fair basis, all of the constituents, we believe that we can roll out the plan in 18 to 36 months and to do so in a way that minimizes litigation and gets us to 5G rollout as quickly as possible and reestablishes the United States as the leader in wireless technology in the world.

Mr. BILIRAKIS. All right. Very good.

Mr. Lieberman, whatever proposal the FCC releases this year—public, private, or a hybrid of the two—what is the best way to ensure that small, rural, and regional providers can complementary—oh, actually, competitively bid on spectrum?

Mr. LIEBERMAN. Well, the rules have to be fair. It has to be smaller blocks that can be bid upon so that smaller entities can have a chance at bidding on licenses in their areas. If it is just three blocks of a hundred nationwide, it is just going to go to the largest wireless providers.

Mr. BILIRAKIS. OK. Mr. Frownfelter, do you have anything else to add with regard to that?

Mr. FROWNFEILER. No, sir, I don't.

Mr. BILIRAKIS. OK. Thank you very much.

I yield back, Mr. Chair.

Mr. DOYLE. The gentleman yields back.

The Chair now recognizes Ms. Eshoo for 5 minutes.

Ms. ESHOO. Thank you, Mr. Chairman.

And thank you to the witnesses. I apologize for not being here for a good part of the hearing. There is another one taking place downstairs.

But this is a big issue. I was here to hear the chairman make his opening statement about what this spectrum represents, that the airwaves are an asset that are owned by the American people. Maybe we should say that 10 times, you know, louder and louder each time to make the point. And that it is really through us representing the people that we provide various entities, you know, the right to use these airwaves.

I think that—and I don't know if this has already been covered, but maybe Mr. Berenbroick, can you give us just a little bit of history about how the current users of the C-band got the rights to use the C-band? Did they pay for the rights to use the C-band, you know, through an auction? Did they buy these rights from others?

I think that we need to get to the heart of how—I don't really find it defensible that these belong to the American people and that we are having a debate about whether we just hand it over to someone or that we have a public process, because we represent the people of our country. I mean, it is really kind of a 101 in democracy.

But can you give us just a little history on it?

Mr. BERENBROICK. Sure, Congresswoman. Thank you.

Ms. ESHOO. Excuse me. I understand once someone uses something, has something, and they are in that lane, they are going to fight like hell to keep it. But I think that we need to get back to the basics, what is fundamental here.

So go ahead.

Mr. BERENBROICK. Sure. So, in previous generations, the FCC often allocated spectrum for broad use for a specific purpose. So think of, for instance, fixed satellite service in the C-band or DSRC in the 5.9 gigahertz band.

You know, here, the existing operators don't have individual licenses. They have access to the entire 500 megahertz of the C-band. And I think, you know, if you project forward and you think about spectrum policy going forward in the future, you know, whether it is using spectrum more efficiently for sharing, for unlicensed use, or for clearing and auctioning, the precedent set here by allowing users that were essentially given, you know, spectrum for free, to demand windfall payments to give up some of the rights in the spectrum, when they admittedly could be using it more efficiently, is going to make it difficult for the FCC—

Ms. ESHOO. Did they pay for the rights to use the C-band?

Mr. BERENBROICK. No, they did not.

Ms. ESHOO. OK. We could have just—just said yes or no.

To Ms. Collier, who is going to put our—has already prepared the chairman's first brochure for his reelection on this, some comment that the FCC—I mean, some people say that the FCC auctions are going to take—they take an average of 13 years. And your written testimony cites more recent examples.

What do you think is the fair number in this?

Ms. COLLIER. You know—

Ms. ESHOO. There is always such exaggeration at both ends, right?

Ms. COLLIER. Right.

Ms. ESHOO. What is it, do you think?

Ms. COLLIER. It varies by auction, the type of auction, the complexity of the auction. And I think that gets forgotten in the whole dialogue.

Ms. ESHOO. So would this be complex?

Ms. COLLIER. This is going to be a little bit more complex.

Ms. ESHOO. Uh-huh. So what does that mean in terms of time?

Ms. COLLIER. In terms of time—

Ms. ESHOO. A little bit more time?

Ms. COLLIER. A little bit more time.

Ms. ESHOO. A little bit more time for a little bit more complex, yes.

Ms. COLLIER. Well, you know, I mean—

Ms. ESHOO. I mean, like how—

Ms. COLLIER. It was interesting listening to the hearing a couple of weeks ago at the Senate, where this same dialogue happened with Senator Kennedy and Chairman Pai. And it came down to a period of 3 years that could conceivably be a doable auction for the C-band.

Ms. ESHOO. Well, I think, given that answer, Mr. Chairman, 3 years with a potential of 60 billion bucks, we are talking real money here, even though we are Federal representatives, really this is—this is a lot of money.

And I don't think anyone should forget that, as we have talked and wrung our hands over for years and years about rural broadband, e9-1-1, all of the PSAPs—what the price tags are for those, with less than that full amount that is projected—we could pay for all of that and have money left over. So I hope with it we are going to be really very smart here and do the right thing.

Thank you all for your testimony, what you do. I didn't get to all of you, to argue with some, congratulate others. You are wonderful to come and be instructive to us.

Mr. DOYLE. The gentlelady's time has expired.

Ms. ESHOO. Thank you, Mr. Chair.

Mr. DOYLE. The Chair recognizes Mrs. Brooks for 5 minutes.

Mrs. BROOKS. Thank you, Mr. Chairman, and thank you very much for holding this very important hearing.

I am one of the cofounders of the 5G Caucus, along with Representative Debbie Dingell from Michigan. But I also represent Indianapolis, and it is the home of actually Indiana 5G Zone, which is a hub—it is led by Purdue University, and it is focused on testing and developing 5G-enabled technologies. It is an R&D center.

But as I have talked to them about what they need, they have stressed with me the importance of the C-band. And so this argument—the hearing today is critically important, and the speed in which we move, I think everyone agrees, is critically important.

I am curious, Mr. Campbell, how does the U.S. compare with particularly the European countries in how they made mid-band spectrum available? I don't think comparing with China is necessarily very fair in how they make mid-band, but how about, you know, countries—democracies? How have they made mid-band available for 5G? Because, as we have heard, they are ahead of us right now, I believe.

Mr. CAMPBELL. Right, right. I think, you know, we do have to recognize that we have in the U.S. a more intensive set of licenses and uses, including government uses, of spectrum than probably any other country on Earth. So we are going to run into these challenges more and more as we look into new bands to do things, including this band, where we have incumbent users that have to be—whose problems must be addressed before we can repurpose the spectrum.

But Europe has definitely focused on this band, and they are moving forward, and they are going to have it available. And I think, you know, rather than wringing our hands on the fact that we have a challenge in making ours available, we just need to focus on how we are going to get there as quickly as we can. Because it is a competitive issue in terms of our ability to compete with—

Mrs. BROOKS. Absolutely agreed. How did they make it available?

Mr. CAMPBELL. They didn't have——

Mrs. BROOKS. How did the EU——

Mr. CAMPBELL. They didn't have the same incumbent users we have in the space.

Mrs. BROOKS. OK. So they just made it available?

Mr. CAMPBELL. I think they had some users they had to deal with. I am not fully knowledgeable on that topic, but they had an easier time in the transition on this.

And we are going to face this in other bands in the future, and we had better utilize as many tools as we can get in our toolbox to repurpose spectrum when we can.

Mrs. BROOKS. So we have heard so much about rural issues, and actually a large part—and a huge part of Indiana is rural. But given the need to encourage rural broadband, are there some encouragements, Mr. Campbell, that the FCC could incorporate into its order to make a private sale—if the private sale is the option that moves forward—much more rural friendly?

Mr. CAMPBELL. Yes. The FCC could put the same obligations on the private sale that they could put on the public auction. So you could end up with the same result on that front, vis-a-vis build-out requirements and issues like that.

Mrs. BROOKS. Mr. Frownfelter, as far as making sure that the license sizes—we have heard about this—are the appropriate size, both the megahertz available and the geographic licensing areas, what incentives do satellite operators have in that private approach to ensure everyone has a fair chance, as well as what is the FCC's role in making sure it is carried out? I don't think anyone ever answered the enforcement question.

Mr. FROWNFEILER. I am not sure I am the right person to answer that question, but I think it——

Mrs. BROOKS. Why not?

Mr. FROWNFEILER. Because from—it is part of the auction process. And from the satellite operators' perspective, depending on what percentage of the proceeds they get, they are going to be looking to optimize those proceeds, as would any of the processes, you know, resulting from the auction.

So, as was mentioned earlier, I think in order to incentivize and make sure that we have appropriate spectrum available in our world communities, we need to make sure that we have small amounts of spectrum that are auctioned.

Mrs. BROOKS. Any further comment on that question from anyone else?

With that, I yield back.

Mr. DOYLE. Gentlewoman yields back.

The Chair recognizes Mr. Cárdenas for 5 minutes.

Mr. CÁRDENAS. Thank you very much, Chairman Doyle and Ranking Member Latta.

One of my colleagues just said about us making smart decisions here. I hope we are capable of that. And when I was just listening to my friend, Congresswoman Brooks, I was thinking, yep, she is one of the smart ones. I really enjoy working with you, and I am going to miss you as a colleague.

I think that everyone in this room today does want to see the U.S. succeed in its deployment of 5G technology, but as usual, everyone has their own priorities.

However, I think that overall I am glad to see that a lot of consensus is that the best way to make sure that that happens is with the transparent auction of this critical spectrum. Fair and open and transparent process is what everybody deserves.

In addition to that, I believe that the FCC-led process to reallocate mid-band spectrum would maximize the amount of mid-band spectrum that will ultimately be made available, all the while maximizing the amount of revenue generated to help fund key priorities, to make sure Americans get the connectivity they need and deserve.

Mr. Lieberman, in your written testimony you note how important it is that a public auction of the C-band protect and make whole the C-band-dependent users. I understand most of those users provide television programming, which I can tell you is important in my household and my district to my constituents. Can you elaborate on why keeping the C-band-dependent users whole is so important?

Mr. LIEBERMAN. Well, these are small businesses that have spent a lot of money on their businesses in order to provide a good service to their customers, particularly in smaller markets in rural areas, and it seems to me like, if the resource that they were relying on is going to be made less reliable, less capable, and less affordable, then they should be made whole.

And so, as part of reimbursements, instead of forcing them onto this lesser C-band, what our proposal is, is that they get fiber so they can transport it that way. And that would actually provide a benefit for rural America in terms of not only for just getting video deployment, but it would also be available for 5G, it would be available for schools, hospitals, libraries, businesses. I mean, it is—really creates the win-win that I think Congress and the FCC should want.

Mr. CÁRDENAS. You just mentioned schools, libraries, hospitals, businesses.

Mr. LIEBERMAN. Yep.

Mr. CÁRDENAS. So suffice it to say that this is a very important matter to the future activity, knowledge, healthcare of all of America.

Mr. LIEBERMAN. I mean, there are a lot of places in America that don't have fiber connectivity of the size and capacity that can support institutions. And so, by providing a reimbursement for like 10-gigabyte pipes to these cable operators so they can transport video over it, that could also be used to provide additional services in those communities.

Mr. CÁRDENAS. Although this may seem like gobbledygook to most Americans, talking about fiber and C-band and spectrum and things of that nature, but at the end of the day, is this something that Americans have already become accustomed to when it comes to these kinds of technologies in their day-to-day life?

Mr. LIEBERMAN. Which technologies are we talking about?

Mr. CÁRDENAS. Just in general. Do people use phones in their day-to-day life? Small businesses, do they depend on the internet for their success, et cetera?

Mr. LIEBERMAN. Yes, most definitely.

Mr. CÁRDENAS. And all that we are talking about today does, in fact, effect the future of all of that kind of activity?

Mr. LIEBERMAN. Oh, absolutely, absolutely. I mean, we have to find a way to provide all areas of the country with the same kind of connectivity, and that is where we think the CBA proposal is short in that regard.

Mr. CÁRDENAS. So, at the end of the day, the issue that we are talking about today, is it important that we do it well versus just maybe—I feel it in a way where let's just see what happens.

Mr. LIEBERMAN. Well, look, speed is very important. I can understand that. I am sympathetic. But there are other factors that need to be considered in terms of that, is how much money is going to be raised from it, what other purposes could that money be used for, and what is the difference in time between public and private versus the amount of money that would be raised? We think that a public is in the best interest of the American public.

Mr. CÁRDENAS. So somebody mentioned a few minutes ago that public and private use and purposes in America is a bit dynamic. But that dynamic environment, it is kind of good, right, that we do have that dynamic, give and take between public and private use of these kinds of resources?

Mr. LIEBERMAN. Yes, certainly, absolutely.

Mr. CÁRDENAS. Thank you, Mr. Chair. My time has expired. I yield back.

Mr. DOYLE. The gentleman's time has expired.

The Chair recognizes Mr. Walberg for 5 minutes.

Mr. WALBERG. Thanks, Mr. Chairman.

And thanks to the panel for being here today.

It is important that a public or private auction be designed and run openly and fairly, one that maximizes the involvement of entities in 5G deployment utilizing spectrum and benefiting more consumers.

I am particularly focused on would-be bidders and purchasers and their confidence that auction design, bidding rules, and license sizes have not been set to favor any one entity. Safeguarding competition and transparency is essential to ensuring a competitive process and fully optimizing our spectrum resources.

Mr. Frownfelter and Mr. Lieberman, if Congress isn't satisfied with any authority to modify or transfer licenses, couldn't Congress authorize a version of the private sale and impose whatever conditions it would like on the process regarding transparency, donations to the Treasury, or any other condition?

Mr. FROWNFEILER. Yes, sir, that is my understanding, that Congress has the ability to make sure that the FCC process, if it moves forward in private sale, is transparent and meets the guidelines and expectations of this subcommittee and the Congress in general.

Mr. WALBERG. So it has that power and ability.

Mr. Lieberman, would you agree?

Mr. LIEBERMAN. Congress has that authority. I would say, though, that one of the benefits of Congress actually authorizing a

private auction would be that they can then use that money that would be raised to meet their objectives that Congress seeks.

Mr. WALBERG. OK. Mr. Frownfelter, speed to market is essential in discussing repurposing C-band. In a private auction, how do you foresee the FCC's role, and do you believe it is important that they are involved throughout the process of transitioning C-band?

Mr. FROWNFEILER. Yes, sir, absolutely. I think it is absolutely critical that the FCC establishes the appropriate guidelines and supervision over the entire auction process, even in a private sale. And it is important that that process is done in a transparent way so that we mitigate any potential litigation and it is conducted in a fair manner.

Mr. WALBERG. Mr. Lieberman, your plan calls for no overbuilding in the construction of the 120,000 miles of new fiber. Hopefully some of that will come to my house.

Can you talk about exactly how it will prevent overbuilding in relation to the Federal programs?

Mr. LIEBERMAN. Sure. The criteria on receiving the funds would be that, if you have fiber available to you of sufficient capacity, that you wouldn't be eligible for support. You would still get money, because you would still need to lease what's available, but this isn't about overbuilding.

My members have the same—I have members without fiber connectivity, I have members with fiber connectivity, which is their own—they don't want overbuilding any more than anybody else. This is not to waste money. This is to actually provide an alternative to using the C-band, which is to deliver the programming over fiber.

Mr. WALBERG. OK. To follow that up, how do you foresee our efforts to improve our Nation's mapping capabilities, working alongside with this new fiber build-out?

Mr. LIEBERMAN. Well, the fiber that we are talking about is not fiber to the home.

Mr. WALBERG. Right.

Mr. LIEBERMAN. This is going to be the backbone fiber that goes from major data centers to cable operator headends. So there is not really any program today that it is providing that level of connect—that is funding that. There have been in the past, as part of the BTOP program under the ARRA, but not today. It would actually work well with the USF programs and the RUS programs, because it would go to funding of connectivity that no funding is going to.

Mr. WALBERG. OK. Thank you.

I yield back.

Mr. DOYLE. The gentleman yields back.

And last, but certainly not least, one of the original cosponsors the H.R. 4855, Mr. Gianforte, you are recognized for 5 minutes.

Mr. GIANFORTE. Thank you, Mr. Chairman. Thank you for holding this important hearing.

I represent Montana. Getting broadband into rural Montana is critically important for all of the reasons we have discussed here today.

5G will come to rural America when different bands of frequencies are put to good use. The C-band provides the right mix of capacity and coverage that will enable network operators to de-

ploy in rural America. Reallocating C-band is complex, as we talked about, because the spectrum has many current users and many others interested in acquiring it.

That is why I joined with Chairman Doyle, Representative Johnson, and Representative Matsui in introducing the C-band Act. Our bipartisan bill requires the FCC to hold a public auction promoting a transparent and open process while preventing a private spectrum sale that could benefit foreign entities.

The proceeds from the public auction can be used for critical priorities, including expanding reliable broadband coverage to close our digital divide.

For the past quarter-century, the FCC has successfully designed and run spectrum auctions that have brought more than \$122 billion in revenues for the American taxpayer.

I believe only a public auction designed and led by the FCC guarantees that the taxpayers will get the benefit of these sales. Only a public auction provides the guarantees of fairness and transparency that ensure bidder confidence in the auction procedures and outcomes. And only a public auction ensures that smaller carriers, including the rural entities in my district and new entrants, have a fair shot at bidding. Ensuring this public confidence is necessary to maximize participation in the auction and maximize taxpayer benefits.

As we have discussed today, we also have to make sure that the districts that are auctioned off are small enough to ensure buildout in these areas, a problem we face in our State, with population centers being covered and many farms and ranches not being covered, which prevents them from using newer agricultural technology.

Ms. Collier, given the track record of success and the obviously taxpayer benefits of an FCC-led auction—we have talked about this today—but just comment on why the FCC should be leading this process.

Ms. COLLIER. The FCC is the only entity with the legal authority to conduct a spectrum auction. If they wanted to abdicate that, they would have to ask Congress for permission to abdicate that authority for a private sale. So legally they are the only entity who can do this, and they have proven through the last—since 1994—that they have the ability and the teamwork to conduct these spectrum auctions. You know, they are well experienced at this.

Mr. GIANFORTE. OK. While I normally believe the private sector can do things more quickly and more efficiently than government, in this instance a private sale could end up delaying the rollout of this spectrum. Could you just comment on how that would occur and why?

Ms. COLLIER. Well, first off, there could be legal challenges to a private sale. It just is one of those things that is so unprecedented that so many interested parties that are currently incumbents in the spectrum may say, “Hey, wait a minute, we are getting shut out, we are being forced out without any recompense by these satellite operators.”

Mr. GIANFORTE. OK. And I would like—and the last question I have—I have just over a minute. I am particularly interested in rural buildout. As we craft this legislation, forget about public/private here for a second.

What provisions can we put in the legislation that would ensure that we get better buildout in rural America? And that is open to anybody on the panel.

Mr. LIEBERMAN. I will start with that.

I think you should—I think that those that are using the C-band that are going to be impacted by the clearing should have the option to get that—the same content via fiber. If we would do that, that would provide the fiber connectivity that Montana is lacking.

Mr. GIANFORTE. Good.

Yes?

Mr. BERENBROICK. Thank you, Congressman.

One of the barriers to deployment of 5G technologies in rural America is the lack of sufficient fixed network infrastructure. So what you could do—and this is similar to, I think, what Mr. Lieberman and the ACA are proposing—is that funds repurposed—or revenues from the C-band auction could then go towards deployment of fixed networks in areas that are unserved and underserved.

Mr. GIANFORTE. And I have seven seconds. Anybody have a quick comment?

Good.

Well, with that, I yield back, Mr. Chairman.

Mr. DOYLE. The gentleman yields back.

The Chair requests unanimous consent to enter the following into the record: A letter from the Aerospace Industries Association, a letter from Americans for Tax Reform, a letter from the C-Band Alliance, a report from Citizens Against Government Waste, a blog post by the American Action Forum on behalf of Mr. Latta, a statement from AT&T Public Policy on behalf of Mr. Latta, a press release from the C-band Alliance on behalf of Mr. Latta, an ex parte letter from the C-Band Alliance on behalf of Mr. Latta—got a lot here—a fact sheet from the C-Band Alliance on behalf of Mr. Latta, and a letter to Reps Walden and Latta from the American Consumer Institute, American Enterprise Institute, Competitive Enterprise Institute Heritage Action for America, Lincoln Network and R Street Institute on behalf of Mr. Latta.

Without objection, so ordered.

I want to thank all of the witnesses for their participation in today's hearing.

I remind Members that, pursuant to committee rules, they have 10 business days to submit additional questions for the record to be answered by the witnesses who have appeared. I would ask each witness to respond promptly to any such questions that you may receive.

At this time, the subcommittee is adjourned.

[Whereupon, at 12:30 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

PREPARED STATEMENT OF HON. ANNA G. ESHOO

The allocation of access to finite airwaves is a core duty of the Federal Communications Commission (FCC) and always has been. In fact, the history of this duty traces back to the Radio Act of 1912. We should cherish this history. Since the FCC started allocating spectrum through auctions in the 1990s, our spectrum auctions have become the envy of the world. This history and our present reality are based on the idea that the airwaves belong to the American people. The owners of this

spectrum, the American people, decided through their Representatives to allow for auctions that benefit the public interest.

Like many public policy questions, one important lens through which we should view the questions in front of us today is that of economics. There are tens of billions of dollars at stake here—up to \$60 billion, according to current estimates. This is a lot of money. It's enough to pay for nearly every American to have access to broadband and Next Generation 9–1–1. The FCC estimates that \$40 billion in broadband infrastructure investment would lead to 98 percent of Americans having access to broadband speeds. The National Highway Traffic Safety Administration and the National Telecommunications and Information Administration estimate that deploying Next Generation 9–1–1 countrywide costs between \$9.5 and \$12.7 billion.

I appreciate the novel ideas proposed for clearing the C-band, and I commend the FCC for taking actions to expediently make spectrum available for 5G. While the auction process can always be improved, I'm convinced that the public interest is best served by holding a public auction of C-band spectrum. I look forward to a productive hearing.

Congress of the United States
Washington, DC 20515

October 28, 2019

The Honorable Ajit V. Pai, Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Chairman Pai:

As the Federal Communications Commission (Commission or FCC) considers its options for the disposition of C-Band spectrum,¹ we write to express our strong preference for a public auction of C-band spectrum rather than a private sale, as some stakeholders have proposed. Given the importance of this spectrum band to 5G and bridging the digital divide, the Commission must fulfill its mandate to ensure that all aspects of the reallocation and transfer of spectrum are done in the public interest. Moreover, a private sale will transfer revenue out of the hands of the American taxpayer, and into the pockets of foreign satellite companies.

As you know, C-Band spectrum has a robust capability to carry large amounts of wireless data relatively far distances, making it valuable spectrum. Pushing more spectrum into the marketplace, including mid-band spectrum such as C-Band, will stimulate the deployment of innovative technologies, including 5G. In addition, reallocating this spectrum for licensed wireless use could help close the digital divide – a priority shared by FCC Commissioners and Members of Congress alike – by making more wireless spectrum available to rural carriers and increasing rural broadband deployment in underserved and unserved communities and to ensure that those using C-Band service today have an alternative of equal or better quality.

Congress was unequivocal in the Communications Act that the Commission should manage commercial spectrum in a way that “includes safeguards to protect the public interest.”² Therefore, in keeping with the Commission’s work on previous spectrum auctions, the Commission should pursue an auction of C-Band that is transparent, that provides accountability, and which is led solely by the Commission. We believe the Commission is the foremost expert in conducting spectrum auctions, has an obligation to put consumers first, and therefore should not cede this authority to private parties. Americans who already lack access to broadband services cannot afford to be disadvantaged by a private spectrum sale that could make the digital divide worse.

¹ Federal Communications Commission, *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, FCC 18-91 (July 13, 2018), para. 10.

² 47 U.S.C. §309(j)(3)

Thank you for your time and attention to this urgent matter.

Most gratefully,



Tom O'Halleran
Member of Congress



Peter Welch
Member of Congress



Anna G. Eshoo
Member of Congress



David Loebsack
Member of Congress



Jerry McNerney
Member of Congress



G.K. Butterfield
Member of Congress



Yvette Clarke
Member of Congress



Tony Cardenas
Member of Congress

cc: The Honorable Michael O'Rielly, Commissioner
The Honorable Brendan Carr, Commissioner
The Honorable Jessica Rosenworcel, Commissioner
The Honorable Geoffrey Starks, Commissioner



October 29, 2019

Rep. Frank Pallone, Chair
House Committee on Energy & Commerce
2321 Rayburn House Office Building
Washington, D.C. 20515

Rep. Greg Walden, Ranking Member
House Committee on Energy & Commerce
H2-394 Ford House Office Building
Washington, DC 20515

Rep. Michael Doyle, Chair
Subcommittee Communication & Technology
House Committee on Energy & Commerce
2322 Rayburn House Office Building
Washington, D.C. 20515

Rep. Robert Latta, Ranking Member
Subcommittee on Communication & Technology
House Committee on Energy & Commerce
2322 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Pallone, Ranking Member Walden, Chairman Doyle and Ranking Member Latta:

The Aerospace Industries Association (AIA) is pleased to file this letter for the record in response to the House Committee on Energy and Commerce's Subcommittee on Communication & Technology (Committee) hearing entitled, "Repurposing the C-Band to Benefit All Americans." We thank the Committee for holding this important hearing and leadership on spectrum issues.

AIA is the voice of the American aerospace and defense industry, representing nearly 340 leading aerospace and defense manufacturers and suppliers that support over 2.5 million U.S. jobs and over \$151 billion in annual exports. As stated in our regulatory comments and ex-parte filings to the Federal Communications Commission (FCC), the aerospace and defense industry has a keen interest in today's hearing due to satellite interests and the potential interference issues with the adjacent 4.2-4.4 GHz spectrum band¹, which is globally allocated exclusively for aeronautical radionavigation.²

Radio altimeters and wireless avionics intra-communication (WAIC) systems, critical pieces of aviation safety equipment, operate exclusively in the 4.2-4.4 GHz spectrum band, directly adjacent to the C-Band under discussion today. As Congress and the FCC look into purposing the C-Band, it is critical to ensure that there is no interference that impacts the safe operations of commercial and military aircraft.

A preliminary report released on October 23, 2019 by the Aerospace Vehicle Systems Institute titled "Behavior of Radio Altimeters Subject to Out-Of-Band Interference" shows that interference issues begin affecting the 4.2-4.4 GHz band starting at 3.95 GHz for commercial aircraft and 3.75 GHz for helicopters, highlighting the extreme safety issues stemming from out of band emissions into the 4.2-4.4 GHz spectrum band.

¹ See, AIA and GAMA Comments to FCC:
<https://ecfsapi.fcc.gov/file/1029597421299/FINAL%20AIA%20GAMA%20Comments--GN%20Docket%20No%2018-122.pdf>

² See, <https://www.ntia.doc.gov/files/ntia/publications/2003-allochrt.pdf>

Radio altimeters support precision approach, landing, ground proximity, and collision avoidance systems. Every commercial aircraft and helicopter in use today, as well as a large percentage of general aviation aircraft, are equipped with radio altimeters that operate continually during flight, and larger aircraft utilize multiple radio altimeters³. The FAA requires that commercial aircraft are certified at Safety Criticality Rating of Level A which means that a radio altimeter failure "...could contribute to a catastrophic failure of the aircraft flight control systems."⁴

Though other pieces of navigational equipment, like the Global Positioning System (GPS), may be able to provide a certain level of assistance to a pilot in understanding the aircraft's altitude and surroundings, the radio altimeter is the only piece of equipment that can provide the necessary accuracy and reliability for altitude readings and terrain avoidance to the pilot for operations at low altitudes above terrain, including landings. In order to perform their critical safety function, radio altimeters require the entire 4.2-4.4 GHz band, as the accuracy of the resulting altitude data is directly linked to the total available bandwidth of the radio altimeter's signal.⁵

Furthermore, the 2015 World Radiocommunications Conference (WRC-15) allocated the 4.2-4.4 GHz band on a global co-primary basis to the aeronautical mobile (route) service exclusively for WAIC systems.⁶ WAIC equipment is being deployed on newer aircrafts to increase the safety and efficiency of their operations by replacing portions of aircraft wiring by using onboard short-range wireless systems.⁷ One notable advantage identified in support of allocating the 4.2-4.4 GHz band for WAIC systems was that this spectrum is already allocated for aeronautical safety services and the spectrum has no adjacency issues.⁸

AIA and our members recognize that there are many factors and actors involved in today's hearing. We thank the Committee for recognizing our concerns and highlighting the importance of the 3.7-4.2 GHz spectrum band. We look forward to continued discussions and hearings as you look to balance the finite nature of spectrum with the depth and breadth of federal and non-federal spectrum users.

Sincerely,



Tim McClees
Vice President, Legislative Affairs
Aerospace Industries Association

³ ibid

⁴ See <https://ecfsapi.fcc.gov/file/7021340930.pdf>

⁵ See Operational and technical characteristics and protection criteria of radio altimeters utilizing the band 4 200-4 400 MHz, Recommendation ITU-R M.2059-0, at 1, 3 & 5 (2014).

⁶ See ITU Radio Regulations No. 5.436 (indicating that use of the frequency band 4 200-4 400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards).

⁷ See, e.g., Presentation of the Aerospace Vehicle Systems Institute for Working Parties 5A, 5B, 5C, "Agenda Item 17 Wireless Avionics Intra-Communication" (May 23, 2012) (available at <https://www.itu.int/ITU-R/studygroups/docs/workshop-wp5abc-wrc15/WP5ABC-WRC15-P2-5.pdf>).

⁸ WAIC systems will not interfere with radio telemetry operations in the same spectrum because the significant attenuation of aircraft "skin" protects radio altimeters from the relatively low power WAIC transmissions inside the aircraft.



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AMERICANS for TAX REFORM

Grover G. Norquist
President

October 28, 2019

Communications & Technology Subcommittee
U.S. House Committee on Energy & Commerce
2322 Rayburn House Office Building
Washington, D.C. 20515

Dear Congressmen:

As the American economy demands more and faster connectivity, Americans for Tax Reform believes that the FCC should make getting spectrum into the hands of wireless carriers that will deploy 21st century networks a top priority. Though we initially opposed the plans set forward by the C-Band Alliance, we are encouraged by the changes they have made to their proposal, which is now more transparent, clears more spectrum, and acknowledges taxpayer interests.

We maintain that the best solution to spectrum scarcity is to make additional government spectrum available for commercial auction. But in working with what is currently attainable to close this gap, the Federal Communications Commission is rightly focused on the C-Band. Mid-band spectrum is a key element in bringing 5G to Americans. Currently, US Companies are operating at a deficit compared to other international competitors, especially China which is making 500 MHz of mid-band spectrum available to its carriers.

When it comes to spectrum, Americans for Tax Reform supports free markets without government set rates, and government should halt its involvement with an asset after it has been sold. To that end, two of best tools that the FCC has at its disposal are spectrum auctions and secondary market transactions. In many circumstances private spectrum sales can be appropriate, and government should make sales, trades, and swaps between willing buyers and sellers in the marketplace as frictionless as possible so that the spectrum can be put to its highest, best use.

The C-Band is not only the most readily available mid-band spectrum, it is also globally harmonized, a rare valuable benefit that would enable wireless carriers to keep costs lower through economies of scale. It is fortunate that the incumbent satellite companies have shown a willingness to work with the FCC to find a win-win solution to re-organizing the band. The revised proposal gets us closer to that goal.

Through the course of the FCC's C-Band proceeding, we have been pleased that the CBA has accepted feedback and revised its proposal. The CBA's modified proposal addresses many of our concerns.

First, CBA has indicated it intends to increase the amount of spectrum cleared and recognizes the FCC goal of clearing 300 MHz. By unleashing the secondary market forces that have served America so well over the last 30 years, the CBA proposal will get C-Band spectrum into the hands of wireless carriers far faster than any of the alternatives proposed to date. Under the revised CBA proposal, well over 200 MHz of the C-Band spectrum will be cleared and ready for 5G deployment within 36 months, with more than 60 megahertz cleared in 46 major markets within the



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first 18 months of an FCC order. We look forward to seeing a significant increase in the amount of spectrum cleared that meets the FCC's stated goal.

Second, the CBA has now repeatedly committed to make a significant contribution to the U.S. Treasury. We have found over time that each auction or sale of spectrum is unique and has its own considerations at play. For these particular licenses and for this particular transaction, we believe that taxpayers do have a seat at the table. That does not mean that every time there is a spectrum transaction the government must extract its pound of flesh. CBA's commitment to make a contribution to the U.S. Treasury addresses our concerns as taxpayer advocates in this particular transaction.

Finally, there will be reasonable FCC oversight of the transition of this spectrum to more flexible licensing and private market ownership that is open to all possible participants.

While we appreciate the CBA's support for basic measures ensuring an open, transparent, fair, and competitive process, we caution that the government should ensure that transactions between willing buyers and sellers in the marketplace are truly market-based so the spectrum can be put to its highest, best use—and as quickly as possible.

In light of the significant changes the CBA has made to its proposal, and the importance for the U.S. to lead on 5G, we hope the FCC will use its existing authority to quickly pursue this viable solution.

If you should have any questions or comments, please contact me, or Katie McAuliffe by phone, 202-785-0266, or email, kmcauliffe@atr.org.

Onward,

Grover Norquist



October 29, 2019

Hon. Michael F. Doyle
Chairman
Subcommittee on Communications &
Technology
U.S. House of Representatives
Washington, DC 20515

Hon. Robert E. Latta
Ranking Member
Subcommittee on Communications &
Technology
U.S. House of Representatives
Washington, DC 20515

Dear Chairman Doyle and Ranking Member Latta:

As the Executive Vice President, Advocacy & Government Relations of the C-Band Alliance (CBA), I write to give this Subcommittee an update on the extraordinary efforts the C-band satellite operators are taking to free up mid-band spectrum for 5G while meeting the government's twin goals of speed and security.

First, the CBA announced on October 28, 2019 in an updated proposal to the Federal Communications Commission (FCC) that it will commit to clear 300 megahertz of C-band spectrum, inclusive of a 20 megahertz guard band, to support 5G wireless deployment throughout the continental United States. The CBA will make 100 megahertz of spectrum available in 46 of the top 50 metropolitan areas within 18 months of an FCC Order and 280 MHz throughout the continental United States within 36 months from a CBA-led auction. Our letter to the FCC is attached.

Advanced compression technology, as well as other technologies, would be employed to increase the amount of spectrum to be cleared under the CBA transition plan. The CBA proposal commits to implement these technology upgrades at no cost to satellite customers employing these upgrades. The CBA remains committed to ensuring that existing customers continue to enjoy the quality of service they experience now, with no interference from 5G services deployed in the future. The CBA also remains committed to covering all other costs of the transition, including the required filtering of earth stations.

Second, the CBA, AT&T, Verizon, U.S. Cellular, Bluegrass Cellular, and Pine Belt Wireless have written an important letter identifying key principles that should govern any bidding of C-band spectrum in a CBA-led auction. This joint letter from industry stakeholders demonstrates broad support for an open private auction with procedural guardrails to ensure a fair and transparent outcome. The CBA endorses these key bidding principles, and stakeholder alignment paves the way for an expeditious sales process that is fair, transparent, well understood by potential buyers, and consistent with FCC process. By facilitating the expeditious clearing and assigning of C-band spectrum for the 5G services, the agreed-upon principles represent a huge win for all concerned—most importantly, for consumers, workers and businesses across the U.S. The joint letter is attached.

In short, it still remains the case that the CBA's proposal is the best plan to help bring the C-band most quickly to market and help win the global race to 5G while protecting the video and radio transmission services upon which nearly 120 million American household currently rely.



Thank you in advance for your consideration of our views. I ask that this letter be submitted into the record. Please contact me with any questions.

Respectfully submitted,

/s/ Peter Pitsch

Peter Pitsch
Executive Vice President, Advocacy & Government
Relations
C-Band Alliance

Enclosures



October 28, 2019

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte Submission*, GN Docket No. 18-122

Dear Ms. Dortch:

The C-Band Alliance ("CBA") files this letter to update its proposal in support of the FCC adopting a market-based approach to clear 300 MHz of C-band spectrum, inclusive of a 20 MHz guard band. More specifically, the CBA proposes to make more spectrum available for terrestrial 5G use—100 MHz of spectrum in 46 of the top 50 PEAs within 18 months of an FCC Order and 280 MHz throughout CONUS within 36 months from a CBA-led auction.

The member companies of the CBA have been working with their customers to ensure that sufficient C-band spectrum remains available for continued content distribution, while maximizing the portion repurposed for terrestrial 5G use within 18-36 months of an FCC Order and auction. These efforts have led the CBA to be able to increase from 180 MHz to 280 MHz the amount of spectrum available for terrestrial 5G use via its market-based approach; a 20 MHz guard band is retained to protect on-going satellite operations in the band.

This increase in the amount of spectrum proposed by the CBA to be cleared for 5G use is made possible by technologies such as advanced modulation, single format transport, and advanced video compression, including High Efficiency Video Coding ("HEVC"). Each of these technologies improves the efficiency of satellite video delivery, allowing the same video content to be transmitted over less spectrum. In fact, a number of video content distributors have already adopted or are in the process of adopting these technologies, including HEVC. The CBA's market-based plan makes it economically viable for those required to reduce their bandwidth usage to employ these technology upgrades because the CBA will pay the costs incurred by those customers adopting such technologies. The implementation costs related to the clearing of this increased amount of spectrum are expected to be between \$2.5 billion and \$3.5 billion.

Importantly, the CBA is committed to ensuring that all C-band satellite customers enjoy continued access to C-band satellite spectrum in an interference-free environment before, during, and after the transition of 300 MHz of C-band spectrum. The CBA member companies will retain all current C-band customer services and maintain the value and capability of C-band video distribution neighborhoods. In addition, the companies have provided updated, specific transition plans to their largest customers.

The CBA is committed to taking steps such that satellite operator customers enjoy continued access to 200 MHz of C-band satellite spectrum in an interference-free environment before, during, and after the transition of 300 MHz (including the 20 MHz guard band) of C-band spectrum. To that end, the CBA makes the following commitments:

- If deemed necessary by the CBA to clear 300 MHz, specific technology choices (e.g., HEVC, AVC), operating parameters (e.g., channel bit rates or modulation roll-off), and the selection of



equipment manufacturers for the purpose of clearing the 300 MHz shall be at the sole discretion of the programmer in every case;

- The CBA shall be fully responsible for all costs necessary to implement the reallocation of 300 MHz of spectrum, including, but not limited to, costs related to technology upgrades (e.g., HEVC, encoding systems, IRDs) for those customers identified by the CBA for such upgrades, antennas, filters, systems design and integration, and logistics, including payments to third-party service providers if needed;
- The CBA shall submit in the record of this proceeding an overall customer-anonymized fleet loading plan, a firm commitment to launching and deploying certain replacement satellites and the estimated dates by which such satellites will be in service, an updated customer commitment letter for those customers identified by the CBA for technical upgrades, and a transition plan describing how the transition will unfold and providing estimated costs and timelines;
- The transition plan will require the CBA to fulfill all deliverables necessary to implement the reallocation of 300 MHz of spectrum in accordance with agreed-upon timetables;
- The CBA agrees that the FCC must retain oversight and enforcement authority over the transition to ensure that the transition is prompt and that the CBA lives up to its customer commitments, and that use of the spectrum occurs in accordance with all applicable FCC rules and policies;
- The CBA shall make available to customers and their affiliates, at the CBA's cost, facilities at one or more of the grandfathered TT&C/Gateway locations, as needed, to downlink any transmissions in the 300 MHz cleared spectrum from satellites viewable from those TT&C/Gateway locations that customers or affiliates require access to in order to have comparable service as today. The CBA shall, at the CBA's cost, backhaul those downlinked transmissions to the customer or affiliate location that is currently downlinking those transmissions;
- The CBA continues to work with the FCC, C-band users, and other parties to develop technical solutions that allow for mobile production of C-band contribution and the downlinking of C-band confidence transmissions in 5G congested areas;
- The CBA commits to continue working with the FCC and industry stakeholders to develop rules for terrestrial 5G operations that minimize the likelihood that 5G transmissions will individually or in the aggregate create harmful impairments to FSS earth stations or to the services they convey. The CBA further commits to working with the FCC and industry stakeholders to develop effective interference prevention, detection, mitigation and enforcement procedures and rules for the benefit of satellite operator customers. The CBA further commits to working with customers to identify, document and attempt to resolve instances of harmful interference impacting video quality as may be relevant to enforcement efforts;
- The CBA continues to commit to its previous representations in the record of this proceeding concerning customer and user protections and interference rules.



Please contact the undersigned with any questions regarding this letter.

Respectfully submitted,

 /s/
Bill Tolpegin
Chief Executive Officer
C-Band Alliance

Cc: Chairman Pai
Commissioner O'Rielly
Commissioner Carr
Commissioner Rosenworcel
Commissioner Starks

October 29, 2019

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary, Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122

Dear Ms. Dortch:

The undersigned parties have a deep interest in a timely, fair process for reallocating C-Band spectrum for terrestrial mobile use. As a result of ongoing discussions, and in an effort to highlight areas of consensus, we submit the attached set of principles upon which we agree regarding a reasonable process for auctioning off terrestrial rights to C-Band spectrum. These principles should help guide an auction, regardless of the ultimate outcome of this proceeding, as the Commission moves to repurpose this critical piece of mid-band spectrum as quickly as possible.

While we may not agree on all facets of how this proceeding should be resolved, there is strong consensus that all potential, qualified bidders should be welcome to participate and have clarity on the rules and procedures that will govern the sales and licensing process. Openness and transparency are critical to achieving a successful transition for all interested parties. We urge the Commission to use the principles set forth below to give certainty to interested stakeholders through a swift resolution to this proceeding.

Sincerely,

/s/
Hank Hultquist
Vice President of Federal Regulatory
AT&T Services, Inc.

/s/
Ron Smith
President and CEO
Bluegrass Cellular

/s/
Peter Pitsch
Vice President
Advocacy & Government Relations
C-Band Alliance

/s/
John C. Nettles
President
Pine Belt Wireless

Marlene H. Dortch
October 29, 2019
Page 2

_____/s/
Grant Spellmeyer
Vice President - Federal Affairs & Public Policy
U.S. Cellular

_____/s/
William H. Johnson
Senior Vice President -- Federal
Regulatory & Legal Affairs
Verizon

Attachment

FCC Guidance for a 3.7-4.2 GHz Auction

- Prior to any spectrum auction, the following should take place:
 - Auction procedures made public and transparent with FCC oversight
 - Reasonable bidder education efforts held consistent with prior spectrum auctions
- Joint bidding agreements prohibited and ownership and agreement disclosures made public. The auction should be open to all qualified bidders consistent with FCC practice
- The band plan should consist of at least 280 MHz of interoperable spectrum, divided into 20 MHz blocks based on PEAs
- To ensure an efficient auction that is familiar and fair to all participants:
 - The bidding process must be transparent:
 - No sealed bids at any point in the auction
 - No combinatorial or package bidding
 - Release of bid data round-by-round consistent with recent FCC auction information practice
 - Use of the FCC's limited information disclosure procedures to safeguard against anticompetitive conduct
 - The auction should include all proposed cleared spectrum regardless of clearing timing or tranche
 - The auction should use a multi-round ascending clock auction format conducted by an experienced and qualified auctioneer that offers substantially the same online functionality as FCC Auction 102
 - The clock phase should be followed by a traditional assignment phase with substantially the same bid assessment formula as Auction 102
 - The auction should be conducted expeditiously with a speedy rounds-per-day schedule to ensure rapid completion
 - The auction should have enforceable penalty provisions to address winning bidder or seller defaults following completion of the auction
 - An assignment phase, with a format similar to Auction 102, shall determine final block assignments. The algorithm for final assignments shall ensure contiguity of block assignments for any bidder winning multiple blocks in a license area. Provisional assignment of spectrum cleared in any early tranche shall be made proportionally based on total blocks with winning bids, with licensees moving to final assignment positions at the end of the transition period, when all spectrum is available.
- All applicants must agree to be bound by the FCC's prohibited communication rules, including reporting obligations to, and enforcement by, the FCC
- A reasonable aggregate reserve price should be set that will ensure that the sale of repurposed spectrum will generate enough revenue to (1) recoup the costs of conducting the auction, and (2) fairly compensate incumbent satellite providers authorized to use the C-Band as well as effectuate reasonable relocation/reconfiguration/modification costs for

themselves and all C-Band earth station users (including reimbursing programmer costs associated with procuring, testing, and installing new encoders)

- A portion of auction proceeds, in excess of those needed to cover the costs for the auction and the transition of the spectrum, should be returned to the U.S. Treasury
- The auction process must be completed expeditiously, with all spectrum subject to the auction cleared for use by winning bidders with any early tranche of spectrum cleared within 18 months of the FCC order and all spectrum cleared within 36 months from the time of the auction. Auction final payments should be reasonably timed to balance the provision of sufficient funding for clearing the C-Band with enforceable penalties for lack of timely completion.



The Race to 5G: Protecting Taxpayers through Spectrum Auctions



DEBORAH COLLIER AND THOMAS SCHATZ

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APRIL 2019

About Citizens Against Government Waste

Citizens Against Government Waste (CAGW) is a private, nonprofit, nonpartisan organization dedicated to educating the American public about waste, mismanagement, and inefficiency in government.

CAGW was founded in 1984 by J. Peter Grace and nationally syndicated columnist Jack Anderson to build public support for implementation of the Grace Commission recommendations and other waste-cutting proposals. Since its inception, CAGW has been at the forefront of the fight for efficiency, economy, and accountability in government.

CAGW has more than 1 million members and supporters nationwide. Since 1984, CAGW and its members have helped save taxpayers more than \$1.8 trillion. CAGW publishes special reports, including the *Congressional Pig Book* and *Prime Cuts*, as well as its official newspaper *Government WasteWatch* and blog *The WasteWatcher*, to expose government waste and educate the American people on what they can do to stop the abuse of their hard-earned money. Internet, print, radio, and television news outlets regularly feature CAGW's publications and experts.

Deborah Collier, Director of Technology & Telecommunications Policy
Thomas Schatz, President



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The Race to 5G: Protecting Taxpayers through Spectrum Auctions

Introduction

The Federal Communications Commission (FCC) is currently considering whether spectrum critical to the deployment of fifth generation (5G) wireless networks should be sold through a public auction or through a private secondary market transaction. This process began with the July 12, 2018 adoption of a proposed rulemaking on Expanding Flexible Use of the 3.7 GHz to 4.2 GHz Band (Docket 18-122), known as the C-band.¹

If this mid-band spectrum is sold through the normal FCC auction process with strong oversight, the proceeds would go to the taxpayers; incumbent users of the spectrum would be protected; and the spectrum would be used for 5G development and deployment. If it is sold on the secondary market through a private sale, there is no guarantee taxpayers would see any of the revenues generated from the sale; incumbent users are not assured they will be made whole; and there would be limited FCC oversight. Spectrum is unlike any other public asset in terms of its value and strategic importance for the future of the economy and national security.

Since 1994, the FCC has conducted 101 spectrum auctions, which through January 24, 2019, generated \$121,672,180,000 to taxpayers in net winning bids and the awarding of 44,499 licenses. The auction of C-band spectrum could generate an additional \$11 billion to \$60 billion to taxpayers, depending on the amount of spectrum made available for sale.² Given this track record of success, it is difficult to see why any entity other than the FCC should be permitted to conduct the C-band spectrum auction.

According to an April 2, 2019 CTIA report, during the rest of 2019, 5G companies in the U.S. are on schedule to deploy 92 5G networks; South Korean companies will be deploying 48 networks; and the United Kingdom will have 16 networks deployed.³ Leading the development and deployment of 5G networks is critical to keeping the U.S. as the world leader in telecommunications.

On October 25, 2018, the White House issued a Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America's Future. Calling on federal agencies to use spectrum as "efficiently and effectively as possible to help meet our economic, national security, science, safety, and other Federal mission goals now and in the future," the memorandum makes it clear that access to spectrum to enhance the nation's technological capabilities is a critical component to leading the way in next generation technologies, particularly for 5G network deployment.⁴

The FCC's five-year strategy to make more spectrum available for 5G deployment, known as the 5G FAST Plan, is comprised of three components: 1) push more spectrum into the marketplace; 2) update infrastructure policy; and 3) modernize outdated regulations.⁵ As part of this strategy, the FCC held an auction in the 28 GHz band in 2018; has begun the auction for spectrum in the 24 GHz band; and, will be holding auctions in 2019 for the upper 37 GHz, 39

GHz, and 47 GHz bands. On April 12, 2019, the FCC adopted a public notice seeking comment on procedures for the incentive auction of these bands.⁶

The C-band spectrum is currently used to send information via satellites between what are referred to as terrestrial or earth stations by various industries, including the television broadcasting community, communications providers, content providers, and others who would be forced to vacate their use of this space should it be auctioned or otherwise sold. Based on previous auctions, the value of this spectrum could range anywhere from \$11 billion to potentially \$60 billion.

The Benefits of Nationwide 5G Coverage

The 5G network will provide faster data transfer speeds, shorter delays in data, and increased connectivity that will further enhance the use of the Internet of Things (IoT). Just as 4G technologies changed mobile computing, the deployment of 5G will offer faster transmission speeds with lower latency or delays from point to point. This will provide improvements to telemedicine and automotive safety, enhance cybersecurity and data protections, enable the development of new products and services, increase productivity, and allow for the emergence of new industries.⁷

According to a January 2017 study commissioned by Qualcomm, the full global economic effect of the 5G economy will be realized by 2035 and potentially provide 22 million jobs and produce up to \$12.3 trillion in global economic output.⁸

The deployment of 5G networks across the country will require access to millimeter wave spectrum for dense urban communities; mid-band spectrum for metropolitan areas; and low-band spectrum for nationwide coverage, including rural communities. The U.S. has moved forward in auctioning spectrum licenses in the low-band frequencies, as well as in the high-band frequencies. However, the U.S. remains behind other countries, like China and South Korea, in the deployment of mid-band spectrum, where the C-band is located.

On April 3, 2019, Verizon announced the rollout of 5G wireless networks in Chicago and Minneapolis.⁹ AT&T announced it would be adding seven more cities to its 5G network, including portions of Austin, Los Angeles, Nashville, Orlando, San Diego, San Francisco, and San Jose.¹⁰ More companies are expected to follow in additional cities across the country, but without additional mid-band spectrum in the pipeline for 5G deployment, national coverage will be difficult.

Understanding the importance of mid-band spectrum to the future of 5G, on April 12, 2019, FCC Commissioner Jessica Rosenworcel called upon the agency to “flip its priorities and pivot to the mid-band.” The FCC “can start by scheduling an auction in the 3.5 GHz band. We should continue our discussion and engage Congress regarding the 3.7 to 4.2 GHz band. Then we need to explore innovative opportunities for making more efficient use of the 2.5 GHz band.

Finally, we need to continue to press our federal partners to work collaboratively with us to open more mid-band spectrum for new commercial use.”¹¹

She continued, “The truth is, when it comes to mid-band spectrum, we’re not just behind, we are no longer even running the same race as the rest of the world. The good news is that it is not too late to do something about it.”¹²

According to the Small Cell Forum, at least half of the 5G deployments between 2019 and 2022 will require the use of mid-band C-band spectrum between 3.4 GHz and 4.2 GHz.¹³ In its filings on the C-band rulemaking, the C-Band Alliance, a consortium of foreign satellite companies based in Canada, France, and Luxembourg, has asked the FCC for permission to sell licenses in the lower 200 MHz of the 500 MHz spectrum currently located in the C-band on the secondary spectrum market. They claim that they will be able to quickly vacate the lower 200 MHz of spectrum by moving their customers to the upper 300 MHz of the C-band and making the spectrum available for sale to speed the deployment of 5G.

History of Spectrum Auctions

Spectrum management in the U.S. had a rocky beginning. In the early 20th century, spectrum use was unregulated. Following the RMS Titanic tragedy, which raised concerns about congestion and false S.O.S. signals over the airwaves, the Radio Act of 1912 was enacted. This law sought to bring order to radio spectrum by regulating its use and requiring spectrum users to acquire a license to operate from the Department of Commerce.¹⁴ The FCC was created by the Communications Act of 1934 (P.L. 73-416) and tasked with the responsibility of processing applications for spectrum licenses.

By the 1980s, the FCC was overwhelmed with license applications and asked Congress to permit the allocation of spectrum through an alternative means, as spectrum had been given to various radio wave interests without any compensation to the taxpayer, other than negligible application costs, since 1927.¹⁵ From 1983 to 1994, spectrum licenses were awarded through a lottery system. However, this process resulted in random spectrum assignments that made little sense and created a cottage industry of spectrum speculators.¹⁶

In 1993, Congress, for the first time, authorized the FCC to conduct spectrum auctions through the Omnibus Budget Reconciliation Act of 1993 (P.L. 103-66).¹⁷ This authorization was extended by the Balanced Budget Act of 1997 (P.L. 105-33), the Deficit Reduction Act of 2005 (P.L. 109-171), and the DTV Delay Act (P.L. 111-4). The Middle Class Tax Relief and Job Creation Act of 2012 (P.L. 112-96) included the Spectrum Act, which extended the auction authority to the end of fiscal year 2022 and authorized the FCC to conduct a broadcast incentive auction and reverse auction. The Spectrum Pipeline Act provisions of the Bipartisan Budget Act of 2015 (P.L. 114-74) further extended the FCC’s auction authority for an additional 30 MHz of federally-held spectrum identified by the Department of Commerce through FY 2025.¹⁸

Since 1994, the FCC has completed 101 spectrum auctions through either simultaneous multiple-round auctions or modified package bidding, which allows bidders to place bids on groups of licenses. These auctions are open to any eligible company or individual that submits an application and upfront payment. These have raised a combined total of \$121.7 billion for taxpayers.¹⁹ The success of these auctions has enabled more than 100 wireless providers²⁰ to build and improve their networks.

The wireless industry supports more than 4.7 million jobs and contributes \$475 billion annually to the U.S. economy.²¹ Wireless networks have provided tens of millions of Americans access to the latest technology, enabled the development of the app economy, and provided for increased opportunities in education, improved health care outcomes through telemedicine, and greater job creation.

During the FCC's April 12, 2019 monthly meeting, Commissioner Brendan Carr noted that the FCC auction proceedings are "a model for the world."²² He further stated that based on his discussions during his travels to Kenya and other countries, "There is no consensus yet in many of their countries that spectrum should be auctioned let alone schedules for doing so. They asked me to explain why removing restrictions on spectrum is important and why they should strongly consider flexible use."²³

Existing Use of C-Band Spectrum

The space race in the 1950s and early 1960s brought about new innovations for communications and video viewing previously never imagined. Following successful rocket launches in the 1960s, the launch and use of domestic satellites for the distribution of television and communications signals were first proposed. However, it was not until 1974, with the launch of Western Union's WESTAR I, that commercial use of satellites became available. In December 1975, RCA launched its RCA SATCOM F-1. In 1976, the launch of the first COMSTAR series by AT&T and COMSAT allowed 120 transponders to provide 1,500 telephone channels or one TV channel.²⁴

As more communications satellites were launched, the use of the C-band spectrum dramatically increased. Compression technology developed in the 1990s enabled greater use of satellites to transmit audio and video signals to and from terrestrial-based earth stations. According to the International Telecommunication Union (ITU) Constitution, radio frequencies and satellite orbits are limited natural resources, and therefore must be used in a manner that will allow for equitable access.²⁵ Globally, the ITU Radiocommunications Sector (ITU-R) manages radio-frequency spectrum and satellite orbits to ensure a rational, equitable, efficient, and economical use of the radio-frequency spectrum of all radiocommunications systems, including those using satellite orbits.²⁶

By 2014, Eutelsat, Intelsat, JSAT, SES, and Telesat owned half of the more than 300 commercial satellites currently in geosynchronous orbit.²⁷ All except JSAT are members of the C-Band Alliance. The satellites are assigned an orbital slot and allocated use of the C-band

spectrum between the 3.7 MHz and the 4.2 MHz range. They provide access to more than 250 channels of video and 75 audio services to approximately 335,000 subscribers.²⁸

Rights to use the C-band spectrum are governed by a “full-band, full-arc” policy, rather than a range of frequencies being assigned to individual licensees with only one operator holding the rights.²⁹ In other words, satellite earth stations use the entire 500 MHz of the C-band, which allows them to point their satellite dishes in every direction toward every possible geosynchronous satellite. While the rights to use spectrum within the C-band are numerous, they are not clearly defined to one particular user of the spectrum.³⁰

Questions that must be addressed in the FCC’s review of the C-Band Alliance’s proposal include whether it takes into consideration existing use by incumbents in the space, including broadcasters, satellite broadband customers in rural communities, and others who would be forced to vacate their channels to make way for 5G deployment; what is the most appropriate mechanism to balance the need for efficient allocation, public value, and legal durability; whether other non-C-Band Alliance satellite operators would be protected from being forced out of their use of the spectrum by their competitors; and, who would receive the proceeds from a secondary market sale of spectrum owned by the U.S. government. There is also the question of how the satellite companies can sell property they do not own, since they only possess a license to use the spectrum.

In its December 11, 2018 filing with the FCC, the Satellite Industry Association noted the C-band plays an unappreciated role in the daily lives of American consumers by enabling “the media industry to provide broad coverage, near-perfect reliability, and distance insensitive pricing of C-band satellite capacity used to distribute video and audio news, weather, sports, entertaining and religious programming to dense urban centers and small, rural communities alike.”³¹

The nation’s broadcasters, media companies, and other providers, including SiriusXM, DirecTV, and DISH Networks, are heavy users of the C-band to provide content to their customers. Small rural telecommunications providers, like those represented by the Alaskan Telecom Association, often rely exclusively on satellite technology for the provision of basic telephone service, telehealth, and distance learning. These providers have little expectation of the availability of a terrestrial network, especially in remote locations.³²

The C-Band Alliance has received commitments from its members to “undertake, manage, and complete all necessary actions to effectuate” customer migration³³ and has proposed covering the moving expenses of their satellite service customers with 120 percent of the costs of repacking them onto new satellites.³⁴ However, this commitment only applies to members of the C-Band Alliance, and provides little assurance to incumbents using other satellite providers that their video and audio content will continue to be delivered as expected.

Efficient and Effective Sale

With respect to a private entity being able to conduct a sale of spectrum on the secondary market rather than the FCC, some might instinctively conclude that the satellite companies would be able to complete the transactions faster and more efficiently. But, that does not consider the complex steps and experience needed to conduct a spectrum auction or significant legal uncertainty involved in a private sale.

A secondary market sale of the spectrum would require the FCC to allocate the spectrum to the C-Band Alliance through its rulemaking and approval process. Incumbents would need to be reassigned to their new designations in the upper 300 MHz of spectrum, and the spectrum would then need to be repacked for private sale after incumbents have been relocated. This process could take just as long, if not longer than an FCC auction. But, even if it may seem faster, the taxpayers will still not benefit from the sale of their assets, as the proceeds would admittedly be divided among the four foreign-owned satellite companies that comprise the C-Band Alliance.

The FCC has a long history of conducting spectrum auctions and is on track to make more spectrum available in the next few years. The 2017 broadcast incentive auction yielded \$19.8 billion in revenue and provided \$10.05 billion for winning broadcast bidders and more than \$7 billion to the U.S. Treasury for deficit reduction.³⁵ This auction repurposed 84 MHz of spectrum (70 MHz for licensed use and another 14 MHz for wireless microphones and unlicensed use), providing even greater experience in repacking and reallocating spectrum for sale through a government-run auction. By contrast, while the C-Band Alliance is positioned to know what entities are currently using its members' satellites and what spectrum bands they may be using under the full-band, full-arc framework, they do not have the underlying experience needed to conduct a spectrum sale.

In addition, a private sale of spectrum in the C-band would undoubtedly be delayed by court challenges that have already been noted by companies that feel they would be excluded from the bidding process.³⁶

Other Non-CBA Aligned Satellite Operators

In its initial comments filed on October 29, 2018, the C-Band Alliance claimed that the four satellite operators that comprise the alliance "represent virtually all of the C-band service providers in the continental United States ('CONUS')." ³⁷ However, this assertion is refuted in a December 11, 2018 filing critical of the C-Band Alliance proposal by a group of small satellite operators (SSOs) who noted that, "the self-styled 'C-Band Alliance' ('CBA') of the four largest U.S. C-band satellite operators proposes to exclude the SSOs from compensation for the reduction in value of C-band assets that would result from a partial reallocation, while nevertheless claiming a right to the exact same compensation for the CBA's own members. The CBA's incoherent and anticompetitive exclusion of its rivals is emblematic of a larger issue with the CBA proposal. As the record demonstrates, the CBA has failed to account for the interests

not just of competing satellite operators, but also of its own customers and U.S. taxpayers as well.”³⁸

The SSOs also raise concerns about the potential for antitrust law violations that could occur if the C-Band Alliance or any other private entity becomes the “facilitator” for the sale of the C-band spectrum on the secondary market.³⁹ These arguments tie closely to the fact that the C-band spectrum is not owned by the satellite operators. It is licensed for their use by the FCC on finite agreements, many of which expire in the mid-2020s.⁴⁰

Proceeds from Secondary Market Sales

The value of the 200 MHz of spectrum proposed for sale by the C-Band Alliance could, according to Laurie Davidson, a satellite equity analyst at Deutsche Bank, generate as much as \$11 billion in gross receipts.⁴¹ The American Cable Association has estimated that the full 500 MHz of C-band spectrum could be worth up to \$60 billion to wireless carriers.⁴² By comparison, the AWS-3 spectrum auction of 65 MHz of Advanced Wireless Services spectrum generated nearly \$45 billion in gross bids for the U.S. government,⁴³ \$7 billion of which was dedicated to build the FirstNet first responder network.⁴⁴

In most instances, the secondary market is used when a licensed owner of spectrum no longer has a use for the spectrum license, and sells it in a private transaction, subject to FCC approval. For example, in 2011, Verizon purchased spectrum from cable television operators valued at \$3.6 billion.⁴⁵ The sellers acquired the spectrum in a government auction in 2006 and therefore owned the rights to the spectrum being acquired.

Secondary markets rely on clearly-defined property rights. The individual or company selling the item has purchased and thereby owns the property, giving them authority to sell it on the secondary market.

Because of the nature of satellite use of the C-band spectrum, satellite owners are allocated an orbital slot and granted use of the spectrum within the C-band. While they have full-band, full-arc access to the entire 500 MHz of the C-band spectrum and the earth stations using the band, the satellite operators do not have ownership rights to any portion of the C-band. Usage is constrained based on time, geographic area, permitted technology, and purpose. Factors relating to interference also create difficulties in defining property rights with respect to selling this spectrum on a secondary market.⁴⁶

The lack of ownership by the C-Band Alliance is made evident by its request to the FCC to give them the spectrum licenses so they can sell them on the secondary market.⁴⁷ This reinforces the critical fact they neither own the licenses nor have the authority to sell the licenses, but instead are only authorized to use the spectrum through which they transmit their satellite signals.

The C-Band Alliance proposal is reminiscent of a prior attempt to obtain licensed spectrum without reimbursing the federal government. In 2003, Northpoint Technology sought

\$100 million worth of spectrum directly from Congress to provide wireless and satellite services, a giveaway that would have benefitted a company whose only asset was its high-powered connections to the right people in the nation's capital.⁴⁸ Fortunately, this proposed theft of spectrum failed.

Similarly, a private sale by the C-Band Alliance of the lower 200 MHz of spectrum in the C-band would not generate any revenue to the current owners of the spectrum, the nation's taxpayers.

Congressional Interest

Members of Congress, including Sens. Jerry Moran (R-Kan.) and Tom Udall (D-N.M.), and Reps. Tony Cardenas (D-Calif.) and Adam Kinzinger (R-Ill.), have asked the FCC to carefully consider potential interference of new terrestrial users on incumbent operations, and ensure that the incumbents are made whole for costs incurred as a result of any new service or shared uses in the C-band.⁴⁹ The members encouraged the FCC to oversee any reallocation of the spectrum and facility and manage spectrum policy in a manner that promotes the public interest.

On March 15, 2019, Sen. John Kennedy (R-La.) called upon the FCC to ensure that the "process for allocating C-band spectrum for 5G must be fair, open, and transparent." He raised concerns about how fair the C-Band Alliance proposal would be, not only to companies that might wish to bid on the spectrum for deploying 5G networks using mid-band spectrum, but also for the American public to whom this valuable resource belongs.⁵⁰

Sen. Kennedy stated, "A privately managed spectrum sale would give the CBA the means to sell nationwide licenses to the largest wireless carriers, with little concern for competitive carriers and new entrants. This outcome would be particularly harmful for rural America as large wireless carriers may never deploy 5G service in these communities. The CBA's members would also have the incentive to raise prices for their remaining satellite services. This would have a disproportionate impact on rural cable operators and their customers."⁵¹

Conclusion

Keeping the taxpayers first in spectrum auctions means that the FCC should take control of and conduct the auction of the C-band. Any other process risks forgoing between \$11 billion and \$60 billion for taxpayers and failing to add that money to the \$121.7 billion already provided through the 101 FCC-conducted spectrum auctions over the past 25 years. The FCC has the experience, knowledge, and fiduciary responsibility to protect the spectrum's owners. Another entity, like the C-Band Alliance, has none of those attributes.

Access to mid-band spectrum, including portions of the C-band, is critical to a fully integrated nationwide 5G network. Just as 4G revolutionized the use of mobile devices with enormous innovations including the creation of the app economy, mobile commerce, and

health care monitoring devices, 5G will bring new technologies that will deliver enormous economic growth, and strengthen the nation's agricultural, automotive, education, IoT, manufacturing, and health care capabilities.

If the U.S. government allows foreign-owned satellite companies to sell part of the C-band spectrum in a private auction, there is no guarantee that the buyers in such a sale would feel compelled to use the spectrum for 5G network deployment. In addition, the proceeds from a private sale would be retained by the private entities selling the spectrum, rather than the funds reverting to the taxpayers. Any sale of federally-owned spectrum must be conducted by the FCC in order to generate the best outcome for taxpayers.

It is clear from the filings of the C-Band Alliance that they do not need access to at least 200 MHz of the spectrum in the C-band once their customers are relocated, leaving one to wonder whether more of the 500 MHz spectrum might be repacked for additional 5G use. Therefore, the FCC should review the entirety of the C-band spectrum, ensure continuity of service for existing incumbents using the C-band, reassign and repurpose available spectrum for deployment of 5G, and conduct another spectrum auction, which will reimburse the taxpayers, not foreign-owned satellite operators, for their use of the spectrum.

¹ Federal Communications Commission, "In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band," GN Docket No. 18-122, Order and Notice of Proposed Rulemaking, Adopted July 12, 2018, <https://docs.fcc.gov/public/attachments/FCC-18-91A1.pdf>.

² Federal Communications Commission, "Auctions Summary: Completed Auctions," January 24, 2019, <https://www.fcc.gov/auctions-summary>.

³ CTIA, "A National Spectrum Strategy to Lead in 5G," April 2, 2019, <https://www.ctia.org/news/a-national-spectrum-strategy-to-lead-in-5g>.

⁴ The White House, "Presidential Memorandum on Developing a Sustainable Spectrum Strategy for America's Future," October 25, 2018, <https://www.whitehouse.gov/presidential-actions/presidential-memorandum-developing-sustainable-spectrum-strategy-americas-future/>.

⁵ Federal Communications Commission, "The FCC's 5G FAST Plan," September 28, 2018, <https://www.fcc.gov/5G>.

⁶ Federal Communications Commission, "Spectrum Frontiers Auction 103, Public Notice – AU Docket No. 19-59," April 12, 2019, <https://docs.fcc.gov/public/attachments/DOC-356692A1.pdf>.

⁷ PSB Research, "5G Economy Global Public Survey Report," commissioned by Qualcomm, December 2016, <https://www.qualcomm.com/media/documents/files/psb-public-survey-report.pdf>.

⁸ Karen Campbell, Jim Diffley, Bob Flanagan, Bill Morelli, Brendan O'Neil, Francis Sideco, "The 5G economy: How 5G technology will contribute to the global economy," IHS Economics & IHS Technology, January 2017, <https://www.qualcomm.com/media/documents/files/ihs-5g-economic-impact-study.pdf>.

⁹ Todd Haselton, "Verizon begins rolling out its 5G wireless network for smartphones," CNBC, April 3, 2019, <https://www.cnbc.com/2019/04/03/verizon-begins-rolling-out-its-5g-wireless-network-for-smartphones.html>.

¹⁰ Eli Blumenthal, "AT&T expands mobile 5G rollout with seven new cities, total rises to 19," *USA Today*, April 9, 2019, <https://www.usatoday.com/story/tech/2019/04/09/at-t-expands-5-g-rollout-seven-new-cities-total-rises-19/3409787002/>.

¹¹ Federal Communications Commission, "Statement of FCC Commissioner Jessica Rosenworcel, Re: Incentive Auction of Upper Microwave Flexible-Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz for Next-Generation Wireless Services, AU Docket No. 19-59," April 12, 2019, <https://docs.fcc.gov/public/attachments/DOC-356984A4.pdf>.

¹² Ibid.

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- ¹³ Small Cell Forum, "Focus on C-Band spectrum means 5G will be dense from day one," January 24, 2018, <https://www.smallcellforum.org/blog/focus-c-band-spectrum-means-5g-will-dense-day-one/>.
- ¹⁴ Ben Christopher, "The Spectrum Auction: How Economists Saved the Day," *Priceonomics*, August 19, 2016, <https://priceonomics.com/the-spectrum-auction-how-economists-saved-the-day/>.
- ¹⁵ *Ibid.*
- ¹⁶ *Ibid.*
- ¹⁷ Linda K. Moore, "Framing Spectrum Policy: Legislative Initiatives," Congressional Research Service, May 18, 2016, <https://fas.org/sgp/crs/misc/R44433.pdf>.
- ¹⁸ *Ibid.*
- ¹⁹ Federal Communications Commission, "Auctions Summary: Completed Auctions," January 24, 2019, <https://www.fcc.gov/auctions-summary>.
- ²⁰ CTIA, "The Wireless Industry, Industry Data," June 20, 2018, <https://www.ctia.org/the-wireless-industry/infographics-library>.
- ²¹ Accenture, "Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities," April 5, 2018, https://www.accenture.com/us-en/insight-smart-cities?c=strat_accenturestratemediarelations_10245982&n=mrl_0418&#block-how-the-wireless-industry-powers-the-us-economy.
- ²² Federal Communications Commission, "Statement of Commissioner Brendan Carr, Re: Incentive Auction of Upper Microwave Flexible-Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz for Next-Generation Wireless Services, AU Docket No. 19-59," April 12, 2019, <https://docs.fcc.gov/public/attachments/DOC-356984A3.pdf>.
- ²³ *Ibid.*
- ²⁴ David J. Whalen, "Communications Satellites: Making the Global Village Possible," National Aeronautics and Space Administration, <https://history.nasa.gov/satcomhistory.html>.
- ²⁵ International Telecommunication Union, "Constitution of the International Telecommunication Union, Article 44, Use of the Radio-Frequency Spectrum and of the Geostationary-Satellite and Other Satellite Orbits," <https://www.itu.int/council/pd/constitution.html>.
- ²⁶ International Telecommunications Union, "Welcome to ITU-R," <https://www.itu.int/net/ITU-R/index.asp?category=information&mlink=itur-welcome%2525E2%25258C%2525A9=en>.
- ²⁷ Intelstat Retirees and Alumni Association, "Brief History & Future Market Demands for Satellite Industry," 2014, http://myiraa.com/content/download/2014/IRAA_Presentation_DK_Sachdev.pdf.
- ²⁸ Satellite Broadcaster & Communications Association, "Consumer Satellite Product Overview," <http://sbca.com/receiver-network/satellite-overview.htm>.
- ²⁹ Mitchell Lazarus, "Fixed Service versus Full-Band, Full-Arc Coordination," National Spectrum Management Association, May 16, 2017, <https://nsma.org/wp-content/uploads/2017/05/2017-06-nsma-fixed-service-versus-full-band-full-arc-coordination.pdf>.
- ³⁰ Joe Kane, "The FCC's 3.7 – 4.2 GHz Spectrum Band Proceeding: Key Facts and Analysis," R Street Policy Study, September 2018, <https://ecfsapi.fcc.gov/file/102675932336/Appendix%20A%20-%20The%20FCC'S%203.7-4.2%20GHz%20Spectrum%20Band%20Proceeding%20Key%20Facts%20and%20Analysis.pdf>.
- ³¹ Federal Communications Commission, "Reply Comments of the Satellite Industry Association, In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band (GN Docket No. 18-122), Expanding Flexible Use in the Mid-Band Spectrum Between 3.7 and 24 GHz, et al.," ("FCC C-band rulemaking"), December 11, 2018, <https://ecfsapi.fcc.gov/file/1211075228340/SIA%20Reply%20Comments%20on%20Mid-Band%20NPRM%2011%20Dec%202018.pdf>.
- ³² Federal Communications Commission, "Reply Comments of Alaska Telecom Association on FCC C-band rulemaking" December 11, 2018, <https://ecfsapi.fcc.gov/file/1211095006980/ATA%20Reply%20Comments%20C%20Band%20Reallocation.pdf>.
- ³³ Federal Communications Commission, "Written Ex Parte Communications, GN Docket No. 18-122, Wiley Rein, LLP on behalf of the C-Band Alliance," April 3, 2019, <https://ecfsapi.fcc.gov/file/1040344662844/CBA%20-%20Customer%20Commitment%20Ex%20Parte%20-%20204-3-19.pdf>.
- ³⁴ John Eggerton, "C-Band Alliance Outlines Compensation for Repack," Multichannel, April 3, 2019, <https://www.multichannel.com/news/c-band-alliance-outlines-compensation-for-repack>.

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- ³⁵ Federal Communications Commission, “Broadcast Incentive Auction and Post-Auction Transition,” May 9, 2017, <https://www.fcc.gov/about-fcc/fcc-initiatives/incentive-auctions>.
- ³⁶ Caleb Henry, “C-Band Alliance plan will spawn lawsuits, Google, Charter warn,” *Space News*, February 7, 2019, <https://spacenews.com/c-band-alliance-plan-will-spawn-lawsuits-google-charter-warn/>.
- ³⁷ Federal Communications Commission, “Comments of the C-Band Alliance on FCC C-band rulemaking,” October 29, 2018, <http://www.intelsat.com/wp-content/uploads/2018/10/FCC-NPRM-Comment-Filings.pdf>.
- ³⁸ Federal Communications Commission, “Reply Comments of ABS, HOSPASAT, and EMBRATEL Star One on FCC C-band rulemaking,” December 11, 2018, [https://ecfsapi.fcc.gov/file/1211140941610/SSO%20C-Band%20Reply%20Comments%20\(12-11\).pdf](https://ecfsapi.fcc.gov/file/1211140941610/SSO%20C-Band%20Reply%20Comments%20(12-11).pdf).
- ³⁹ *Ibid.*, p. 19.
- ⁴⁰ Mark Holmes, “Fan of the C-Band? Industry Analyst is Cautious About SES,” *Via Satellite*, October 15, 2018, <https://www.satellitetoday.com/telecom/2018/10/15/fan-of-the-c-band-industry-analyst-is-cautious-about-ses/undefined>.
- ⁴¹ Mark Holmes, “Telesat Joins the Band: What this Means for the C-Band Alliance,” *Via Satellite*, October 4, 2018, <https://www.satellitetoday.com/mobility/2018/10/04/telesat-joins-the-band-what-this-means-for-the-c-band-alliance/undefined>.
- ⁴² Caleb Henry, “C-Band Alliance plan will spawn lawsuits, Google, Charter warn,” *Space News*, February 7, 2019, <https://spacenews.com/c-band-alliance-plan-will-spawn-lawsuits-google-charter-warn/>.
- ⁴³ Federal Communications Commission, “Auction 97: Advanced Wireless Services (AWS-3): Fact Sheet,” January 29, 2015, <https://www.fcc.gov/auction/97/factsheet>.
- ⁴⁴ FirstNet First Responder Network Authority, “The Network,” <https://www.firstnet.gov/network>.
- ⁴⁵ Anton Troianovski, Lauren A.E. Schuker and Greg Bensinger, “Verizon Snaps Up Spectrum,” *The Wall Street Journal*, December 3, 2011, <https://www.wsj.com/articles/SB10001424052970204826704577074103860244794>.
- ⁴⁶ Scott J. Wallsten, “Secondary Spectrum Markets,” *Economists, Incorporated*, Fall 2009, <https://ei.com/economists-ink/fall-2009/secondary-spectrum-markets-by-scott-j-wallsten/>.
- ⁴⁷ Federal Communications Commission, “Comments of the C-Band Alliance on FCC C-band rulemaking,” October 29, 2018, <https://ecfsapi.fcc.gov/file/1029067703990/C-Band%20Alliance%20NPRM%20Comments%2010.29.2018.pdf>.
- ⁴⁸ Al Cors, Jr., “Stealing Spectrum,” *National Review*, September 4, 2003, <https://www.nationalreview.com/2003/09/stealing-spectrum-al-cors-jr/>.
- ⁴⁹ Federal Communications Commission, “Letter from Sens. Jerry Moran (R-Kans.) and Tom Udall (D-N.M.) regarding Expanding Flexible Use of the 3.7 to 4.2 GHz Band,” November 13, 2018, <https://docs.fcc.gov/public/attachments/DOC-355996A2.pdf>; and, Federal Communications Commission, “Letter from Reps. Tony Cardenas (D-Calif.) and Adam Kinzinger (R-Ill.) regarding Expanding Flexible Use of the 3.7 to 4.2 GHz Band, with response from FCC Chairman Ajit Pai,” January 17, 2019, <https://ecfsapi.fcc.gov/file/10222306836318/Letter%20from%20Rep%20Cardenas%20%20et%20al%20and%20Chairman%20Pai%20Response.pdf>.
- ⁵⁰ Senator John Kennedy (R-La.), “U.S. Sen. John Kennedy: Don’t Hurt Rural Communities With Privately-Managed Spectrum Sale,” March 15, 2019, <https://www.kennedy.senate.gov/public/press-releases?ID=72CBD77A-71E0-4B0C-8770-BFCD615B0FE>.
- ⁵¹ *Ibid.*

(<https://www.americanactionforum.org>)

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Analyzing Plans To Reallocate C-Band for Deployment

Will Rinehart

Executive Summary

The ubiquity of smartphones and the advent of the Internet of Things has propelled the importance and demand for transmission infrastructure for mobile data. Rising demand for radio spectrum has driven a conversation over how the Federal Communications Commission (FCC) should use its power to allocate spectrum, but recently this discussion has taken a unique turn with a proposal by the C-Band Alliance (CBA) to repurpose 180 megahertz (MHz) of spectrum between 3.7 gigahertz (GHz) and 4.2 GHz through an auction. What follows is an overview of the current proposals for the space known as the C-Band. For policymakers, it is important to understand that:

- The C-Band spectrum is valuable, but its value is highly dependent on the underlying costs required to put this new spectrum to use;
- While many have decried the CBA plan as a private sale, its plan would likely mirror previous FCC auctions and it has strong incentives to create a competitive and efficient process;
- Whatever method is pursued to repurpose the band, the transition needs to be orderly and conducted in a timely manner since a two-year delay could mean a loss of nearly \$18 billion in consumer surplus; and
- Assuming the FCC secures a portion of the spectrum sale proceeds for the public and ensures an open and transparent auction process, moving forward with such a plan appears to be the most economically efficient option available.

History of the C-Band

The history of data transmission in the C-Band begins during World War II. Toward the end of 1943, AT&T secured the ability from the Federal Communications Commission (FCC) to test a series of microwave relays in the 3.7 gigahertz (GHz) to 4.2 GHz space for sending telephone calls between stations in New Jersey. This project developed into the Long Lines (<http://long-lines.net/tech-equip/radio/BLR1067/283.html>), a relay network that supplied long-distance services to AT&T and AT&T's customers in the television industry. Although the telephone company began to phase out the Long Lines system in the 1970s, shifting to fiber, coaxial cable, and other means of transmitting data, this band of spectrum has been continuously used since to transmit data via point-to-point microwave links. Today, these licenses are called Fixed Services, or FS.

Even during the height of FS transmission, another use for the same spectrum range began. In 1965, the American Broadcasting Company (ABC) petitioned (<https://scholarship.law.unc.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1473&context=ncilj>) the FCC to be able to use a satellite to transmit its television feed. It wasn't until 1972 that the FCC finally ruled on the matter (<https://scholarship.law.unc.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1473&context=ncilj>), but the resulting system created the unique pattern of spectrum use that we have today. After asking everyone in the industry to apply for a license in a 1970 order (*Domsat I*), the FCC in a second order (*Domsat II*) implemented the Open Skies policy (<https://scholarship.law.unc.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1473&context=ncilj>), which encouraged the development of the nascent Fixed Satellite Services (FSS) sector.

In allowing open development of the 3.7 GHz to 4.2 GHz band, the FCC rejected the comparative bidding system that was prevalent at the time. These dressed-up beauty contests often gave away licenses due to political connections. Most notably, Lady Bird Johnson made millions (<https://slate.com/news-and-politics/2007/07/how-lady-bird-and-lyndon-baines-johnson-came-by-their-millions.html>) from buying KTBC, as her husband, then-Senator and later President Lyndon Johnson, was able to pressure the FCC to secure a license for the station.

Domsat II took a different tack. Instead of allocating unique slices of spectrum to particular applicants, *Domsat II* gave the applicants access to the full range of C-Band spectrum. As a result, the different users were forced to cooperate. In the FCC's words:

Our decision in favor of multiple entry does not mean that we have opted for a policy of "unlimited or unrestricted open entry." Our aim, as outlined above, is to afford qualified applicants a reasonable opportunity to demonstrate the public advantages in use of the satellite technology as a means of communications. But such entry cannot be "open" in the sense that it is without any restrictions or limitations.

Spurred on by this relative hands-off approach, the satellite players coordinated to mitigate interference. By the late 1980s there were tens of thousands
(<https://ecfsapi.fcc.gov/file/10022703505533/SIA%20Comments%20on%20Mid-Band%20NOI%202%20Oct%202017.pdf>) of earth stations sharing over 39,000 channel assignments.

Current C-Band operators developed from this Open Skies policy. Registered or licensed earth stations operating in the C-Band coordinate with each other and are authorized to use the entire C-Band across the full geostationary arc (i.e. the area of earth covered by the satellite). This policy is known as full-band, full-arc licensing. Currently, FSS uses the 3.7 GHz to 4.2 GHz band for space-to-earth, or downlink communication, while the 5.925 GHz to 6.425 GHz band is used for earth-to-space or uplink communication. Combined, these two bands are considered the traditional C-Band. Four satellite operators provide the vast majority of services in the C-Band and include Intelsat, SES, Telesat,

and Eutelsat. Today, the C-Band is currently being used by satellite providers to distribute video and radio programming to nearly 120 million U.S. households.

C-Band's Unique Benefits

Because few uncharted regions remain on the spectrum map, spectrum policy has increasingly focused on repositioning incumbents and making bands more efficient. The AWS-3 auction, to name one recent example, came from spectrum previously granted (<https://www.fiercewireless.com/tech/aws-3-auction-dod-pledges-to-enable-greater-access-to-shared-spectrum>) to the Department of Defense. Today, several prime bands, including the C-Band, are being eyed for repurposing.

Why has the C-Band become a topic of interest? First, the C-Band resides in what is known as the mid-band. Lower bands are best suited to broad coverage and can penetrate buildings. Most of the low-band space, which is considered anything below 1 GHz, has already been dedicated to specific uses, so businesses are increasingly looking to the next-best options to deploy new tech. Because the lower band is spoken for, the mid-band is having a renaissance. The Citizens Band Radio Service (CBRS), which runs from 3.5 GHz to 3.7 GHz (<https://www.satellitetoday.com/government-military/2019/04/05/fccs-cbrs-auction-not-happening-until-at-least-2020/>), will be auctioned in June 2020, while the 5.925 GHz to 7.125 GHz band (<https://www.multichannel.com/news/fcc-test-concludes-wi-fi-can-share-5-9-ghz-band>) is being targeted for potential unlicensed use as well. (<https://www.multichannel.com/news/fcc-test-concludes-wi-fi-can-share-5-9-ghz-band>)

Second, the C-Band spans 500 MHz, making it one of the largest contiguous bands in spectrum. Contiguous spectrum allows operators to use larger blocks of spectrum. While having prime spectrum is important, there are clear benefits to using larger blocks of spectrum (<https://www.gsma.com/latinamerica/wp-content/uploads/2011/01/gsmaamericasmbbspectrumpaperjan2011-1.pdf>). Increasing the width of the channel in which an operator deploys can increase its traffic carrying capability, which reduces its costs.

Moreover, interest in the C-Band has been picking up because other countries are likely to use this space as well for the deployment of next generation 5G wireless services. The European Conference of Postal and Telecommunications Administrations mandated that the 3.4 GHz to 3.8 GHz band will be the first primary band for 5G, pushing Austria, France, and Germany to take steps to secure it for use by carriers. Japan and Australia are also putting this band at the front of their 5G spectrum plans. In many of these countries, the spectrum has already been auctioned to mobile broadband operators.

To top it all off, the band is being used by satellite providers to distribute video programming, and as in the rest of the industry, newer tech has given these providers other options. For one, the transmissions are more efficient (<http://www.intelsat.com/tools-resources/library/satellite-101/digital-compression/>) than they were years ago, so less total spectrum space is needed to send better transmission. The arrival of fiber has also given companies the ability to send traffic through another route. Both have eased the need to occupy the full 500 MHz space fully.

Given all of these changes, the current allocation could be significantly reduced and still be adequate for the incumbents. The CBA estimates (<https://www.fiercewireless.com/wireless/c-band-alliance-reiterates-200-megahertz-right-number-at-3-7-4-2-ghz>) that, of the total 500 MHz band, around 200 MHz could be repurposed for new uses, including a 20 MHz guard band, for a total of 180 MHz brought to market. According to the CBA (<https://www.fiercewireless.com/wireless/c-band-alliance-reiterates-200-megahertz-right-number-at-3-7-4-2-ghz>), anything larger than 200 MHz might force companies to move to the Ku-Band, which is much higher in spectrum and doesn't have the same kind of propagation qualities, leading to degradation in their services. In contrast, a study commissioned by ACA Connects, formerly the American Cable Association, posits that that 130 MHz is more than enough spectrum for the current companies, which would leave around 370 MHz free to reallocate for 5G in a comparable time period. This proposal has been met with concerns about its complexity, delay, and lack of reliability by existing video customers such as Disney, Fox, and CBS. AT&T and Verizon also opposed it as premature. Nonetheless, most agree that there is an opportunity with the C-Band, but with all opportunities come a cost.

C-Band's Opportunity Cost of Transition

The full-band, full-arc licensing creates a potential conflict in the reallocation of the band. Since the current license inherently grants various actors with overlapping and non-exclusive rights the ability to use the band, any one player could hold up the process to switch to a newer and better use. This kind of license stands in contrast to the recent

600 MHz incentive auction, where individual TV stations radiating in specific regions could make independent decisions to give up their rights.

Indeed, that the industry has coalesced around a singular plan to transition the C-Band underscores the willingness to repurpose the space for a potentially more efficient use. In a free market in which each satellite operator had control and property rights over their piece of the spectrum, a trade within the C-Band would have already occurred. Yet because satellite spectrum allocations aren't full-fledged property rights and license holders must gain favor from the FCC to transition licenses, market failures like the current holdup are endemic.

Valuing the C-Band is challenging because there are no domestic sales with which to compare. In Appendix 1 of this paper, values for a sale are approximated using a maximum likelihood method. Given that the underlying data come from other countries, the estimates should be read with caution. Still, the median sales price was estimated at \$0.201 per MHz per population (MHz pop), with an upper band of \$0.597 per MHz pop and a lower band of \$0.011 per MHz pop, which is explained in Appendix 2.

Policies and Plans for Transitioning

Making the transition from the current allocation system to one where more services are supported will force current operators to incur costs, but there are still a number of unanswered questions that the FCC will need to address.

For one, it is still unclear who will run the auction. The CBA has proposed selling the spectrum through an auction process mirroring that of the FCC. At the helm would be

economist Paul Milgrom

(<https://www.telecompetitor.com/c-band-alliance-you-want-an-auction-for-valuable-spectrum-we'll-give-you-one/>), who played a key role in designing the multiple-round auction first used by the FCC in 1993 and led the team that created the incentive auction
(https://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db1002/FCC-12-118A2.pdf).

This kind of auction, which some have decried as a private sale, will need the blessing of the FCC. Earlier this year, Citizens Against Government Waste worried that (<https://www.telecompetitor.com/watchdog-group-joins-opposition-to-private-c-band-spectrum-sale-valuable-5g-spectrum-at-stake/>) “If it is sold on the secondary market through a private sale, there is no guarantee taxpayers would see any of the revenues generated from the sale; incumbent users are not assured they will be made whole; and there would be limited FCC oversight.” In response, the CBA modified its proposal
(<https://docs.house.gov/meetings/IF/IF16/20190716/109797/HHRG-116-IF16-Wstate-PitschP-20190716.pdf>) to ensure that a portion of the revenues would be directed to the Treasury.

Michael Calabrese of New America Foundation has also expressed doubts, explaining
(<https://www.fiercewireless.com/wireless/cba-proposes-fuel-auction-process-for-c-band/>), “a private FCC-like auction subject to FCC oversight proposed here clearly violates Section 309(j) of the Communications Act. Only a public auction with the lion’s share of revenue returned to the public is within the FCC’s authority to authorize.” Section 309(j) of the Communications Act grants the FCC the authority to conduct auctions, but it doesn’t limit the FCC to assigning spectrum through public auctions or prevent

private sales or auctions of interference rights by other entities. Rather, section 309(j)(6)(E) requires the FCC to consider other assignment mechanisms when appropriate to protect the public interest. Although the FCC must avoid unjust enrichment in certain contexts, whether an unjust enrichment claim could apply in this matter is up for debate. Traditionally, concerns about unjust enrichment have concerned the issuance of licenses as well as the resale of spectrum within a five-year period by entities that qualified for credits in an auction. On the other hand, broadcasters were compensated by more than \$2 billion in the Incentive Auction, so it isn't without precedent that some kind of monetary trade should occur. Thus, the question at hand is the *extent* to which current operators should be compensated for the move.

Still, it is a fundamental mistake to think that the auction mechanism that the CBA has proposed is a private sale. Unlike a private sale, an auction would allow all qualified entities to bid. Given that the FCC would likely adopt a similar plan if it ran the auction, the result should approximate what the agency would have garnered. Yet, the FCC might not be able to solve the holdout problem. Thus, in the most optimistic of scenarios, the FCC would do only as well as the CBA plan. In the worst case, the agency might not come close to transitioning as large a swath of spectrum.

A chief selling point of the CBA plan (<https://ecfsapi.fcc.gov/file/106102490907232/CBA%20-%20FUEL%20ex%20parte%206-10-19.pdf>) is the relatively quick timeframe that spectrum could come to the market, which it projects will be 18 months for the first 60 MHz tranche of spectrum and 36 months for the rest of the 180 MHz. Furthermore, CBA states that if the FCC were to make its

decision this fall, the CBA could conclude its sales process in the first half of 2020. While it is difficult to know exactly how long an analogous process will take for the FCC, the agency is hardly a hare on these matters. According , it takes the agency on average 13 years to complete an auction fully. If the FCC were to undertake its own version of an auction, it would surely take much longer than the timeline set out by the CBA.

Already the FCC has a full plate. Auction 101 wrapped up in January, raising \$702 million. Auction 102 was completed at the tail end of May 2019. The agency plans to hold one more auction in 2019, Auction 103, which will sell off spectrum at 37 GHz, 39 GHz, and 47 GHz. However, that auction has been delayed, pushing back other scheduled auctions as well (<https://www.telecompetitor.com/orielly-doesnt-expect-cbrs-auction-date-before-2q-2020-wants-more-mid-band-spectrum/>). Commissioner O’Rielly put a fine point on the FCC’s relative slowness when he noted,

Most of the criticism of what is known as the CBA Proposal shows a lack of understating of how the internal Commission works. For instance, the argument has been made that the FCC should conduct a public auction for these frequencies rather than allowing the private sector to do it. Please don’t anyone try to lecture me on the Commission’s supposed efficiency and timeliness in conducting auctions, as I have experienced the latter firsthand for the past six years and twenty more from a different perch. This is not a new problem by any stretch of the imagination. Given what is already in the pipeline and how long it takes for the Commission to set up and operate an auction, we are talking years – and I mean years – before

completion. We can certainly ensure transparency, accountability, fairness, and openness without having to run the auction ourselves.

Since there is a time value of money, the FCC will need to determine if the quick turnaround set out by the CBA is worth pursuing. This delay can be modeled using discounted cash flow analysis, as explained in more detail in Appendix 2. Assuming a conservative one- or two-year delay, the lost value could be between 8 percent and 25 percent of the value of the spectrum. Empirical studies (<https://ecfsapi.fcc.gov/file/60001117200.pdf>) in the broadband space typically find that annual consumer surplus is equal to the value of a spectrum sale.

Thus, at the low end, the total value lost given a year delay by the FCC roughly equates to:

	C-Band Low Estimate	C-Band Mean Estimate	C-Band High Estimate
100 MHz	\$29.2 million	\$516.9 million	\$1.5 billion
180 MHz	\$52.5 million	\$930.5 million	\$2.7 billion
370 MHz	\$107.6 million	\$1.9 billion	\$5.7 billion

And at the top end, if the agency were to delay for two years, the total value lost would be:

	C-Band Low Estimate	C-Band Mean Estimate	C-Band High Estimate
100 MHz	\$92.7 million	\$1.6 billion	\$4.8 billion
180 MHz	\$166.8 million	\$3 billion	\$8.7 billion

370 MHz	\$341.6 million	\$6 billion	\$17.9 billion
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Inaction and delay by the FCC on this matter could be costly, especially for consumers, to the tune of nearly \$18 billion.

Conclusion

With these considerations in mind, the FCC should:

- Ensure that the transition is orderly and is conducted in a timely manner;
- Safeguard incumbents by keeping them whole;
- Establish that whatever mechanism is used is open and transparent; and finally
- Secure a portion of the spectrum-sale proceeds for the public.

Regardless of the path that is taken, the proposals by the CBA have reinvigorated the conversation around this important band. The C-Band is undergoing a transition (<https://www.linkedin.com/pulse/state-satellite-industry-nsr-fss-index-gagan-agrawal/>), and operators in the band have come forward with a market-driven approach. For the FCC, the most important question is how to transition this part of the spectrum to its highest and best use at the lowest cost as quickly as possible.

Appendices can be found here

(<https://github.com/willrinehart/c-band-estimation/blob/master/C-Band%20Appendices.pdf>).

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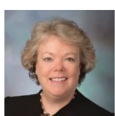
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Progress on the C-Band

by [Joan Marsh](#)

Executive Vice President of Federal Regulatory Relations

October 25, 2019 at 2:06pm

The FCC under Chairman Pai has been focused intensely on establishing and maintaining U.S. leadership in the deployment of 5G networks. Chairman Pai's [5G FAST Plan](#), which outlined a comprehensive strategy on 5G, included as a cornerstone the reallocation of essential 5G spectrum, including low-, mid- and high-band allocations.

On high-band opportunities, the FCC has moved aggressively to repurpose and auction millimeter wave bands, with an important [mmWave auction](#) set to commence this December. On low-band, AT&T and other carriers have signaled plans to repurpose and use some of their licensed low-band frequencies to support 5G. New mid-band allocations, however, remain a critical target.

Mid-band spectrum is important for 5G because it provides a mix of strong signal propagation with the opportunity for the higher capacity and speeds that large mid-band blocks can deliver. Enter the C-Band (3.7-4.2 GHz), currently used primarily for the delivery of video programming to MVPDs (multichannel video programming distributors). This band is broadly seen as the best near-term source for a wide swath of mid-band spectrum that could be repurposed for 5G, promising significant coverage and capacity support.

Indeed, to their credit, the satellite companies that currently operate in the C-Band were the first to recognize the opportunity and formed a consortium called the C-Band Alliance (CBA) early in 2018 to pursue it. The CBA's proposals have evolved over time, but current trajectory suggests that an auction and phased repacking of the band could clear around 300 MHz of new spectrum for 5G.

Through our Warner Media affiliates, AT&T is a significant user of C-Band services and believes that retaining part of the C-Band for video delivery is essential. In that regard, the FCC appears to be nearing decision on an approach that will strike a careful balance between clearing essential mid-band spectrum while also maintaining needed C-Band satellite connectivity for existing users. However, a number of important issues remain to be resolved.

First, there is the ongoing debate on who should run the auction. I think that asks the wrong question. The focus should instead be on getting the auction format, platform and rules correct.

As with any auction, adoption of a fair and transparent auction framework is essential. We support a multi-round, clock auction format. It is the approach that was used to reallocate the [600 MHz band](#) and one well known to the FCC and industry bidders. CBA previously proposed an auction structure that was unproven, complex and incomplete. We opposed it — we should not be experimenting with unproven or truncated auction formats with an auction of this importance. We also support proceeding with a single auction with two clearing phases as opposed to two separate auctions.

Once the format is established, the Commission will also need to adopt rules for engaging in the auction, which allow for fair participation by all qualified bidders, appropriate price discovery and transparent bidding. These rules, as well as service rules including interference thresholds, should be established by the FCC well in advance of the auction so bidders have clarity and confidence around the spectrum being sold.

In addition to auction and service rules, the FCC will need to adopt an appropriate and well-defined transition process that allows sufficient time for the needed repacking without disrupting important video delivery. The record suggests that up to 100 MHz can be cleared relatively quickly (within 18 months), largely through the deployment of new earth station receiver filters.

In contrast, clearing 300 MHz will likely require the elimination of standard definition video and the universal adoption of more efficient encoding, compression and modulation technologies. This process will in turn require new hardware installation and re-configuration of thousands of affiliate reception sites — installations that may vary in significant detail from provider to provider and even within the various head-ends of a single provider. We have separately [documented these issues](#) and encourage the FCC to develop a more detailed record.

Detailed transition planning should be completed prior to the auction, both to provide certainty to bidders on when the new mid-band spectrum will be available, and to ensure that the aggregate cost of reimbursing C-Band satellite service providers and users is known and can be accommodated in reserve pricing.

As long as these predicates are met, we would support a private auction with robust FCC oversight to ensure that the auction rules as adopted are properly enforced.

There are also outstanding questions on how the proceeds will be split and whether the U.S. Treasury will benefit from the auction. There is no doubt that this auction, if designed effectively, could garner billions in proceeds. While we'll let others opine on how the U.S. purse gets its fair share, we support ensuring that all reasonable programmer relocation costs get reimbursed, including the cost of adopting new compression technologies that will make the use of the remaining part of the satellite C-Band more efficient.

The C-Band is an enormous opportunity for U.S. 5G deployment. While it's time to move forward, it's paramount that the FCC move the auction and related planning forward on solid footing. We look forward to reviewing the draft Order that we expect Chairman Pai to circulate in the near term.

Posted in [5G](#), [Business Broadband](#), [Consumer Broadband](#), [Spectrum](#)



C-Band Alliance Proposes to Clear 300 MHz of Spectrum for Nationwide 5G Deployment

C-Band Alliance updates 5G proposal to the FCC and offers to clear 300 MHz of C-band spectrum, inclusive of a 20-MHz guard band

Proposes to make available for 5G use 100 MHz in 46 top metropolitan areas within 18 months of an FCC order, and 280 MHz throughout the continental U.S. within 36 months from a CBA-led auction

Maintains reliability and continuity of all services and encourages customer use of advanced video compression and other technologies to improve spectrum efficiency

Washington, D.C. – October 28, 2019 – The C-Band Alliance (CBA) announced today that it will commit to clear 300 MHz of C-band spectrum to support fast 5G wireless deployment throughout the continental U.S. In an updated filing with the U.S. Federal Communications Commission (FCC), the CBA detailed that the 300 MHz of spectrum includes a 20-MHz guard band to protect existing satellite services from 5G interference.

Further enhancing its plan to clear spectrum quickly, the first tranche—which clears spectrum within 18 months of an FCC order in 46 top metropolitan zones—is now increased to 120 MHz, inclusive of the 20-MHz guard band. The second tranche of the remaining spectrum will be made available within 36 months from a CBA-led auction, providing cleared spectrum throughout the entire continental U.S.

As it completed the work necessary to enhance its proposal, the CBA collaborated closely with U.S. broadcasters and programmers that serve nearly 120 million American homes via the C-band. This work included analyzing the potential use by some customers of technologies such as advanced modulation, single format transport and advanced video compression, including High Efficiency Video Coding (HEVC). Each of these technologies improves the efficiency of satellite video delivery, allowing the same video content to be transmitted over less spectrum. The CBA proposal commits to implement these technology upgrades at no cost to those satellite customers implementing them.

The CBA remains committed to ensuring that existing customers continue to enjoy the quality of service they experience now, with no interference from 5G services deployed in the future. The CBA member companies will maintain continuity of all current C-band customer services and maintain the value of the continental U.S. C-band video distribution neighborhoods.

In its most recent *ex parte* filing, the CBA updated its commitments to its customers, including on key elements such as the transition plan, hardware selection, and interference detection processes. The CBA also affirms its commitment to covering all other costs of the transition, such as the required filtering of earth stations throughout the continental U.S. as outlined in previous CBA submissions and the order of eight new satellites from U.S. manufacturers.

The CBA's proposal is the only one that balances the public interest in rapid 5G network deployment throughout the continental U.S. with the requirement by the FCC and C-band user



community to maintain satellite delivery for current services, providing continued operating efficiency and quality.

Speaking on behalf of the C-Band Alliance, Intelsat CEO Stephen Spengler said, "Throughout this nearly two-year process, we have sought to work collaboratively as peers, to be responsive to the goals of U.S. policy makers seeking spectrum for 5G, and to work closely with our customers to protect their transmissions and understand their current and future network needs. Over this time, compression technology has continued to commercialize. We are confident that we can deliver a solution that not only maximizes the clearing of mid-band spectrum to enable 5G in the U.S., but also fully funds a spectrally-efficient, next-generation compression infrastructure for programming distribution in the U.S. This solution represents unprecedented coordination among satellite operators, our customers, and the FCC, and we look forward to delivering to the U.S. an accelerated 5G deployment and the innovation and high-technology job growth that the deployment of 5G is expected to generate for the U.S. economy."

Forward-Looking Statements

The repurposing of up to 300 MHz of C-band spectrum is contingent upon a number of factors which at this stage cannot be guaranteed and their outcome is uncertain, including the following: (i) a final FCC Order that accepts the CBA's market-based proposal; and (ii) a satisfactory market-based process with potential terrestrial 5G users of the repurposed spectrum.

About the C-Band Alliance

The C-Band Alliance, or CBA, was established by Intelsat (NYSE: I), SES (Euronext Paris: SESG), Eutelsat (Euronext Paris: ETL), and Telesat to implement the safe and efficient clearing and repurposing of C-band spectrum, supporting the United States in its goal of leadership in 5G deployment and innovation. While implementing the breakthrough, market-based proposal to clear spectrum, the CBA will also protect the quality and reliability of existing C-band services, providing current users certainty and operational integrity. For more information, please visit www.C-BandAlliance.com.

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Resources

- [Ex Parte Filing](#)
- [CBA Fact Sheet](#)



October 28, 2019

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
Office of the Secretary
445 12th Street, SW
Washington, DC 20554

Re: *Ex Parte Submission*, GN Docket No. 18-122

Dear Ms. Dortch:

The C-Band Alliance ("CBA") files this letter to update its proposal in support of the FCC adopting a market-based approach to clear 300 MHz of C-band spectrum, inclusive of a 20 MHz guard band. More specifically, the CBA proposes to make more spectrum available for terrestrial 5G use—100 MHz of spectrum in 46 of the top 50 PEAs within 18 months of an FCC Order and 280 MHz throughout CONUS within 36 months from a CBA-led auction.

The member companies of the CBA have been working with their customers to ensure that sufficient C-band spectrum remains available for continued content distribution, while maximizing the portion repurposed for terrestrial 5G use within 18-36 months of an FCC Order and auction. These efforts have led the CBA to be able to increase from 180 MHz to 280 MHz the amount of spectrum available for terrestrial 5G use via its market-based approach; a 20 MHz guard band is retained to protect on-going satellite operations in the band.

This increase in the amount of spectrum proposed by the CBA to be cleared for 5G use is made possible by technologies such as advanced modulation, single format transport, and advanced video compression, including High Efficiency Video Coding ("HEVC"). Each of these technologies improves the efficiency of satellite video delivery, allowing the same video content to be transmitted over less spectrum. In fact, a number of video content distributors have already adopted or are in the process of adopting these technologies, including HEVC. The CBA's market-based plan makes it economically viable for those required to reduce their bandwidth usage to employ these technology upgrades because the CBA will pay the costs incurred by those customers adopting such technologies. The implementation costs related to the clearing of this increased amount of spectrum are expected to be between \$2.5 billion and \$3.5 billion.

Importantly, the CBA is committed to ensuring that all C-band satellite customers enjoy continued access to C-band satellite spectrum in an interference-free environment before, during, and after the transition of 300 MHz of C-band spectrum. The CBA member companies will retain all current C-band customer services and maintain the value and capability of C-band video distribution neighborhoods. In addition, the companies have provided updated, specific transition plans to their largest customers.

The CBA is committed to taking steps such that satellite operator customers enjoy continued access to 200 MHz of C-band satellite spectrum in an interference-free environment before, during, and after the transition of 300 MHz (including the 20 MHz guard band) of C-band spectrum. To that end, the CBA makes the following commitments:

- If deemed necessary by the CBA to clear 300 MHz, specific technology choices (e.g., HEVC, AVC), operating parameters (e.g., channel bit rates or modulation roll-off), and the selection of



equipment manufacturers for the purpose of clearing the 300 MHz shall be at the sole discretion of the programmer in every case;

- The CBA shall be fully responsible for all costs necessary to implement the reallocation of 300 MHz of spectrum, including, but not limited to, costs related to technology upgrades (e.g., HEVC, encoding systems, IRDs) for those customers identified by the CBA for such upgrades, antennas, filters, systems design and integration, and logistics, including payments to third-party service providers if needed;
- The CBA shall submit in the record of this proceeding an overall customer-anonymized fleet loading plan, a firm commitment to launching and deploying certain replacement satellites and the estimated dates by which such satellites will be in service, an updated customer commitment letter for those customers identified by the CBA for technical upgrades, and a transition plan describing how the transition will unfold and providing estimated costs and timelines;
- The transition plan will require the CBA to fulfill all deliverables necessary to implement the reallocation of 300 MHz of spectrum in accordance with agreed-upon timetables;
- The CBA agrees that the FCC must retain oversight and enforcement authority over the transition to ensure that the transition is prompt and that the CBA lives up to its customer commitments, and that use of the spectrum occurs in accordance with all applicable FCC rules and policies;
- The CBA shall make available to customers and their affiliates, at the CBA's cost, facilities at one or more of the grandfathered TT&C/Gateway locations, as needed, to downlink any transmissions in the 300 MHz cleared spectrum from satellites viewable from those TT&C/Gateway locations that customers or affiliates require access to in order to have comparable service as today. The CBA shall, at the CBA's cost, backhaul those downlinked transmissions to the customer or affiliate location that is currently downlinking those transmissions;
- The CBA continues to work with the FCC, C-band users, and other parties to develop technical solutions that allow for mobile production of C-band contribution and the downlinking of C-band confidence transmissions in 5G congested areas;
- The CBA commits to continue working with the FCC and industry stakeholders to develop rules for terrestrial 5G operations that minimize the likelihood that 5G transmissions will individually or in the aggregate create harmful impairments to FSS earth stations or to the services they convey. The CBA further commits to working with the FCC and industry stakeholders to develop effective interference prevention, detection, mitigation and enforcement procedures and rules for the benefit of satellite operator customers. The CBA further commits to working with customers to identify, document and attempt to resolve instances of harmful interference impacting video quality as may be relevant to enforcement efforts;
- The CBA continues to commit to its previous representations in the record of this proceeding concerning customer and user protections and interference rules.



Please contact the undersigned with any questions regarding this letter.

Respectfully submitted,

 /s/
Bill Tolpegin
Chief Executive Officer
C-Band Alliance

Cc: Chairman Pai
Commissioner O'Rielly
Commissioner Carr
Commissioner Rosenworcel
Commissioner Starks

CBA Proposes Clearing 300 MHz of C-Band Spectrum – Fact Sheet



The CBA Increases Its FCC Proposal to 300 MHz for Spectrum Repurposing in the U.S.

In 2018, the C-Band Alliance (CBA) filed a proposal with the FCC to voluntarily clear a significant part of the C-band spectrum in the continental U.S., which is currently used to provide nearly 120 million American households with TV and radio content. The original proposal focused on repacking existing services in their current format to the upper portion of the band.

Over the last several months, the CBA, in consultation with industry experts and customers, has analyzed, applied, and tested compression software and related signal enhancements, which can improve the efficiency of transmitting broadcast video signals over satellite. Having confirmed customer willingness to deploy these techniques, the CBA now proposes to clear 300 MHz (inclusive of a 20 MHz guard band) of the C-band in the continental U.S., or 60% of the total of 500 MHz allocated to satellite operations today, to enable a fast, nationwide roll-out of 5G.

Further enhancing its plan to clear spectrum quickly, the CBA proposes to make available for 5G use 100 MHz in 46 top metropolitan areas within 18 months of an FCC order, and 280 MHz throughout the continental U.S. within 36 months from a CBA-led auction.

The CBA Will Protect the Existing C-Band Video Ecosystem

In seeking to balance the need to clear a maximum of spectrum rapidly to enable the rollout of 5G with the need to protect the existing C-band video ecosystem, the CBA has worked closely with U.S. broadcasters and programmers that serve nearly 120 million American homes via the C-band. The CBA remains committed to ensuring that existing customers continue to enjoy the quality of service they experience now, with no interference from 5G services to be deployed in the future. The CBA member companies will retain all current C-band customer services and maintain the value and capability of C-band video distribution neighborhoods.

The CBA's Proposal is in the Public Interest of the U.S.

The CBA and its member companies have invested significant effort in recent months toward making these improvements viable. They also have engaged in extensive discussions with their customers to explore and accommodate each customer's specific needs. The CBA's proposal, grounded in the rapid application of technological innovation in the video transmission space, will benefit both the customers who will receive next-generation technologies and the mobile phone operators who will be able to deploy 5G services in a short timeframe. Finally, the speed with which the CBA's plan will enable the rollout of 5G will allow the U.S. to begin experiencing the economic benefits 5G is expected to bring.

The CBA's New Proposal Is Enabled by Advanced Compression Technology and Other Techniques

Advanced video compression technologies increase the efficiency of video transmission via satellite.

- Video signals by design carry redundant information. The Advanced Video Coding (AVC) and High Efficiency Video Coding (HEVC) technologies decrease the amount of information that needs to be transmitted by reducing the redundant information in the pictures, without degrading the overall video quality.
- A compression upgrade requires changes on both the encoder and the cable headend decoder via the installation of new hardware and/or software. Because the CBA will cover all costs associated with hardware and software upgrades, the C-band spectrum clearing proposed by the CBA will benefit content providers by delivering the latest video compression technologies at no cost to them.

Beyond compression upgrades, further efficiency in spectrum use can be achieved through additional techniques.

- Satellite modulation and coding improvements will be combined with improved coverage of the continental U.S. on the new satellites that Intelsat and SES will launch—if the CBA proposal is adopted—to improve spectrum efficiency and signal quality.
- The CBA will work with customers to encourage them to provide a single High Definition signal to a receive site, which will free up significant satellite transponder capacity by eliminating simultaneous satellite transmissions of the same video signal in several different formats (i.e., SD MPEG-2, SD AVC, HD MPEG-2, HD AVC).

While the new proposal will be more complex to implement, the C-Band Alliance will serve as the transition coordinator, bringing additional efficiency to the process.

Q&A

Is compression technology taking a risk with the content delivery ecosystem?

- No. Many of the largest users of satellite capacity adopt advanced compression technologies over time as part of their technology enhancements. The CBA proposal merely accelerates those decision points, made possible by the CBA's agreement to fully compensate the ecosystem for its compression costs.

What is the cost estimate to clear the spectrum?

- The total is now estimated at \$2.5 billion to 3.5 billion.

How many satellites will be built to clear 300 MHz?

- The new proposal requires eight satellites in total to supplement the capacity in the continental U.S. arc serving the existing media neighborhoods.



The C-Band Alliance (CBA) is composed of leading global satellite operators Intelsat (NYSE: I), SES (Euronext Paris: SESE), and Telesat. The role of the CBA is to implement the safe and efficient clearing and repurposing of mid-band spectrum in the U.S., accelerating the deployment of 5G services and innovation, serving all Americans. The CBA is designed to act as a facilitator as described in the companies' breakthrough, market-based proposal to clear a portion of C-band spectrum under a U.S. Federal Communications Commission (FCC) proceeding. Follow our mission...visit www.c-bandalliance.com. Follow us on Twitter at [@Cbandalliance](https://twitter.com/Cbandalliance) and on LinkedIn at [C-Band Alliance](https://www.linkedin.com/company/c-band-alliance).



October 29, 2019

The Honorable Greg Walden
Ranking Member
House Committee on Energy & Commerce
2125 Rayburn House Office Building
Washington, DC 20515

The Honorable Robert E. Latta
Ranking Member
Subcommittee on Communications & Technology
2125 Rayburn House Office Building
Washington, DC 20515

Re: October 29 Hearing – Repurposing the C-Band to Benefit all Americans

Dear Rep. Walden and Rep. Latta:

To win the all-important race to 5G and maintain our status as the world's economic leader, the United States must move quickly to make more wireless spectrum available for 5G deployment. To that end, we strongly urge the Subcommittee on Communications & Technology to support the C-Band Alliance (CBA) plan to reallocate a significant amount of mid-band spectrum through private auctions in the secondary market.

Speed matters in the race to 5G and the C-Band is the most readily available mid-band spectrum. Private auctions will put that spectrum into the hands of U.S. wireless providers much more quickly than other proposed alternatives. At the same time, the CBA's plan will protect the existing C-Band video and radio services currently used by 120 million U.S. households.

We cannot afford to delay the reallocation of C-Band spectrum. A recent analysis found that a two-year delay could mean a loss of nearly \$18 billion in consumer surplus. In addition, China has already pledged to make the full 500 megahertz of mid-band spectrum available to its wireless carriers. Other

countries including France, Germany, Japan, and Australia are also making the C-Band a key element of their 5G plans.

The economic benefits of repurposing the C-Band to speed 5G deployment will be enormous. Building the network infrastructure necessary to support 5G will drive \$275 billion in private sector U.S. investment, spurring \$500 billion in economic growth. More than 3 million new jobs will be created for American workers.

In addition to the advantages they will enjoy from a stronger, more competitive U.S. economy, taxpayers will also be protected by the CBA plan; the CBA has repeatedly pledged to make a significant contribution to the U.S. Treasury from auction proceeds. Conversely, U.S. tax revenues will diminish if the C-Band is not rapidly brought to market, as the economy will lose billions of dollars every additional year we fail to make it available.

We commend the Subcommittee on Communications & Technology for holding this hearing to explore mid-band spectrum options for speeding 5G deployment. It is truly one of the most crucial technological issues facing America today. We sincerely hope that as a result of your factfinding you will conclude that the CBA private auction plan holds the most benefits for our nation and join us in giving it your full support.

Sincerely,

Steve Pociask
American Consumer
Institute

Mark Jamison
Roslyn Layton
American Enterprise
Institute*

Jessica Melugin
Competitive Enterprise
Institute

Tim Chapman
Heritage Action for
America

Zach Graves
Lincoln Network

Tom Struble
R Street Institute

* The American Enterprise Institute (AEI) does not take institutional positions on any issues. The views expressed are those of the scholars.

Mr. Ross J. Lieberman

Additional Questions for the Record

**Subcommittee on Communications and Technology
Hearing on
“Repurposing the C-Band to Benefit all Americans”
October 29, 2019**

**Mr. Ross J. Lieberman, Senior Vice President of Government Affairs,
ACA Connects—America’s Communications Association**

The Honorable Adam Kinzinger (R-IL)

1. Mr. Lieberman, your testimony describes a number of concerns relating to the repurposing of the C-Band. Specifically, you state:

“Reducing the supply of C-Band spectrum ... will diminish the band as a pipeline for video delivery. It will become *less reliable, less capable*, and less affordable... Permitting...use [of] repurposed C-Band for 5G services will introduce new risks that video programming...will *suffer interference*,” (emphasis added).

As a point of clarification:

- a. When you use the term “interference”, did you mean to convey the term “*harmful interference*,” which is the legal standard to which the FCC must be held?

Response: I intended the term interference to include both harmful interference in the same band and harmful out-of-band emissions from an adjacent band. In both cases, the result can be to seriously degrade, obstruct, or repeatedly interrupt the reception of video programming by cable operators. The FCC has the authority and responsibility to cure both problems.

- b. In your opinion, how likely is it that the engineers at the FCC would approve a reallocation that would allow for harmful interference?

Response: There are many variables in play that would complicate the FCC’s efforts to implement a C-Band reallocation plan that accommodates all current C-Band incumbents, including cable operators, with protection from harmful interference and out-of-band emissions. As an initial matter, C-Band earth station filters capable of blocking out 5G licensees’ signals have not been developed, let alone tested in the field. Even when these hurdles are cleared, the FCC will need to set power limits and other service rules for the reallocated band. In doing so, the FCC will face the difficult task of balancing incumbents’ demands for strong interference protections with wireless carriers’ desire for more permissive rules that allow maximum 5G use of the band. And even if the FCC’s rules end up striking that balance perfectly, they cannot

Mr. Ross J. Lieberman

eliminate the risk that actual 5G operations in the C-Band will cause harmful interference to cable operators' reception of video programming. If and when such interference occurs, the operator may have limited recourse; it may be difficult to prove or even identify the offending party, and the latter may in fact be unaware that it is causing the problem. Though we would expect such incidents to get resolved in time, with or without FCC intervention, even brief disruptions of video programming create severe annoyances for customers, which threaten cable operators' bottom line.

In light of these concerns, among others discussed in my written testimony, ACA Connects has urged the FCC to implement a C-Band transition plan that gives cable operators the flexibility to use relocation funds to migrate from the C-Band to fiber-based video distribution alternatives rather than repack within the band.

Mr. Jeff Campbell

Additional Questions for the Record

**Subcommittee on Communications and Technology
Hearing on
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October 29, 2019**

**Mr. Jeff Campbell, Vice President, Government Affairs and Technology Policy,
Cisco Systems, Inc.**

The Honorable Adam Kinzinger (R-IL)

- 1. Mr. Campbell, for those of us who want to ensure rural providers have an opportunity growing out of C-Band, I’d like to hear your assessment of our options. Some of the plans propose to build fiber in rural areas.**
 - a. If the FCC chooses something other than a traditional public auction, what can we do to make sure that big and small carriers both have opportunities to acquire this spectrum and use it?**

Response: The FCC has various tools at its disposal that it can use or has used to ensure that a variety of participants could participate whether an auction is conducted by existing licensees or by the FCC itself. While the C-Band Private Auction proposal is now hypothetical in light of Chairman Pai’s announced choice for a public auction, the FCC could essentially use many of the same tools. First among them is the geographic size of the license areas. Private auction proponents set forth in the FCC record an extensive auction plan that would auction spectrum in 406 separate “Partial Economic Areas” – a definition used in many other spectrum auctions such as the Broadcast Television Spectrum Incentive Auction. Another possible choice, although not proposed by the C-Band private auction proponents, would have been Cellular Market Areas (Metropolitan Statistical & Rural Service Areas) of which (when last used) result in 734 licenses auctioned. These choices are neither the largest geography ever auctioned (e.g., the FCC auctioned a nationwide 700 MHz license) nor the smallest (e.g., the upcoming Priority Access Licenses for CBRS for each of 3000+ counties). The size of the license to be auctioned has a direct bearing on the affordability and desirability of the license for small carriers. In addition to size of the footprint to be auctioned, other tools used to enhance small carrier participation are how reserve prices are set for the licenses and bidding credits to small entities. Finally, the Commission could impose facilities build out requirements that would encourage larger carriers to sell rural holdings that would not be built out quickly.

Had a private auction been selected, the FCC could have engaged C-Band Alliance to determine if C-Band Alliance could adjust its auction proposal, and in any event, could have conditioned necessary FCC action (reallocation of the band, acceptance of the auction winners, etc.) on following the agency’s preferred approach.

Mr. Jeff Campbell

It's also worth noting that while allowing all willing bidders to participate is good, an auction design that is optimized to bring in revenue is important also, particularly if the revenue can be directed toward rural build out. For example, auction revenues could be redirected into universal service to support 3.55-3.7 GHz CBRS build out from qualified entities or as an add-on to the newly announced 5G fund. Particularly in rural areas, there is expected to be less pressure on the use of 3.55-3.7 GHz adjacent than in urban locations. Fueling development of that band directly addresses the need for mid-band spectrum for rural carriers.

b. Can the FCC ensure that satellite operators pay a fair share to the Federal Treasury?

Response: Yes. Had the private auction proposal been allowed to run its course, in our opinion, the likely outcome is that, prior to an FCC decision, the satellite proponents would have filed a summary statement of the commitments that they had collectively made in the docket. This would have supplemented the proponents' ongoing commitment to transparency, but also would have been a vehicle for the FCC to use as a basis for its decision. As the Treasury contribution was receiving significant attention, the FCC could have indicated its desire for a Treasury commitment, likely stated as a formula to reflect the still-unknown auction revenue. We would have expected the FCC to be quite clear that failure to honor commitments would result in the FCC not honoring the auction results. While such a rule would have triggered bidders to insist on certain legal protections for their winning bids until revised FCC licenses were finalized, this is not an insurmountable challenge.

The Honorable Bill Flores (R-TX)

1. The next generation of satellite providers such as Starlink or ABS-3A will bring a whole new set of innovative services to the telecommunication industry. It will also, however, bring along a whole new set of challenges in the use of our spectrum. As these technologies begin to enter the marketplace, the FCC will need a flexible regulatory regime that facilitates innovation and the continued creation of new services.

a. How important will it be for the FCC to find ways to cut down on the time required to auction spectrum?

Response: Your question goes to the heart of difficulties that we face as we think about how to wring the most out of our public airwaves going forward. There are four big challenges. First, as you point out, technology is changing more quickly than regulators can predict. Who knew a few short years ago that we would see huge constellations of small, non-geostationary satellites being launched to utilize the Ku-band and the C-band? For terrestrial technology, how could we have predicted even a few short years ago the large bandwidths needed to support 5G and Wi-Fi 6 next generation technologies? The second challenge - how do you manage a Table of Frequency Allocations so that regulators can flexibly provide for innovative new technologies, while providing as much predictability and certainty for existing users as they can? Third, how do you manage a Table of Allocations that in part is regulated by the FCC and in part controlled

Mr. Jeff Campbell

by the federal government? And finally, how do assure that spectrum is assigned (by auction or otherwise) as quickly as possible and yet still consistent with Administrative Procedure Act principles and requirements? The Administration has before it a National Spectrum Strategy, which – when finalized – may begin to answer some of these questions. Hopefully, that document will enable us to start to work toward spectrum planning so that each issue that arises does not feel like a new mountain to climb.

Ms. Deborah Collier

Additional Questions for the Record

**Subcommittee on Communications and Technology
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October 29, 2019**

**Ms. Deborah Collier, Director of Technology and Telecommunications Policy,
Citizens Against Government Waste**

The Honorable Adam Kinzinger (R-IL)

1. Ms. Collier, you state in your testimony that “only the FCC may legally conduct any auction of publicly-held spectrum.” But I would venture to guess that you have been hearing the same things that members of this Committee have been hearing about what a final proposal may look like. The FCC is almost certainly not going to rubber-stamp the C-Band Alliance proposal—or any proposal for that matter.

Given that Section 309(j)(6)(E) of the Communications Act provides that “nothing in this subsection...relieves the Commission of the obligation in the public interest to...use engineering solutions, negotiation...and other means,”:

- a. How would a “hybrid” mechanism in which the FCC sets the terms and carefully oversees the process be illegal?

Response: As Congress is aware and as noted in my testimony, proposals for the c-band spectrum have been offered by various organizations and corporations, including the C-Band Alliance, who are potential bidders or existing incumbents using the spectrum for transmission of data signals between satellites and fixed earth stations. Citizens Against Government Waste (CAGW) had long been opposed to a private sale of this spectrum and was therefore pleased with Federal Communications Commission (FCC) Chairman Ajit Pai’s announcement on November 19, 2019 that the FCC would be voting in early 2020 to approve an order to conduct a public auction of the spectrum within this band, with comments being sought on the auction procedures.

Under Section 309(j)(6) of the Communications Act of 1934, “Rules of Construction,” the FCC cannot abdicate its responsibility in conducting an auction of publicly-held spectrum to protect the public interest. Section 309(j)(6)(E) specifies that nothing in this subsection, or in the use of competitive bidding, shall “be construed to relieve the Commission of the obligation in the public interest to continue to use engineering solutions, negotiation, threshold qualifications, service regulations, and other means in order to avoid mutual exclusivity in application and licensing procedures.” Nothing in this section suggests that the FCC has the ability under current law to contract with a third party to auction taxpayer-owned, publicly-held spectrum.

Ms. Deborah Collier

Section 309(j)(3) sets forth the FCC's regulatory authority for designating the design of a system of competitive bidding for publicly-owned spectrum licenses to be auctioned by the FCC. This section requires the FCC to ensure that safeguards are included in the process that promote the following objectives: "(A) the development and rapid deployment of new technologies, products, and services for the benefit of the public, including those residing in rural areas, without administrative law judge delays; (B) promoting economic opportunity and competition and ensuring that new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women; (C) recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource; and (D) efficient and intensive use of the electromagnetic spectrum."

The hybrid solution discussed in news reports surrounding this portion of spectrum, as well as legislative proposals like Rep. Doris Matsui's (D-Calif.) bill, H.R. 4171, suggest that the FCC should have the authority to designate an agent to act on its behalf in auctioning publicly-held spectrum. If Congress deems this to be in the best interest of the American people, then the Communications Act of 1934 must be amended to give the agency the option to provide an ancillary oversight role in the spectrum auction process and a third-party contractor to conduct some or all auctions. This would subvert the very successful public auction process conducted since 1994 by the FCC, which has garnered more than \$120 billion in revenues to the Treasury.

Should Congress decide to take this route for repurposing and auctioning licensed spectrum for c-band and other proceedings, there should be strong guardrails against conflicts of interest for the third-party designee that may arise within the bidding process. This would include a prohibition on designating as the third-party auction contractor incumbent users or potential license bidders that have a vested interest in the sale of the spectrum licenses to be auctioned.

As I noted in my testimony, incumbent users of this spectrum band should be reimbursed for their transition costs. However, as affirmed during questions and answers by the full FCC panel at the Energy and Commerce Committee's December 5, 2019 hearing on "Accountability and Oversight of the Federal Communications Commission," all proceeds from an FCC-conducted auction must be deposited into the Treasury, and any reimbursement for relocation costs or other uses from the proceeds must be authorized by Congress. But, given the FCC's decision to move forward with a public auction, it appears the hybrid solution is moot.

Mr. James B. Frownfelter

Additional Questions for the Record

**Subcommittee on Communications and Technology
Hearing on
“Repurposing the C-Band to Benefit all Americans”
October 29, 2019**

Mr. James B. Frownfelter, Chairman and Chief Executive Officer, ABS

The Honorable Adam Kinzinger (R-IL)

1. **Mr. Frownfelter, I appreciate the perspective you offered through your testimony, and I think the Commission should carefully consider the submitted comments of the Small Satellite Operators—and really, all the stakeholder submissions—as they proceed. However, like the CBA’s plan, the SSO plan lacks some definition with respect to revenues or other payments to the Treasury.**
 - a. **Would you like to take this opportunity to clarify the position of the SSOs? Is there either a payment “floor” or minimum percentage that the SSOs feel should be directed to the Treasury?**

Response: The SSOs believe it is critical that (1) 300 MHz of C-band spectrum be quickly repurposed for 5G through an FCC-run auction; (2) taxpayers benefit from the proceeds of the transition through ESO incentives and a substantial payment to the U.S. Treasury; and (3) satellite operators be fairly compensated for the loss of 60% of their rights to use C-band spectrum, because if satellite operators can have their spectrum use rights taken without just compensation, so can the operator of any wireless network – and this would undermine all future investments in wireless infrastructure.

The SSOs have proposed from the beginning of this process that taxpayers be substantially compensated both indirectly through incentives paid to U.S. Earth Station Operators (ESOs) and directly through a substantial payment to the U.S. Treasury.

The CBA has estimated that there are 35,000 U.S. Earth Station Operators affected by the C-band transition, the vast majority of which provide telecommunication connectivity to our rural communities. By incentivizing each licensed ESO to effect the transition of carriers currently utilizing the lower C-band spectrum in as timely a manner as possible, Congress can achieve two objectives: 1) accelerate the transition to roll out 5G services as quickly as possible, and 2) inject much needed funding directly into U.S. rural communities that each ESO can deploy to bridge the U.S. digital divide.

Specifically, the SSOs believe that the ESOs and the US Treasury payments should equal approximately 50% of the proceeds from the auction.

Mr. James B. Frownfelter

The Honorable Bill Flores (R-TX)

1. **The next generation of satellite providers such as Starlink or ABS-3A will bring a whole new set of innovative services to the telecommunication industry. It will also, however, bring along a whole new set of challenges in the use of our spectrum. As these technologies begin to enter the marketplace, the FCC will need a flexible regulatory regime that facilitates innovation and the continued creation of new services.**

- a. **How important will it be for the FCC to find ways to cut down on the time required to auction spectrum?**

Response: The SSOs believe that, generally speaking, the Commission has done a remarkably good job running spectrum auctions. But, of course, the faster it can conduct an auction the faster spectrum can be repurposed and new licenses issues. As new technologies and innovative uses of spectrum proliferate, speed becomes even more important – and Congress should make sure the Commission has the flexibility and resources it needs to move quickly.

Mr. Phillip Berenbroick

Additional Questions for the Record

**Subcommittee on Communications and Technology
Hearing on
“Repurposing the C-Band to Benefit all Americans”
October 29, 2019**

Mr. Phillip Berenbroick, Policy Director, Public Knowledge

The Honorable Adam Kinzinger (R-IL)

1. **Mr. Berenbroick, you recommend in your testimony that the FCC pursue a “traditional forward auction, repack incumbent satellite users into the upper portion of the band, and require auction winners to reimburse incumbents for eligible and reasonable costs.”**
 - a. **When you say “incumbents” should be reimbursed, do you mean the C-Band Alliance members only? Or should members of the Small Satellite Operators also be reimbursed for their licenses and the investments they have made in satellites and earth station facilities?**

Response: The Commission has broad authority under 47 U.S.C. § 316 to modify licenses. Modifying the licenses of the incumbent satellite operators in a way that permits more efficient use of the C-Band while not harming the ability of satellite users to deliver video programming is well within the Commission’s statutory authority.

The quickest and most straightforward way for the Commission to make C-Band spectrum available for mobile wireless use, consistent with the agency’s authority and precedents, is for the FCC to modify existing C-Band licenses and hold a public auction of the lower portion of the Band. The Commission should direct winning bidders to negotiate with and reimburse incumbent satellite users for eligible and reasonable costs they incur for relocation into the upper portion of the band.

CBA’s filings with the FCC demonstrate that the incumbent satellite operators can clear up to 300 megahertz of lower C-Band spectrum without diminishing their business. Chairman Pai has announced the Commission will auction 280 megahertz of C-Band spectrum, leaving the upper 200 megahertz of the band available for the continued delivery of video programming. Transition costs that are eligible and reasonable and deemed reimbursable should be contingent on those costs being necessary for repacked satellite users to continue to deliver their current level of video programming. Because small satellite operators do not offer domestic fixed satellite service and their business operations are unlikely to be affected by the auction and repack, they are unlikely to incur eligible and reasonable transition costs.

Mr. Phillip Berenbroick

2. Separately, your testimony states concern that the CBA's plan excludes small and rural broadband providers. Given the FCC's stated mission and bipartisan record on improving access to rural broadband:

a. In your opinion, what is the likelihood that the Commission would approve a plan that does not accommodate smaller and rural providers through bidding credits or some other set-aside?

Response: Under 47 U.S.C. § 309(j)(4)(d), the Commission is required to ensure that small businesses, rural businesses, and women and minority owned businesses have the opportunity to compete for licenses. The Commission is directed to consider the use of tax certificates, bidding credits, and other measures to comply with Congress' goal. Chairman Pai's announcement in November 2019 that the Commission would conduct a public auction for C-Band licenses was a critical step for ensuring that Congress' intent is followed so small, rural, and women and minority businesses have the opportunity compete for C-Band licenses.

A traditional FCC-run auction will include rules that are subject to a transparent notice and comment process. As a result, the public and policymakers will have an opportunity to request the Commission adopt auction rules, license areas, and limits on spectrum aggregation to promote participation and license acquisitions by small, rural, and women and minority owned firms. This transparent, public process is a critical difference between a traditional FCC-run auction and the opaque and untested proposals by CBA.