UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

COMMERCE SPECTRUM MANAGEMENT ADVISORY COMMITTEE (CSMAC) MEETING

Via Teleconference
Tuesday, July 18, 2023
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MR. RICHARDSON: Good afternoon, everyone, and welcome to the Commerce Spectrum Management Advisory Committee meeting. Of course, my name is Antonio Richardson and I'm the Designated Federal Officer of this committee. I'd like to put out a couple of housekeeping notes. For those on the phone who are using the Teams, by all means, use *6 to unmute yourself if you need to speak or want to speak. And if not, I need everyone to put their phones on mute if you're not talking that way we don't have any interruptions. Second, this meeting is being recorded to assist with the drafting of the minutes and attendees volunteered participation in the meeting demonstrates consistent to this recording. And now, I will turn this over to our CSMAC co-chairs, Ms. Charla Rath and Ms. Jennifer Manner. MS. MANNER: Thank you so much, Antonio. And I just want to welcome everyone to the Tuesday, July 18th meeting of the Commerce
Spectrum Management Advisory Committee. We wanted to first, before we give our opening remarks, we wanted to turn the floor over to Alan Davidson, who's Assistant Secretary of Commerce for Communications at the National Telecommunications and Information Administration for some opening remarks, please.

MR. DAVIDSON: Well, thank you, Jennifer. And good afternoon and welcome to this meeting of the Commerce Spectrum Management Advisory Committee. And it is really great to see you all and to be here together with so many of you in person. And I had not realized, actually, until we were headed over here, I was surprised at how many folks were here in person and I didn't realize this was the first meeting in person since before the pandemic. So, it is really nice to be able to reconvene and to see so many of you and folks who've traveled in.

And I want to start by just first of all, thanking our co-chairs for your leadership and your service here in gathering this group and
corralling all of us. And also, whether you're here in person or joining remotely, I'm grateful to all of you for your ongoing work for the subcommittee reports that we're going to be talking about today and really looking forward to a productive meeting.

Actually, I apologize, I have to leave at the bottom of the hour but I was reviewing the reports last night. And I said to Coop that I should have really should have blocked out more time because (inaudible) -- there we go. We were talking about the hybrid meetings. They're wonderful. And let me just also say a quick thank you to our host today Bryan and the folks at Wilkinson for our private venue today and the La Croix.

So, to start I thought maybe just a very quick update on what NTIA has been up to lately. And this is a busy time for us, really busy time. And this summer slowdown that people talk about in Washington, D.C. we have yet to really experience it. We're hoping for August, but we'll see. We
continue to make progress on a number of different major policy efforts. I'll just update you on a few of them.

First, I just wanted to say we're, you know, a top priority for us in this space, we hard at work on developing a national spectrum strategy. We're deep in it now. I think you know that. We received a lot of input from both within and outside the federal government. We're making sure to, you know, we're working to make sure that that (inaudible) -- we're working very closely with the White House, OSPP, NEC, the National Security Council. I would just say people are deeply engaged right now.

And we've actually teased this up in some ways, you know, we are committed to -- we said we were going to get this report out this year. We really wanted to make sure we're surfacing issues early in our own internal processes, and the good news is we are. The bad news is we are. You'll hear more about this from Scott. And we're working very closely I should
say with our partners, the FCC, the other agencies, the other Federal agencies who have equities here. And it's a very -- it's a full-on discussion right now.

Scott Harris has been our fearless leader in this effort. He's going to give you a much deeper dive on our current status and some of the big issues that are coming up. But I just want to say it is a top priority for us and we intend to complete this report by the end of the year. That is our commitment.

My second big update is just I wanted to mention the exciting, a new initiative at NTIA, exciting initiative which is the $1.5 billion Wireless Innovation Fund that we're managing and have just launched this year. As many of you know, this fund will promote development of open and interoperable wireless networks. Last month, we received grant applications for our first notice that has gone out earlier in the spring. More than 120 applications requesting over $1.3 billion in this first round of awards. For us,
that's really overwhelming interest. We had
planned to give out -- I said we are planning to
give out awards of up to about 10 percent, $140
million in this first round of awards. So, we're
kind of almost 10X oversubscribed, which is both a
good problem to have and it's going to make our
job difficult.

I will say, we are on track. We have
said we're going to do a first set of grants, a
first tranche of grants in early August. And then
a second round of the grants for this first round,
first NOFO after that. And I'll just say, the
grant applications are terrific. It's an
important effort to drive competition, strengthen
the supply chain, improve our resilience and
really ultimately we are looking towards
innovative choices for wireless equipment and
excited about the possibilities here.

And third and finally, I feel like I
would be remiss if I didn't mention the major
milestone that NTIA has reached in our mission to
connect everyone in America with an affordable,
reliable, high speed Internet service. It is a once in a generation project. We were at the White House just last month with the President. The President announced how much each state and territory we're going to get in our $42 billion state grant program. And it was an exciting moment. I have to say a real milestone in that program and in our execution of that program in partnership there again with the FCC and their mapping efforts, with a huge number of stakeholders at the state and local level across the federal government and we delivered on it five days earlier than we had announced that we would. So, that's always good to see the team executing well.

Now, the hard work actually begins on this project in the states. The attention will turn to the states. We've told the states how much money they're going to get. Nineteen states will get over $1 billion in this grant program. And they have to put together initial plans, which they will be submitting to us to show how they're
going to use this funding to connect everyone
within their borders.

So, we're really excited about reviewing
those plans, moving this closer this dream of the
Internet for all are closer to a reality. And I
really do believe we will look back on this 10
years from now, 20 years from now and say this is
really the moment that we've stepped up as a
generation to close the digital divide, finish the
work that was begun, and it's a turning point in
this long effort around digital equity and
connectivity. So, we're very, very excited about
the progress there.

And by the way, I should say I wanted to
mention it here because we really do believe that
the conversations here are an important part of
understanding how we're going to meet the need out
there, how we're going to connect everybody. We
fully expect that across the states, fixed
wireless is going to be -- and other technologies
are going to be part of the solution for many,
many states. And we want to make sure that we're
thinking with all of you about where the
technology is going and thinking about the future.

So, I shared about where we've been. I
want to give you a quick preview of where we're
going. Top of mind for us is the upcoming World
Radio Communication Conference, or WRC, as you all
know, this fall in Dubai. As you know, this will
help set up the global framework for spectrum
allocations to come and use for years to come in
key markets such as broadband wireless and NGSO
satellites. The final CITEL preparation meeting
will held in Ottawa late next month. The other
regional groups also will make their final
proposal decisions during and after the meetings
that are being held in August and September. And
then WRC itself will kick off in just over four
months from today.

So, we really are in the homestretch. I
know many of us are spending a significant amount
of time and effort on preparations as we approach
the conference and I'm just saying now is the time
to buckle down on that work as we are doing.
So, in conclusion, I'll just say we have a ton going on, a lot is going on. It's only going to get busier as the fall approaches. With that in mind, I want to thank you all again for your time this afternoon, for taking time out of your busy schedules, the work that you're doing, for your dedication to this work here at CSMAC helping us helping the country think about the future in this important space.

So, we rely on your work and I want to thank you for all that you're doing and I look forward to hearing more from you all today. I think we might have a couple minutes for questions. It's sort of I'll defer to the chairs if they want to -- if we want to do a couple. We can move on or I'm available and do some questions from the committee.

MS. RATH: If you have questions, just a reminder since it's been a while since we've been here, tent up if you have questions. But also, since several of the members are on the phone, we will also just break in and ask you at the end if
there are questions when we're finished here. So, I don't think there are any questions here.

MR. DAVIDSON: Yeah, they're no requirement for it.

(Laughter) It was just like I was just sort of feeling I'm here, I'm with you. If anybody had any comments or questions, I didn't want to --

MS. RATH: Just double checking if there is if anyone -- any of the CSMAC members on the phone have questions.

MR. RICHARDSON: No.

MS. RATH: Great.

MR. DAVIDSON: I think with that I'm turning it back over to you.

MS. RATH: Thank you. Thank you very much, Assistant Secretary Davidson, for your remarks. I listened to it and I'm a little scared to hear what Scott has to say because it already sounds like we've got a lot on our table. So, you know, I've spent a good portion of my career in
this field and I keep thinking that someday, you know, spectrum world will quiet down and it --

SPEAKER: The conference is now in silent mode.

MS. RATH: (Laughter) That scared me. Yes, it did. I think a voice from above.

So, before moving into just a couple of housekeeping type things, I just want to say how nice it is to be sitting here in person. As you just mentioned, it has been over three years since we were here and I was actually co-chair with a different Jennifer at that point. (Laughter) But it is -- and a couple of you who are sitting here in the room have actually never done an in-person meeting. So, welcome to the -- I think it's just the two of you and there are several new people on the phone. So, we'll have to wait for you to join us the next time to get the real feel of what it's like to be in the mix in the CSMAC meeting.

I almost feel like I have to welcome the new members again. But so welcome, thank you.

Thank you for being here. Just a couple of quick
housekeeping items maybe only one, which is if you need the restroom, Bryan it's out right -- right through the lobby and then through the door, yeah. And somebody at the front desk can help you if you get lost.

And I'm trying to think. I think that was it for housekeeping. So, we're nearing the end of our session. So, we've already actually heard from one of the subcommittees and we've got three more by the end of the year. And needless to say, as you will hear in a few minutes, and I know many of you are sitting at this table have been involved in multiple subcommittees, it has been a very, very active year with a lot of work that's being done by, you know, both the subcommittee co-chairs, as well as the members.

So, right now, we continue to be little bit in the gathering phase, but we're moving into the analysis and getting ready for recommendations. The first set of draft recommendations, as everybody knows, will be at our next meeting, which I don't know whether can
we announce when the next meeting is? Or would you rather hold off?

MR. DAVIDSON: Yeah, maybe identify it as tentative.

MS. RATH: Tentative.

MR. DAVIDSON: Yes.

MS. RATH: Tentatively set for September 21st also the same timeframe 3:00 to 5:00. So, what we're, you know, we're going to be moving into the states pulling together the recommendations for NTIA, which of course is when the real fun begins and you get to see, you know, just where everybody stands and how we work that out. And it is a very -- it's -- it is a very consensual type of process but it also, you know, it can get kind of interesting sometimes, so.

I also wanted to mention in a slightly unusual move because the CBRS committee, subcommittee has a pretty daunting task and only started in January, we made an additional -- we've actually asked Jennifer McCarthy to join as a co-chair. So, we'll have three co-chairs. She
will be joining Mariam and Patrick as co-chair.

Jennifer, I think is on vacation so she's not able
to join us today. So, thank you, Jennifer.

I've already thanked her but I just wanted to make
sure people knew that that was going to happen.

So, I've already reminded you to, you
know, use your tent card and we will, you know,
pick people in order that they've actually
responded. It's actually easier on Teams to do
that because you can see the order that people
responded. But we'll keep an eye on it. Over to
you, Jennifer, for your remarks and roll call.

MS. MANNER: Thank you. And I want to
thank Wilkinson as well for hosting us, and the
Assistant Secretary for his remarks. And once
again, it's a thrill to see folks who are here in
person in person. It's nice to be in the room
where it happens. I think that's the quote I was
just in Schuler's House this weekend in upstate
New York, so I feel a special akin to Mr.

Hamilton. I won't sing though, I promise. Thank
you.
So, with that just want to take our attendance to see who's here. So, I'll start if you can just say aye including for the folks on the phone if you can say aye that would be helpful. Jennifer Alvarez? Okay. Reza Arefi? Donna Bethea-Murphy? All right, are people muted?

MR. RICHARDSON: No, they shouldn't be muted.

MS. MANNER: Okay. So, I'll just try one more time. Are Jennifer --

MR. RICHARDSON: A couple of those already sent me an email telling me they won't be able to make it.

MS. MANNER: Okay. So, I don't have Jennifer, Reza, or Donna, all are not on. Okay. Hilary?

MS. CAIN: Aye.

MS. MANNER: I saw Michael Calabrese.

MR. CALABRESE: I'm here.

MS. MANNER: I saw Thomas Dombrowsky --

MR. DOMBROWSKY: Aye.

MS. MANNER: -- in here somewhere. Mark
Gibson?

MR. GIBSON: I'm here.

MS. MANNER: I saw that. Dale Hatfield?


Paul Margie, are you on the phone?

MS. RATH: May I interrupt? Apparently some people are trying but cannot hear on the phone.

MR. RICHARDSON: Yeah, I just got a --

MS. RATH: Just so you know. Sorry to interrupt.

MS. MANNER: They can't hear?

MR. DAVIDSON: They can them --

MS. RATH: Well, what I --

MR. DAVIDSON: -- or they just can't see?

MS. RATH: -- well, what was texted to me was trying to respond but cannot hear on either the phone or Teams.

SPEAKER: Yeah, I'm dialed in. I don't hear anything from this room.

MR. DAVIDSON: Oh, really?
MS. MANNER: We'll wait to see what Antonio tells us.

MR. DAVIDSON: Make sure the mic is on.

MS. MANNER: Yeah, I have my mic on.

MS. RATH: Mic on.

MS. MANNER: So, Antonio, should we take a two-minute pause while you -- or do you want me to keep going? What would you prefer?

MR. RICHARDSON: Tell you what, let's just keep going.

MS. MANNER: Okay.

MR. RICHARDSON: I'll have them let me know if they're on here while I'm troubleshooting.

MS. MANNER: Okay. Thank you. So, I'll keep track of who we have to go back. Jennifer McCarthy I believe isn't here. Karl Nebbia, I saw Karl. Louis Peraertz? He would be on the phone so he may not be able to speak. Danielle Piñeres?

Also, on the phone. I know Charla's here since she's sitting next to me. Glenn Reynolds, yes. Okay. Dennis Roberson? Okay. Andrew Roy?

MR. ROY: Yep.
MS. MANNER: Yeah. Jesse Russell?
Steve Sharkey?

MS. RATH: He may not be here.

Bob Weller, yes.

MR. WELLER: Yes.

MS. MANNER: Patrick Welsh?

MR. WELSH: Here.

MS. MANNER: Yes. And David Wright?
So, Antonio, I've gone through and tell me if you want me to do anything, redo anything with other people. Oh, who is that?

MR. WRIGHT: This is David Wright. I just got a text from NTIA. They could hear us but they can't speak.

MR. RICHARDSON: Yeah.

MR. WRIGHT: Which is better than the other way around. (Laughter)

MR. RICHARDSON: Okay. Can you guys here us on the phone?
MR. WRIGHT: Hello? Can you hear me?
MS. MANNER: I can, but I don't know who it is.
MR. RICHARDSON: Who was that?
MR. WRIGHT: It's Dave Wright. I am present and you have to hit *6 to speak if you're dialed in.
MR. PERAERTZ: Louis Peraertz is here.
MS. MANNER: Okay, thank you.
MR. RICHARDSON: Thank you. I'll say it one more time. Again, for you all on the Teams, please hit *6 to unmute and talk.
MS. MANNER: Okay. So, I'm going to call again for the people who I didn't have as present. Jennifer Alvarez? Reza Arefi? Donna Bethea-Murphy?
MS. RATH: I know she's on.
MS. MANNER: Okay. So, I don't know what is --
MR. RICHARDSON: Yeah, she's on.
MS. RATH: Based on the texting.
MS. MANNER: Dale Hatfield?
MR. DAVIDSON: Dale I know is on also.

MR. RICHARDSON: Yeah, he's on.

MS. MANNER: He's on? Okay.

MR. DAVIDSON: Lily says I hit 6 and it didn't work, so.


MR. MARGIE: I'm here. Can you hear me?

MS. MANNER: Okay. We, can. Yay.

(Laughter) Jennifer McCarthy?

MS. RATH: Jennifer is not.

MS. MANNER: On vacation I believe.

MR. RICHARDSON: Dave Wright said *6 worked for him.

MS. MANNER: Okay. Danielle Piñeres?


MR. RUSSELL: I'm here.

MS. MANNER: Oh, great. He's here.

Steve Sharkey?

MS. RATH: I think he's out of the office.
MS. MANNER: Okay. And then I have --

MR. DAVIDSON: No, Steve is here.

MS. RATH: I think he's out.

MS. MANNER: Okay. Steve's here?

Thanks. Okay. So, I think I have everyone now.

Okay. So, with that, a very complex roll call. I apologize. So, with that without further ado, I'd like to turn the floor over to Scott Blake Harris who's a senior advisor -- Senior Spectrum Advisor -- I'm sorry -- at the National Telecommunications and Information Administration and has been running development of the National Spectrum Plan. And I think we're all very interested to hear what you have to say, Scott, so, over to you.

MR. HARRIS: Well, after the lengths (inaudible) (Laughter). So, I can't tell you guys how happy I am to be back downtown, particularly at WBK where they apparently name conference rooms after former partners. I've walked around Bryan and I'm just saying.

MR. TRAMONT: We're working on it.

(Laughter) You weren't here either, Scott.
MR. HARRIS: Open the door, counselor.

So, maybe I'm going to look forward to going back to commerce again. One of the things I've learned in my year at NTIA is how many successes there are that pass relatively unnoticed, or at least NTIA's role goes largely unnoticed. And so, with your indulgence, I'd like to take a moment, if you don't mind, to note just a few matters where my OSM colleagues played what I think was a critical role in important spectrum developments.

You will notice particularly if you were traveling on July 1st, the date on which wireless carriers could expand into the upper portion of the C-band, there was no discernable disruption either to cell service or to airplanes. That wasn't random. OSM worked with our colleagues at the FAA and the FCC, as well as our friends in the private sector, to help find the solutions that address the issues that arose over the use of that band.

And the OSM team also worked with our
colleagues at DOT, and the other executive branch agencies, and our friends in the private sector, enabling the FCC to move forward on CV2X smart transportation technology. Similarly, the OSM team worked with the Commission and the executive branch agencies allowing the FCC to put in place new rules at 60 gigahertz enabling the development of short-range radar systems, including onboard UAVs.

We talk a lot about the spectrum strategy, which is great. And we talk a lot about spectrum reallocation and we talk about the WRC which is necessarily. But the OSM team is quietly helping resolve tough spectrum sharing issues every day, every day. They are amazing. And I just wanted to take a couple minutes to say so publicly, particular with Charles and Derrick and John here. (Applause)

SPEAKER: If you don't mind me, I would say Ed Drocella and Nick LaSorte too. (Applause)

MR. HARRIS: Yeah, hiding behind the column. I didn't see them but absolutely.
So, turning briefly to the spectrum strategy, I think you all know about the outreach we did. The RFC, with 140-plus comments, two listening sessions, two tribal consultations, endless one-on-one meetings, which by the way are still going on, additional supplemental filings by just about everybody. And I have to say, we were surprised, not to mention a little bit gratified by all of the public interest in what we are doing.

The other thing I want to say, it has in fact had a substantial impact on our thinking. We thought we knew everything going into this. Maybe that's an overstatement. We didn't know nearly as much as we thought we did. And hearing from the public really made a bid difference. And as I'm sure everyone in this room understands, our interaction with the public is only half the process. We are spending a lot of quality time with our friends in the interagency community. And we are going to continually be doing that for the next few months.
So where are we now? Even as we continue to solicit and receive input from the public, we are busy drafting and already redrafting the strategy. We have a discussion draft, which we continue to work on. As Alan said, we intend to complete and release the strategy by year end. We expect the strategy to have four pillars. First, we hope to focus on improving long-range planning, communication, and coordination among the government agencies, which is sort of the minimum. But also, critically, between government agencies and the private sector. We need a better system for the private sector and the government to communicate on these issues.

One goal is to avoid the reactive crisis management that has sometimes followed piecemeal, uncoordinated efforts to address spectrum allocation and related issues. Another goal is to avoid waking up every two years and say, oh, my God, we have to do something to start a new process for spectrum reallocation. It should be a
continuous open transparent process not something
every two years go oh, my God, we got a problem.

We are also giving a significant amount
of thought, and if anyone feels they have
something to say about this, we're still open to
comment as I mentioned. A significant amount of
time to figure out how we can leverage the CSMAC
to work as part of this process.

Second, as I've said many times and I'm
sure all of you have heard, we intend to identify
at least 1,500 megahertz of spectrum for study in
the near term, to see what repurposing is
possible. Obviously, it does not mean we can or
will repurpose all 1,500 megahertz of spectrum
that we study. But study we will.

We also want to note this isn't a
one-off exercise. We're not going to identify the
1,500 megahertz of study and stop. We are
definitely not doing that. We are going to
identify opportunities for repurposing in the out
years to begin the process such that the spectrum
pipeline we hope never runs dry.
Third, we're going to focus on leveraging technology to achieve more effective spectrum management and more efficient spectrum use. We believe that we are in just the beginning stages of utilizing dynamic spectrum technologies and tools to boost sharing and opportunistic access to spectrum. And finally, we have heard from many commentators, and I don't think we expected this, that we need a strategy for workforce development and professional empowerment. So, we plan to focus on that as well.

So, that's it for now. I don't want to delay any further you getting on with your work and your reports. But I appreciate the opportunity to catch you up on OSM and the spectrum strategy and I will be here at the end if you all or folks on the phone have additional questions. But in the meantime, I'll turn it back over to you all and you can get on with the business of the meeting. Thank you.

MS. RATH: Thank you. Thank you, Scott.
I'm looking forward to seeing that at the end of the year. And actually, am particularly interested in the workforce development because that has continued to come up in a lot different places. So, I'm glad to see that you're going to be looking at that as well. You're here so you can take questions later --

MR. HARRIS: Yes.

MS. RATH: -- if you want? Okay, great.

So, we'll move on to the reports of the subcommittees. The first one up is the CBRS Subcommittee. And I just wanted to mention because I don't think the reports were sent around to folks. So, we here in the room can actually see them up here but if you're -- wait a minute, Antonio has his hand raised, so.

MR. RICHARDSON: Sorry, I don't have a tent card.

MS. RATH: Do you have a microphone though so you?

MR. RICHARDSON: No, I think you guys can hear me. I'm pretty loud.
MS. RATH: But I don't know whether the people on the --

MR. RICHARDSON: I think they do. When you guys get ready to talk in the room or on the phone, please announce your name before speaking so that way we can capture it in the minutes, please.

MS. RATH: Thanks. Thanks, Antonio.

MR. RICHARDSON: Thank you.

MS. RATH: Charla Rath. I just wanted to -- what I was trying to tell people on the phone, is you can actually look up the reports on the CSMAC website. They have been posted on the website. So, if you want to follow along on the phone. And, yes, now I'm going to turn it over to Mariam. And when the questions come up, Mariam and Patrick, afterwards when -- usually when we're on the -- on a Zoom call or on a Team call, Jennifer or I will manage it. But I think here it's if you want to just manage the questions that come up to your report, that would be great. And turn it back over when you're done.
MS. SOROND: The reports were not distributed?

MS. RATH: Apparently not, no. They were not distributed. So, people who are on your subcommittee have seen them. And those people who are on the phone can actually just log onto the CSMAC website. Antonio has another comment.

MR. RICHARDSON: Yeah, the other thing is I'm actually sharing the slides out on Teams as well.

MS. RATH: Oh, okay, good. Thanks. So, you'll be able to see them there too. Thank you. Now, over to you, Mariam.

MS. SOROND: Okay. Well, thank you, Charla, Jennifer, the NTIA, WBK. On behalf of myself and Patrick, great to see everybody in person. I'll start and then, Patrick, feel free to chime in to add to what I will be presenting today.

So, let's start actually with our first slide talking about our CBRS Subcommittee Members. Co-chairs of the subcommittee are Mariam Sorond
and Patrick Welsh. We have our wonderful NTIA liaisons with Nick LaSorte and Ed Drocella. Our FCC liaisons are Kevin Holmes and Jessica Quinley. I will not go through all subcommittee member names but we have a really fantastic subcommittee, very active, very passionate topic, and really I think looking forward to getting to the final report.

If we could move over to the next slide, please. As a background for the NTIA question, there were four main questions posed to the subcommittee. The first one was about general and specific lessons learned both positive and negative from the CBRS framework of sharing between commercial and federal incumbents. Second question was actually, you know, looking at those positives and negatives, how could the sharing be improved in CBRS bands? Third question was actually looking at other bands and use cases for the CBRS spectrum sharing experience. And finally, what should be avoided in this experience?
The subcommittee did take these questions and create more detailed sort of created scenarios of asking the specific lessons learned. So, there was a lot of sub-bullets created under these questions that were then distributed to a group of folks that we were going to -- we will -- we have and will be interviewing.

If you can go to the slide, I could talk about that a little bit. We kicked off the subcommittee in January 2023. We have had monthly meetings since. We have not cancelled any of them. We have, through these meetings, we identified a list of 47 entities to talk to. And these were across federal sort of new to the bands. It was also across licensed, unlicensed, operators, private enterprise, vendors. So, it is a very good and comprehensive sort of list that we have as a target.

The subcommittee members have been actively looking to schedule these meetings since these 47 entities were identified. So, far I think we have had eight -- actually I want to say nine
because when these slides were prepared, we did have one interview after that, have been completed. These are in-person interviews on Zoom calls. However, we've also had several of these entities submit answers to the questions and some of them we may go back to interview. So, it's a little bit more than eight. And some of them we'll just have to rely on the answers, the written answers provided. Our goal is to deliver the final recommendations still on target of December 2023.

If you can go to the next slide, please.

Thank you. So, here's our observations so far. Actually, except probably most of the interviews actually that we do except for one, were all with commercial users. We very much look forward to talking to federal users. Actually, the NTIA is also on the list of the interviews to be able to get it. There has been a little bit of challenge in scheduling with federal users of the bands. Our subcommittee members have been diligent reaching out. It's been pretty hard to
get some of these identified members on the phone
to talk to us. So, but that's underway. I think
we've got our first one probably next week. So,
looking forward to that.

So, what you're seeing here as
observations has been primarily from a commercial
standpoint. And I'll go through these bullets
because they're pretty good learning. I wanted to
kind of highlight this is not a recommendation of
any sort at this point. This is observations. We
still have some work to do on the subcommittee to
kind of go back and turn these into
recommendations.

But observations so far that we've
heard, the propagation model needs to be updated.
It needs to use clutter. It needs to use a lot of
the other factors that don't look at such
worst-case unrealistic scenarios. That's what
we've been hearing. Implementing an automated IIC
solution to eliminate or reduce the ESC whisper
zones. Reducing complexity of aggregate
interference protection. Reducing DPA
neighborhood sizes. Reducing heartbeat in non-
DPA areas. Reducing DPA activation timer.
There's an observation made about restrictive
power limits imposed for a higher above ground
CPEs. There's also there's an observation about
reserving more spectrum than expected during
federal events, particularly with one with China
Lake. There's also a request on advanced
notification of events as some of the events did
not have much of a notification, especially to
commercial entities we're trying to make the
business work.

So, that was the observations we've
collected so far. There's also with respect to
sharing. But in general, there's also the second
bullet is highlighting what the licensees are
seeing as a benefit to the band, particularly with
their own use and other users of the band whether
light and power or GAA. They see a benefit in TDD
synchronization and increased power. Some may be
in specific areas. Some may be more in larger
areas. There's also an observation that in dense
urban cities, there's a congestion in GAA already. And there needs to be better coexistent management among the GAA users in these areas. Finally, there's also an observation that the sharing process administered by the SASs is overly conservative. So, providing more protection to the incumbents than is necessary and therefore resulting in commercial access being excessively restricted and interrupted.

That is our final slide on observations. I'll hand it over to Patrick and then we can take questions after that.

MR. WELSH: Thank you, Mariam. I think the only observation I would have from our work so far is we did a -- I think we've done a very good job of casting a broad net to talk to as many stakeholders as possible so we're not focusing on any particular use case or a particular service. We're trying to listen to all of them. So, we can, you know, get the recommendations, and hopefully come back to you.

MS. SOROND: Name? (Laughter)
MR. WELSH: Okay, Jennifer Warren.

MS. WARREN: Yeah, I just wanted to comment as a member of the committee, subcommittee.

MS. SOROND: There should be --

MS. WARREN: Oh, gotcha. I was wondering why (inaudible) I think I was. Okay. Now, can you all hear me? Okay.

MS. SOROND: Very good.

MS. WARREN: So, I just wanted to say as a member of the subcommittee, I think the -- I wanted to echo kind of what they both said which was about the range of identified participants. And as someone who is not a CBRS participant, it has been really interesting to listen to all the different use cases. And I think there are some observations -- there's many more observations we can -- I mean, there are I'd a select subset. But there are others that have expressed a great deal of positivity about CBRS and been, you know, CBRS modified the great -- there could be some modifications that would enhance it. So, it's
been a really interesting learning particularly
for a lot of the enterprise activity those that
need trusted networks that they can access. So,
I've learned a lot.

So, I think, you know, that it's been
very valuable for the subcommittee members and
kudos for the structure that's been put in place
here. I think it'll be interesting to understand
the flipside of some of this. But one of my
takeaways in listening to a number of them, I
wasn't on online or (inaudible) calls but I was on
most of them, was also an acceptance that this was
a learning curve, right?

So, I'm fine for some of these
observations able to be made and that it's
realistic for it to -- I didn't -- I found it very
satisfying to hear that. So, thank you.

MS. SOROND: Thanks, Jennifer.

MR. WELSH: Karl.

MS. SOROND: Karl Nebbia.

MR. NEBBIA: Yeah, I also wanted to
mention that I think the agency participation
would be really helpful and important to our
overall discussion. This band was identified via
the fast-track process and Scott as has told us,
they are looking and identifying 1,500 megahertz
of spectrum for study. We were given three months
to identify a band to reallocate and that's how
CBRS came about. Using that kind of process, we
made a decision before we really knew all of what
we were going to get into led to a lot of the work
being redone in order to make it useable. And I
think we've got, you know, the discussion with the
agency so I think we've kind of fleshed that out a
little bit.

And also, as Jennifer was saying, as the
process is going through an evolutionary path, the
question always comes back to the federal agencies
how do we pay for this? How do we fund our
participation? Because we thought the decision
was made and the deal was done and now we find
ourselves in this constant process. And as this
becomes the path for future bands, once again,
they need to know how do they get appropriations
to support it or does somehow money come out of
the spectrum fund, reallocation fund, and so on.
So, I think their participation is certainly very
important.

MR. WELSH: Mike Calabrese.

MS. SOROND: Actually, hang on a second.

Charles?

MR. WELSH: Thank you, Charles, over
here.

MR. COOPER: Appreciate the comments.

(Laughter)

MS. SOROND: And actually, just a
reminder to those of you who, CSMAC members on the
phone, we -- sorry to have to do it this way, but
we're going to take the folks here first and then
we'll move to you on the phone. And are you
seeing anybody raising their hand down there?

MR. WELSH: Dale.

MS. SOROND: Yeah, no, I knew Dale.

Dale has actually reached out to us --

MR. WELSH: Oh.

MS. SOROND: -- separately. So --
MR. WELSH: Yeah, move on to --

MS. SOROND: -- yeah, great. So, we --

we'll just let him ask his question after Michael

is done. So, Charles.

MR. COOPER: So, before Michael, yeah,

just to quickly chime in here, Charles Cooper,

NTIA, OSM, to address, you know, for the comments

from the subcommittee chairs and also from

Jennifer and Karl. Yeah, I'm delighted you got 47

entities that are going to talk to you guys. I

can't imagine the immense support to the

scheduling just in that. But I'm confident that

we'll be able to get the agency participating in

that. So, we'll work with you on that as needed.

And with regard to Jennifer's comment

about this being a learning process, absolutely

right. You know, this is kind of a novel spectrum

sharing platform and I think there are going to be

lessons learned. Not only for this band what we

can do in improvements, even though understanding

that this is ultimately an FCC process, right,

regarding to the non-federal access. But we're,
you know, with our MOU that we've executed almost
a year ago now, where we are working very well
with the Commission and look to continue that.

And then also, Karl, with your comment
about, you know, who's going to pay for this,
right? Especially on the encumbrances on the
federal agencies to support that. You know,
that's absolutely right. I hear from agencies
pretty regularly on this. It's not only on
repurposing issues, but, yeah, the ongoing
spectrum support that it's going to take and who's
-- and again, who's ultimately going to pay for
that. So, I'm glad to hear you articulate that
point as well. Thank you, Karl. And Michael.

MR. CALABRESE: Yeah, Michael Calabrese.

Yeah, so I won't repeat what Jennifer -- as
another committee member, I won't repeat what
Jennifer and Karl have said. You know, I totally
endorse that. I did want to point out something
that struck me even more when we compiled these
observations. Is that this isn't -- and I think
this was part on purpose hopefully, but this isn't
just about how do we make CBRS better. I mean, it seems that all of these things, all of these observations so far would apply in great part to the next band that is shared, federal, commercial. And so, I think for Scott's purposes, you know, that list right now because your process, National Spectrum Strategy, is running ahead of ours. But, you know, that list may be good to take into your process as well or what we come up with in the next draft in the next round before you're completely done. Because I think some of these things need to become explicit. But one thing that is worrisome is the pay for I don't think -- I don't know if our committee -- I haven't been in all of the interviews, it would be somebody like John Leibovitz, for example, who would bring this up, is that it was very purposeful at the FCC that they combine PALs and GAA in the same band so that if there were federal costs to reimburse, you know, the PAL revenue is available for that. And, you know, that could be an observation of a
challenge we have as Karl mentioned, is how do you
get the, you know, the federal users to believe
they'll be whole and to not be doing this out of
the goodness of their hearts, so.

MS. SOROND: Thank you. Thanks for
bringing that up, Michael. Yeah, absolutely the
intention is as part of the questions is future
bands is the specific question we're asking in the
interviews. And you're absolutely right that
these would be interesting points for future
bands. And thank you, Charles. Any help that you
could give our subcommittee members for getting
some of these federal agencies to schedule calls
would be much appreciated. Mark Gibson.

MS. MANNER: Now, with Mark Gibson.

MS. SOROND: Mark Gibson.

MR. GIBSON: I'm not sure this thing's
working because it's flashing.

MR. WELSH: You have to press the button
first.

MR. GIBSON: I did press the button and
it's flashing off of red and green, so. Okay. I
just want to identify -- this is my rock star impression.

There are three things on the list that are actually already under review that -- but with the interactions between the SASs and in the industry joint working group that's worth noting. And I probably should have mentioned this because I'm on the committee. One of them is reducing the heartbeat interval. And in fact, that is all but done. We're waiting for a public notice from the Commission to finalize that. So, and again, I think that's thanks to Nick and Ed and a lot of the work that's been going on within the ITWG.

The other thing is the DP activation timer. This is the two-hour timer that sits at the end of any DP activation. That's working too. Although it has been tabled until later use to get some testing considerations. And then finally, I think we're working on interactions with some of the updating propagation models to address the neighborhood.

So, CSMAC is working in real time. This
stuff is already being dealt with. So, I think,
you know, we'll add more to the list as we go
through. But again, I'd like to just thank Ed and
Nick for their work on a lot of this stuff that's
coming out of the ITWG.

MS. SOROND: So, sorry. Can I before
you go to Dale. So, can I ask you, Mark -- this
is Mariam -- the real time aspect and with the
work that's going on, what's your recommendation
on making sure we're in sync? When you said these
things have been identified, so, what is that?

MR. GIBSON: I think that's my fault.

MR. SOROND: Okay.

MR. GIBSON: So, I'm at fault.

MS. SOROND: Because you're a
subcommittee member. Okay.

MR. GIBSON: I think it's mostly there
was sort of a frenzy of activity yesterday trying
to get this done. And I had some changes that got
lost in translation. So, I'll take the
responsibility for that. But I also think that I
and Jennifer McCarthy, who are both in the middle
of this, can probably provide more feedback. I'm not throwing Jennifer under the bus, but I think we're the two that are more involved with this. So, I think we can add more to what's going on. Also, like Nick's involved. He's a liaison from the NTIA. And we can bring that in. So, I think that's the best way to do it is just be more aware. So, that's my fault I think.

MS. SOROND: So, move over to Dale.

MR. HATFIELD: Can you hear me?

MS. SOROND: Yes.

MR. WELSH: Yes.

MR. HATFIELD: I actually had a comment for later. I was just trying to be set so that when I wanted to make a comment, I could. So, I apologize for the interruption.


MS. MANNER: Okay. Well, thank you so much and thank you for all your work and 47 is a
big number. So, I'm in awe. So, with that, we
want to -- I want to turn the floor over to
Carolyn Kahn who's going to give a report on 6G.

MS. RATH: We're bringing you the --
MS. MANNER: And you're getting the
official microphone.

MS. KAHN: Great. Well, thank you so
much. Again, great to be here in person. And
I'll be presenting the work that we've been doing
on the 6G Subcommittee on behalf of our
subcommittee. And we'll be presenting a status
update and some observations that we have so far.
So, the next slide shows a list of our
subcommittee members. If you can switch to the
next slide. Thank you.

Thanks to all of our subcommittee
members, really appreciate all the diverse input
that we've had some great discussions and it's
thanks to the subcommittee's participating in
that. We've also had some really great outreach
that I'll talk about. So, that's been going well.
Also, special thanks to Rich Orsulak, our NTIA
Liaison and Antonio Richardson, our Designated Federal Officer. We've also been working with the FCC to facilitate collaboration between NTIA and FCC. Kevin Holmes has been included as an FCC Observer and Jessica Quinley as an FCC Liaison.

The next slide. This shows our study question from NTIA. So, again it's two parts. The first part is on use cases, what sort of use cases 6G may entail. And importantly, NTIA would like to consider use cases beyond traditional wireless communications including safety, sensor, radar, space, and other scientific applications, and address 6G's impact on the federal government users.

The second part is on spectrum bands, what spectrum bands could be used for 6G. NTIA has observed the terahertz band has been identified. So, how that would impact government users in the range, what recommendations could help prepare for this. And then also, are there other spectrum bands that might be appropriate for 6G. We also received subsequent clarification
that the scope should concentrate on 6G services as opposed to future generations and consider the benefits to the government.

The next slide is our schedule. We are on track. We kicked off our subcommittee work about a year ago, almost a year ago. We've have regular subcommittee meetings since so have had them every couple to few weeks. We've also been conducting interviews and are wrapping that up and have been preparing, analyzing what we've been finding on developing our draft report. And we'll be delivering our draft report and recommendations at the September -- at our next full CSMAC meeting. Then we'll do some interim work to iterate on that and deliver our final paper and recommendations in December.

Next slide. So, these are the organizations that we've reached out to in order to collect additional information on 6G use cases in spectrum. They range across federal agencies, commercial industry, and academic, and other non-profit organizations. Those indicated in bold
are the ones that we've received responses from.

We've given these organizations options of providing either written and/or verbal responses, and really appreciate the input that we've received so far. So, thank you.

The next slide shows 6G use cases and applications. So, the material on this slide was presented at our last full CSMAC meeting. What's new here is that indicated in bold are those use cases and applications that are expected to be most relevant to federal agencies based on interview responses and surveys that we received.

And so, some points to note is 6G use cases and applications are expected to broadly benefit federal users similarly to how they benefit commercial industry users. In some cases, there will be use cases we expect that will evolve to meet unique needs of government or industry users. And also, we expect there to be a lot of cross pollination between industrial and federal agency use cases.

There also will likely be some blending
between traditional, which we define as mobile broadband wireless communications use cases and non-traditional, which also can integrate into with non-traditional use cases -- or non-traditional can integrate with traditional use cases.

So, for instance, traditional terrestrial cellular communications are expected to evolve into hybrid terrestrial space ariel and underwater networks. And federal agencies and other users can use the link best suited for a given application. 6G is expected to enable seamless connectivity across. So, this will improve global communications coverage regardless of the location of the federal agency user. It will also provide resiliency during extreme conditions. And this benefits, for instance, public safety and closing the digital divide.

The next slide shows additional non-traditional use cases specifically in the categories of safety, sensor, radar, space, and other scientific applications. Again, we expect
federal users to benefit broadly from these use cases. And those, again, indicated in bold are the ones from the surveys that were identified as most relevant to federal agencies.

So, federal agencies are expected to benefit for instance from massive data, immersive technology, AI machine learning. They can establish digital twinning for instance in areas of national security, transportation, environmental forecasting, health, and education. So, in these digital twin environments, you can analyze with the BF analytics this massive amount of data to provide better information and enable improved decision making in real time.

The next slide shows 6G unlicensed and shared spectrum use cases. This is an updated slide that Danielle presented at our last full CSMAC meeting. You can see here all the use cases and applications are bolded because these did all come out in the surveys and interviews as relevant to federal agencies. So, things from environmental sensing, Internet of Things,
wireless, and local personal area networks providing this information showers of high bandwidth activity. And In-X subnetworks for instance where a network can operate within an application within a robot or a vehicle or even within the human body.

The next slide, turning over to the spectrum area, Reza had prepared this on looking at spectrum and spectrum needs are going to be dependent on systems and deployment characteristics. So, this is still being studied but some general observations is suitability of spectrum. So, from a technical point of view, the amount of spectrum that's needed for 6G is going to be dependent on application KPIs, data rate spectrum efficiency. And then also, will be dependent on the range or types of spectrum, which will depend on deployment models and propagation characteristics. So, there are still being sorted out and studied.

Also, there's what is suitability from a regulatory point of view. So, this will depend on
incumbent protection, service rules, sharing
models, different types of sharing, whether it's
time-based, location-based, frequency-based, or a
mixture of these, which can be enabled by more
intelligent sharing approaches, and what sort of
power restrictions and indoor restrictions are in
place or necessary.

The next slide shows some observations
that we've made as a subcommittee. So, we've
observed that carriers are still very much focused
on deploying 5G and moving onto 5G- Advanced. We
expect this to take a few more years. On the
other hand, the RAN vendors are aggressively
working to define 6G technology elements and
spectrum for 6G. And the carriers and network
infrastructure vendors see open networks and ORAN
is dominant in 6G.

The next slide shows some observations
from use cases. And so, where we're at right now,
and our subcommittee did take a very intentional
approach to be realistic in looking at 6G, and
where we observe we are right now is in between
this clash of visionary ideas that are put out there and to look at the future and ideas of how the future can or should be. But at the same time, practical realism. What is possible economically. What can actually be done within various timelines. And that's normal, especially where we're at now. It's a normal part of the process.

So, there needs to be -- we need to address the challenges of 6G in order to have it to feel better. And part of addressing these challenges are filling the gaps of 5G. So, this in particular includes the business case ROI, economies of scale, which is even more difficult when we've got multiple deep verticals that are included across the use cases, a convergence of different visions, and the path forward, risk of fragmentation of different approaches and different ideas, as well as regional divergence.

We also noted at a subcommittee the tradeoffs that we've been seeing between economies of scale, economies of specialization, and
economies of scope. And this is something that will need to be worked through. We've noted other tradeoffs as well between open architectures and diverse specialized systems. So, there's a lot going on here head-to-head that are all really important.

Also, we've noted that equipment providers and researchers are driving the 6G vision from what we've observed until MNOs provide requirements. And again, this is a normal part of the timeline that has been observed in the 5G process as well.

Some indicators of use case viability include investment in R&D, the progression of technology readiness levels and maturation of technologies, seeing proven business cases and economic impact, seeing convergence of different visions and approaches, lower barriers to entry, and demonstrated impact.

The next slide shows observations on the spectrum side. So, most of the focus for terrestrial use now is on mid-bands and extending
them up to around 15 gigahertz versus millimeter wave or terahertz, other bands are being considered for non-terrestrial.

There's interest in sub-terahertz limited to research areas mostly for short-range communications with longer associated timelines for commercial use. We observed that innovation could be allowed potentially in the terahertz spectrum for localized exploration of 6G. And there is observed a lack of dedicated or shared spectrum and the potential use of spectrum ranges for 6G includes low-band, which has not been as much -- thank you -- is not as much of a focus for terrestrial 6G, but underutilized spectrum, particularly in large geographic areas with relatively few users, could be pieced together with carrier aggregation or multi-radio connectively for more coverage. And the mid-band the sweet spot between coverage, capacity, and contiguity. Millimeter wave where you can have these information showers via wireless local and personal area networks. And hotspots in
Sub-terahertz and terahertz for fixed wireless and backhaul, high bandwidth applications if feasible, and passive services.

Some overall thoughts on our next slide includes that federal agency engagement early on, that is really important to help shape the use cases. Getting in requirements early and into the process identifying gaps and building it into a national R&D strategy and roadmap, as well as influencing standards and technology development will help things from the beginning and really be impactful.

It's also important to posture to increase spectrum sharing opportunities, including leveraging spectrum across the generations, and having incentives in order to make that possible and optimized. There's also a need for more advanced spectrum sharing techniques such as customizing sharing techniques to different frequency bands and ranges of incumbents and digitized more automated spectrum sharing approaches. There's also benefits of
incorporating interoperability, open APIs, and AI and machine learning, and need to invest in 6G research.

So, that presents the status of our 6G work and I welcome questions and comments from the subcommittee.

MR. WELSH: Michael?

MS. KAHN: Andy?

MR. ROY: Is that working? Okay. I guess this is a hint I need to work harder in the subcommittees on this slide on the tables.

So, Andrew Roy. I had a question and I missed this on the last update from the last committee. Sorry, it's a clarifying question. So, with radar, are we talking about actual radar as in using the wave form properties to detect things or is it more of a communicating the position over 6G? I wanted to understand does it get into that because it has radio determination allocation considerations as well then. So, I was curious what does radar for 6G mean?

MS. KAHN: Okay. So, it is as it's used
for more 6G types of integrated a lot with
different communications and sensing so to provide
more information incorporated into the system.

MR. ROY: Okay. So, like a multi-static
radar system we're talking about then potentially
that sort of thing?

MS. KAHN: That could be.

MR. ROY: Okay, all right.

MR. KAHN: Yeah, you have --

MR. ROY: Sorry, it's just that there's
been discussions in aviation about using TV
broadcast towers to do similar things with
detecting secondary signals, can detect positions.
I was curious if it was going down that line or
there was another means of doing it as well, so.

MS. KAHN: Mariam? Could you pass the
microphone down to her?

MS. SOROND: Thank you. So, I just
wanted to highlight the wonderful work the
subcommittee, specifically Carolyn and Reza has
done. A lot of lessons learned for me in also
doing the CBRS. And also, I wanted to highlight
that it's a really tough sort of timing for the
subcommittee because I remember when we did 5G on
the subcommittee I don't think the MGMN
requirements were available from the operators and
so it was a lot easier to kind of say what does
this do to the federal sharing. And so, they've
done a wonderful job in given that that's still
not even available and there are so many topics
and everybody's so over the top on where 6G is to
try to bring this together. So, it's just really
that comment.


MS. WARREN: Just one word -- Jennifer
Warren. So, I would, you know, second what Mariam
said. But I also think, you know, we're just, the
federal agencies in particular are just finishing
their 5G use case studies. So, expecting them to
be on the frontend of 6G use case studies that are
undefined as to what, you know, it's, you know,
going back to what's realistic, it is very
unrealistic.

I think the 5G, you know, maybe telling
but then how transformative 6G will be versus 5G, that's still so much -- that's nobody here has that -- well, maybe a couple here -- have that understanding. But I think we can't expect too much on the 6G use cases just simply because we're just in the final times of looking at those 5G use cases.

MS. KAHN: Yeah, there is still a lot of focus on 5G, yeah. Dale, I think you've got a --
catching your comments online?

MR. COOPER: Talk about digital 20.

MS. SOROND: Oh, it's Charles.

MR. COOPER: Yeah, thank you, again.

Charles Cooper, NTIA OSM. Appreciate the interim report that's done here. You know, to kind of cue off what Jennifer was saying as well about the use cases, I'm glad you bolded the ones that may be of interest to the federal agencies based upon your interviews.

And kind of flipping back between Slides 6 and 7, where 6 is, you know, the traditional, non-traditional and Slide 7 deals with 6G with
kind of a little more the safety, the sensors. I'm, you know, in hindsight not surprised to see perhaps more potential for federal involvement in use in those use cases with regard to the safety and sensors in particular. So, I appreciate you kind of differentiating those use cases and also flagging those especially of interest to the federal agencies potentially.

MS. KAHN: Thank you. Dale Hatfield?
SPEAKER: Go for it, Dale.
MS. KAHN: Dale, do you have a question online?
MR. HATFIELD: Yes, can you hear me?
MR. KAHN: Yes.
MR. HATFIELD: Okay. I have -- Dale Hatfield. Of course, I am on the subcommittee but I'd like to, if I could, call the attention of the full committee to slide -- I believe it's Slide 24, the very last slide in the deck. Yeah, I think it's Slide 24.
MS. KAHN: What's the title of the slide, Dale?
SPEAKER: I thought it was 20, Dale.

MR. HATFIELD: It was up there momentarily. It's Slide 24. I think you're only on 20 right now.

MS. KAHN: What's the title of the slide because we don't have a Slide 24.

MR. HATFIELD: Well, I don't have it either. The very last slide in the whole deck.

MS. KAHN: Is it the summary of the responses on research or the subcommittee thoughts?

MR. HATFIELD: No, it was, there was a comment and this is my point regarding the challenges associated with achieving five-nines or even six-nines type availability and reliability.

MS. KAHN: Maybe five-nine, six-nine challenges, back up.

MR. HATFIELD: Yeah, it's in this part of the thing. It's actually the very last. There it is right there. There it is, yes. I just wanted to call the full committee's attention to this because I have tried
-- only if somebody will let me say first of all, of course, five minutes you're talking about -- five-nines you're talking only about five minutes per year. And, of course, that could be scattered over various incidents. And you go to six-nines, you're talking about what, 60 seconds per year. And I've been playing around with, if you will, some flow diagrams. And I just can't figure out how in a system that's subject to radio propagation variability, to malicious jamming, unintentional jamming, and so forth, how you can possibly achieve that. And that goal we see all the time. Moreover, we see the issues we're having with the power grid and so forth. And it's unclear to me is this what's the availability that people are achieving in that kind of environment? In other words, what is included and what isn't? And I think it's, if I could say, it underlies so much of what people talk about, but I just can't get there. I just cannot get there. And I just wanted to maybe emphasize it for the full
committee's behalf.

And then finally, of course, now with some private systems 5G, it'd be very interesting to see, you know, what their service level agreements are and to see whether they're actually achieving these high degrees of reliability availability. Thank you.

MS. KAHN: Okay. Thanks for those comments, Dale. You've provided throughout our subcommittee work really good helpful observations. And it sounds to me like that's getting at again kind of what visions are out there and then what can realistically be achieved by certain timelines and also as you point out, what's needed and who needs it. So, thank you. Other? Jennifer Manner. Oh, Mark Gibson, go ahead.

MR. GIBSON: Just real quick on the spectrum. I will just shout. So, on the spectrum discussion, I think it's important to set expectations because, you know, the activity was to look at the spectrum bands in the 3.1 to 16 gig
and the 95 to 3,000 gigahertz. When you look at that in detail, that's almost 191 gigahertz of allocation, which comprises 127 band segments and 106 different allocations. And so, and I took -- so, I took that on and that was way more than I thought it would be.

And I think what we need to -- and Reza did a good job trying to figure out what use cases would fit into what band segments -- but there's a whole bunch of spectrum out there. Some of this is part of the pipeline that's being discussed that you referred to all but completely in the national spectrum strategy stuff. So, in terms of setting expectations, especially when we get to the terahertz range because there's nothing allocated above I think 300 gigahertz, I think that we're a little ahead. I think that this is what somebody said earlier where I think Jennifer may have this, there's a lot of time between now and when 6G's going to be relied. And the spectrum is not -- there's just a ton of spectrum out there and there's going to be a lot more work
needed for that.

One of the things that I tried to do in this effort was to connect this back to some previous CSMAC work that we had done, which was a paper on how to characterize spectrum for sharing. That was done I think it was 2017. And it was interesting because I thought that was really good. It didn't necessarily apply too well to some of the radar bands or the terahertz, but in terms of being able to look at spectrum for repurposing, things like propagation considerations, continuity, and something like that. So, it's really always good to go back and rely on some of our previous work. But anyway so, there's a lot more work to be done here for setting that expectation. And now this is working.

MS. KAHN: Okay. Thanks, Mark.

Jennifer Manner?

MS. MANNER: So, thanks, Carolyn. I do appreciate all you and Reza have done. It's a huge process and I've been very pleased to be
around and part of it. But I forgot to give one small edit on the slides. You have satellite. It's the slide where you talk about the different types of licensing, 2, I think. Satellite is not just exclusive. Actually, a fair amount of it is non-exclusive. So, just a clarification you may want to do before you finalize the slides.


MS. MANNER: Any other questions online or comments? Okay. They say no. So, over to Charla to introduce our last group.

MS. RATH: Great, thank you. And the microphone is being passed as I speak, which is turning it over to Tom Dombrowsky to give an update on the Electromagnetic Compatibility Improvements Subcommittee. So, thanks, Tom.

MR. DOMBROWSKY: Yeah, this is working now? Everybody can hear me well?

MS. RATH: Yes.

MR. DOMBROWSKY: Doublechecking since
Gibson can't apparently make a microphone work.

(Laughter)

MR. GIBSON: But I did it. I can't hear you either.

MR. DOMBROWSKY: That has nothing to do with the microphone I was just going to say.

(Laughter)

For the ECI, the Electromagnetic Compatibility Improvements Subcommittee slide presentation, if you can go to the next slide. We basically we have this question that's been presented to us that has multi parts. Our focus has been on radar and specifically radar from 5 to 16 gigahertz and figuring out how to make it coexist better with co-channel and non-co-channel interference or users. Trying to figure out how we can look at statistical risk-based analysis techniques to actually characterize the impacts of these federal systems in the 5 to 16 gigahertz range. Looking at propagation modeling, how can we improve that? How could we increase the accuracy of those propagation models that are out
there? The role that NTIA should play in ensuring there's independent and timely analysis, and other improvements suggested by CSMAC. And I'll note that we have added sort of enforcement as a sort of other improvements to the list.

If you can go to the next slide, we'll have the list of members in the group. It's been a very active group. Donna Bethea-Murphy and I are co-chairing here. Donna's not here, hence I get the lucky -- I know, but I'm here personally, you know, so I get the lucky run through of the slide deck. But Donna and I have been working heavily with the NTIA and FCC liaisons. And all the subcommittee members have been very active and helpful.

If we go to the next slide to sort of talk about what we've been doing here. We have met at least monthly and some months it's been more than once in the month. We had a series of interviews similar to other groups. We've had some struggle in getting federal agency interviews done but we did get NASA and FAA to talk with us
as well as Garmin and Collins who are contractors or vendors to the federal agencies.

We also had a couple of different meetings with NTIA and the IIC effort to get a better understanding of that to see how that would play in this effort as well. All of that has led to the drafting of a report that's probably 25 to 30 pages long at this point. It's really focused on capturing the information from the interviews as well as data from other federal agencies that engage in statistical analysis. Even though not related to spectrum, we think it actually has some good correlation that we could use here.

We did have some initial draft recommendations. We say under discussion, I will just say they were presented but we really haven't discussed them yet. So, that's why they haven't been presented to the full committee yet. And the goal is to complete the report and ensure that these recommendations that are developed are based on information within the report itself. And our goal will be to provide a draft report and draft
recommendations at the September meeting. If it's
the 21st, it'll be -- we'll be ready on the 21st.
And we'll see where that goes from there.

I think just as a heads up to my
subcommittee members, we'll probably have to pick
up the cadence a little bit. I know everybody's
very excited to have lots of meetings in August
and September, but at least I forewarned you.

Onto the next slide there. I just
wanted to sort of provide a little bit of a flavor
of what we're working on in this report before
people actually see the draft in September. We
have a discussion on the radars, again focused on
aeronautical radar systems in the 5 to 16
gigahertz band. And Andrew Roy and Mark Gibson
have been the parties pulling that together with
some support from Jennifer Warren. We're hoping
to get that finalized and have a fairly
substantial amount of information about the radars
that are in those bands. We've also summarized
the responses and discussions with the
interviewees on the radar front. Shifting to
commercial wireless, we've got an overview of parameters that could be used and some suggestions in terms of using general values unless more granular data is provided for these coexistence analysis.

Onto the next slide. And then on the coexistence analysis itself, when you look at these sort of radar and commercial wireless inputs, talking about the parameters that have to be part of any coexistence analysis, types of inputs that need to be gathered, use of statistical analysis by other federal agencies and how it could be applied to this sort of coexistence modeling. Importance of propagation modeling and the improvements that we could possibly get in the existing propagation modeling, especially for that 5 to 16 gigahertz range. And then potential approaches for coexistence analysis. We do have an appendix that sort of walks through issues on coexistence analysis. And I think the goal of the next month, month and a half is to sort of build that out a little bit
more through discussion in the subcommittee level.

And then finally, as systems will evolve over time both commercial and federal systems, suggesting that any of this modeling coexistence analysis be iterative and allow all the affected parties the opportunity to update technical parameters and innovate and move forward.

We have an extensive section on the role of NTIA. Importance of the NTIA providing the independent analysis for coexistence and what sort of process is needed to facilitate federal agency/commercial user collaboration. And then finally on the enforcement front, really talking about having reasonable assurance and interference protection of systems and having mechanisms to identify and mitigate interference are going to be critical if you're going to actually have some trust in the sort of coexistence analysis.

And I believe that was my final slide, yes. So, open it up to questions from the full committee or from my subcommittee members. It's always good to be last.
MS. RATH: Anybody on the phone? I'm checking with our guys down there. Nope, nothing there.

MR. DOMBROWSKY: Okay.

MS. RATH: Well, thanks. Another huge amount of work that's going on among all of the subcommittees but thanks for that report. And I think at this point, we can turn it over for --

MS. MANNER: Public comment, okay.

MS. RATH: Yeah, if the --

MS. MANNER: So, thank you, yeah, a fantastic amount of work. Keep it up, we only have a little bit more to go. So, and a lot more work to do. With that, we have on the agenda time for public comment. So, Antonio, I don't know if there's anyone on bridge who's asking for public comment? Yes, Jennifer Warren, please.

MS. WARREN: I thought before we got to public comment, we were going to be able to ask Scott questions.

MR. HARRIS: Oh, I thought you forgot me.
(Laughter)

MS. MANNER: We can do that first. So, we'll do ask questions first.

MR. HARRIS: And I was just going to remind you.

MS. MANNER: I know. And then we'll turn to public comment. So, does anyone have a question for Scott?

MS. WARREN: Yes.


MS. WARREN: So, both you and Alan emphasized by the end -- sorry, Jennifer Warren. Both you and Alan emphasized by end of year -- thank you -- you expect, you're planning on having the strategy done. Can you talk a little bit how you foresee rolling that out and what that will look like? Thank you.

MR. HARRIS: No.

SPEAKER: Now, you're open to questions.

MR. HARRIS: So, to be perfectly candid, we are -- we have a timeline in place that if all
goes well, we actually hope to have it released pre-WRC. But we've set an absolute deadline for ourselves at the end of the year. We have not actually focused on sort of the roll out process, if you will. We're still focusing on substance. I would love to just talk about this. But we're working on substance right now and we do have this timeline with basically two dates built in.

And, you know, given that half of the spectrum world is going to be in Dubai for a month, we really -- that's one of the reasons we are hoping to get it done before WRC. But if we can't, our deadline is for ourselves is the end of the year.

MS. MANNER: Thank you.

MR. HARRIS: Isn't the old saying, if you can't answer the question you're asked, answer a different question.

MS. MANNER: So, I have Mark Gibson next, please.

MR. GIBSON: All right. I'm going to throw this thing out the window. You mentioned in
one of -- in the leveraging -- it's working now?

MR. RICHARDSON: Yeah, just hold the --

MR. GIBSON: You mentioned one of the

things you were looking at is how to better or

have a different leveraged CSMAC. Can you

elaborate on that a little bit? What are you --
yeah.

MS. RATH: Go on mute folks.

MR. RICHARDSON: Make sure you stay on

mute.

MR. HARRIS: So, we're just trying to --

started to think about this issue. We are

convinced we need some better way to regularly

have the private sector and the government

agencies talk about spectrum issues, long-term

spectrum planning, the reallocation issues,

one-off kinds of issues that arise from time to

time. We think there should be a continuing

process. We think it should be open and

transparent. We think it should have parts of it

that can be in a classified basis, if necessary.

And we're trying to think about how to
do this, right? We don't think that there is a mechanism today for this to take place. One of the mechanisms we think where the private sector interacts really well with the government is the CSMAC. So, we're looking at that and trying to come up with ways based upon that or somehow taking off of that to create some kind of continuing forum for interaction between the private sector and the government.

MS. MANNER: Thanks.

MR. HARRIS: And I wish our ideas were better formed but we really are working on this stuff day to day.

MS. MANNER: I guess anyone on the phone, any members on the phone who would like the floor. Antonio, is there anyone asking for the floor?

MR. RICHARDSON: Give me one second, please.

MS. MANNER: Yeah, please.

MR. RICHARDSON: Did you say Paul? Paul Margie.
MS. MANNER: Paul, please go ahead.

MR. RICHARDSON: Unmute.

MS. MANNER: Paul?

MR. HARRIS: Yeah, I'm not answering any questions from him. (Laughter) That scares me.

MS. MANNER: Anyone else, Antonio, or can we move on to public comment?

MR. RICHARDSON: Are we all lit up to the public now?

MS. MANNER: Yeah, so let me first thank Scott for taking those questions and thank you, Jennifer, for keeping us honest (inaudible).

Yeah, now I guess we'd like to open up the floor for any public comments.

MR. RICHARDSON: Okay, the phones are -- say your name again, please?

MR. KENNEY: Yes, Ken Kenney. Our question for Carol is on her I think, Carol, in your Slide number 12 you're using the acronyms TN and NTN, what do those stand for?

MS. KAHN: Sure, it stands for terrestrial networks and non-terrestrial networks.
MR. KENNEY: Gotcha, thanks a lot.

MS. KAHN: Sure, thanks.

MS. MANNER: Thank you, Ken. Antonio, anyone else?

MR. RICHARDSON: Anyone else from the public, questions? Anyone?

MS. MANNER: I have someone in the room who wants the floor if possible. Oh, you're trying to fix the microphone, okay. Same person.

MR. WELLER: Hello? How are you?

MS. MANNER: Bob Weller, please.

MR. WELLER: Since Scott is evading questions, I thought I would ask one. There's 1,500 megahertz to be identified as part of the national spectrum strategy identified through study. Can you narrow the field from DC to daylight, what sort of spectral range you're talking about?

MR. HARRIS: I can but I won't.

(Laughter) I also want to say it's at least 1,500 that's sort of the minimum. If we can do more than that for the first tranche, we will. But I'm
not in a position publicly to talk about the range yet. I can say that we are looking at mid-band spectrum among other spectrum.

MS. MANNER: Okay, thank you. So, any other -- I don't see any other public comments. Any other comments in the room especially for Scott since he really likes them.

(Laughter) Okay. Well, with that I want to say we've had a very productive meeting. We're looking forward tentatively to meeting September 21st at the same time. We still haven't confirmed that but please at least put that tentative plan on your calendar. And I think Charla and I are very much looking forward to the next meeting and the progress has just phenomenal. So, thank you all for all your hard work. And with that I'll turn it over to Charla for a final five.

MS. RATH: Yeah, sure. Thank you,
everyone. It has been certainly challenging and interesting work from each of the subcommittees. I don't think I've ever been with a CSMAC where we've had so many subcommittees doing so many interviews at the same time. It seems it's very challenging. So, but I appreciate that, you know, how that's going on.

And I continue to be in awe of the dedication of everyone involved in the process. There's just a great level of participation of principals, which is really important in this. But also, want to thank the NTIA liaisons, the FCC liaison, subcommittee co-chairs, and of course, our Designated Federal Officer sitting down there, Antonio Richardson, who also happens to be a liaison to one of the committees. And clearly is our AV god too. So, I really don't know how you do it all, Antonio, but we really do appreciate it.

And, you know, I think we're all looking forward to our next session in the fall where we get a chance to review all the draft
recommendations. For those of you who are new
this committee, we've gone through it once. I
guess I have to give a shout out to Dennis and
Paul since, you know, they are also -- they've
already produced something which is terrific. And
looking forward to seeing the draft
recommendations in September. And again, you
know, our sincerest thanks for all the work that
you all put into this.

And I think with that we're done.

Unless, Jennifer, do you have something?

(Laughter) No, okay. Thanks, everybody.

(Whereupon, at 4:48 p.m., the
PROCEEDINGS were adjourned.)

* * * * *

I Charla Rath or Jennifer Manner do hereby certify this
transcript as Co-Chair of the Commerce Spectrum
Management Advisory Committee.
CERTIFICATE OF NOTARY PUBLIC

COMMONWEALTH OF VIRGINIA

I, Kendra Hammer, notary public in and for the Commonwealth of Virginia, do hereby certify that the forgoing PROCEEDING was duly recorded and thereafter reduced to print under my direction; that the witnesses were sworn to tell the truth under penalty of perjury; that said transcript is a true record of the testimony given by witnesses; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this proceeding was called; and, furthermore, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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