

UNITED STATES DEPARTMENT OF COMMERCE

NATIONAL TELECOMMUNICATIONS &  
INFORMATION ADMINISTRATION  
OFFICE OF SPECTRUM MANAGEMENT

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COMMERCE SPECTRUM MANAGEMENT  
ADVISORY COMMITTEE (CSMAC)

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MEETING

+ + + + +

WEDNESDAY

DECEMBER 2, 2015

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The Advisory Committee met in the  
offices of Wilkinson, Barker, and Knauer LLP,  
Suite 800N, 1800 M Street, NW, Washington, D.C.,  
at 1:00 p.m., Larry Alder and H. Mark Gibson, Co-  
Chairs, presiding.

**PRESENT:**

LARRY ALDER, Co-Chair  
H. MARK GIBSON, Co-Chair  
AUDREY ALLISON, Member  
MICHAEL A. CALABRESE, Member  
MICHAEL S. CHARTIER, Member  
MARTIN COOPER, Member (by telephone)  
MARK E. CROSBY, Member  
THOMAS S. DOMBROWSKY, JR., Member  
DAVID L. DONOVAN, Member  
HAROLD FELD, Member  
DALE N. HATFIELD, Member  
ROBERT KUBIK, Member  
MARK A. MCHENRY, Member  
JANICE OBUCHOWSKI, Member  
CARL POVELITES, Member  
CHARLA RATH, Member  
RICHARD L. REASER, JR., Member  
JEFFREY H. REED, Member (by telephone)  
DENNIS A. ROBERSON, Member (by telephone)  
KURT SCHAUBACH, Member  
MARIAM SOROND, Member (by telephone)  
BRYAN TRAMONT, Member  
JENNIFER WARREN, Member (by telephone)

**ALSO PRESENT:**

GLENN REYNOLDS, Chief of Staff, National  
Telecommunications and Information  
Administration, U.S. Department of Commerce  
PAIGE ATKINS, Deputy Associate Administrator for  
Spectrum Planning and Policy, National  
Telecommunications and Information  
Administration, U.S. Department of Commerce

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Adjourn	

## P-R-O-C-E-E-D-I-N-G-S

(1:06 p.m.)

1  
2  
3 CO-CHAIR ALDER: Hi. Welcome,  
4 everyone. I think we are ready to get started  
5 here. I hope everyone had a good travel here,  
6 made it through a little bit of the rain. I  
7 think today, unfortunately, Larry Strickland was,  
8 at the last minute, unable to make it. So, we  
9 are lucky to have Glenn Reynolds here, who will  
10 give us some opening remarks.

11 MR. REYNOLDS: Larry does send his  
12 apologies. Larry got called out to New York at  
13 the last minute. So, he asked me to sort of  
14 channel him to the degree I can, which is,  
15 ultimately a futile exercise.

16 But I do want to start off by  
17 acknowledging Wilkinson Barker and their swanky  
18 new digs here with the garage door and the whole  
19 bit. And thanks Bryan and Wilkinson Barker for  
20 hosting us.

21 I did want to recognize a couple of  
22 new players on the NTIA team that are going to be

1 important contributors to the efforts of this  
2 group.

3 It should be on. If the green light  
4 is on. Okay.

5 A couple new contributors that we have  
6 brought on since the last CSMAC hearing, Giulia  
7 McHenry, who many of you all recognize is a  
8 former member of the CSMAC and is now NTIA's  
9 chief economist.

10 Dave Reed, who is sitting behind me,  
11 who recently joined our office of Spectrum  
12 Management as Chief of the Spectrum Affairs and  
13 Information Division. You all will be seeing  
14 plenty of him because he will be transitioning to  
15 the role as managing the day-to-day operations of  
16 CSMAC will be one of his primary  
17 responsibilities.

18 And then I haven't seen Keith but  
19 Keith Gremban was going to be here. Keith, some  
20 of you may be familiar with, is our relatively  
21 new head of our institute for telecommunications  
22 studies out in Boulder. We have been very

1 excited in the work he has done over the six  
2 months he has been there and sort of turning  
3 around and kind of reinvigorating some of the  
4 work that ITS is doing that I think will continue  
5 to be an important contributor to the same goals  
6 that this group is trying to achieve.

7 It will come to no surprise to anybody  
8 in this room that Spectrum has become an  
9 increasingly significant focus in telecom policy  
10 areas over the last several months. Paige will  
11 cover a lot of this in more detail in her readout  
12 but I wanted to take note of two specific  
13 milestones that have occurred over the last  
14 couple of months.

15 First, enactment of the Spectrum  
16 Pipeline Provisions of the Budget Act, which we,  
17 as NTIA and on behalf of the Administration, view  
18 as a very balanced piece of legislation that will  
19 provide substantial support in our efforts.  
20 Particularly, we applaud the increased  
21 flexibility that was provided for use of SRF  
22 monies that we believe will facilitate better

1 spectrum planning in R&D by the agencies. We  
2 note that it aligns specifically with some  
3 recommendations, previous recommendations of the  
4 CSMAC. The legislation also provides, as many of  
5 you probably know, for making available an  
6 additional 30 megahertz of spectrum option by  
7 2024 and identifying 100 additional megahertz of  
8 spectrum for possible repurposing for wireless  
9 broadband use.

10 The other major milestone that I  
11 wanted to acknowledge was the conclusion of the  
12 WRC-15 last week. I know many of the folks  
13 around this table had a very major role, both  
14 government and non-government folks had a very  
15 major role over the last many months in  
16 contributing to that effort.

17 The efforts of WRC-15 set the  
18 foundation for innovation and economic  
19 opportunities globally, including the priorities  
20 such as mobile broadband, unmanned aircraft  
21 systems, non-geostationary and geostationary  
22 satellite networks, and global flight tracking.

1           On Larry's behalf, I wanted to express  
2 our thanks to everybody who contributed to that  
3 effort but a particular thanks to the senior  
4 delegation leadership, including Ambassador  
5 Anstrom, Julie Zoller, Mindel De La Torre, and,  
6 of course, Paige.

7           These milestones and the increasing  
8 focus on spectrum policy simply reinforces the  
9 important work that is being done by all of you  
10 here at CSMAC. It is essential that the debates  
11 that we are all having be informed by facts and  
12 to have a forum where the stakeholders can come  
13 together to bridge the differences.

14           Paige will discuss more of the steps  
15 that NTIA will be taking with respect to the most  
16 recent recommendations from the CSMAC but we are  
17 also looking forward anxiously to see the early  
18 responses from the next round of questions that  
19 have been assigned to folks.

20           So with that, I will say thanks to all  
21 of you for being here and pass it back on to  
22 Paige or pass it to back.

1 CO-CHAIR ALDER: Thank you very much,  
2 Glenn. Glad to have you here.

3 So, Bryan is our host today. And do  
4 you have want to say a few words about the  
5 surroundings and logistics?

6 MEMBER TRAMONT: The very important  
7 restroom issues.

8 (Laughter.)

9 MEMBER TRAMONT: If you need to go to  
10 the restroom, you can go out either door but it  
11 is down the hallway and to the right. So, you  
12 will find a number of people who will help you on  
13 the way. We do have coffee and cookies and stuff  
14 over there and there is a kitchen across the way.  
15 So, if you want anything that is not there, you  
16 can go get it in the kitchen across the hall.

17 And any other questions? I think we  
18 are all set.

19 Wi-Fi, there is a sheet out available  
20 on -- yes, on the sheet. So, you can just grab  
21 that if you want to get the Wi-Fi password if you  
22 have any questions about that. Anything else?

1                   Okay.

2                   CO-CHAIR ALDER: All right, thanks,  
3 Bryan. It is a great facility. We are really,  
4 really happy to be here.

5                   So, I am going to give a few opening  
6 remarks on behalf of the co-chairs and then we  
7 will do our usual roll call and proceed with the  
8 rest of the agenda.

9                   So, I think at a high level where we  
10 are is we have wrapped up, last meeting, a number  
11 of subcommittees that were kind of our 2014 and  
12 2015 work. And so thanks everyone for finishing  
13 that up. And I know Paige is going to give some  
14 responses to those recommendations.

15                   And we kicked off, really for the  
16 first time at the last meeting, we kicked off  
17 five new subcommittees with new chairs, new  
18 liaisons, new questions. And each of those  
19 committees has met at least once.

20                   CO-CHAIR GIBSON: No, all but one.  
21 Sorry, that is my bad. I didn't know.

22                   CO-CHAIR ALDER: I thought that all

1 met at least once so, I stand corrected. But we  
2 basically got those kicked off.

3 Mark here has done a great job. I  
4 want to commend him for actually attending all of  
5 the kickoff meetings of the first --

6 CO-CHAIR GIBSON: Even one I didn't  
7 even know about.

8 CO-CHAIR ALDER: -- meeting. So, we  
9 are really happy to have those committees going  
10 with some new chairs, some new ideas, hopefully.

11 What we wanted to make sure is by the  
12 end of this meeting we didn't leave this meeting  
13 without ensuring that the questions were locked.  
14 Some of the subcommittees have reworded their  
15 questions and they have brought the proposals. I  
16 think Mark and I and Paige have reviewed that and  
17 we believe all the subcommittees have their  
18 questions locked and finalized. But let's make  
19 that a goal of this meeting, to make sure we  
20 don't leave this without that. And the reason  
21 is, we are on a pretty short time line.

22 So, the current plan of record, not

1 absolutely finalized, is that this convening of  
2 the CSMAC will go through August. And so that  
3 leaves us roughly three meetings beyond this one.  
4 And if you look on the agenda in the back, there  
5 is a March, a May, and an August meeting. So,  
6 the current target is to have these subcommittees  
7 deliver their recommendations no later than the  
8 May meeting. And then that gives one final  
9 meeting for responses, cleanup, et cetera. So,  
10 we are really working on about a six-month time  
11 line. If we were all software engineers, we  
12 would be in the Agile Methodology; this would be  
13 a sprint for this body.

14 So, one of the tips, I think, is that  
15 the goals, although I know a lot of these  
16 subcommittees they like to do a lot of outreach,  
17 collect data, and that is all welcome and good  
18 but, given the time line, it might not be  
19 possible. So at a minimum, just collect the  
20 collective wisdom of this advisory committee. It  
21 is not required to go out and do a lot of extra  
22 research. There just may not be time in the six

1 months that we have to kind of conclude all this  
2 work.

3 Okay, so then I think that is kind of  
4 where we are in the big picture. In order to do  
5 the August work, we will get an extension on our  
6 membership. And Bruce is working on that but the  
7 working assumption is that this group will go  
8 through until August and be allowed to complete  
9 the work.

10 I guess I had one more comment before  
11 we do the membership roll call. We have got a  
12 portal available. And I know Bruce sent out some  
13 email and I think the idea is we are going to  
14 actually use the portal to try and deposit the  
15 documents and to be sharing. There were some  
16 issues with the portal. Apparently, it is now  
17 working. I tried to use it myself. For those of  
18 you who haven't gotten your user name and  
19 password, you have to go through a training. And  
20 if you are not expecting that, that takes on the  
21 order of 45 minutes to an hour. So, what you  
22 need to do is budget 45 minutes or an hour to sit

1 down and learn all about cybersecurity. It is a  
2 cybersecurity training. After you complete that  
3 training, you will get a certificate of  
4 completion and you then complete another form  
5 that was in your email from Bruce. You sign  
6 those forms, send them in, and then you will be  
7 able to get a password, a user name and a  
8 password.

9 So, we are asking everyone before the  
10 next meeting, I think personally try and make a  
11 goal maybe before the new year, to try and  
12 complete that training and that way we can use  
13 that facility to share the documents.

14 So, those are the things that I wanted  
15 to touch on in the opening remarks. Is there  
16 anything else you want to touch on?

17 CO-CHAIR GIBSON: With respect to the  
18 portal, it is Mark Gibson, I went through the  
19 training and if you haven't done cybersecurity  
20 training, it may take a little longer. But it is  
21 what it is. But when you get in -- the  
22 documentation shows you how to get into the

1 portal. You probably could figure this out but  
2 it took me a minute. There is an entry point for  
3 DoD or Defense Department and an entry point for  
4 federal employee. Use the entry point for  
5 federal employee. So that way, you won't do what  
6 I did and go halfway down the road with the DoD  
7 one.

8           Anyhow, other than what Larry said, I  
9 would add to the one point about reaching out for  
10 getting other information. I know for some of  
11 the work that I have sat in on, some want to get  
12 in some other experts, I would encourage that you  
13 expedite that process and maybe cut down on the  
14 list of experts you feel like you need. But I  
15 also wouldn't expedite the work at the expense of  
16 getting it done properly, to your and everybody  
17 else's comfort level. So, it is kind of trying  
18 to maximize both time and content. Thanks.

19           CO-CHAIR ALDER: Okay, with that,  
20 let's go ahead and do our membership roll call.  
21 Shall we go?

22           MS. ATKINS: Paige Atkins, NTIA.

1 MEMBER RATH: Charla Rath, Verizon.

2 MEMBER DOMBROWSKY: Tom Dombrowsky,  
3 Wiley Rein.

4 MEMBER REED: Jeff Reed, Virginia  
5 Tech.

6 MEMBER HATFIELD: Dale Hatfield,  
7 University of Colorado.

8 MEMBER DONOVAN: David Donovan, New  
9 York Broadcasters.

10 MEMBER POVELITES: Carl Povelites,  
11 AT&T.

12 MEMBER SCHAUBACH: Kurt Schaubach,  
13 Federated Wireless.

14 MEMBER FELD: Harold Feld, Public  
15 Knowledge.

16 MEMBER CHARTIER: Mike Chartier,  
17 Intel.

18 MEMBER CROSBY: Mark Crosby, EWA.

19 MEMBER MCHENRY: Mark McHenry with  
20 Shared Spectrum.

21 MEMBER REASER: Rick Reaser from  
22 Raytheon.

1                   MEMBER CALABRESE: Michael Calabrese,  
2 New America.

3                   MEMBER KUBIK: Rob Kubik, Samsung.

4                   MEMBER ROBERSON: Dennis Roberson,  
5 Illinois Institute of Technology.

6                   MEMBER OBUCHOWSKI: Janice Obuchowski,  
7 FTI.

8                   MEMBER TRAMONT: Bryan Tramont,  
9 Wilkinson Barker Knauer.

10                  MR. REYNOLDS: Glenn Reynolds, NTIA on  
11 behalf of Larry Strickling.

12                  CO-CHAIR GIBSON: Mark Gibson,  
13 Comsearch.

14                  Let's actually get the members on the  
15 phone.

16                  CO-CHAIR ALDER: Yes, the phone.  
17 People on the phone, you want to go ahead and  
18 introduce yourself, members?

19                  So, do we have -- is Martin Cooper  
20 there?

21                  MEMBER COOPER: Yes, Martin is on.

22                  (Laughter.)

1 CO-CHAIR ALDER: Martin's not there?

2 CO-CHAIR GIBSON: He is there.

3 MEMBER COOPER: Yes, I'm here.

4 CO-CHAIR GIBSON: It's hard for us to  
5 hear the phone.

6 MEMBER COOPER: Can you hear me?

7 CO-CHAIR ALDER: And Mariam?

8 MEMBER SOROND: Yes, I'm here.

9 CO-CHAIR ALDER: Jennifer?

10 MEMBER WARREN: Yes, I'm here.

11 CO-CHAIR ALDER: And then I think  
12 Robert Pepper.

13 I guess Robert's not there. Anyone  
14 else we are missing on the phone? All right,  
15 that sounds like it.

16 Do we want to go around the guests and  
17 introduce themselves? Why not?

18 MR. GREMBAN: I'm Keith Gremban with  
19 NTIA.

20 MR. MOLINA: Steve Molina with NTIA.

21 (Off mic introductions)

22 CO-CHAIR ALDER: Okay, thank you,

1 everyone. Anyone else we missed?

2 All right, so the next item on the  
3 agenda, the next several items on the agenda, so  
4 I am going to turn the floor over to Paige and  
5 she is going to cover first her Spectrum update.

6 MS. ATKINS: Good afternoon. Well,  
7 there really is no doubt that our work is never  
8 done and Spectrum is never boring. So, that is a  
9 good thing. We have been busy since the last  
10 CSMAC meeting and, as Glenn mentioned, Spectrum  
11 remains a high-interest item across the board,  
12 particularly on Capitol Hill, while many of us  
13 have been focused also on the World Radio  
14 Conference for 2015 and many of us around this  
15 table.

16 And at the same time, we are trying to  
17 keep the day-to-day work going, making sure the  
18 agencies have what they need operationally, as  
19 well as they develop systems to accomplish the  
20 mission and to stay focused and on track with the  
21 500 megahertz goal.

22 And I am happy to say that we are

1 successfully managing this very complex and  
2 challenging set of requirements.

3 And I can't emphasize enough what a  
4 critical role CSMAC plays to all of our  
5 activities. And it helps us maintain a strategic  
6 perspective and to see things through a different  
7 lens, which is very important, as we tackle our  
8 challenges, as well as our opportunities.

9 And today, we will talk about the  
10 actions that we have identified or at least a  
11 subset of the actions we have identified in  
12 response to the latest CSMAC recommendations.  
13 And I will do that in a few minutes. And I am  
14 excited to be kicking off these new sets of  
15 questions.

16 And as Larry and Mark indicated, we  
17 are under a compressed time line. I would ask  
18 you to, as they mentioned, not only to smartly  
19 reach out to folks but also try to avoid scope  
20 creep because we really don't have time for that,  
21 and to focus, again, on practical and actionable  
22 recommendations so we can grab them and run as

1 appropriate.

2 Before we start talking about the new  
3 questions or the actions, I wanted to give you my  
4 normal update. And I apologize up-front for  
5 those that have been involved in the World Radio  
6 Conference because that is going to be one of the  
7 major elements, particularly for Audrey,  
8 Jennifer, and others.

9 To start off with, I want to make sure  
10 that you all realize we haven't forgotten about  
11 AWS-3. So, one of our priorities is successful  
12 transition and remain focused on that priority.  
13 Formal coordination started about a month ago and  
14 it is has been pretty quiet so far, though a lot  
15 of activity.

16 Two portals came online to support  
17 that formal coordination. The ITS portal, which  
18 covers 1695 to 1710 megahertz and the DoD portal  
19 covering 1755 to 1780 megahertz.

20 And I want to remind folks that we  
21 would not be where we are today without the  
22 support of this Advisory Committee. It was

1 critical to us being successful in the transition  
2 planning process and being able to set up the  
3 right mechanisms to be successful in coordination  
4 and transition as we move forward.

5 Now, as we stood up the formal  
6 coordination or started formal coordination with  
7 AWS-3, in parallel, we kicked off the World Radio  
8 Conference 2015 or WRC-15, which concluded last  
9 Friday. And I am grateful to see some of the  
10 bright and shining faces that must be tired at  
11 this point. It was a marathon and a very intense  
12 environment from almost the beginning of the  
13 conference.

14 So, I would like to echo Glenn's  
15 comments to say thank you to everyone on the U.S.  
16 delegation, as well as the other sector members  
17 that participated not as part of the U.S.  
18 delegation and, in particular, to reiterate my  
19 thanks to Ambassador Anstrom and Julie Zoller, in  
20 particular, for their steadfast leadership.

21 This was a very successful conference  
22 for the United States. And I will use some words

1 that Decker Anstrom used earlier this week in a  
2 press call that he coined it as a watershed  
3 conference that set the agenda for the technology  
4 innovations that will largely define the 21st  
5 Century and directly benefit lives around the  
6 world and I think that is very relevant in terms  
7 of what we got out of the conference, not just  
8 from the U.S. perspective, from a global  
9 perspective. And to remind folks, particularly  
10 folks that are not involved in the work, it is  
11 held approximately every three to four years; it  
12 revises the treaty-level radio regulations, which  
13 allocate and govern how we use radio frequencies  
14 globally, as well as how we use satellite and  
15 orbital slots. So, it is an extremely important  
16 item to us.

17 And though the conference just  
18 completed, it has been a four-year study cycle  
19 and studies and negotiation including this last  
20 Friday on the 27th of November. And in fact,  
21 some people are still in Geneva for the kickoff  
22 of WRC-19. So, the cycle starts immediately

1 following the conclusion of the conference.

2 Now, a top priority for the U.S., as  
3 well as many other administrations was the  
4 identification of additional spectrum for  
5 international mobile telecommunications or mobile  
6 broadband. And though you can count the numbers  
7 in various ways, I will use numbers that have  
8 been used previously that, taken as a whole, and  
9 you have to understand they are exceptions and  
10 different regions and different administrations  
11 agreeing to different allocations and footnotes.  
12 But as a whole, the conference identified some  
13 250 megahertz of additional effectively  
14 globalized, harmonized -- globally harmonized  
15 spectrum to meet the near-term need for wireless  
16 and mobile broadband. And in some countries, you  
17 could count up to over 500 megahertz of spectrum  
18 that is now available.

19 More specifically, there was spectrum  
20 identified within the C-band, L-band, and  
21 flexible footnotes that will allow for use of the  
22 lower UHF band. So, thank the incentive auction

1 for next year. Overall, a very successful  
2 outcome.

3 This conference also was interesting  
4 in that it was somewhat of an aviation conference  
5 and we reached successful conclusion in many of  
6 those items as well or all of them, essentially.

7 The conference approved the use of  
8 selected fixed satellite service links for  
9 command and control of long-range unmanned  
10 aircraft. So, beyond line of site command and  
11 control of the vehicles. And that was one of the  
12 top U.S. priorities.

13 This groundbreaking agreement  
14 establishes a regulatory foundation to support an  
15 exploding set of new applications and  
16 capabilities that will literally add billions of  
17 economic benefit, not only to the U.S. but to  
18 other administrations and, in the process, it  
19 will revolutionize aviation across multiple  
20 applications, including disaster relief, cargo  
21 transport, agriculture, meteorology, and a host  
22 of others. And we see the small UAS all the time

1 as we coordinate within the U.S. but these are  
2 for larger platforms and, again, beyond line of  
3 sight.

4 There is still more work to be done,  
5 as ICAO, the International Civil Aviation  
6 Organization, develops a related safety standards  
7 and practices but now we have a regulatory  
8 framework to move forward. It was really pivotal  
9 to this growing market.

10 In another aviation example, the work  
11 established a regulatory approach that will  
12 enhance global flight tracking mechanisms in the  
13 short-term. And it has also established an  
14 agenda item for WRC-19 that will comprehensively  
15 explore further technological and regulatory  
16 needs for flight tracking and management under  
17 what is called the Global Aeronautical Distress  
18 and Safety System or GADSS, G-A-D-S-S.

19 And when you think about what a feat  
20 this was, this agenda item for the near-term WRC-  
21 15 agreement came very early in the conference,  
22 the second week of the conference, yet, it was

1       only added to the conference as an agenda item a  
2       year ago. So, it was a very compressed time  
3       line. This was directed out of the Plenipot in  
4       2014 as a result of the loss of the Malaysian  
5       Airlines Flight 370 and other incidents. So, it  
6       was really an amazing feat to get that done and  
7       very important to all of us from a safety  
8       standpoint.

9                 This work also set a course to  
10       identify spectrum that will be needed for IMT,  
11       International Mobile Telecom above 6 gigahertz to  
12       support particularly 5th Generation or 5G  
13       capabilities.

14                And the conference agreed on a range  
15       of 11 bands from 24.25 gigahertz to 86 gigahertz  
16       to be studied between now and WRC-19. It is a  
17       lot of spectrum. I have all 11 bands, if anybody  
18       is interested. It will be a significant effort  
19       but think of the benefit that we can reap on the  
20       other end, as we look at these higher bands.

21                And you can see, internationally, we  
22       are seeing a shift in terms of this focus in the

1 higher bands and you could think of it as  
2 extending the beachfront from what we  
3 traditionally thought of as prime spectrum. And  
4 several of these bands are aligned with the FCC  
5 NPRM, as well the spectrum frontiers NPRM, which  
6 is focused between 28 and 61 gigahertz.

7 Now, I wanted to note that we  
8 understand that 5G is not a one-size-fits-all.  
9 It can't totally be done with the higher bands.  
10 You still need a mixture of low, mid, and high  
11 band spectrum to get the job done. However, it  
12 does allow us to take a significant step forward  
13 and leverage new spectrum opportunities that  
14 wouldn't be available otherwise. So, we are  
15 really excited about that as well.

16 There were many other critical actions  
17 supporting the commercial space industry, the  
18 space science community, high altitude platforms  
19 and many other emerging applications that will  
20 have direct positive impacts on people's lives on  
21 a day-to-day basis globally.

22 In summary, we believe that the WRC-15

1 set a solid foundation for the future and for us  
2 to enable federal operations worldwide, support  
3 global broadband adoption, enable groundbreaking  
4 technologies and spur innovation and economic  
5 growth within the U.S., as well as other  
6 administrations.

7 Another key accomplishment since our  
8 last meeting was the enactment of the Spectrum  
9 Pipeline Act, which Glenn spoke to earlier, and  
10 that was enacted as part of the Balanced Budget  
11 Act and it is a substantial step forward. We do  
12 think it is largely answering the President's  
13 call for action on spectrum and doing it through  
14 these smart reforms from a Spectrum Relocation  
15 Fund perspective and it allows significant  
16 additional flexibility to apply the SRF funds to  
17 advanced spectrum planning and research and  
18 development to help us make additional spectrum  
19 available for commercial services.

20 Included, as Glenn mentioned, is a  
21 requirement for identification and auction of 30  
22 megahertz, followed by identification for another

1 100 all below 6 gigahertz. So, again, that will  
2 help with the lower band requirements.

3 But coupled together, and particularly  
4 the SRF reforms, we think this lays the  
5 foundation for sustainable process to allow us to  
6 have a spectrum pipeline in the future. So, we  
7 think there is great benefit from how this was  
8 instantiated.

9 We do believe it is a solid baseline  
10 for consideration of additional legislation and  
11 we feel it is important that we understand what  
12 the impact is of the Spectrum Pipeline Act and  
13 see what benefit it provides us over the next  
14 year or so in particular. But we are very  
15 optimistic that this will have a tremendous  
16 impact on our success, as we move forward.

17 We continue to see a lot of activity  
18 on Capitol Hill, with potential additional  
19 legislation, which I am sure many of you are  
20 following, and we look forward to continuing to  
21 work collaboratively with our partners in  
22 Congress, as well as the agencies, and other

1 organizations for exploring ideas to promote  
2 efficient and effective use of spectrum.

3 Last but not least I want to mention  
4 the National Academy of Sciences and their recent  
5 study published on NTIA's Institute for  
6 Telecommunication Sciences and NIST  
7 communications, technology, laboratory. If you  
8 recall, those two organizations have teamed  
9 together to form the Center for Advanced  
10 Communications.

11 This study, in part, was to analyze  
12 the research activities of ITS and make  
13 recommendations regarding the extent to which ITS  
14 research is addressing future telecommunications  
15 and spectrum challenges. And though there were  
16 many findings and recommendations, and I would  
17 recommend, if you are interested, it is posted on  
18 the web. So, you can get to it and read it.

19 I wanted to summarize and highlight  
20 just a couple of key items. Now, this study  
21 recognized that ITS has extensive capabilities in  
22 public safety radio spectrum sensing propagation

1 modeling and interference analysis but really  
2 almost more importantly, in my view, they noted  
3 that ITS was recognized by government agencies  
4 and the private sector for its objectivity,  
5 expertise, and physical resources; that it is,  
6 historically, a trusted expert, a trusted agent,  
7 so to speak, in certain areas of spectrum and  
8 communication engineering; and that it is an  
9 essential provider of these services to  
10 government agencies and, in some cases, to the  
11 private sector.

12 So, the bottom line out of this study  
13 is that DOC, Department of Commerce, and NTIA  
14 need to ensure that the critical functions that  
15 ITS provide remains and is strengthened over  
16 time. And that latter part is critically  
17 important. And that is especially in the area of  
18 spectrum sharing research analysis and test  
19 capabilities.

20 And NTIA is, obviously, committed to  
21 making that happen and a key component to our  
22 success if bringing onboard our relatively new

1 ITS director, who Glenn mentioned earlier before,  
2 I think, Keith came into the room. And so if you  
3 have any hard questions on ITS, please talk to  
4 Keith.

5 Keith joined us a few months ago. I  
6 believe it was May time frame, end of May, and he  
7 hit the ground running. And we will fold the  
8 National Academy of Sciences results into his  
9 planning, as we he develops a revised or enhanced  
10 strategy for the organization as they move  
11 forward.

12 And when I talk about some of the NTIA  
13 actions that we have identified in response to  
14 the CSMAC recommendations, though I will not  
15 break it out separately whether it is ITS or the  
16 Office of Spectrum Management, many of the  
17 actions include a partnership with ITS or where  
18 ITS is actually a major driver for executing  
19 against those actions.

20 There are many other ongoing efforts  
21 that I could highlight, however, I have taken too  
22 much time as it is already. And we want to make

1 sure we get to, after we talk about the NTIA  
2 response to recommendations, the initial response  
3 to the new questions and make sure that, as Larry  
4 said, we clarify and lock down any remaining  
5 questions or any remaining issues with the  
6 questions before we leave today.

7 So, as you can see, we have,  
8 collectively, been very busy the last three  
9 months and the momentum continues. We have much  
10 work ahead of us and, sincerely, we appreciate  
11 the collective wisdom of this group and that is  
12 important for our success.

13 And with that, I would like to turn to  
14 our responses to some of the CSMAC  
15 recommendations from the last set.

16 CO-CHAIR ALDER: You want to ask for  
17 questions first?

18 MS. ATKINS: Sure. Any questions or  
19 comments?

20 MEMBER FELD: Yes. I may have missed  
21 it in the readout from the WRC but I thought that  
22 there was also a recommendation that was made

1 with regard to harmonization of the DTSC  
2 globally. I believe that that was in the I think  
3 76 gigahertz band.

4 MS. ATKINS: Yes, that was for -- was  
5 that the short-range radar? Yes.

6 And I didn't cover everything that  
7 came out of the work. I just covered a couple of  
8 the particular high priority items.

9 MEMBER FELD: All right. I flagged  
10 that, though, in particular, given that it may  
11 have relevance with regard to the U-NII-4 5  
12 gigahertz and potential supplementary spectrum  
13 that may be available to DOT as distinct from the  
14 U-NII-4 band.

15 MS. ATKINS: And that is a good point.  
16 The band was 71 to 76. Was that it? Yes, so  
17 this was a band that was identified for short-  
18 range radar particularly focused on automotive  
19 applications and also for some wingtip  
20 applications to make sure planes didn't run into  
21 each other on the runway. So, and Audrey is  
22 diligently trying to look it up.

1           But yes, that is correct, Harold, and  
2 thank you for pointing that out.

3           CO-CHAIR ALDER: Janice.

4           MEMBER OBUCHOWSKI: I would just like  
5 to applaud the ITS focus here. As somebody that  
6 was in ITS in 1990 and got to observe, and this  
7 is the historic point that I think is very  
8 topical, got to observe that it was ITS that did  
9 the groundbreaking research on millimeter wave  
10 frequencies. And at the time, people were saying  
11 well, this is a rather obscure set of bands and  
12 yes, it is a world famous gentleman doing it but  
13 what is this all about. You see an example and  
14 Charla remembers this as well, it is an example  
15 of how forward-thinking many of the individuals  
16 at the lab have been but the fact that it has  
17 always been somewhat underfunded and  
18 underappreciated. I'm glad that topic has been  
19 raised.

20           CO-CHAIR ALDER: So, the next slide  
21 and then, again, Paige, is going to give us an  
22 update on the responses to the recommendations

1 from the last set of recommendations that came  
2 in.

3 MS. ATKINS: And I hope everybody has  
4 a copy.

5 If you recall, at the last meeting, I  
6 gave you a preview, some preliminary feedback on  
7 how we were looking at the recommendations and  
8 thoughts on actions we would take.

9 And so if we go to slide 2, there is  
10 a summary. We assessed the recommendations and  
11 there were many to assess. Many of the  
12 recommendations were actually related to on-going  
13 activities, things we have already started. In  
14 some cases, things that had been overcome by  
15 events or things that integrate into our normal  
16 operating practice. And by that, I mean using  
17 our Policy and Plans Steering Group for certain  
18 activities, our Interdepartment Radio Advisory  
19 Committee, et cetera. So, there are many  
20 mechanisms that we will use to respond to these  
21 recommendations.

22 What I really want to do today is

1 really highlight a subset of those and I  
2 characterize them as new discrete actions that we  
3 have identified and have some target dates  
4 associated with them. So, you can see more  
5 concretely some of the actions we plan to take  
6 over the next couple of years, predominately.

7 And then once we compile the full set  
8 of mapping of ongoing activities that map to some  
9 of the recommendations, as well as these discrete  
10 actions, we will be publishing that on the CSMAC  
11 website as well. And that compilation is not  
12 quite done yet. So, you will see that over the  
13 next few weeks.

14 So, if we move to slide 3, I will  
15 start with the Spectrum Management via Databases  
16 Subcommittee. And we have identified a few  
17 actions associated with this subcommittee and I  
18 did not reiterate the actual recommendations like  
19 I did in the last meeting. So, hopefully, you  
20 will remember the essence of the recommendations.  
21 However, all of that, obviously, is available on  
22 the website.

1           One of the actions that we will be  
2           taking over the next two quarters is to look at  
3           the applicability of some web-based coordination  
4           mechanisms that we have today, in particular,  
5           around the 70, 80, 90 gigahertz band. That  
6           permits public coordination, while protecting  
7           sensitive information.

8           And in this case, we use I will call  
9           it a government master file or GMF-like  
10          construct. So, it allows direct input and  
11          feedback to somebody coming in with a request.  
12          So, we are going to look at that and see if we  
13          can reapply that technique for other bands, other  
14          systems. In this case, we will probably start  
15          with some fixed systems because you are somewhat  
16          restrained by that light construct, in terms of  
17          the data fields that you can use for the analysis  
18          that needs to be done. But we think it may be  
19          applicable to other bands. So, we are going to  
20          do that, again, with the conclusion in Q3 of  
21          fiscal year '16.

22          Now, in the next item, there was also

1 a lot of interesting in making sure we are  
2 staying up on research and development and the  
3 technology. And as most of you probably know,  
4 there is a Wireless Spectrum R&D Senior Steering  
5 Group, which NTIA co-chairs. And we will work  
6 with them to get input on a priority list of  
7 research topics focused on advanced sharing and  
8 techniques to include database approaches. So,  
9 we will work with them and we are targeting  
10 getting that list from them in Q2, as well as  
11 coupled with our ongoing engagement in that forum  
12 with the other agencies, et cetera.

13 And if anybody has a question as I go  
14 along, please feel free to interrupt.

15 Now, if we move on to, let me see --  
16 I lost my slide number -- slide 4, in terms of a  
17 Spectrum Access System, one of the things that we  
18 talked about at the last meeting is the  
19 subcommittee essentially assumed a federal  
20 Spectrum Access System would be required. And  
21 one of my comments was I'm not sure that is a  
22 valid assumption. So, one of the thing we want

1 to do is assess the need for a federal Spectrum  
2 Access System and we are going to focus,  
3 initially, on the 3.5 gigahertz activities. And  
4 at the end of the year, we are expecting to be  
5 able to have a recommendation on whether we think  
6 a federal SAS is needed or not, at least a  
7 preliminary recommendation in that regard.

8 At the same time, we want to frame  
9 what we would need to do to establish a federal  
10 SAS. So, take a look at that construct in  
11 parallel. So, if we determined we do think we  
12 need it, we are a little bit ahead of the game.

13 And then after that, if we determine  
14 a federal SAS would be required, we would  
15 complete a study in terms of implementation and  
16 an associated roadmap on how to get there. And  
17 you see the time lines associated with those two  
18 actions. So, they are sequential in nature.

19 And then there was a lot of discussion  
20 around access to classified information, how  
21 information, spectrum information is classified.  
22 And there has been an action to the White House

1 Spectrum Policy Team to continue to look at that  
2 and we will work with them to look at assessing  
3 and implementing the appropriate policies in that  
4 regard.

5 CO-CHAIR ALDER: I have a question.

6 MS. ATKINS: Sure.

7 CO-CHAIR ALDER: Yes, as a co-chair of  
8 that committee, I think these are great  
9 responses, particularly the last one where we  
10 think the NTIA is really in a unique position to  
11 be kind of an advocate for a balanced approach on  
12 some of those issues of proprietary data and  
13 classified information. So, I think that is  
14 great that they are taking an active role there.

15 Just commenting on the need for the  
16 federal SAS, I think a subtle point was the  
17 committee, having sat on it, was trying to say  
18 you might be able to get more with a federal SAS.  
19 There is more you can do. It wasn't like a hard  
20 line required or not required. So, I think the  
21 committee was very clear that even without a  
22 federal SAS we thought there was a lot that could

1 be done but maybe even more could be done. So,  
2 it wasn't requirement/not requirement. It was  
3 more of a gradual -- a graduation.

4 MS. ATKINS: Okay, thank you. Any  
5 other questions or comments?

6 Then let's move to slide 5. And we  
7 are going to shift to bi-directional sharing.  
8 And obviously some of this work is being carried  
9 into the next set of questions, as well, but we  
10 did want to highlight a couple of specific  
11 actions that we will be taking over the next few  
12 months.

13 And one is to take a look at the NTIA  
14 Manual and specifically a couple of chapters in  
15 the NTIA Manual to clarify really the scope of  
16 our authorities, in terms of allowing federal  
17 users secondary access or even co-primary access  
18 to non-federal spectrum. Because I am not sure  
19 we are taking full advantage of what we can do  
20 today. And that will be a resulting paper that  
21 will be, in some sense, educational to the  
22 federal agencies, as well, so they understand the

1 scope of what they can do today. And I think  
2 that will help all of us moving forward.

3 And then we will start looking at  
4 potential regulatory changes. And if we needed  
5 to, we would file a rulemaking petition with the  
6 FCC to enable co-equal use rights for federal  
7 users sharing non-federal spectrum. But again,  
8 we expect this next set of question to help us  
9 continue the dialogue. And particularly, if you  
10 remember, the first phase was really focused on  
11 short-term intermittent kinds of requirements,  
12 somewhat isolated requirements. And then this  
13 next phase, we will be looking at, I will call  
14 them more pervasive requirements for sharing,  
15 federal users sharing non-federal spectrum.

16 Any questions on the bi-directional  
17 sharing?

18 Okay, now if we move to slide 6, this  
19 was the Government and Industry Collaboration  
20 Subcommittee. And again, some of elements of  
21 that will be ongoing as well.

22 And there are two items that I wanted

1 to highlight. One is there was a listing of  
2 potential collaboration topics that we were  
3 recommended for areas of focus. And what we want  
4 to do is leverage our Policy and Plans Steering  
5 Group Spectrum Working Group, specifically, which  
6 is an ongoing forum, if you aren't familiar with  
7 it, and includes the agencies, FCC, and White  
8 House personnel to identify, assess, and  
9 prioritize topics for increased collaboration.  
10 And this will be coupled with the next item,  
11 which I will describe in a moment.

12 So, we will be using an ongoing  
13 established forum, which we use today for  
14 collaboration, coordination, and prioritization  
15 across multiple elements to include how we look  
16 at bands for potential repurposing to help us  
17 shape how we move forward and our areas of focus  
18 for government and industry collaboration more  
19 broadly.

20 And then the second element, one of  
21 the questions we asked was whether our framework  
22 that we envisioned to enhance this collaboration

1 made sense. And the feedback that we got from  
2 the subcommittee was the framework seemed to make  
3 sense.

4 So, what we are doing, and we have  
5 already started this process, we are taking that  
6 framework and creating a much more detailed  
7 implementation plan. And if you recall, the  
8 framework included a multi-tiered process that  
9 allowed us more public-facing engagement and then  
10 more, I will say controlled -- that is not quite  
11 the right word but different levels of engagement  
12 to allow us to look at different issues and allow  
13 us to stay out of trouble from a FACA standpoint.  
14 And that framework is posted on the web, if you  
15 are interested in going back and looking at it.  
16 But we will be or have already started fleshing  
17 that out to put meat on the bone. So then we can  
18 start implementation by the third quarter of this  
19 fiscal year.

20 And we still are engaging pretty  
21 robustly with industry now but this will help put  
22 some framework and structure around it.

1                   Any questions on these two  
2 recommendations?

3                   Okay, so if we can go to the next  
4 slide, slide 7, measurement and quantification.  
5 There were several different recommendations and  
6 we identified -- well and jut to clarify, part of  
7 our assessment here was what we could do with our  
8 resources and where we thought the priorities  
9 were. So, you are seeing what we have identified  
10 as priorities that we think we can accomplish  
11 within our current resources.

12                  So, from a measurement and  
13 quantification standpoint, there was, I'll call  
14 it, a process that was proposed in terms of a  
15 tiered way to do measurement, to do it smartly.  
16 And what we want to do is exercise the first two  
17 tiers and that was the recommendation was around  
18 a measurement applicability analysis and we want  
19 to do that for one of our quantification  
20 assessment bands, 1300 to 1390 megahertz, and  
21 perform that this year. And then couple that,  
22 and this is one of the tasks that we will be

1 working very closely with ITS and they will be  
2 taking a major role in this effort, to then go to  
3 the next level and do some occupancy  
4 measurements, based on the applicability  
5 analysis. And there are some measurements that  
6 exist today in this band. So, we will try to  
7 couple that into the assessment as well and,  
8 again, exercise those first two tiers. And we  
9 should be able to get through that toward the end  
10 of fiscal year 17 in total.

11 Now, the other element that we want to  
12 address now is there was an assessment on what  
13 was required to try to project or estimate  
14 occupancy without additional test information.  
15 And I think I mentioned at the last meeting that  
16 NTIA is currently performing or working with the  
17 agencies to perform a quantitative assessment and  
18 that was based out of the last President's memo  
19 and incorporated into I think it was the fifth  
20 in-progress report that we published, where we  
21 had the quantification assessment plan.

22 And what we want to do is we are on

1 the tail end of that effort and we will be  
2 documenting what we did and that is, again,  
3 projecting occupancy based on data, not  
4 measurements, to include what our data collection  
5 and verification requirements were, as well as  
6 our methodology in how we analytically quantified  
7 what that usage looked like. And that  
8 quantification includes the frequency, geography,  
9 and time and actually overlaid on population  
10 information.

11 MEMBER CALABRESE: What is the federal  
12 usage in that particular band?

13 MS. ATKINS: For this band -- well,  
14 this is kind of band agnostic. So, there were  
15 five bands included. The last item is not 1300  
16 to 1390 specific.

17 MEMBER CALABRESE: Oh, was it not 1300  
18 to 1300.

19 MS. ATKINS: Oh, okay, 1300 to 1390,  
20 a couple segments. They are in the bottom half,  
21 roughly, 1300 to 1350. There is a lot of long  
22 range radar, air surveillance radars in there.

1 There is other tactical radar systems,  
2 predominately. In the upper portion of the band,  
3 there is a combination of a little bit of radar,  
4 as well as tactical radio relay. There is  
5 nuclear detection elements in it and other major  
6 elements. Airborne, I think.

7 MEMBER TRAMONT: Okay, thanks. So,  
8 the third bullet is not 1300 to 1390-specific.

9 MS. ATKINS: Correct.

10 MEMBER TRAMONT: Okay. So, just as a  
11 general matter, we are going to figure out how to  
12 do those quantify on those three metrics. Is  
13 that correct?

14 MS. ATKINS: Yes, and so we are,  
15 again, wrapping up an effort and we want to  
16 document how we did it, so everybody can  
17 understand our methodology.

18 MEMBER TRAMONT: I see.

19 MS. ATKINS: And we did it for  
20 actually five different bands, including 1300 to  
21 1390. And again, you can find the plan in our, I  
22 think it was the fourth in-progress report for

1 the 500 megahertz of the ten-year plan, which is  
2 posted. It describes the initial plan construct  
3 and then this will be documenting, so to speak,  
4 how we actually did it and then eventually, we  
5 will be documenting some of the actual results of  
6 the quantification assessment.

7 These are intended to be public  
8 documents. In terms of the actual  
9 quantification, we just need to do an assessment  
10 to make sure we know what we can publish and what  
11 we can't. But we are trying to be as transparent  
12 as possible, across the board.

13 MEMBER OBUCHOWSKI: Well, probably a  
14 predictable comment from me and I would pose it  
15 to Dennis if he were here. Is the TAC pursuing a  
16 similar analysis of commercial bands or more  
17 sophisticated analytics?

18 MS. ATKINS: From a quantification  
19 standpoint?

20 MEMBER OBUCHOWSKI: Yes.

21 MS. ATKINS: Matthew, did you hear the  
22 question?

1           PARTICIPANT:  If we are presenting the  
2 same commercial band?

3           MEMBER OBUCHOWSKI:  No, not  
4 necessarily the same.  I mean this is you know,  
5 obviously, much of it -- a lot of debate.  Some  
6 of it, I would say a bit overheated, as to do  
7 with measuring government use and perhaps, at  
8 times, assumptions about that use, which this  
9 will help verify or not.  I am wondering if FCC  
10 has been similarly engaged or considering  
11 similarly engaging in such analytics that might  
12 be made public.

13           PARTICIPANT:  That may be for a task  
14 force to answer, maybe that or the TAC.  I don't  
15 know.  So, I would just have them address that.

16           MEMBER REED:  You mentioned that you  
17 wanted to try to find usage without measurements.  
18 Could you elaborate?  Or maybe I misunderstood  
19 you.

20           MS. ATKINS:  One of the questions that  
21 was posed to this group was how might you  
22 quantify occupancy or usage, I can't remember the

1 exact words, without additional measurement  
2 information. Part of what we are trying to or we  
3 were trying to also determine is now only how you  
4 might measure but how you could do it effectively  
5 and efficiently and is it useful to us.

6 So, the other portion of that question  
7 was then, is there a methodology where if you  
8 didn't have the measurement data, if it came out  
9 too expensive, too resource-intensive, is there  
10 another way to do it with data versus  
11 measurements.

12 MEMBER REED: I'm somewhat  
13 pessimistic.

14 MS. ATKINS: Well, that is why we want  
15 to document what we did.

16 CO-CHAIR GIBSON: Jeff, I would read  
17 the report because there was some pretty  
18 interesting thoughts on how to do that.

19 MEMBER REED: Okay.

20 CO-CHAIR GIBSON: It is how you  
21 quantify occupancy. And the group, the Erstwhile  
22 Group did some pretty good work at least on

1 teasing that out a little bit. So, to the extent  
2 you are still dubious, read it and then come back  
3 with thoughts. That is your homework.

4 MS. ATKINS: And I would say, also,  
5 that it is not necessarily purely one or the  
6 other. We are trying to understand what we  
7 should be doing and how we can do it effectively.  
8 So, it might be analytically trying to project  
9 occupancy that helps us drive the tears of how we  
10 measure. So, don't think of it as purely one or  
11 the other.

12 MEMBER MCHENRY: While we are at it,  
13 can you explain what the measurement  
14 applicability analysis is? What is that?

15 MS. ATKINS: So, I will describe it  
16 best I can because that was the terminology from  
17 the recommendation. So, I would encourage  
18 anybody from the subcommittee to add.

19 So, how I would interpret it, and  
20 please correct me for the folks that generated  
21 the terminology, is to understand how well you  
22 could -- how effective measurements could be

1 within a given band, such as receive only or GPS,  
2 et cetera.

3 MEMBER MCHENRY: If it was a satellite  
4 receive band and you walk around with an Omni  
5 antenna, you could measure all day. You wouldn't  
6 learn much. So, you have got to ask what you  
7 learn as you make a measurement.

8 MS. ATKINS: So, it is really looking  
9 at what is in the band, how are they dispersed.  
10 Can you really measure it and measure it to a  
11 higher degree of confidence?

12 Any other questions? Oh, there is  
13 Dennis. We will go back to Dennis's question --  
14 yes, question for Dennis.

15 MEMBER OBUCHOWSKI: Just answer.

16 MEMBER ROBERSON: The answer is 37.

17 MEMBER OBUCHOWSKI: There is a lot of  
18 good work done on measurement and quantification  
19 and NTIA is committing to document following  
20 quantitative assessment methodologies. And not  
21 surprisingly, my question to the TAC is there is  
22 a lot of rhetoric about federal spectrum. Is it

1 insufficiently used or not? And this should, at  
2 least, give some objectivity to the discussion.

3 Is there similar work being done at  
4 the TAC, as it observes commercial spectrum  
5 utilization?

6 MEMBER ROBERSON: Yes.

7 MEMBER OBUCHOWSKI: And how is that --  
8 I mean are there recommendations being made?

9 CO-CHAIR ALDER: I think we are not  
10 being fair to Dennis because I think Paige's  
11 description of what her response is. Maybe it is  
12 something we can let Dennis digest.

13 (Simultaneous speaking.)

14 MEMBER ROBERSON: No, this is really  
15 the source of spectrum and receiver working group  
16 within the TAC. So, it is very much the focus on  
17 spectrum efficiency and the metric, really the  
18 focus there is on the commercial spectrum, more  
19 so than federal use of the spectrum, defining  
20 means of improving it. And there have been a  
21 whole set of activities that are under that  
22 banner going from interference and how do you

1 dense pack more effectively, how do you share  
2 more effectively and the like.

3 MEMBER OBUCHOWSKI: So, are you  
4 looking at spectrum usage measurements, current  
5 spectrum usage, measurements of current spectrum  
6 usage?

7 MEMBER ROBERSON: There have been, in  
8 the past, and there are now.

9 MEMBER OBUCHOWSKI: Okay and those are  
10 broad-based or band-specific?

11 MEMBER ROBERSON: They have tended to  
12 be focused on band-specific. Yes, different  
13 bands at different times.

14 MEMBER OBUCHOWSKI: Okay.

15 MEMBER ROBERSON: And actually that is  
16 what I did this morning. We were working on the  
17 plans next year. So, this is pronouncing but we  
18 will likely be doing some things very focused in  
19 that are for the next year as well.

20 MEMBER OBUCHOWSKI: No, I think that  
21 is very useful because, frankly, you know the  
22 difference between the deliberations at the CSMAC

1 and the TAC and the rhetoric that is communicated  
2 to Capitol Hill is quite different. And there  
3 are probably reasons for that. We can all  
4 speculate. But it would certainly behoove all of  
5 us to take the rhetoric down and the objectivity  
6 up.

7 MS. ATKINS: And I think the point  
8 being we just need to have a balanced approach  
9 and balanced visibility so as we try to better  
10 quantify how the federal government uses spectrum  
11 to have corresponding on the non-federal side so  
12 we can see the big picture and optimize the best  
13 we can across the board.

14 MEMBER OBUCHOWSKI: Because I think  
15 that is in everybody's best interest.

16 MEMBER ROBERSON: Yes, but this is a  
17 very expansive subject so, I'll try to balance  
18 how much here to share but the use of the  
19 spectrum is fit for purpose. There are different  
20 purposes, different importance levels assigned.  
21 So, you can have a very efficient use of the  
22 spectrum by the radios. They are doing very

1       useless things. Or you can have very inefficient  
2       use of the spectrum that do extremely important  
3       absolutely critical things for our survival. And  
4       balancing those things is really a critical  
5       component that is often not built into the  
6       conversation.

7                   MS. ATKINS: That's an excellent  
8       point.

9                   MEMBER TRAMONT: Can I do one more?  
10       Sorry. Will the spectrum quantitative assessment  
11       include an assessment of throughput or is it  
12       limited to frequency used, geography, and time?  
13       I'm not sure it should.

14                   MS. ATKINS: Yes, it has no indication  
15       of throughput because there are different kinds  
16       of systems, for instance, in the 1300 band, air  
17       surveillance radar systems. So, it is really the  
18       perspective of frequency and bandwidth, geography  
19       and time.

20                   MEMBER TRAMONT: Will it be  
21       transparent which systems -- well, we don't know  
22       yet because we don't know what we can disclose.

1 But as a general matter, it will be transparent  
2 to the public what type of systems are being  
3 measured along these metrics. Is that fair to  
4 say?

5 MS. ATKINS: So, I would say I believe  
6 so. You just won't have the details of the  
7 systems themselves.

8 MEMBER TRAMONT: I understand.

9 MS. ATKINS: And I would offer, if you  
10 haven't seen it yet, and I think we have  
11 discussed it here, we do have the spectrum  
12 compendium on our website as well and that gives  
13 for below 5 gigahertz and we are starting to  
14 extend it. It gives a pretty good snapshot of  
15 what systems are in the various bands, high level  
16 summaries, numbers of assignments, the agencies  
17 that own the assignments. And then in many  
18 cases, I will say coverage plots not in the same  
19 sense of the quantitative assessment. But there  
20 is a lot of good information there that may be  
21 helpful as well.

22 CO-CHAIR GIBSON: It's Mark Gibson.

1 Now, you may have addressed this. So, I will  
2 just say if you did, okay.

3 Are you going to try to involve  
4 industry in any of these measurements or at least  
5 discussions on your metrology or in what you call  
6 measurement applicability analysis?

7 Because it seems that to the extent  
8 that there is nothing in there that is FOUR  
9 classified that will require that type of  
10 protection, it would be helpful to have industry  
11 involvement sort of a priori so as it works  
12 through the process, there is more facility for  
13 buy-in as it comes through.

14 And I am thinking about that in the  
15 terms of the former discussion we had about  
16 industry and government collaboration.

17 So, to the extent you can include  
18 industry in that, it might be helpful to get  
19 through.

20 MS. ATKINS: Yes, that is a good  
21 recommendation.

22 CO-CHAIR GIBSON: Okay.

1 CO-CHAIR ALDER: Yes, I just wanted to  
2 make the point that I know the working group did  
3 a lot of interesting analysis of what was  
4 spectrum occupancy and did some clever ideas  
5 about what is occupancy, how much you are using  
6 the spectrum versus how much you are preventing  
7 someone else from using the spectrum. So, I am  
8 just hopeful you will incorporate some of those  
9 ideas.

10 MS. ATKINS: Yes, so this particular  
11 effort is on the tail end because we actually  
12 started it before the subcommittee ended. But in  
13 this case, the contours or the occupancy for the  
14 transmitters, federal government transmitters is  
15 as it relates to a notional commercial receiver  
16 in the environment. So, it is somewhat of a  
17 hybrid approach. And that, again, is something  
18 that we will be explaining and documenting, if  
19 that made sense.

20 Any other questions on this one?

21 Okay, let's move to enforcement,  
22 Dale's favorite topic. And so I want to talk

1 about the bullet I have here and then I will add  
2 a verbal comment.

3 So enforcement, as we have talked  
4 about in the report that came out of the  
5 subcommittee, it is a very complex issue and  
6 multi-layered issue and extremely important. And  
7 as Janice said, I think at the last meeting, it  
8 is really fundamental to us being able to do what  
9 we need to do in the future and we agree with  
10 that.

11 So, what we would like to do over the  
12 next few months is to study, and this is directly  
13 from the recommendation, potential mechanisms for  
14 effective enforcement. I think the  
15 recommendation actually is the verbiage radio  
16 policing or something like that. I would rather  
17 use enforcement in this case.

18 (Laughter.)

19 MS. ATKINS: But we want to base it on  
20 a case study. And the case study is the Terminal  
21 Doppler Weather Radar interference that we have  
22 been experiencing, have been studying, have been

1 working with ITS on as well.

2           And it really covers -- I created a  
3 subset of the mechanisms here from the  
4 recommendation but it really covers all the  
5 mechanisms that were identified. And you can  
6 read the mechanisms I have down here. And we  
7 think that would be a solid foundation that  
8 allows us to really look at a real case that has  
9 been occurring for some time and help us address  
10 what the issues were, as well as the mitigation  
11 for those issues. And that will help us start  
12 framing this in a more holistic way.

13           And in this case, this is unlicensed  
14 devices, so it could be considered more of a  
15 worst case and how you identify, how do you  
16 enforce in that situation.

17           Now, the second item I wanted to  
18 mention, as many of you probably know, we have  
19 biannual meeting between the FCC chairman and the  
20 Assistant Secretary. And our last biannual  
21 meeting, I believe, was in -- it was a few weeks  
22 ago, a couple of months ago, October time frame.

1 And there were many key issues addressed to  
2 include spectrum sharing as one. But another  
3 area that we did have a discussion around was  
4 enforcement. And what we are doing is working  
5 together to peel that back, to ensure enforcement  
6 of the rules that are put in place and how we do  
7 that to facilitate sharing, specifically, between  
8 federal and non-federal users. And we have a  
9 shared commitment to promptly correct any  
10 interference that occurs and we have to ensure we  
11 would have that framework in place to do that.

12 We have not gone to the extent of  
13 saying we need an MOU or other mechanisms. And  
14 those were in some of the recommendations back  
15 from the enforcement subcommittee. But I wanted  
16 folks to know that it is an area of priority for  
17 ours, obviously for FCC and we are working  
18 together on how we move forward together in this  
19 capacity.

20 Any other questions?

21 MEMBER HATFIELD: Because we are  
22 looking in the TAC at the same sort of issues

1 that Pierre is doing. Anyway, people need to  
2 talk to each other because there is, obviously,  
3 some overlap and I use that in a good sense. I  
4 think the work is very, from my standpoint, is  
5 pretty complementary, actually.

6 MEMBER ROBERSON: No, it is. This is  
7 Dennis. There is a lot of complementary work  
8 which is really terrific. I think that is one of  
9 the nice things that Dale and I sitting on both  
10 bodies and now we have the liaisons that Matt has  
11 seen, wherever you are Matt, representing the FCC  
12 at this body and representing the NTIA at FCC  
13 TAC. But I think that there is a considerable  
14 complementarity.

15 So, I think we need to continue to  
16 focus on that but it is getting better and better  
17 in terms of having things that mesh well together  
18 -- staying away from that word. Mesh is a  
19 measuring or something.

20 MS. ATKINS: So, we will make sure  
21 that we ensure we know what is being done in the  
22 TAC, as well, and as we move forward on this more

1 detailed study, I think that will be very  
2 helpful.

3 MEMBER ROBERSON: And this is where I  
4 wasn't sure why I was being led on this because  
5 Dale, in fact, is the one who is authoring the  
6 report that is going to be coming out.

7 MS. ATKINS: Harold?

8 MEMBER FELD: I want to flag some  
9 concerns that I have with regard to using the  
10 TDWR interference issues as a case study. The  
11 reaction of the FCC with regard to operation  
12 within the U-NIII band in terms of the enhanced  
13 limitations on use of U-NIII that were adopted as  
14 part of what was more broadly the U-NI reform  
15 order, which I believe went into effect a couple  
16 of months ago. The subsequent follow-up with  
17 what I think I can politely characterize as a  
18 rather over-aggressive response embedded within  
19 the E-labeling with regard to what certification  
20 of operation, the 5 gigahertz band that open  
21 source equipment, that open source middleware,  
22 the implication in the language that we used that

1       seemed to suggest that open source middleware  
2       represented a particular threat of interference  
3       and created a suspicion that somehow the use of  
4       open source could facilitate interference which  
5       caused considerable backlash in the technical  
6       community.

7               The difficulty in ascertaining details  
8       for a number of us, particularly those folks who  
9       were concerned about the potential for chip lock  
10      down and getting more details from either the FCC  
11      or from the FAA with regard to the specifics of  
12      the incidents that raised concern, frankly, make  
13      me worry that this is not an ideal case to study  
14      or if we are studying this as a case study, we  
15      need to be cognizant of not simply how things  
16      worked out from the FAA's perspective but the  
17      implications within the private sector and  
18      particularly, I think, for the open source  
19      community which, being somewhat more distributed,  
20      often is not able to lobby as effectively as  
21      manufacturers or some of the other interests that  
22      are affected.

1 MS. ATKINS: Thank you, Harold. We  
2 will take that into consideration.

3 MEMBER CROSBY: This is Mark Crosby.  
4 I'm looking at the case study. It is great to do  
5 a case study and I think all of the elements are  
6 there, perhaps, except one. Is there going to be  
7 during the case study an identification of any of  
8 the penalties that might be imposed in those  
9 provoking the interference or the harmful  
10 interference?

11 I mean it is great to identify it and  
12 they are doing it and they shouldn't be doing it  
13 but it would be good to also perhaps, during the  
14 discussion, what can you do to identify and make  
15 sure that they don't do it again.

16 MS. ATKINS: Yes, I would say we will  
17 work with the FCC to determine what makes sense  
18 in that regard. And we will take that also into  
19 consideration.

20 MEMBER DONOVAN: This is David  
21 Donovan. Yes, I think that this is, obviously, a  
22 very complex issue and I know you have had

1 discussions with the Chairman regarding  
2 coordination between the NTIA and the FCC. Do  
3 you view that, particularly in the context of  
4 this case study, that that will lead towards a  
5 formalization of rules and processes that may  
6 come out of this, whether it is an enforcement in  
7 the context of unlicensed or enforcement in the  
8 context of federal and non-federal sharing? And  
9 I raise that only because at the end of the day,  
10 sharing, to a large extent, is going to be based  
11 on uncertainty from both sides. And do you  
12 contemplate on that discussion, at least with  
13 respect to enforcement, sort of a path or a guide  
14 to how commercial entities and federal entities  
15 know what their remedies would be? And to Mark's  
16 point, I see the technical aspects of how you  
17 define interference and things of that nature,  
18 looking at the case study, which are absolutely  
19 critical. I mean they are foundational  
20 discussions. But what I am trying to get a feel  
21 for is where is sort of the next step, if there  
22 is one, between looking at sort of the

1 fundamental jurisdictional issues that exist in  
2 enforcement between NTIA and the FCC and whether  
3 or not -- how you are approaching that.

4 MS. ATKINS: So, I think it is a  
5 combination of things. So, as you said, this  
6 kind of study is foundational, in terms of what  
7 we are trying to do. I see our continued  
8 discussion in collaboration with the FCC will  
9 lead us somewhere, in terms of identifying those  
10 other kinds of policy and implementation issues.  
11 What it will eventually look like, I won't  
12 speculate.

13 But going back to your earlier  
14 comment, it really is largely about I will call  
15 it certainty, on both sides, that things will  
16 happen in a predictable and consistent way. So,  
17 the intent is there. Again, how we will move  
18 forward, we are still defining.

19 MEMBER DONOVAN: If I could just  
20 follow-up. Will the discussion of how we move  
21 forward be done in the context of this case study  
22 or is that sort of Chapter 2 after we look at

1 these specific questions?

2 MS. ATKINS: I will say somewhat in  
3 parallel.

4 MEMBER DONOVAN: Okay.

5 MS. ATKINS: Not necessarily specific  
6 to the case study but in the FCC NTIA discussions  
7 and collaboration that will occur in parallel to  
8 the case study.

9 MEMBER DONOVAN: Okay, fair enough.  
10 Thank you.

11 CO-CHAIR ALDER: Real quickly, one  
12 last question on this topic, then we will move  
13 on.

14 MEMBER FELD: With regard to the  
15 definition of harmful interference, and this goes  
16 to the question of coordination with the FCC on  
17 this, the FCC has, of course, defined harmful  
18 interference in its own regulations with regard  
19 to the use of commercial services. Granted, it  
20 is a somewhat flexible definition, which is one  
21 of the things that I know people have had some  
22 concerns about but, nevertheless, it is the one

1 that we employ at the FCC, is the objective here  
2 to define a separate definition of harmful  
3 interference for federal systems or to examine  
4 how the FCC's definition of harmful interference  
5 fits within the context of interference with  
6 federal systems?

7 MS. ATKINS: Well, I will answer to  
8 the best of my ability. So, I believe it is  
9 focused, initially, on how we came to a  
10 definition of harmful interference as it relates  
11 to the federal systems in this case from the  
12 unlicensed devices. But I would want to defer  
13 the answer until -- I am speaking somewhat out of  
14 ignorance related to what is explicitly being  
15 targeted for this case study.

16 But it is all part of the fundamental  
17 mechanisms is understanding what that looks like,  
18 whether it be to federal or to non-federal  
19 systems as part of that framework for certainty  
20 and consistency. But we will get you more  
21 information as we drill it back.

22 CO-CHAIR ALDER: Okay, Janice, I am

1 going to hold the question. I am going to let  
2 Paige finish her briefing in the interest of time  
3 and then we will cover questions at the end.

4 MS. ATKINS: I honestly didn't think  
5 I was going to need the whole time.

6 Okay, so spectrum sharing cost  
7 recovery. This will be quick. A lot of great  
8 information came out of the Spectrum Sharing Cost  
9 Recovery team. As you know, there is a lot of  
10 discussion on the Hill and among various  
11 organizations that are aligned with many of the  
12 recommendations out of this subcommittee. And  
13 there is so much discussion going on right now,  
14 we wanted to defer actually responding with  
15 specific actions, at this time, for various  
16 reasons. So, we will get back to you on this one  
17 in more detail, when the time is right. But  
18 great work out of this team.

19 And then the one that you won't see  
20 here is transitional sharing. As you recall,  
21 many of those recommendations became overcome by  
22 events or were already implemented. So, I did

1 not have any new actions related to that  
2 subcommittee.

3 So, to wrap up, we will compile,  
4 again, all of these recommendations to include  
5 some of the ongoing work that is already being  
6 done to address the recommendations and create  
7 some logical format for that and post it on the  
8 website.

9 And then I wanted to add the caveat  
10 that these could change, depending on resource  
11 issues or other priorities that pop up, as we  
12 move forward. But right now, this is our plan of  
13 attack for the discrete actions that we have  
14 identified again, in response to the CSMAC  
15 approved recommendations for this last cycle.

16 So, I appreciate your feedback, your  
17 questions. If you think of additional questions  
18 or inputs that you feel would be helpful to us,  
19 please send those our way.

20 CO-CHAIR ALDER: We are running a  
21 little overtime, not majorly overtime, so, if  
22 there is one or two questions on the brief. If

1 not, we will -- Janice? Dale has one.

2 MEMBER HATFIELD: Just real quickly,  
3 I would comment -- this is Dale Hatfield. I  
4 would quickly comment of course the work on the  
5 Harms Claim Threshold issue that is being done in  
6 the TAC and so forth, obviously, has some  
7 implications here. Because if we don't come up  
8 with that good definition of harmful  
9 interference, you know it is for naught. We have  
10 got to do a better job of quantifying it and I  
11 think that the work that Pierre has been trying  
12 to do.

13 So, just a comment that I think that  
14 fits in with what you are talking about as well.

15 MS. ATKINS: And I will just add  
16 quickly we have talked about increasing the  
17 collaboration between the CSMAC and the TAC. And  
18 I think on some of these areas, we need to peel  
19 that back a little bit more and see how we can  
20 more robustly collaborate on certain key topics.

21 CO-CHAIR ALDER: Okay, thank you,  
22 Paige for both the spectrum overview and the

1 responses to the recommendations.

2 I know for me, it is great to see the  
3 recommendations being taken into consideration  
4 and actual actionable outputs. So, I think that  
5 is very fulfilling to everyone who has given  
6 their time in putting together the  
7 recommendations.

8 So, now, I am going to turn the  
9 meeting over to Mark, who is going to walk us  
10 through the new committee work.

11 CO-CHAIR GIBSON: Which I'm sure will  
12 be a lot more interesting. Right? Just kidding.

13 Let's get right into it. I think we  
14 are going to right down the line with what is on  
15 the agenda. And I think you are up first,  
16 Charla. You were the two co-chairs, Charla and  
17 Audrey, right?

18 MEMBER RATH: Yes.

19 CO-CHAIR GIBSON: Awesome.

20 MEMBER ALLISON: The one in absentia.

21 CO-CHAIR GIBSON: You're here now.

22 Right?

1           MEMBER RATH: Right, she is here now  
2 and she is going to be up next, I promise you.

3           CO-CHAIR GIBSON: Okay.

4           MEMBER RATH: Yes, thank you. We  
5 just, you should have received already and it was  
6 also actually on the sideboard, just a quick  
7 rundown of our subcommittee on Federal Access to  
8 Non-Federal Bands. And as Paige said earlier, it  
9 is really about more pervasive access than the  
10 last CSMACs. And actually, I shouldn't just say  
11 last CSMAC. You guys were working on that issue  
12 for two CSMACs, I think. It is less temporary,  
13 more pervasive.

14           I'm not going to read the question.  
15 The question itself is fairly straightforward.  
16 We actually had some questions about it but felt  
17 like that they would be answered by NTIA  
18 providing use cases, which it has. I have also  
19 got a page with just a list of the members. It  
20 is not necessary to talk through that, unless I  
21 missed somebody, which I don't think I did.

22           We have had two meetings so far. The

1 first meeting we held was really just purely  
2 organizational because we didn't yet have copies  
3 of the use cases. And again, to Paige's earlier  
4 statement, the reason that we actually talked  
5 about having use cases and you, Paige, you were  
6 on top of that right away, was to avoid scope  
7 creep. You know the idea being that we would  
8 have a clear idea that the agencies would get  
9 together and determine really where it is that  
10 they thought that they needed that kind of  
11 pervasive access.

12 So, what we did, we did most of the  
13 work in the second meeting, although, we did  
14 decide, even before we had the use cases in front  
15 of us, because we knew from what Rich Orsulak had  
16 told us, we had a good idea of where they would  
17 be, we decided early on that we could actually  
18 split them into two separate areas. One, dealing  
19 primarily with the public safety and the second  
20 one, which turned out then to be just a single  
21 use case from DoD because they were very  
22 different. The ones in public safety, once we

1 actually saw them, we looked at them and the ones  
2 that are in public safety are very similar and it  
3 was our judgment that they could be dealt with  
4 together, which also goes to I think some of the  
5 things that our co-chairs and our NTIA fellows  
6 have been saying, which is we want to get some  
7 recommendation by May. So, it was actually good  
8 because there were six use cases. It was good  
9 that we were able to split them.

10 So, what we have is Mark Crosby has --  
11 can I say you volunteered Mark? Mark volunteered  
12 to sort of headline the use cases on the public  
13 safety side for obvious reasons. And John  
14 Hunter, who works with Steve Sharkey, is going to  
15 be leading up the DoD use case. But we also  
16 decided, as a group, that what that meant more  
17 than anything is the coordination back with NTIA  
18 on setting up meetings. We, as a group, decided  
19 that we really all needed to be involved in the  
20 discussions as much as possible.

21 The next steps, we have requested some  
22 minor points of clarification, mostly just about

1       how you want us to go about setting up these  
2       meetings. We feel it is critical to sit down  
3       with the agencies that put together the use cases  
4       and actually get more information from them and  
5       help to understand.

6               Our next steps are in fact for the  
7       agencies identify some key stakeholders. On the  
8       DoD side, I am mentioning that first because  
9       several carriers who actually hold AWS-3 licenses  
10      are actually members of the subcommittee. So, we  
11      have a fair number of the stakeholders there. We  
12      have actually decided, though, that we need to  
13      reach out and make sure that we are covering some  
14      of the smaller carriers.

15              So, the more difficult, and it is not  
16      really more difficult, it is just more  
17      complicated side is public safety because I think  
18      there are more entities that would be engaged  
19      there. And again, keeping in mind that we don't  
20      want to spend a lot of time doing this but, at  
21      the same time, we really feel the importance of  
22      getting some feedback from the commercial side or

1 the public, in this case, the public safety side.  
2 The non-federal side is probably the best way to  
3 say it.

4 We are meeting again in December and  
5 that meeting is primarily to go in detail through  
6 the use cases and really come up with questions  
7 that we want to ask the agencies because we felt  
8 it was very important for us to be able to do  
9 that in advance to give them advance notice of  
10 what we wanted to talk to in order to make the  
11 meetings productive.

12 Given that, the meetings are going to  
13 be arranged in the January/February time frame.  
14 Hopefully, January, but it could bleed into  
15 February. And at this point, in some ways, we  
16 haven't gotten to the hardest part. All we are  
17 doing is sort of setting out a schedule. But I  
18 think if we continue to just keep at it, we will  
19 definitely be able to have a preliminary rundown  
20 in March and then I'm hopeful that we will be  
21 able to then have our preliminary report and  
22 recommendations at the May meeting.

1           So, I turn it over first to Audrey to  
2           see if she has anything to say and then,  
3           obviously, any of the other subcommittee members  
4           who might have some comments.

5           And Mark, you were on both calls. So,  
6           I don't know whether you have anything to say.  
7           But that is it.

8           MEMBER ALLISON: I have nothing to  
9           add. Way to go Charla. Thank you.

10          CO-CHAIR GIBSON: Dale are you -- is  
11          that left over from before, you tent?

12          MEMBER HATFIELD: Oh, I'm sorry.

13          CO-CHAIR GIBSON: I figured it was.

14          MEMBER HATFIELD: Although, I was kind  
15          of curious.

16          (Simultaneous speaking.)

17          CO-CHAIR GIBSON: It is not a  
18          precedent to keep your tent up.

19          MEMBER HATFIELD: Are the use cases  
20          public knowledge, at this point, at least, in  
21          sort of summary form?

22          MEMBER RATH: I defer to NTIA on when

1 that would happen but they are not yet. And in  
2 fact, one of the key issues we raised is if we  
3 are actually going to go to outside stakeholders,  
4 we have to have some way of at least telling them  
5 what the use case is.

6 MS. ATKINS: Right. And I think the  
7 current version is something that we don't want  
8 publicly disseminated but we will fix that and  
9 make sure that you have a version that can be  
10 made public.

11 CO-CHAIR GIBSON: Michael.

12 MEMBER CALABRESE: Yes, Michael  
13 Calabrese. Just a question about the NTIA  
14 question. And it's probably because I have  
15 missed -- I'm actually on the subcommittee but  
16 missed a meeting due to travel.

17 It seems implicit but is it intended  
18 that we are looking at this both in terms of  
19 short-term access and longer term access?

20 MEMBER RATH: I mean I think we had  
21 talked about this really is more pervasive access  
22 since the last committee actually really dealt

1 more with the shorter term issues.

2 So, this is anywhere from, I think,  
3 longer than six months or more to permanent  
4 arrangements.

5 MEMBER CALABRESE: Okay, so the short-  
6 term is resolved.

7 (Laughter.)

8 (Simultaneous speaking.)

9 MEMBER RATH: I am not answering that  
10 question. Janice? Jennifer?

11 MEMBER OBUCHOWSKI: Michael, I am very  
12 happy Charla and Audrey have taken this over and  
13 Jennifer, I'm sure, would agree.

14 MS. ATKINS: And so I will just add  
15 the actions that we are taking now against the  
16 original recommendations are focused more on the  
17 short-term requirements that are characterizing  
18 the scope of our authorities today, as an example  
19 of that action that I discussed. That really is  
20 focused on the short-term intermittent  
21 requirements that the first cycle addressed.

22 Once the more pervasive requirements

1 are addressed, we will combine or aggregate the  
2 information to have a better picture of how we do  
3 this kind of sharing across the short, medium,  
4 and long-term requirements.

5 MEMBER CALABRESE: That is for the  
6 potential, like a potential FCC action would come  
7 at that point.

8 MS. ATKINS: Potentially.

9 MEMBER CALABRESE: Okay, thanks.

10 CO-CHAIR GIBSON: Any other questions?

11 MS. ATKINS: I have one question.

12 CO-CHAIR GIBSON: Oh, go ahead.

13 MS. ATKINS: So, I know you broke it  
14 up into public sector and DoD. And just to  
15 clarify for everyone's benefit, public sector  
16 here we are talking about federal --

17 MEMBER RATH: Yes. No, I meant -- I  
18 said public safety.

19 MS. ATKINS: Sorry. No, I meant  
20 public safety. But we are talking about federal  
21 public safety requirements, which could include  
22 law enforcement or other things?

1 MEMBER RATH: Yes.

2 MS. ATKINS: I seem to recall the case  
3 studies not all fitting within those two buckets.  
4 So, we might have an additional discussion, just  
5 to make sure everything is covered.

6 MEMBER RATH: I think that is fair.

7 CO-CHAIR GIBSON: Any the questions?  
8 I have a question. And that is -- say again?  
9 No, he's next.

10 Are you comfortable enough, Charla,  
11 that you have enough guidance now from NTIA with  
12 the last bullet here about arranging meetings  
13 with other agencies? I believe there was some  
14 question about how to go about doing that.

15 MEMBER RATH: I don't think we have  
16 that guidance yet and I am expecting that at our  
17 next meeting Rich will be able to talk about  
18 that.

19 CO-CHAIR GIBSON: All right, good.  
20 The question is why.

21 MEMBER RATH: We actually didn't have  
22 a lot of discussion, except saying you know

1 trying to understand what share meant in  
2 particular circumstances. But because we were  
3 dealing with use cases, we could define it that  
4 way.

5 CO-CHAIR GIBSON: All right, thanks.  
6 Tom.

7 MEMBER DOMBROWSKY: Yes, I am  
8 representing the Agency to Industry Collaboration  
9 Subcommittee. I will get everybody back on  
10 schedule because we will have a very short brief,  
11 which is why we don't even have a brief.

12 We had an initial kickoff call. A  
13 number of the parties were tied up with work, so  
14 we had some participation but I will suffice it  
15 to say we had a very focused question, which is  
16 really around how can we change traditional  
17 regulatory approaches to get better agency to  
18 industry collaboration.

19 Building on our last subcommittee of  
20 government industry collaboration, this is more  
21 focused. I think our group is going to focus on  
22 things from the commercial side of

1 recommendations to help with that approach. But  
2 our discussion also led to we also should be  
3 asking the feds at the same time, sort of get  
4 some input at least from some of the key federal  
5 folks. And since collaboration was in our actual  
6 subcommittee name, we actually reached out to the  
7 bidirectional guys, too, and said you guys are  
8 going to be talking to some feds and we are, too.  
9 So, why don't we do this together to some extent,  
10 especially since bidirectional and what we are  
11 doing is very much overlapping at some level.  
12 So, we have at least initiated outreach to I  
13 think three different federal agencies at this  
14 point trying to set up either December or January  
15 discussions, just to get some input from them.  
16 And then from that point, we think we can move  
17 forward fairly quickly to put all that  
18 information together for at least either an early  
19 readout in March and a more finalized readout in  
20 May. And I think that is where we are at at this  
21 point.

22 With the schedules being sort of

1 challenging, I don't see us having another call  
2 in December until we sort of have these follow-on  
3 meetings. I think the follow-on meetings will be  
4 sort of our next meetings.

5 CO-CHAIR GIBSON: All right, thanks,  
6 Tom. That was brief. Thank you.

7 CO-CHAIR ALDER: I have a question,  
8 though.

9 CO-CHAIR GIBSON: Question, Larry.

10 CO-CHAIR ALDER: So, I know from the  
11 last group, this subcommittee, one of the  
12 leftover work was around collaboration in small  
13 working groups. Is that something that is going  
14 to be taken on here or no?

15 MEMBER DOMBROWSKY: It is certainly  
16 something we discussed as a group and I think we  
17 are trying to be focused. I think what we found  
18 last time was getting down that sort of wormhole,  
19 didn't really -- wasn't really productive. We  
20 tried really hard for several months and it just  
21 meandered. So, I think we were going to try and  
22 be more focused, according to the question, to

1 sort of just look at particular things that we  
2 can actually recommend that will help the process  
3 in general.

4 MS. ATKINS: So, one of our actions is  
5 to, as I characterized, put meat on the bone in  
6 terms of that collaboration framework. And as we  
7 said, that was a multi-layered approach to  
8 include smaller groups. And so I think you will  
9 see some fleshing out of that concept within our  
10 implementation plan that we are building as well.

11 CO-CHAIR GIBSON: Who is liaison?  
12 That's Ed -- no. It's Dave, okay. Were there  
13 any questions of NTIA that came out of there?  
14 Because I thought I had an action I would be  
15 happy to execute right now that NTIA is here.

16 MEMBER DOMBROWSKY: You tried to  
17 create a question and we wouldn't let you.

18 CO-CHAIR GIBSON: You wouldn't let me,  
19 okay, good.

20 MEMBER DOMBROWSKY: We shouted you  
21 down and so there is no question from us back.  
22 And our question is locked down at this point as

1 well.

2 CO-CHAIR GIBSON: Okay. I'm not into  
3 mission creep any more than anybody else is.

4 Okay, going, going. No more  
5 questions. Okay, thanks, Tom.

6 The next one is Measurements and  
7 Sensing. Dennis, I think that is you.

8 MEMBER ROBERSON: It is me. And,  
9 unfortunately, we are the group that was  
10 referenced as not having met. So, confession is  
11 good for the soul. Not very good for your  
12 humility but good for the soul. Or maybe it is  
13 good for humility, not good for -- anyway.

14 CO-CHAIR GIBSON: I'm not in a  
15 position of giving you absolution.

16 MEMBER ROBERSON: Okay. Paul Kolodzy  
17 is the co-chair for this and to be honest, I'm  
18 not sure this combination works very well because  
19 Paul and I have literally not been able to  
20 connect ourselves, much less get the whole group  
21 together. So, we are remedying that and we will  
22 go ahead and set up the meetings and proceed

1 forward.

2 But what I am giving you, therefore,  
3 is the input which is my personal input and not  
4 the work of the committee. So, if you don't  
5 grant absolution, I will grant it for the members  
6 of the committee in terms of their contributions  
7 here, so they can correct, modify, alter whatever  
8 I say because we have not, in fact, met.

9 But it is a great group.

10 (Laughter.)

11 MEMBER ROBERSON: No, it is. I'm  
12 serious. This is a terrific group of people.  
13 So, I am delighted that they are together on this  
14 one.

15 The study question, itself, just to  
16 remind you all is measurement and sensing. It is  
17 broad and narrow. The question focuses on  
18 definition of harmful interference and how we  
19 move forward looking at, broadly, using spectrum  
20 sensing, and using monitoring to analyze,  
21 identify, and address trends in the harmful  
22 interference area. So, that is the broad.

1           The narrow is the focus on U-NII-2B  
2           and U-NII-4, the two specific bands. So, as we  
3           go back and forth on the broad, very broad, in  
4           fact, and the somewhat narrow focus, that will be  
5           one of our challenges.

6           The study approach that has been  
7           identified thus far is that we will focus on the  
8           measurement and sensor approaches that have been  
9           already deployed or are being proposed for  
10          deployment and then try to understand how those  
11          apply to resolving the issue. And this brings in  
12          not only the measurement and sensor, at least in  
13          my mind, but also brings in what Dale has  
14          mentioned earlier, the interference limits policy  
15          and Harms Claim Threshold because that is not  
16          deployed but certainly proposed as a means of  
17          addressing this area. But one of the huge  
18          challenges is exactly here. First, we have to  
19          define what that threshold is. Then, you need to  
20          find the proper mechanism for measuring it. And  
21          is that broad-based measurement, is that sensors,  
22          a combination of the two? So, that is the

1 challenge of sorting this through.

2 The goal, of course, is to come back  
3 with, in the words that we use so often in the  
4 TAC, actionable recommendations for the NTIA.

5 And that would come, in my mind, in two forms as  
6 well. The first is the local optimization, the  
7 current optimization based on what people are  
8 doing because there a variety of things that  
9 people are doing or proposing to do with some  
10 background behind that.

11 So, out of that mix of options, what  
12 is the best current option to proceed forward?  
13 And then try to identify, as a complement to  
14 that, since these things are not static, what is  
15 the future. Where do we go? Where is research  
16 needed to move in this area? Where is investment  
17 needed, as well, so that we know lies in the  
18 future, beyond what is there now? Because the  
19 perspective is this whole notion of measuring and  
20 sensing spectrum beyond 5 gigahertz is going to  
21 be a very, very important element for our future.  
22 And those of you who know my own research would

1 find that that is something that I am very  
2 heavily invested in, personally, which is how  
3 Mark sucked me into serving as co-chair in this  
4 but I think that that is going to be a key for  
5 us.

6 But it is good that this group is  
7 grounded in the 5 gigahertz so we have a  
8 foundation rather, rather than trying to look at  
9 the global scope as this keeps us grounded and  
10 focused.

11 So, that is where we are and we will  
12 be meeting on a regular basis. We have catch-up  
13 to be done. Mark pointed out that it is all fine  
14 that you are slow to the game but the expectation  
15 is still you get it done in May. So, you have to  
16 work double time to get from here to there. And  
17 I am taking that as a serious input so we will be  
18 doing that and, probably as a warning for the  
19 group, trying to meet on a weekly basis, rather  
20 than a biweekly basis in order to accomplish  
21 that.

22 CO-CHAIR GIBSON: All right, thank

1 you. Consider that your absolution.

2 Any questions? Okay. And have you  
3 and Paul had a chance to talk yet?

4 MEMBER ROBERSON: No.

5 CO-CHAIR GIBSON: Okay. I'm sure he  
6 would like to talk to you.

7 MEMBER ROBERSON: No, it's -- well, I  
8 won't go into it.

9 CO-CHAIR GIBSON: Yes, I understand.

10 MEMBER ROBERSON: He seems to hide in  
11 boxes that have no communication features.

12 CO-CHAIR GIBSON: Yes, it's not a bad  
13 thing.

14 Paige.

15 MS. ATKINS: So, as a reminder, one  
16 reason we are focused on 5 gigahertz is that is  
17 an important two bands for us, as we move toward  
18 our target of 500 megahertz. There is ongoing  
19 work, particularly in the 5350 to 5470 band. So,  
20 if you are not familiar with what is going on  
21 already in collaboration among FCC, NTIA and  
22 industry, we want to make sure that you have that

1 set of information as a starting point.

2 One of the reasons we wanted to do  
3 this specifically was to ensure we weren't  
4 missing anything. And if there was something  
5 else that would help us significantly in the near  
6 or mid-term as we study those bands in  
7 particular.

8 And I would ask if you need any  
9 further definition or constraints, if you are  
10 concerned about the timing, let us know and we  
11 can discuss what that might look like.

12 MEMBER ROBERSON: And I am counting on  
13 Ed as our representative to bring that to the  
14 table. Although, I am somewhat familiar with it.

15 CO-CHAIR GIBSON: Okay, any more  
16 questions?

17 All right, Kurt and Jeff, you guys are  
18 going to tag team the next one, SAS and  
19 databases?

20 MEMBER SCHAUBACH: Sure. I'd be happy  
21 to lead.

22 So, the Spectrum Access System

1 Sensing/Spectrum Database International Extension  
2 group met twice. And I think the first couple  
3 discussions that the group has had has been very  
4 productive, in terms of largely forming and  
5 storming around the study item, the study  
6 question, which is can evolving database and  
7 sensing approaches adopted in the U.S. to  
8 facilitate a more dynamic spectrum sharing  
9 environment be effectively extended to  
10 international spectrum management applications.

11 And if so, how?

12 I think the early discussion, to try  
13 and characterize it, a lot of different facets or  
14 aspects of international sharing were brought up  
15 in the group from the relative maturity of  
16 sensing and database techniques to implications  
17 of international standards development, to some  
18 perhaps more operational aspects of just what  
19 happens when devices that are authorized for use  
20 in one region are tried to be used in a separate  
21 region.

22 So, I think through that discussion,

1 the group really came to a rephrasing and a  
2 restatement of the original question, which is,  
3 as you can see here, what are the challenges in  
4 using database and sensing approaches for  
5 international spectrum management, and how can  
6 NTIA help address these challenges.

7 So, really, what the group is going to  
8 try and do for its work over the coming months is  
9 to focus on very specific case studies. So, in  
10 particular, there are already database and  
11 sensing approaches employed, for example, the 3.5  
12 gigahertz band, the U-NIII band. And the group  
13 will look at those specific scenarios and take  
14 them as case studies and identify areas where the  
15 case studies could lead to specific take-aways  
16 and then ultimately actionable items for NTIA to  
17 consider for an international sharing environment  
18 or application of these technologies.

19 The group also discussed the idea or  
20 concept of doing key stakeholder interviews, I  
21 think largely to expand and enrich the knowledge  
22 base that the group has around the technologies

1 themselves. Maybe, for example, some of the  
2 federal stakeholders or federal spectrum  
3 community users, in terms of what their specific  
4 interests or needs are for international sharing.

5 I wouldn't say these interviews are  
6 necessarily in the critical path for the group to  
7 get its work done but would certainly help sort  
8 of expand the knowledge base. So, largely, these  
9 case studies will form the key content for the  
10 deliverable.

11 As you can see, the group has gone as  
12 far as developing a preliminary outline for the  
13 report or deliverable. And again, a lot of the  
14 focus will be on the specific challenges that are  
15 identified through these case studies. What the  
16 technical challenges are, what recommendations  
17 the group may have for NTIA to the extent there  
18 are recommendations, and also looking at some of  
19 the institutional or regulator challenges  
20 associated with that as well.

21 So, I think, at this point, the group  
22 has good focus. I think we have a well-defined

1 work scope and good understanding of the question  
2 and work before us. And I think over the next  
3 quarter, we will largely be focused on these  
4 specific case studies.

5 CO-CHAIR GIBSON: Thanks, Jeff. You  
6 also get the star award for having your outline.

7 Now, Jeff, did you want to add  
8 anything?

9 MEMBER REED: Yes, just one more  
10 thing. We do plan on conducting some selected  
11 interviews. And if you have any suggestions on  
12 people who you believe we should interview for  
13 that, let us know. Let Kurt or I know.

14 MEMBER SCHAUBACH: Yes, thanks, Jeff.  
15 WE have probably a list of about four or five so  
16 far but we certainly would like to expand that.

17 CO-CHAIR GIBSON: Great. Dennis.

18 MEMBER ROBERSON: A question for you  
19 and for the team. Since Winn Forum is doing a  
20 lot of work in this space, how will your efforts  
21 tie off with the Winn Forum work? Because I know  
22 that you, in particular, have been very actively

1 in Winn Forum, so I am presuming that there is  
2 going to be some connection there.

3 MEMBER REED: Yes, I think there is  
4 going to be some good overlap. In particular,  
5 the Winn Forum publishes an annual state of  
6 spectrum sharing report. And we plan to  
7 incorporate that. We have already discussed it  
8 with them and they are fine with this and pulling  
9 material.

10 CO-CHAIR GIBSON: I think Dale and  
11 then is that Mark down there or Mike? All right,  
12 Dale.

13 MEMBER HATFIELD: I will be very  
14 predictable. One of the things, of course, is  
15 enforcement of the boundaries. And I'm not sure  
16 that it makes it any worse but I think it needs  
17 to be someplace in there. Okay, you know, we  
18 have to do that in international boundaries and  
19 how does that complicate things?

20 CO-CHAIR GIBSON: Can you be sure to  
21 push your button? I think I am getting a button  
22 push sign. There we go.

1                   MEMBER HATFIELD: I'm sorry. My  
2                   fault.

3                   CO-CHAIR GIBSON: That's okay. Just  
4                   be careful. I would caution that it is a great  
5                   point but to consider the scope of the question  
6                   as we have now, maybe enforcement is one of those  
7                   things, if you guys can address within the six  
8                   months we have. If you don't remember, the last  
9                   enforcement went for quite some time. So, it may  
10                  just be you identified as an action for a next  
11                  effort but I mean Dale raises a good point.

12                  MEMBER SCHAUBACH: Yes, I think that  
13                  is right. And it did come up as a topic in the  
14                  early discussion.

15                  CO-CHAIR GIBSON: Mike and then  
16                  Janice, are you playing with yours?

17                  MEMBER OBUCHOWSKI: I am questioning  
18                  myself.

19                  CO-CHAIR GIBSON: That's okay. What  
20                  do they say about examining life? Anyhow, Mike.

21                  MEMBER CHARTIER: Thank you. And this  
22                  relates, actually, to the last presentation and

1 is a question for Paige. With regards to  
2 internationalization, did we get at the WRC an  
3 agenda item for 5.3 for parlance?

4 MS. ATKINS: Yes, and more, actually.  
5 So, the agenda item ended up with broader scope  
6 in 5 gigahertz but we did get 5350 to 5470.

7 CO-CHAIR GIBSON: All right, I see  
8 Bryan's and Janice's is now down.

9 MEMBER TRAMONT: I was just saying,  
10 upon reflection, you declined.

11 CO-CHAIR GIBSON: Okay.

12 MEMBER TRAMONT: I just have a quick  
13 question for the co-chairs. How are you thinking  
14 about the existing databases? Are you looking at  
15 them as successfully implemented regulatory  
16 models or are you thinking as potentially  
17 successfully regulatory models? How were you  
18 thinking about the current state of databases  
19 that you are looking at?

20 MEMBER SCHAUBACH: So, Bryan, I don't  
21 think we are going to get into necessarily the  
22 maturity of a particular technology. But we will

1 to the extent of how databases themselves could  
2 be extended for international use. Some are much  
3 more dynamic in nature. Some are less so.

4 So, I think we will, perhaps, look at  
5 specific implementations, like today the TV White  
6 Spaces versus say the 3.5 gigahertz band and  
7 compare and contrast those in terms of their  
8 application elsewhere.

9 MEMBER TRAMONT: But are we assuming  
10 they work? I mean in other words --

11 (Laughter.)

12 MEMBER TRAMONT: I don't mean to be  
13 dense about it but it is an open question and I  
14 did look at David when I asked it because I mean  
15 extending it only is a good exercise if it is a  
16 useful model that has been successful in  
17 widespread deployment and consumer welfare. And  
18 it is not yet obvious, I think, that it works in  
19 any of those two bands. And that it protects  
20 incumbents, by the way, too, as I look at Paige.

21 MEMBER SCHAUBACH: I think as a  
22 threshold measure, yes. We are going to assume

1 perhaps from a conceptual standpoint they do  
2 work.

3 Now, certainly, there have been  
4 implementation issues and those are, perhaps,  
5 some of the challenges that need to be addressed.  
6 But you know I think the context of the question  
7 is to say that, in essence, these are  
8 technologies that do exist, do work, and could be  
9 extended.

10 MEMBER TRAMONT: This will be the last  
11 comment, I promise. I just think it is important  
12 to be explicit about that assumption. And it is  
13 probably the right answer because the committee  
14 can't examine whether or not the databases work.  
15 That is too big of a scope.

16 MEMBER SCHAUBACH: Right.

17 MEMBER TRAMONT: So, I think it should  
18 just be -- I think it is an important threshold  
19 that anybody thinking of adopting these abroad  
20 shouldn't just assume that they have work because  
21 we don't have the data yet to support that  
22 assertion.

1                   MEMBER WARREN: Well, can I get in the  
2 queue?

3                   CO-CHAIR GIBSON: Well, hang on a  
4 minute. Go ahead, Jennifer.

5                   MEMBER WARREN: Thank you. I think  
6 there is also the challenge, again, that we have  
7 to look at which is not whether they work or not  
8 in the United States but what are the  
9 differentiators in other markets that could call  
10 into question whether they are exportable. And  
11 that is, I think, the important of the second  
12 bullet under challenges.

13                   You have got the technical and then  
14 you have got the institutional and regulatory.

15                   CO-CHAIR GIBSON: And that is an  
16 excellent point. I was going to make that point.

17                   Your question, Bryan, are they  
18 functional technically. I mean is the concept  
19 adoptable from a technological standpoint or will  
20 they work within a regulatory framework. I mean  
21 or none of the above.

22                   MEMBER TRAMONT: Or both of the above.

1 I mean Jennifer's point is really important and I  
2 think that is probably an important focus of the  
3 committee. I am making a slightly different  
4 point, which is that before we think about  
5 exporting them, we shouldn't pretend like we know  
6 for sure they work.

7 And so I agree that presuming  
8 eventually they do prove out as concepts, then  
9 the challenges that Jennifer has identified  
10 become the important point for the committee to  
11 explore.

12 CO-CHAIR GIBSON: Good point. Okay,  
13 I don't remember order they were in. I think it  
14 was Rick, and then Dennis, and then David, if  
15 that's okay. So, Rick, go for it.

16 MEMBER REASER: It's Rick Reaser from  
17 Raytheon.

18 I was going to make the same point  
19 that Jennifer made. The issue is the appeal and  
20 whether they can be actually used by some places,  
21 like some countries may not be whatever.

22 The other point I want to make, and

1 this is something that I have had my staff look  
2 at, is whether we like it or not, people are  
3 already doing this overseas anyway. So, now you  
4 have this situation where you have we are doing  
5 stuff here. They are already starting to do  
6 stuff over there and I sent out some surveys of  
7 things that are happening out there. So,  
8 something is going to happen, regardless.

9 The other question is how do we  
10 influence that? Because they are going to want  
11 to bring their database over here. It is not  
12 just us taking our ideas and concepts over there  
13 but it is going to happen in reverse. And so we  
14 need to look at that as well, what that means in  
15 a regulatory sense.

16 Because here is the other thing you  
17 get into. If they have a system that works with  
18 their TV White Space database over in you know  
19 Nigeria, can they just bring that device over  
20 here in the overhead and just turn it on and it  
21 works here? Because there is going to be that  
22 other whole process about how that may work. It

1 is like people, before they figured out the cell  
2 phones, your mobile phone was on a different  
3 frequency when you took it overseas.

4 So, this is just another one of these  
5 things that is going to be have to be sorted out.  
6 And one of the things is there will have to be  
7 some international harmonization. That's why one  
8 of the places we really want to talk to is talk  
9 to Canada because they are a little more  
10 sophisticated. So, what are they thinking about  
11 this? They are probably scared to death of what  
12 is going on down here sometimes. And so, because  
13 I am sure they are thinking about these things as  
14 well because they don't use all their TV  
15 channels. And they have other issues with the  
16 same kinds of bands.

17 So, I think you have to realize it is  
18 not like this was just here. There is a lot of  
19 work going on overseas. And then is that  
20 exportable? How does it move back and forth?  
21 There are some other things that need to be  
22 looked at in terms of strategy about how you are

1 going to do that.

2 And Jennifer makes a very good point.  
3 Some places may not be interested in this at all.  
4 They just want to have television. You know,  
5 whether they have TV White Space, or whatever,  
6 they don't have broadcasting there. So, it has  
7 no meaning to them.

8 CO-CHAIR GIBSON: Well, good. Good.  
9 It's good you are on the committee, too. And I  
10 would just add that I think Canada may be as  
11 sophisticated, perhaps, but not more so.

12 (Laughter.)

13 CO-CHAIR GIBSON: So you know,  
14 remember where we are. Kurt.

15 MEMBER SCHAUBACH: Maybe just not so  
16 much a response but thank you, Rick, and maybe to  
17 build on that comment. You know the charter for  
18 the subcommittee is to not look just or only at  
19 database approaches but also sensing approaches.  
20 So, I just want to be clear that it is not  
21 strictly narrowly focused on database approaches.

22 CO-CHAIR GIBSON: And again, we have

1 six months to get the work done. And this is one  
2 of those that could go on forever. Maybe it  
3 will. Do you want to put your tent down, Rick,  
4 or I will call you again?

5 Dennis and then David.

6 MEMBER ROBERSON: I think this whole  
7 line of questions are very similar but this is  
8 maybe rendering this in a more specific way.

9 Because there is the TV White Space regime.

10 There is the LSA, LAA. There is the SAS. There  
11 are proposals for others. So, with the nodding  
12 of your head, you are all of the above. Okay.

13 CO-CHAIR GIBSON: And David.

14 MEMBER ROBERSON: Hopefully, the right  
15 answer, except for the problem that Mark points  
16 out that by covering them all, that is a big  
17 ocean that you are boiling. I don't know how you  
18 would do it without that but it is a big space.

19 CO-CHAIR GIBSON: Thanks. And David.

20 MEMBER DONOVAN: The only question I  
21 have is if we are taking the construct  
22 internationally, in the United States you have

1 your database and you also have it administered  
2 by private entities as well that are very much  
3 involved. And so the only I question I have is  
4 that if you could address that issue, once we are  
5 looking internationally, whether we are looking  
6 at a government sort of monopoly in the database  
7 in the foreign country or they are looking at a  
8 regime similar to what we have here. And that  
9 may raise some very different questions,  
10 particularly if a foreign entity decides to have  
11 a private sector entity manage its database or  
12 how it goes up.

13 I don't know whether that is getting  
14 too much into the weeds but it always was a very  
15 delicate question that we spent a lot of time on.

16 CO-CHAIR GIBSON: Yes.

17 MEMBER DONOVAN: And so if you could  
18 just address it as you go forward, that is fine.

19 Now, Michael, we could have a great  
20 discussion about White Spaces later.

21 CO-CHAIR GIBSON: No, no, no. No, we  
22 only have an hour. That's fine. You can do that

1 at like there is a nice restaurant downstairs.  
2 Because I was in the middle of that one, too, so,  
3 I hear what you are saying.

4 Did you want to comment on that, Kurt?  
5 Yes, it was a good point. Thank you. Okay,  
6 Paige.

7 MS. ATKINS: Are you going to also  
8 highlight or address standards issues related to  
9 this, specifically?

10 MEMBER SCHAUBACH: Thank you, Paige.  
11 Go ahead, Jeff.

12 MEMBER REED: I think we probably will  
13 to some extent because I see that 5G is going to  
14 incorporate some of these ideas. 5G has got to  
15 include spectrum sharing. So, just kind of  
16 understanding where we are on that should be a  
17 subject in the report.

18 CO-CHAIR GIBSON: And Winn Forum has  
19 been looking at that, too. So, to the extent  
20 that you can sort of co-op some of that or at  
21 least borrow some of it, you can get that.

22 Okay, thanks. Is everybody fine with

1 the rephrasing of the question? We really didn't  
2 vote on the questions or did we, initially? Did  
3 we vote on the questions? I can't remember.

4 Everybody's good? I take that as a good.

5 Okay, so no more changes to the  
6 questions. Cool.

7 And then finally, 5G. And I think  
8 Rob, you are here, and then Mariam, I think, is  
9 on the phone. So you want to go?

10 MEMBER KUBIK: Sure, I'll go and I  
11 will let Mariam jump in as she wants.

12 So, we met three times. The second  
13 page of the presentation shows the co-chairs,  
14 Mariam and myself, our NTIA liaisons and our  
15 outstanding group that is participating.

16 Page 3 is the study question. When we  
17 first met, the group realized, I think as a  
18 whole, this seems to be too narrow, the original  
19 question. Because I coined this term now, the  
20 question seemed to be focused on high 5G, as  
21 opposed to mid-5G or low 5G. So, we rephrase the  
22 question as shown here, to try to be sure that we

1 covered not only the millimeter wave but other  
2 bands and other technologies that may be included  
3 in the 5G realm. Hopefully, we didn't make the  
4 ocean too big that we can't boil it but we did  
5 revise the question and we sent this over to NTIA  
6 and I think they gave an initial nod to it.

7 Moving on, page 4 is our work plan.  
8 We have met three times and we will continue in  
9 regular meetings, about every two weeks.

10 Hopefully, we will have this skeleton  
11 out pretty soon so we can start focusing our  
12 discussions on that. We do plan on considering  
13 the result of the WRC, as well as other  
14 developments in the standards and technology  
15 groups, as well as all the various 5G partnership  
16 activities that go on around the world. And we  
17 plan on delivering a report by May 16th.

18 The last page, just to kind of give  
19 you a framework of some of the activity going on  
20 there. Paige did a great job of outlining the  
21 results of the WRC-15 and Gen Item 113 that came  
22 out and the newly formed Task Group 5-1 that is

1 going to be focusing on studies but there are  
2 still activities within the other study group 5  
3 group on evaluation criteria requirements and  
4 evaluation and submission of proposals and then  
5 the specifications within the broader study group  
6 5.

7 Then there is standardization works.  
8 There is a lot of activity going on within the  
9 3GPP forum and activities within planning for  
10 showcases at the Olympics coming up in Korea and  
11 Japan.

12 So, Mariam, is there anything you  
13 would like to add?

14 MEMBER SOROND: No.

15 MEMBER KUBIK: Anything from the  
16 committee membership?

17 CO-CHAIR GIBSON: Any questions? Just  
18 clarify that the subcommittee is not going to be  
19 working toward the Olympics.

20 MEMBER KUBIK: I think we should do a  
21 site visit, actually.

22 CO-CHAIR GIBSON: Yes, I'm down with

1 that.

2 Yes, Kurt.

3 MEMBER SCHAUBACH: Kurt Schaubach. It  
4 would just perhaps be helpful for the workgroup  
5 to identify sort of the context of how they are  
6 thinking about 5G in terms of the definition of  
7 it, what technology options that they are  
8 considering.

9 I know it is still very early days in  
10 terms of the standards activity defining 5G but I  
11 think that that would be helpful to understand  
12 sort of the output of the workgroup.

13 MEMBER KUBIK: It's a valid point. I  
14 think that is probably one of the first actions  
15 that we have to do is capture what the various  
16 study groups are looking at within 3GPP and the  
17 other working group forums. Good point.

18 CO-CHAIR GIBSON: Harold. Harold  
19 Feld.

20 MEMBER FELD: I just want to clarify  
21 that this is not just limited to sharing with  
22 license spectrum, that this includes sharing on

1 an unlicensed or mixed model basis, as well as  
2 sharing exclusive license use with federal  
3 spectrum use. Is that correct?

4 MEMBER KUBIK: Well, I think it covers  
5 the scope of not only that within the FCC process  
6 because the FCC, themselves, do have both  
7 licensed and unlicensed and they do have sharing  
8 with federal/non-federal. So, I think all that  
9 falls within the scope of the working that we are  
10 doing.

11 CO-CHAIR GIBSON: Dennis.

12 MEMBER ROBERSON: Dennis Roberson.  
13 One of the big elements that is hitting with 5G  
14 that is outside of what we tend to talk about,  
15 including my various talks about 5G, is the move  
16 to software to find networks and network  
17 virtualization. The whole notion of what 5G is  
18 is becoming inherently different than all of our  
19 telecommunication systems, historically, because  
20 you could go identify a box and say okay that is  
21 the switch or that is the whatever. But as we go  
22 to the virtualization, it is just computers.

1 This computer does computation. This computer  
2 runs the network. And they are all bolted  
3 together.

4 With that notion, that notional  
5 difference, it seems that that would be an  
6 important part of what you are considering. But  
7 it is also a big item.

8 So, how are you thinking about that or  
9 are you thinking about that one?

10 MEMBER KUBIK: Well we haven't had  
11 that level of discussion yet. I think we need to  
12 figure out if we want to try to go down that  
13 path. I think maybe at a high level, we may just  
14 identify that as one of the issues that need to  
15 be followed on at some point and really delved  
16 into.

17 But I think how these aspects relate  
18 to the federal/non-federal spectrum sharing I  
19 think is one of the key points here.

20 MEMBER ROBERSON: And I would submit  
21 that that will be a big part when it is --

22 MEMBER KUBIK: Please join the

1 committee.

2 MEMBER ROBERSON: Yes, that is the  
3 challenge.

4 CO-CHAIR GIBSON: Thank you. Jeff.

5 MEMBER REED: Yes, actually, I think  
6 Dennis really brings up a good point but I'm not  
7 sure it is going to directly go into 5G because  
8 it is more of an implementation and they try to  
9 give as much leeway for implementation variation  
10 as possible within these standardization models.

11 But I was contemplating this the other  
12 night and you and I were on the PCAS committee.  
13 How would we have changed that report if we know  
14 today how much some defined networking has  
15 progressed? I think it would be different.

16 CO-CHAIR GIBSON: Okay, thanks. Any  
17 other questions?

18 Paige, did you want to make any more  
19 remarks to anything? Anything at all?

20 MS. ATKINS: Anything at all?

21 CO-CHAIR GIBSON: Talk about the  
22 Redskins or whatever?

1 MS. ATKINS: We don't have that much  
2 time.

3 CO-CHAIR GIBSON: No.

4 MS. ATKINS: So, I would like to thank  
5 everybody for taking this first cut,  
6 understanding one of the subcommittees didn't  
7 have an opportunity to meet.

8 But I do appreciate you, again, trying  
9 to stay on scope and stay focused, since we do  
10 have a compressed time line. And I think we  
11 successfully locked down all of the questions.

12 CO-CHAIR GIBSON: Yes.

13 MS. ATKINS: And I think we have  
14 successfully agreed that folks know what they are  
15 trying to do and trying to answer. If you have  
16 questions over the next few weeks that come up  
17 that make it muddier, please let us know so we  
18 can clarify it and keep you headed toward that  
19 toward of May target.

20 CO-CHAIR GIBSON: All right, thanks.

21 Are you done, Jeff?

22 MEMBER REED: Actually, I have one

1 question.

2 CO-CHAIR GIBSON: Oh, okay, sorry.

3 MEMBER REED: Oh, no. No, actually,  
4 I am kind of like Dale -- then I remember the  
5 question.

6 CO-CHAIR GIBSON: Oh, you are in good  
7 company.

8 MEMBER REED: For the WRC, is it  
9 possible for you to circulate something to us  
10 that summarizes in writing some of the key  
11 points?

12 MS. ATKINS: Specifically from a 5G or  
13 just in the general points that I make?

14 MEMBER REED: Oh, just in general.

15 MS. ATKINS: Okay, yes.

16 MEMBER REED: I'm sure it must be out  
17 there already.

18 MS. ATKINS: Yes, we can send  
19 something out.

20 MEMBER REED: Okay.

21 CO-CHAIR GIBSON: I think that is it.  
22 We are now to the point where there is public

1        comments.  Would any of the public like to  
2        comment?  I take that as a no.

3                Audrey, you are not public but that's  
4        okay.

5                MEMBER ALLISON:  Well, this is a  
6        shameless cross-promotion but if you are  
7        interested in the WRC results, the Ambassador  
8        Anstrom and Julie Zoller will be speaking at an  
9        event on Tuesday, if you are interested in  
10       attending, in D.C.  It is the USITUA annual  
11       meeting and it will be open to the public and you  
12       can see me for more information.

13               CO-CHAIR GIBSON:  That's cool.  That's  
14       a good plug.

15               MEMBER TRAMONT:  Just one housekeeping  
16       announcement.  Folks are welcome to stay around  
17       as long as they like.  If you are here from out  
18       of town and you need a conference room or  
19       anything like that, just let me know.  We are  
20       happy to set that up.  A cappuccino maker is  
21       there, coffee maker is in there.  Just do  
22       whatever you need.

1                   Anyway, so you are welcome to do  
2 whatever, if people need to hang around.

3                   CO-CHAIR GIBSON: All right, thank  
4 you. And is there any comment on the phone? I  
5 should say from the phone.

6                   All right, no more public comment.

7                   All right, now what? Oh, I get to do  
8 closing remarks. Well, I would like to echo what  
9 Paige said. You know this is a lot of work for  
10 just a couple of months working with some  
11 questions that are fairly new with a process that  
12 is fairly new to some.

13                   So, thank you for all the hard work.  
14 I look forward to the next meeting, whenever that  
15 is, in March, when I'm sure there will be a lot  
16 more meat on the bones, as Paige says. But until  
17 then, good luck with all the work and thanks  
18 again.

19                   Larry?

20                   CO-CHAIR ALDER: Have good holidays.

21                   CO-CHAIR GIBSON: Good holidays, safe  
22 trip. And thank you all for coming. And thanks

1 again to Bryan and Wilkinson for the space.

2 I like this space except those lights.  
3 Not only are they hot, I am now blind when I look  
4 on that side.

5 Thanks to everyone.

6 (Whereupon, the above-entitled matter  
7 went off the record at 3:16 p.m.)

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## A

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C E R T I F I C A T E

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Spectrum Advisory Committee

Before: USDOC/NTIA

Date: 12-02-15

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