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4 NEXT STEPS FOR SPECTRUM POLICY

5 THURSDAY, MARCH 26, 2015

6 House of Representatives,

7 Subcommittee on Communications and Technology

8 Committee on Energy and Commerce

9 Washington, D.C.

10 The Subcommittee met, pursuant to call, at 10:16 a.m.,
11 in Room 2322 of the Rayburn House Office Building, Hon. Greg
12 Walden [Chairman of the Subcommittee] presiding.

13 Members present: Representatives Walden, Latta,
14 Shimkus, Lance, Guthrie, Olson, Pompeo, Bilirakis, Johnson,
15 Long, Collins, Cramer, Eshoo, Yarmuth, Clarke, Loeb sack,
16 Rush, Butterfield, Matsui, and McNerney.

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17 Staff present: Ray Baum, Senior Policy Advisor for
18 Communications and Technology; Andy Duberstein, Deputy Press
19 Secretary; Gene Fullano, Detailee, Telecom; Kelsey Guyselman,
20 Counsel, Telecom; Grace Koh, Counsel, Telecom; David Redl,
21 Counsel, Telecom; Charlotte Savercool, Legislative Clerk;
22 David Goldman, Democratic Chief Counsel, Communications and
23 Technology; Margaret McCarthy, Democratic Senior Professional
24 Staff Member; and Ryan Skukowski, Democratic Policy Analyst.

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25 Mr. {Walden.} We are going to go ahead and call to
26 order the Subcommittee on Communications and Technology, and
27 welcome our Members and our witnesses here today. Since this
28 is a go-away day and we have votes coming up in about an hour
29 or so, we are going to go ahead and get started.

30 There is no question that mobile technology is one of
31 the key components of the economy of both today and of the
32 future. Americans have wholeheartedly embraced the role of
33 mobile in their lives. In fact, there are more wireless
34 devices in the country than there are people in the country.
35 Mobile is even more critical in developing nations for whom
36 mobile is the first national network for connectivity. Time
37 and again, as the country that pioneered spectrum auctions
38 once, and is the process of doing it again, the world looks
39 to the United States to lead spectrum policy and answer the
40 challenge of meeting spectrum demand. We must continue to
41 rise to that challenge.

42 Demand for connectivity will only continue to grow as
43 the Internet of Things becomes a ubiquitous part of our daily
44 lives. People rely on spectrum to stay connected to friends

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45 and family, conduct business, engage with the government, and
46 access resources for things like healthcare and education.

47 This committee has long been a leader in freeing up
48 spectrum for commercial and unlicensed use to meet demand and
49 feed the innovation that has been the hallmark of U.S.
50 spectrum policy. In just the past few Congresses we have
51 brought forth bipartisan legislation to authorize a first-of-
52 its-kind broadcast television incentive auction, formed
53 working groups that Ms. Matsui and Mr. Guthrie co-chaired
54 that we organized to look at how do we modernize the federal
55 spectrum, how do we work together to ensure that this vital
56 national resource is put the most efficient and effective
57 use. By the way, going into that legislation, the
58 Congressional Budget Office said it would never happen, and
59 they gave us a zero score, or something like that. And after
60 the fine work of you all at the FCC and the people who
61 actually arrived with checkbooks, I think the net is
62 somewhere around \$41 billion, paying fully for the
63 interoperable broadband spectrum, or a system for public
64 safety, as well as 911 enhanced process, and paying down
65 debt. And that is just the first part of the auction with

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66 AWS-3.

67 Now, as we go forward, we need to make sure that there
68 continues to be good cooperation and understanding about all
69 the parties as we go into the broadcast incentive auction. I
70 know our broadcasters were involved in this auction with some
71 of the spectrum they had with the Defense Department and
72 other federal agencies, so it was more than just the Federal
73 Government, and I commend the broadcasters for their
74 involvement. But the model can hopefully be recreated in
75 other spectrum bands through the Federal Spectrum Incentive
76 Act. This was introduced, by the way, by Congressman Guthrie
77 and Congresswoman Matsui, as the broadcast incentive auction
78 is doing for broadcasters, this legislation would allow
79 participating government agencies to receive a portion of the
80 proceeds from the auction of spectrum assigned to it. That
81 makes sense. It incentivizes agencies to take a hard look at
82 the modern spectrum needs and consider alternatives, free up
83 even more spectrum for commercial or unlicensed use.

84 Now, in the past, there has been a great deal of focus
85 on so-called beachfront spectrum, the spectrum with the best
86 propagation characteristics for commercial mobile use. Some

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87 of this will be auctioned off in the upcoming incentive
88 auction of the 600 megahertz band currently used for UHF
89 broadcasting. But these types of opportunities are going to
90 be even more scarce in the future and it means we are--we
91 have to start looking outside of the traditionally desirable
92 spectrum bands. There is only so much spectrum out there, so
93 we need to work together with what we have and that means
94 expanding use into the spectrum frontiers.

95 The FCC began a proceeding last fall to examine the use
96 of frequencies above 24 gigahertz. To put that in
97 perspective, most commercial use happens below 6 gigahertz,
98 and most mobile use is in the 3 gigahertz level. Development
99 of technologies that can utilize higher frequencies to meet
100 current and future needs could be a real game-changer. I
101 look forward to hearing more about the FCC's work in the
102 space from our witnesses.

103 So how do we achieve these goals and ensure that America
104 remains a leader in wireless technology, and development and
105 deployment of mobile innovations? It will require a great
106 deal of working together to leverage industry and engineering
107 know-how, government authority, and agency implementation.

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108 To achieve this, both Congress and the FCC must be flexible
109 and forward-looking stewards of our public spectrum asset.

110 So I look forward to hearing from our witnesses today.

111 And with that, I will turn over the remaining time to my vice
112 chair, Mr. Latta.

113 [The prepared statement of Mr. Walden follows:]

114 ***** COMMITTEE INSERT *****

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|

115 Mr. {Latta.} Well, thanks, Mr. Chairman, for yielding.
116 And thank you for our witnesses for being here with us today.

117 The demand for wireless spectrum capacity is growing
118 daily, as technologically advanced devices and products are
119 increasingly using unlicensed spectrum instead of cellular
120 networks to connect to the Internet. There is no doubt that
121 spectrum has become an integral part of our everyday lives,
122 and contributes greatly to economic growth and innovation.
123 It is vital that the capacity of our Nation's airways is able
124 to accommodate advanced mobile innovation, therefore, we must
125 examine all ways to expand access to spectrum. That is why I
126 introduced H.R. 821, the Wi-Fi Innovation Act, which would
127 examine ways to maximize the use of spectrum in the upper 5
128 gigahertz band, without creating harmful interference with
129 incumbent users. My bill also recognizes that unlicensed
130 spectrum is a critical component promoting continued economic
131 development, increased connectivity, and greater
132 productivity.

133 Mr. Chairman, I look forward to today--hearing from
134 today's witnesses, and I thank you for yielding. And I yield

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135 back.

136 [The prepared statement of Mr. Latta follows:]

137 ***** COMMITTEE INSERT *****

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138 Mr. {Walden.} Mr. Latta, we appreciate your
139 participation and your comments.

140 We will turn now to Ms. Eshoo from California for an
141 opening statement.

142 Ms. {Eshoo.} Thank you, Mr. Chairman. And good morning
143 to all of our witnesses. It is wonderful to see you. Roger,
144 is this the first time you have ever testified? It is.

145 Mr. {Walden.} Oh, boy.

146 Ms. {Eshoo.} Isn't that great? Yeah. Well, we miss
147 you, but we are proud of you.

148 \$41.3 billion. How would you like to have that in your
149 checking account? That is a lot of money. It is really
150 unprecedented in terms--that it was raised from the AWS-3
151 auction. It is a huge win, and I think that it is
152 instructive to all of us in the value of spectrum. Spectrum
153 is gold. Some is 18 karat, some is 24 karat, there are
154 different levels of gold, but it is still gold. And we know
155 that these funds are going to be used to reduce the deficit
156 by some \$20 billion. I don't know what other committee is
157 producing that, but everyone here should pat themselves on

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158 the back. It is going to pay for the build-out of the first
159 ever nationwide interoperable public safety network. That
160 was the only recommendation of the 9/11 Commission that the
161 Congress had not made good on, and it is going to upgrade our
162 911 call centers across the country to support next-
163 generation technology. So this is, I think by all--anyone
164 that takes a look at this would say this is a success story.

165 Now, less than 2 years ago, Chairman Walden and I began
166 regular meetings with NTIA, with the FCC, with the DoD, to
167 ensure that our efforts to relocate or share spectrum held by
168 federal agencies really stayed on track. And those were
169 important informal meetings as well as hearings, but it
170 really paid off. Many thought that the DoD wouldn't
171 cooperate, but thanks in part, I think, to this bipartisan
172 process and their cooperation we--that we established in June
173 of 2013, 65 megahertz of spectrum will be brought to market
174 to support America's insatiable appetite for wireless
175 broadband. But our work is far from complete, because our
176 goal is to free-up 500 megahertz of spectrum, and ensure that
177 every American has access to 4G high-speed wireless
178 broadband.

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179 According to Cisco's latest forecast, global mobile data
180 traffic will increase nearly tenfold over the next 4 years.
181 That is a lot; increasing tenfold over the next 4 years,
182 reaching an estimated 24.3 X-bits per month by 2019. So as a
183 finite resource, we have to think big in our approach to
184 spectrum management.

185 I think a 21st century spectrum policy should recognize
186 the following. The complimentary benefits of both licensed
187 and unlicensed spectrum. The need for competitive safeguards
188 to prevent excessive concentration of spectrum, particularly
189 within the prime beachfront bands below 1 gigahertz. And the
190 need to utilize new sharing technologies to enhance
191 efficiency and better manage spectrum.

192 The upcoming incentive auction can achieve, I think,
193 each of these policy goals, while generously compensating
194 broadcasters who voluntarily chose to participate. And I
195 salute the broadcasters for cooperating. I want this to work
196 very well for them because when it does, it is going to
197 compliment the rest of the system. Similarly, freeing up
198 additional unlicensed spectrum in the 5 gigahertz band will
199 unlock immense economic value in our country, promote access

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200 to broadband, and expand the digital sandbox used by
201 innovators and entrepreneurs.

202 So it is a pleasure for me to welcome all of you here,
203 the experts, and as I said before I began my opening
204 statement, to see our former Chief Democratic Counsel, Roger
205 Sherman, you are a great source of pride to us, Roger. So I
206 look forward to your testimony and the conversation that we
207 are going to have, and the input that you will give to us.

208 And with that, I yield back.

209 [The prepared statement of Ms. Eshoo follows:]

210 ***** COMMITTEE INSERT *****

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|

211 Mr. {Walden.} Gentlelady yields back.

212 Anyone on the Republican side want to make an opening
213 comment, or should we move on to our witnesses? Okay.

214 We will go to Ms. Matsui now, using Mr. Pallone's time
215 as the senior Member on their side.

216 Ms. {Matsui.} Thank you, Mr. Chairman, for yielding me
217 time. And I also would like to welcome Roger Sherman. It is
218 great to see you.

219 The future of American innovation would be fueled by
220 spectrum, and more and more spectrum. Never has this been
221 more evident than the record-breaking AWS-3 auction which
222 generated nearly \$42 billion. That is more than four times
223 the reserve price that the FCC put on the sale, and more than
224 double the previous record of \$18.9 billion set in the 2008
225 wireless auction.

226 The planning for the AWS-3 auction did not happen
227 overnight. There were many skeptics who doubted this auction
228 would ever occur. But as a result of years of bipartisan
229 congressional collaboration with the Department of Defense,
230 the FCC and the NTIA, along with our Nation's broadcasters,

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231 the final product of the AWS-3 auction was truly historic for
232 the wireless market and for consumers. The major investments
233 put forth all provides us with fresh evidence of the
234 increasing consumer demand for Internet access by
235 smartphones, tablets and devices. Spectrum has become one of
236 the lynchpins in our economy. 4G speeds will soon become 5G
237 speeds. New cars rely on spectrum to improve driver safety.
238 Wi-Fi hotspots are popping up across the country. Innovative
239 healthcare devices are being introduced utilizing spectrum to
240 monitor blood pressure, oxygen levels, and activity levels.
241 Technologies that allow consumers to control home energy
242 consumption from mobile devices also rely on spectrum.

243 To more efficiently utilize our Nation's airwaves,
244 America needs a national spectrum plan, one that would
245 require a healthy mix of licensed and unlicensed spectrum
246 bands. To that end, Congress must look for creative ways to
247 produce more spectrum and create a pipeline for spectrum
248 reallocation or sharing. That is why today I join
249 Congressman Guthrie in introducing legislation that would
250 create the first ever incentive auction for federal agencies,
251 and for once, offer revenue to federal spectrum users in

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252 exchange for federal spectrum. It is a game-changer.

253 I thank Chairman Walden and Ranking Member Eshoo for
254 cosponsoring this bill. I also welcome the Senate Companion
255 Bill also introduced today by Senators Ed Markey and Deb
256 Fischer.

257 Moving forward, I also believe that unlicensed spectrum
258 should be part of our spectrum plan. It is important for the
259 FCC to develop a testing process on the upper 5 gigahertz
260 band this year. It is time for the FCC to bring together in
261 one room engineers from both the auto and technology sectors
262 to see if they can coexist without interference in the 5
263 gigahertz band. That was the underlying principle of the
264 bipartisan law passed in 2012.

265 I look forward to continuing to work in a bipartisan
266 manner on spectrum issues. It is one of the key issues for
267 our economy.

268 I would now like to yield the balance of my time to the
269 gentlelady from New York, Ms. Clarke.

270 [The prepared statement of Ms. Matsui follows:]

271 ***** COMMITTEE INSERT *****

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272 Ms. {Clarke.} I thank the gentlelady from California.
273 Chairman Walden and Ranking Member Eshoo, thanks for
274 convening this hearing. Thank you once again to
275 Congresswoman Matsui for yielding time.

276 For years, we have been discussing the Nation's spectrum
277 crunch, and it is good to see the progress in this area,
278 particularly as consumers are increasingly becoming dependent
279 on their mobile devices. The world is going wireless,
280 needless to say. Most of us couldn't even imagine going
281 through the day without our mobile devices. But it is more
282 than having our phones in our pockets. Our kids are using
283 connected textbooks, our cars are equipped with fourth-
284 generation wireless technology, our doctors treat us faster,
285 at lower cost, by using wireless equipment, and everybody
286 expects that--excuse me, and everyone expects to watch what
287 they want, when they want to, where they want it, and
288 whatever wireless devices they have handy.

289 Americans are clearly more engaged in the wireless
290 ecosystem, and we need to ensure that our Nation has the
291 capacity to accommodate current and future wireless needs.

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292 But all of this innovation does not happen alone. Our hunger
293 for all things mobile is driving our insatiable demand for
294 the airwaves that feed our devices. These airwaves are the
295 invisible infrastructure that is all around us. It powers
296 the devices and services we use every day. That is why
297 Congress charged the FCC with managing this scarce public
298 resource on our behalf, and that is why we directed the FCC
299 to conduct spectrum auctions that make more spectrum
300 available for wireless carriers, and to supercharge the
301 Nation's supply of spectrum for--of Wi-Fi.

302 The FCC has taken the ball and ran with it. Earlier
303 this year, the agency completed the most successful auction
304 in history. It raised over \$41 billion for public safety and
305 wireless, and made a significant slice of the airwaves
306 available for mobile broadband. The FCC also gearing--is
307 also gearing up for the broadcast incentive auction next
308 year, but if we want the United States to continue to lead
309 the world in wireless, there is a lot more to be done.

310 I look forward to the hearing from--to hearing from our
311 expert panelists today about what is next in the spectrum
312 pipeline, and I yield back.

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313 [The prepared statement of Ms. Clarke follows:]

314 ***** COMMITTEE INSERT *****

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315 Mr. {Walden.} Gentlelady yields back. We appreciate
316 her comments.

317 And now we will go to our witnesses. We want to thank
318 each of you for being here, not only before our committee but
319 also the work you do not far away at the FCC. So thanks for
320 being here.

321 And we will start out with Mr. Roger Sherman, he is the
322 Chief of the Wireless Telecommunications Bureau of the
323 Federal Communications Commission. Mr. Sherman, we are
324 delighted to have you back here. I have 23 yes-or-no
325 questions Mr. Dingell submitted, and--but go ahead with your
326 testimony.

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327 ^STATEMENT OF ROGER SHERMAN, CHIEF, WIRELESS
328 TELECOMMUNICATIONS BUREAU, FEDERAL COMMUNICATIONS COMMISSION;
329 ACCOMPANIED BY GARY EPSTEIN, CHAIR, INCENTIVE AUCTION TASK
330 FORCE, FEDERAL COMMUNICATIONS COMMISSION; JULIUS KNAPP,
331 CHIEF, OFFICE OF ENGINEERING AND TECHNOLOGY, FEDERAL
332 COMMUNICATIONS COMMISSION; AND JOHN LIEBOVITZ, DEPUTY BUREAU
333 CHIEF, WIRELESS TELECOMMUNICATIONS BUREAU, FEDERAL
334 COMMUNICATIONS COMMISSION

335 } Mr. {Sherman.} Thank you. Good morning, Chairman
336 Walden, Ranking Member Eshoo, and members of the
337 subcommittee. We appreciate the opportunity to discuss next
338 steps for spectrum policy, and welcome your interest in this
339 topic.

340 At the table with me today are 3 experts well known to
341 this committee; Juli Knapp, the Chief of the Office of
342 Engineering and Technology; Gary Epstein, the Chair of the
343 Incentive Auction Task Force; and John Liebovitz, the Deputy
344 Chief of the Wireless Bureau, and Special Advisor to the
345 Chairman for Spectrum Policy.

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346 We know that time is limited and you are probably
347 anxious to ask questions, so I won't reiterate our testimony,
348 but instead briefly highlight three basic points. First, the
349 demand for spectrum continues to grow exponentially, and as a
350 nation, we need to maintain our collective focus on this
351 resource to continue to be the world leader in wireless.
352 There is no debate that wireless is an engine of economic
353 growth and progress in the United States, and there is no
354 debate that spectrum fuels this engine.

355 As Chairman Walden and Chairman Wheeler pointed out in a
356 recent op-ed upon the close of Auction 97, there is direct
357 linkage between spectrum, jobs and economic growth, not to
358 mention innovation, competition and consumer choice. You can
359 be sure FCC staff is focused on making licensed and
360 unlicensed spectrum available for mobile broadband to meet
361 consumer and business demands. This has certainly been a key
362 area of focus for Chairman Wheeler and all of the
363 commissioners.

364 Second, we are actively bringing more spectrum online.
365 Since Chairman Wheeler's arrival at the FCC, we have
366 auctioned the 10 megahertz H block, and 65 megahertz of AWS-3

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367 spectrum. We have also made other spectrum newly available
368 and useable for wireless broadband and unlicensed uses. Of
369 course, we are working towards the incentive auction early
370 next year.

371 A couple of quick observations about AWS-3, many points
372 that you have already raised in your statements. AWS-3 was a
373 team effort, and it is well known that it was a success in
374 large part due to the important work of NTIA, DoD, and other
375 Federal agencies. What is less well known, at least outside
376 the Rayburn Building, is that full engagement of the Energy
377 and Commerce Committee was a critical element of this
378 success. Members of this subcommittee in particular took a
379 personal interest in the success of this effort, and did
380 everything possible to bring along other stakeholders with
381 interest in this spectrum. These collective efforts yielded
382 a great result. More spectrum is available for wireless
383 broadband, federal agency transitions are paid for, and a
384 number of congressional priorities have received critical
385 funding, including the nationwide broadband public safety
386 network, public safety research, next generation 911
387 implementation, and more than \$20 billion for federal deficit

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388 reduction. As you are well aware, these priorities came
389 directly from legislation authored by this subcommittee.

390 Third, and finally, the FCC is continuing to think hard
391 and creatively about how to ensure a continuing supply of
392 spectrum is in the pipeline. We all know how long it takes
393 to ready spectrum for auction, or otherwise make it available
394 for commercial use. The agency intends to use the tools
395 Congress has provided towards this end. We will also
396 continue to working closely with this committee and our
397 federal partners going forward. Along these lines, I am
398 pleased to report that tomorrow Chairman Wheeler plans to
399 circulate with the commissioners draft final rules to create
400 a new service in the 3.5 gigahertz band, the Citizens
401 Broadband Radio Service. This is an exciting opportunity to
402 use new innovative technologies and policies to leverage 150
403 megahertz for wireless broadband. We have also initiated a
404 proceeding aptly titled Spectrum Frontiers. This notice of
405 inquiry examines spectrum high up on the spectrum chart, the
406 bands above 24 gigahertz. This proceeding will help us
407 understand better the future of wireless services, and
408 hopefully create a regulatory environment in which new

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409 innovative technologies can flourish for the benefit of
410 consumers.

411 On behalf of my colleagues here today and at the FCC, we
412 thank the subcommittee for the opportunity to testify, and
413 stand ready to answer your questions. Thank you.

414 [The prepared statement of Mr. Sherman follows:]

415 ***** INSERT A *****

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416 Mr. {Walden.} Mr. Sherman, thank you for your
417 testimony. We thank the other witnesses for being here today
418 for the committee.

419 Mr. Sherman is the only one presenting testimony today,
420 so we will go right into our questions and then he will--he
421 told me he is more like the point guard, he will hand it off
422 to the other experts on the panel as well, but feel free to
423 ask him questions too.

424 So we will start with--please, lots of questions, Mr.
425 Sherman. We will start with Mr. Epstein.

426 The FCC's budget requests include \$2.4 million to engage
427 an administrator to manage the broadband relocation fund. Is
428 that engagement going to be awarded through competitive
429 bidding, and if not, why, and is this a one-time request or
430 do you think additional funding will be necessary? I have a
431 couple of other follow-up questions, but--

432 Mr. {Epstein.} Well, thank you, Mr. Chairman.

433 Mr. {Walden.} And, yeah, turn on that mike. There you
434 go.

435 Mr. {Epstein.} Yeah. Thank you very much, Mr.

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436 Chairman, for the opportunity to testify today. The
437 broadcast administrator is going to be a crucial part of the
438 transition post-auction, and yes, we do anticipate it as
439 being a fair and open compete, and we do anticipate that it
440 will be a one-time-only request.

441 Mr. {Walden.} All right. And where will those funds
442 come from, the \$2.4 million estimated cost?

443 Mr. {Epstein.} I am not an expert in the budget aspects
444 of things. My anticipation is it will come out of auction
445 proceeds, but I will confirm that with our Office of Managing
446 Director.

447 Mr. {Walden.} Okay. And the commission has engaged
448 clearinghouses before to manage cost sharing in the clearing
449 of spectrum bands. How much--do you know how much those cost
450 to manage--those--how much it costs those entities to manage
451 a clearinghouse?

452 Mr. {Epstein.} Mr. Chairman, I don't have those
453 numbers. As--does any--do any of the other experts--

454 Mr. {Walden.} Yeah, if other members on the panel have
455 answers to any of these questions our Members have, please
456 feel free to speak up.

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457 {Voice.} We will get that back to you.

458 Mr. {Walden.} All right.

459 Mr. {Epstein.} We will get that information back to
460 you.

461 Mr. {Walden.} Perfect. Okay. And, Mr. Knapp, welcome,
462 by the way. We are always delighted to have you in the room,
463 and helping us on the technical side of these issues. And so
464 I want to talk about performance requirements for receivers.
465 Do you think that a sort of one-size-fits-all rule setting
466 performance requirements for receivers or defining the
467 interference environment will solve the problems across many
468 different types of radio devices, and if not, how would you
469 tailor an appropriate framework?

470 Mr. {Knapp.} Thanks, Mr. Chairman. We have had our
471 technological advisory council look at this issue. One of
472 the things that came out of that is a proposed new approach
473 for dealing with receivers. It is based on something called
474 interference harms fresh roles.

475 Mr. {Walden.} Um-hum.

476 Mr. {Knapp.} Rather than setting standards for
477 receivers, which we--as we got into it, found that a one-

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478 size-fits-all would be really difficult--

479 Mr. {Walden.} Right.

480 Mr. {Knapp.} --to come up with. In fact, I was at a
481 conference earlier this week where I heard another idea that
482 is coming out of a multi-stakeholder group that is a
483 variation on that, which talks about more of a generic mask.
484 So the receiver issue continues to come up. We are still
485 working with the industry on approaches that we can take to
486 this without moving quickly to mandatory standards.

487 Mr. {Walden.} All right. Yeah, let me--I will go to
488 this next question. Mr. Knapp and Mr. Sherman, the proposed
489 use of heightened receiver performance standards as a
490 solution to interference problems has long been of interest
491 to our subcommittee, as you all know. However, we recognize
492 requiring more stringent standards for receivers can result
493 in over-engineering and higher consumer prices, which I think
494 is what you are alluding to there. So how do we balance
495 this? Is there a way to improve receive performance without
496 concurrent increase in price or device size? And then I
497 still have people asking me about, you know, spectrum is
498 limited, are there ways to maximize use, and that leads to a

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499 discussion about FM chips in cell phones and all of that.

500 So, Mr. Knapp, do you want to address that?

501 Mr. {Knapp.} So the problem is a lot easier to deal
502 with when you are introducing new services. So in the
503 spectrum that Roger referred to, the proceeding on Citizens
504 Broadband Radio Service, the--one of the things that we are
505 looking to a multi-stakeholder group to do is to try to
506 address the receive issues at the start. And so that is how
507 we are trying to approach this. It is difficult to do
508 something about receivers that are already out there, but we
509 think--

510 Mr. {Walden.} I think we learned that with LightSquared
511 and GPS and all of that, right?

512 Mr. {Knapp.} Right. Absolutely.

513 Mr. {Walden.} Mr. Sherman?

514 Mr. {Sherman.} On the question about FM chips that
515 you--

516 Mr. {Walden.} Right.

517 Mr. {Sherman.} --asked earlier, I think Chairman
518 Wheeler spoke about that last week at one of his hearings.

519 Mr. {Walden.} I heard he was on the Hill.

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520 Mr. {Sherman.} Yeah. And I think he indicated that he
521 thinks the market seems to be working, and if consumers want
522 their FM chips, they can let their carriers know, and that
523 their--the market should solve that problem. And I think
524 that--I probably don't have anything to add to that.

525 Mr. {Walden.} All right. Those are the only questions
526 I have, so I will yield back the balance of my time.

527 And I will turn now to my friend from California, Ms.
528 Eshoo.

529 Ms. {Eshoo.} Thank you, Mr. Chairman.

530 I am going to go as quickly as I can because I have a
531 lot of questions, and I doubt I will get them all in, but the
532 ones that I don't, we will submit them to you in writing for
533 a response.

534 To Roger, you know, I think, very well that it has been
535 a long-held belief of mine that the upcoming incentive
536 auction rules really have to be sufficient to prevent
537 excessive concentration of spectrum amongst the Nation's
538 largest wireless providers. Now, today, approximately 73
539 percent of the highly desirable spectrum below 1 gigahertz is
540 held by two companies in the country. Is it the commission's

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541 view that wireless carriers who lack substantial low
542 frequency spectrum are at a competitive disadvantage?

543 Mr. {Sherman.} Thanks for the question, Ms. Eshoo. I
544 think the commission has been wrestling with this issue for
545 the last several years in various competition reports.

546 Ms. {Eshoo.} Yeah. It is a sticky wicket, um-hum.

547 Mr. {Sherman.} And last year--

548 Ms. {Eshoo.} Um-hum.

549 Mr. {Sherman.} --in--about a year ago, when it adopted
550 the incentive auction order, it also adopted a companion
551 order of mobile spectrum holdings in which it recognized that
552 a complimentary mix of spectrum, including low band spectrum,
553 because of its special properties, was critical to
554 competition. And it took steps in that order to recognize
555 the unique characteristics of low band, which as you know, is
556 better for rural coverage because it propagates over further
557 distances--

558 Ms. {Eshoo.} Um-hum.

559 Mr. {Sherman.} --and it also is great for urban areas
560 where it can go through buildings and walls. So the
561 commission took action in that item to recognize the special

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562 qualities of low band, and in transactions it gives special
563 deference to the amount of low band spectrum being
564 transferred. And then importantly, in the incentive auction,
565 it established what we call a market-based reserve, which is
566 a real balancing act to try to make sure that nobody can get
567 all of it--

568 Ms. {Eshoo.} Um-hum.

569 Mr. {Sherman.} --and make sure it is available to the
570 smaller providers, because as you mentioned, it is
571 disproportionately held by a couple of large carriers. Not
572 suggesting those carriers did anything wrong, it is just a
573 historic fact.

574 Ms. {Eshoo.} No, they didn't, but the whole issue is
575 that we have competition in our country.

576 Mr. {Sherman.} Right. Right.

577 Ms. {Eshoo.} I mean that is--we have free markets, we
578 have--but competition is one of the essential ingredients in
579 our national economy. Thank you.

580 Mr. Knapp, it is great to see you. I have fought very
581 hard for unlicensed in the TV white spaces, which is why I
582 was concerned to hear that the FCC recently received a

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583 petition to suspend the TV white spaces database. Can you
584 explain to the committee exactly what is going on with this,
585 and if you are aware of any instances of interference as a
586 result of the database problems raised by the NAB?

587 Mr. {Knapp.} Sure. These are databases that were set
588 up through private providers where only fixed users, the
589 people who do things like wireless broadband and provide
590 service to businesses, can register their locations and some
591 related information into the databases. We are aware there
592 are some anomalies in the databases, and we have been working
593 with the database providers and the other stakeholders to
594 take care of any housekeeping that needs to be done, as well
595 as continuing to work with the broadcasters to correct any
596 problems that we find. But we have not--

597 Ms. {Eshoo.} So what is--this is really loud. What is
598 the--yeah. We have some at the table. What is the upshot of
599 it though? I mean will--is this going to be settled, is it
600 going to be left hanging in limbo, what is going to happen to
601 the TV white spaces?

602 Mr. {Knapp.} So I am confident that this can be easily
603 corrected.

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604 Ms. {Eshoo.} That is great.

605 Mr. {Knapp.} It is things like missing phone numbers.

606 Ms. {Eshoo.} I like the word easily. Okay, good.

607 Moving on.

608 Both to Mr. Liebovitz and to Mr. Knapp, the prospect of
609 5G technology is very exciting. It is very exciting for
610 consumers. I think for everyone on the committee, we
611 understand what superfast speeds will bring about for people
612 in our country, and that is the cause of excitement. It is
613 my understanding that the commission is currently examining
614 which bands of spectrum would best be suited for 5G services.
615 When can consumers expect to see 5G deployed in our country?

616 Mr. {Liebovitz.} Thank you, Congresswoman, and thanks
617 for the invitation to speak today.

618 Ms. {Eshoo.} Uh-huh.

619 Mr. {Liebovitz.} So 5G is a topic of growing interest
620 in the wireless industry.

621 Ms. {Eshoo.} Um-hum.

622 Mr. {Liebovitz.} As I think Members know here, in the
623 U.S. our policy is not to earmark spectrum for certain
624 technologies. We have a strong policy of technology

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625 neutrality and we intend to continue that.

626 Ms. {Eshoo.} And I think that is a sound policy.

627 Mr. {Liebovitz.} At the same time, we recognize that
628 some of the new technologies that are coming down the pipe
629 have the potential to use very wide channels, and use
630 spectrum that otherwise is previously thought unusable for
631 terrestrial service. So we put out the NOI last fall on
632 spectrum frontiers which teed-up a number of different bands
633 above 24 gigahertz for both licensed and unlicensed 5G-type
634 service. We have--there are also incumbents in those bands.
635 Some of those bands that we have to think about protecting
636 their users, satellite users and others, but the technology
637 itself is not really ready yet, it is still in the lab. I
638 think most people anticipate that these technologies would
639 happen in the 2020-plus time frame, and I think if you look
640 at the history of wireless, this technology, they tend to--
641 the schedules sometimes tend to slip a little bit, but it is
642 a--it is looking at the next decade I think, more than, you
643 know, tomorrow or the next year, but it is coming and we want
644 to be the first--we want America to be the first country to
645 have it, and the place where the technology gets developed

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646 and thrives.

647 Ms. {Eshoo.} Speed it up.

648 Mr. {Liebovitz.} Is that my testimony, or are you--

649 Ms. {Eshoo.} No, your testimony is over. My time is
650 up.

651 Mr. {Walden.} Gentlelady's time has expired. We have
652 to move now to the gentleman from Ohio, Mr. Latta.

653 Mr. {Latta.} Thank you very much, Mr. Chairman. Again,
654 gentlemen, thanks very much for being here today to testify.

655 Mr. Knapp, if I could just start questioning with you.
656 The FCC has done very good work in facilitating compromise
657 solutions so that the 5.1 gigahertz band can be shared to the
658 benefit of Wi-Fi consumers. We now need more such compromise
659 solutions to enable efficient use of the 5.9 gigahertz band
660 to keep up with consumer Wi-Fi demand. Wi-Fi can share the
661 band with future intelligent transportation systems if those
662 systems are every deployed. What is your timeline do you
663 think for allowing Wi-Fi operations in this band?

664 Mr. {Knapp.} So the--we brought together the
665 stakeholders for the two bands that are in play. One is a
666 band of 120 megahertz that is used primarily by the

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667 Department of Defense. So we have set up a working group
668 with Department of Defense, NTIA, there are also some NASA
669 operations in there, along with the industry stakeholders.
670 There have been studies done on the required protections. We
671 are not quite there on the ability of the equipment to meet
672 what the requirements would be. So we are still working on
673 that. Once we get to a point where we have a solution, there
674 will need to be prototype devices from industry to be tested
675 to make sure it works.

676 So it is a little bit hard to give you a firm timeline.
677 I can tell you that we are trying to accelerate this as fast
678 as we can.

679 Mr. {Latta.} Let me ask, when did the working groups
680 first form--

681 Mr. {Knapp.} So most of the work had been going on
682 internationally. So that has been going on actually probably
683 a year and a half, 2 years. We reached a point where it was
684 clear we were not going to be able to have everything that--
685 necessarily in place to succeed internationally, so we
686 created the work group, I think we started late last summer,
687 and then we picked up the pace with meetings once a month

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688 earlier this year.

689 Mr. {Latta.} So you are meeting with the working groups
690 about every month that you are working--

691 Mr. {Knapp.} Every month.

692 Mr. {Latta.} Okay.

693 Mr. {Knapp.} We created a technical subgroup that is
694 meeting in between. So we have all the players there trying
695 to find an answer here.

696 Mr. {Latta.} Okay. Let me ask also, given the
697 tremendous advance in the wireless technology over the last
698 decade, should the commission review its DSRC spectrum
699 designation to determine in the public interest if there are
700 other more advanced vehicle or to--vehicle safety
701 technologies using services like the LTE advance 5G or Wi-Fi?

702 Mr. {Knapp.} So this is the other portion of the
703 spectrum, 75 megahertz, that we have been looking at. There,
704 the technology is very similar to Wi-Fi, and so the IEEE,
705 which is basically the developer of both the Wi-Fi standard
706 and the DSRC standard, put together a tiger team to try to
707 find a solution. They are nearing the completion of a
708 report. There are a couple of proposals on the table to be

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709 looked at, plus we have been meeting separately with the NTIA
710 and Department of Transportation, and one of the things I
711 think that we have agreed we need to look at is the broader
712 scope of communications for vehicles beyond just the DSRC.

713 Mr. {Latta.} Thank you.

714 Mr. Liebovitz, if I could ask you quickly, how can we
715 move forward and ensure shared use of the upper 5 gigahertz
716 band, and would it be beneficial for the FCC to hold routine
717 meetings with the committee in order to accomplish the goal?

718 Mr. {Liebovitz.} So I would like to yield to Mr. Knapp
719 on that question.

720 Mr. {Latta.} Okay, that is fine, if you want to do
721 that. He is on the hot seat then.

722 Mr. {Knapp.} You know, we would be more than happy to
723 meet if you would like and keep you apprised of the progress.

724 Mr. {Latta.} Yeah, we would appreciate that.

725 Mr. Sherman, as stated in the--your joint testimony, in
726 2010, the FCC analyzed spectrum demands and determined that
727 the 300 megahertz would be needed by 2015. It is now 2015,
728 and as you have outlined, the FCC has released 145 megahertz
729 of spectrum for wireless broadband use.

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730 What is the plan for our Nation to meet the skyrocketing
731 consumer demand for wireless services?

732 Mr. {Sherman.} Thanks for the question, Mr. Latta. I
733 think--

734 Mr. {Latta.} Yeah, is your mike--

735 Mr. {Walden.} Yeah, turn your mike--yeah.

736 Mr. {Sherman.} The announcement about the 3.5 gigahertz
737 item that is being circulated will make progress, but I would
738 defer to my colleague, John Liebovitz, because he has been
739 working on this plan for several years, and he probably can
740 give you more up-to-date information.

741 Mr. {Latta.} Thank you.

742 Mr. {Liebovitz.} Yes, so the national broadband plan,
743 which of course, was authorized and directed by Congress,
744 which came out in 2010, talked about 2 goals. One was 300
745 megahertz for mobile use in 5 years, and then 500 megahertz
746 within 10 years. Towards the first goal, as you mentioned,
747 we have succeeded in getting close to 150 megahertz out
748 already, which if you look at the history of spectrum
749 release, is very fast actually. The 3.5 gigahertz item,
750 which is--which looks to be voted in the April meeting, would

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751 add another 100 megahertz of new spectrum. And then, of
752 course, we have the incentive auction coming in early 2016.
753 So it might not exactly be in the 5-year time frame, but it
754 is pretty close, that we actually have a roadmap to get to
755 the 300 megahertz.

756 Beyond that, we would be looking at other bands. We
757 have talked about some of them today for both unlicensed and
758 licensed broadband use, which would take the Nation to 500
759 megahertz.

760 Mr. {Latta.} Thank you.

761 Mr. Chairman, my time has expired, and I yield back.

762 Mr. {Walden.} And we will now turn to the gentleman
763 from Kentucky, Mr. Yarmuth, for 5 minutes.

764 Mr. {Yarmuth.} Thank you very much, Mr. Chairman.

765 Thanks to the witnesses for being here today.

766 I know there are some stakeholders who think the FCC
767 should focus exclusively on allowing opportunities for
768 licensed spectrum. And, Mr. Sherman, I think in your
769 testimony you referenced the agency's commitment to--the
770 commission's commitment to both licensed and unlicensed.
771 Could you explain--which I think is a good idea. Could you

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772 explain why it is important to allow the opportunities for
773 unlicensed spectrum?

774 Mr. {Sherman.} Sure, I would be happy to. And I would
775 ask if my colleagues, Juli Knapp or John Liebovitz, have
776 anything to add, but I think the agency recognizes that in
777 this environment, licensed spectrum and unlicensed spectrum
778 are complimentary and mutually--and very critical and support
779 each other in a lot of ways. Consumers use both and
780 consumers want both, and there are benefits to licensed users
781 and licensees by having unlicensed, and vice-versa. Congress
782 recognized this in the middle tax--the Middleclass Tax Relief
783 and Job Creation Act by allowing for unlicensed uses in the
784 600 megahertz. So I think everybody is very comfortable with
785 the symbiotic relationship between licensed and unlicensed.

786 I would ask if Juli or John have anything to add.

787 Mr. {Knapp.} No, I completely agree with what Roger
788 said, and we are working hard on both fronts to provide
789 spectrum and opportunities for growth of both licenses and
790 unlicensed services.

791 Mr. {Yarmuth.} I know that unlicensed spectrum is
792 really important for innovation and for small business and so

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793 forth. How do some of the larger carriers--wireless carriers
794 use unlicensed?

795 Mr. {Sherman.} Well, I think the most obvious way is
796 unlicensed--a lot of people in their everyday use of their
797 smartphones will be on a licensed network, so to speak, as
798 they travel from their office to their house. When they get
799 into their house, a lot of times their phone will transfer
800 onto a Wi-Fi network within the residence, and they will be
801 using data on an unlicensed Wi-Fi network.

802 Mr. {Yarmuth.} Okay.

803 Mr. {Knapp.} Yeah, I would just add that certainly, Wi-
804 Fi gets all the attention, but in those same devices are
805 Bluetooth to connect to your headphones and the Near Field
806 Communications for the automatic payment that is emerging.
807 All that is unlicensed.

808 Mr. {Yarmuth.} Okay. Thank you for that.

809 And one of my kind of personal obsessions now is how we
810 make policy in real time with as fast as the world is
811 changing, and certainly, in this area, that kind of dilemma
812 is certainly relevant. Is there any--you talked about
813 research on 5G and so forth, is there anything going on out

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814 there, research and so forth, that actually scares you, and
815 might be so disruptive that your world--the world as you know
816 it, and we know it, is--will change?

817 Mr. {Sherman.} Well, if you are talking about research,
818 I should probably defer to the engineer.

819 Mr. {Yarmuth.} I mean the reason I--for instance, I
820 read something a few weeks ago where somebody had--has
821 invented a way to transmit electricity through sound waves to
822 appliances, and if that is--I am--I think that, if it is
823 scalable and if it actually works, that is a disruptive
824 technology because then we have to say, well, should we
825 really be investing trillions of dollars in the grid if we
826 are going to be--have another way to transmit electricity. I
827 was just curious whether in your specific area there are
828 things that promise that kind of disruption. I mean it is
829 fine if you say no.

830 {Voice.} No. No. Go ahead.

831 Mr. {Liebovitz.} I would just add, I would just say
832 that the--I think this is a big policy challenge that we
833 always face about how do you prepare for the next disruptive
834 technology. I think it is instructive and reinforces the

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835 policy of technology neutrality, of flexibility, as much as
836 possible so that we don't, you know, as much as possible that
837 we don't lock certain types of uses categorically into the
838 rules, we allow lots of different applications to thrive.
839 Our 3.5 gigahertz proceeding actually is an attempt to try to
840 push the boundary of flexibility even farther. So in some
841 ways it is a hybrid between licensed and unlicensed uses, and
842 I think there is a lot more we can do looking forward to 5G
843 and so forth.

844 Mr. {Yarmuth.} Um-hum. I have no other questions. I
845 yield back, Mr. Chairman. Thank you.

846 Mr. {Walden.} Gentleman yields back.

847 And we now turn to the gentleman from New Jersey--yeah,
848 gentleman from New Jersey, Mr. Lance.

849 Mr. {Lance.} Thank you very much. Good morning to you
850 all.

851 The incentive auction will be the first time the FCC
852 auctions a band plan that is not set in advance of the
853 auction, using a new auction mechanism, ascending clock, that
854 includes a separate round to assign licenses after the main
855 auction is over. It will also include a spectrum reserve

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856 triggered when bidding reaches a certain level, impaired
857 licenses and something called intra-round bidding. As I
858 understand it, all of this new, even for those wireless
859 carriers who have participated in traditional auctions.

860 To the panel in general, and perhaps to Mr. Epstein and
861 Mr. Liebovitz, what steps will you take to help prepare
862 carriers for bidding in this first of its kind auction? For
863 example, will there be multiple mock auctions and seminars?

864 Mr. {Epstein.} Thank you much--thank you very much,
865 Congressman. You are absolutely right. Outreach is
866 extremely important in this auction on both sides of it; both
867 the reverse auction side and on the forward auction side.

868 On the reverse auction side, you know, broadcasters are
869 really not used to bidding in an auction, and especially in a
870 new auction, a voluntary auction like this. And so I can go
871 into detail later, but we have taken many new steps to
872 encourage and to inform broadcasters.

873 On the forward auction side are--wireless providers are
874 more familiar with auctions, they are expert, but you are
875 exactly right, there are several new features of this
876 auction. We have been working with them on a daily and on a

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877 weekly basis to help formulate the appropriate policy, and we
878 will have outreach and we will have mock auctions as part of
879 the planning to go forward before the auction.

880 Mr. {Lance.} Thank you. Would others like to address
881 the issue?

882 {Voice.} No, thank you.

883 Mr. {Lance.} Thank you. The FCC's incentive auction
884 public notice proposes to sell both impaired and unimpaired
885 licenses. As I understand it, a license is impaired when a
886 carrier cannot serve the entire geographic market due to
887 interference from television broadcasts. Before bidding on a
888 license, carriers will need to know the extent to which
889 licenses are impaired, meaning which parts of their license
890 area they may not serve or may be subject to interference.

891 What kind of information will carriers have prior to
892 bidding regarding the geographic areas that may be impaired?

893 Mr. {Epstein.} This concept of impairment, Congressman,
894 comes from the fact that the commission made the policy
895 decision that it really doesn't want to go to what is called
896 the least common denominator. And, you know, if we can't get
897 a reasonable amount of spectrum in certain congested areas,

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898 we don't want the whole country to have that limited amount
899 of spectrum. And what that means is, as you said, you are
900 exactly right, we may have broadcasters in that particular
901 band which will mean that hopefully in some limited areas,
902 bordering congested areas, that the--they--the--certain
903 blocks in the auction will be subject to interference.

904 What we have said in the public notice that you have
905 talked about, and what the commission will decide in the
906 summer when it resolves that, is the amount of detail, what
907 we have talked to the carriers about, is very specific detail
908 so that they will know exactly what they are bidding on in
909 the forward auction, almost on a 2 by 2 sale level.

910 Mr. {Lance.} Thank you. Anyone else on the panel like
911 to comment?

912 Thank you very much, Mr. Chairman. I yield back the
913 balance of my time.

914 Mr. {Walden.} Gentleman yields back the balance of his
915 time.

916 Now turn to the gentleman from Iowa for 5 minutes.

917 Mr. {Loebsack.} I was not expecting to speak this soon.
918 Thank you, Mr. Chair.

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919 I want to be pretty brief just because some of the
920 things that I wanted to ask about have already been covered,
921 but I would like to just--and I may be repeating, and that is
922 fine, but refer to the unlicensed issue, and this is to any
923 of the witnesses. Some stakeholders argue that the FCC
924 should focus exclusively on maximizing opportunities for
925 licensed spectrum. I believe, however, that the FCC should
926 pursue a balanced spectrum policy that includes more spectrum
927 for both licensed and unlicensed. I know unlicensed spectrum
928 has lower barriers to entry which can help startups, I think
929 that was mentioned already, and small businesses get access
930 to the--this platform for innovation. How do larger wireless
931 carriers use unlicensed spectrum? And that is really for
932 anybody here.

933 Mr. {Sherman.} Well, I think we would agree that there
934 is a symbiotic relationship between licensed and unlicensed
935 spectrum, and they are not mutually exclusive; you can have
936 both. And I think the Congress has recognized that, and the
937 FCC strives to implement a policy that recognizes that.

938 I mentioned earlier the example of offloading usage--
939 data usage onto an unlicensed network to ease capacity, and

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940 there are other new innovations that are coming down that use
941 both licensed and unlicensed technology, and seamlessly
942 between unlicensed and licensed services.

943 I don't know if John or Juli have anything to add.

944 Mr. {Knapp.} Yeah, I mentioned some before, and I think
945 most people have--appreciate where we had the arguments years
946 ago about should be one or the other or more, that the 2 win
947 when there is spectrum for both.

948 I mentioned a couple of things before, even on the
949 medical front, we have got glucose monitors that can--use
950 unlicensed spectrum, or lightly licensed spectrum, to collect
951 data. They feed it to the wireless device, and then the
952 information can go back to the doctor or--so there are things
953 that are being accomplished and innovations that are
954 occurring because we have both, and we need to continue to
955 provide for both.

956 Mr. {Loebsack.} Thank you. Anyone else? Okay. Just
957 one--go ahead.

958 Mr. {Sherman.} I just wanted to add one other thing.
959 We often look at it also, consumers don't really care if it
960 is licensed or unlicensed--

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961 Mr. {Loebsack.} Right.

962 Mr. {Sherman.} --they just want their device to work
963 and the services--

964 Mr. {Loebsack.} Right.

965 Mr. {Sherman.} --to perform. So I think at the end of
966 the day, consumers are going to want services in both the
967 required to make things robust.

968 Mr. {Loebsack.} And I think that is the bottom line for
969 us here in Congress too. We have to make sure that that
970 access is there.

971 Mr. Sherman, paying for a broadband connection,
972 including wireless broadband, you know, can be a major
973 challenge obviously for many of my constituents, many of the
974 constituents here--of the folks here on the dais today, and
975 competition in the wireless industry is critical, no doubt,
976 if we are going to help low-income Americans get connected.
977 And I have a particular concern about rural America, I have
978 to say, not just because I represent a lot of rural areas,
979 but a lot of folks on this committee now who have that
980 particular concern as well.

981 How does access to spectrum impact the level of

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982 competition in the wireless industry, because competition,
983 hopefully, would lead to, you know, lower prices or at least
984 more competitive prices, and providing the same kind of
985 access as well. And so if you could speak specifically to
986 the rural areas, I think that would be important for a lot of
987 us here.

988 Mr. {Sherman.} Thanks for that question. It is also
989 very important to the commission on a bipartisan basis. And
990 there are a number of policies that the commission has
991 adopted over time to incent rural deployment and build out.
992 We need to do more but there are a lot of things already in
993 place.

994 One thing that is critical is low band spectrum, which
995 we talked briefly about before.

996 Mr. {Loebsack.} You mentioned that earlier. Can you
997 elaborate on that a little bit?

998 Mr. {Sherman.} The more--low band spectrum, because of
999 its propagation characteristics--

1000 Mr. {Loebsack.} Um-hum.

1001 Mr. {Sherman.} --is really well suited for rural areas.
1002 It goes farther with less infrastructure--

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1003 Mr. {Loebsack.} Um-hum.

1004 Mr. {Sherman.} --so that it costs less and can serve
1005 those areas where people live, you know, longer distances
1006 apart. And--or in congested cities oftentimes, you can have
1007 multiple sites attached to buildings and serve lots of
1008 densely populated areas, but rural areas you have bigger
1009 distances, so low band spectrum is particularly well suited.
1010 We want to make sure that there is lots of low band spectrum
1011 in rural areas with lots of providers having options, so
1012 rural consumers have the same benefit of competition that--

1013 Mr. {Loebsack.} Right.

1014 Mr. {Sherman.} --that urban consumers have. We also
1015 have incentives for building out--we have build-out
1016 requirements. There are, right now in looking at small
1017 business preferences and incentives in open NPRM, you know,
1018 the question of rural build-out incentives is also, you know,
1019 keyed up and the commission is very sensitive to those
1020 issues.

1021 But I think in everything we do with competition policy,
1022 rural is a big part of it.

1023 Mr. {Loebsack.} It is. And, you know, again, I mean I

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1024 cited a lot of examples where it is just really hard for
1025 folks in a rural area to--because there isn't that much
1026 competition. And, you know, in the end, they end up paying a
1027 lot of money and they are not getting as good a service often
1028 as the--is the case in the urban areas. So how we can
1029 incentivize that is the question.

1030 Mr. {Sherman.} Well, one other thing I should mention
1031 in the incentive option, one thing the commission did is it
1032 changed the standard license size to what is called a PEA--

1033 Mr. {Loebsack.} Um-hum.

1034 Mr. {Sherman.} --and it was a compromise amongst
1035 various stakeholders, but it allows smaller providers to have
1036 access to a smaller license area, which might not be as
1037 expensive as a large, nationwide or regional license--

1038 Mr. {Loebsack.} Okay.

1039 Mr. {Sherman.} --and a lot of the small rural providers
1040 that we talked with and engaged in that proceeding were
1041 really pleased that the commission came up with a way that
1042 they can get into the auction--

1043 Mr. {Loebsack.} Thank you.

1044 Mr. {Sherman.} --at a reasonable basis.

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1045 Mr. {Loebsack.} Thank you.

1046 Mr. Chair, I see my time has expired. I yield back.

1047 Mr. {Walden.} The gentleman yields back. And I just
1048 concur with what he said about the rural areas. I have a
1049 town, Mitchell, Oregon, 130 people in 2010, now to 129. The
1050 local city had to pay to put in a payphone because there is
1051 no cell coverage, and you have a highway going by, and people
1052 are just--have a problem, breakdown, knock on somebody's
1053 door. I mean it is just--we still have these areas that--
1054 like Mitchell, Oregon, that need coverage.

1055 Ms. {Eshoo.} Would you just yield for a moment--

1056 Mr. {Walden.} Yeah, sure.

1057 Ms. {Eshoo.} --Mr. Chairman?

1058 Mr. {Walden.} I am on--I don't know whose time I am on.

1059 Ms. {Eshoo.} Yeah, I--sure. You have the best time.

1060 It is the chairman's time. But it is great spectrum, yeah.

1061 Mr. {Walden.} Yeah.

1062 Ms. {Eshoo.} On this issue of rural, in the last
1063 Congress, I had counted how many members of the Energy and
1064 Commerce Committee represented rural areas, and a combined
1065 from both sides of the aisle there were 18 members. So, you

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1066 know, the rural representation could take over this entire
1067 committee, you know. I don't know how many--

1068 Mr. {Walden.} We just haven't told you we have them.

1069 Ms. {Eshoo.} --I haven't counted. I haven't counted
1070 for this Congress, but this issue is sweeping in terms of--
1071 and it has excellent representation here. So it is very
1072 important to highlight it.

1073 Mr. {Walden.} Yeah.

1074 Ms. {Eshoo.} Thank you.

1075 Mr. {Walden.} Yeah, actually in this county, there is
1076 one person for every 9 miles of power line. So I mean these
1077 are not--you know, but--so it is hard to find the economic--
1078 anyway.

1079 We will go now to Mr. Guthrie, who helped lead our task
1080 force--the bipartisan task force on this issue. Thanks for
1081 your leadership, you and the rest of the Members did a
1082 terrific job. So please go ahead.

1083 Mr. {Guthrie.} Thank you, and I appreciate that, and I
1084 think people who have heard this will get tired of hearing me
1085 say this but it is true that now that we are having these
1086 spectrum meetings, it is interesting when you get into public

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1087 service, things you get involved in you never thought about.
1088 I used to--I have said I didn't walk around Kentucky going
1089 send me to Washington and I will deliver you spectrum, but
1090 that is something that people want and expect, and so it is
1091 really good that we are here doing this. And so I would just
1092 kind of make a statement of--for a few minutes and then ask a
1093 couple of questions. But I would like to thank all you guys
1094 for testifying. It is very important. And I also want to
1095 mention my appreciation for working with Doris Matsui and for
1096 all of her efforts working with me on the spectrum issues, as
1097 co-chairs of the Congressional Spectrum Caucus, it was
1098 bipartisan effort and very--worked well together. And, in
1099 fact, today we have reintroduced together the Federal
1100 Spectrum Incentives Act, a bill that would provide financial
1101 incentives to encourage government agencies to relocate from
1102 their existing spectrum bands in order to free-up additional
1103 spectrum for other uses. And I look forward to hearing
1104 from--I mean working with all of you to move this forward.

1105 As we have already discussed at length today, spectrum
1106 is an important limited resource, and by incurring--
1107 encouraging federal agencies to make additional spectrum

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1108 available, we can invest in innovation and ensure spectrum is
1109 available to meet the demands of our critical emergency needs
1110 and commercial uses. And this bill received strong
1111 bipartisan support last Congress, and I look forward to
1112 working at the same again this time.

1113 And just what Mr.--my friend from Iowa, Mr. Loeb sack,
1114 just said, I was going to mention that we also want to
1115 recognize the commission's work to create rules for the
1116 upcoming incentive auction that does use the partial economic
1117 areas for geographic support in Kentucky. I am one of those
1118 18. I have some good-sized--couple of good-sized cities, but
1119 I do have a lot of rural area, and it will aid my
1120 constituents and it will aid better participation in the
1121 auction, so we appreciate that.

1122 I just have a couple of questions with the couple of
1123 minutes I have left. Mr. Epstein, for you, you know, we have
1124 heard--I have heard concerns that the \$1.7 million relocation
1125 fund for broadcaster expenses may be inadequate for the true
1126 cost of relocating stations. What is your opinion on this,
1127 and assuming that it could be inadequate, what are potential
1128 solutions?

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1129 Mr. {Epstein.} We are very concerned about both the--
1130 Mr. {Walden.} Can you turn on your microphone, sir?
1131 Mr. {Epstein.} --amount and the--I am sorry.
1132 Mr. {Walden.} Thank you.
1133 Mr. {Epstein.} I think it is on. Is it?
1134 Mr. {Walden.} Yes.
1135 Mr. {Epstein.} I will move it closer.
1136 Mr. {Guthrie.} Move it closer, yeah. Thanks.
1137 Mr. {Epstein.} Yes, we too, Congressman, are concerned
1138 about both the amount and the process, so we commissioned an
1139 expert report called the Waddelli Report, that was out there,
1140 and they came back with the conclusion that it was
1141 challenging but feasible to do so if we were careful and took
1142 certain steps. So we have no reason to believe that it--the
1143 \$1.75 billion which Congress set forth, will be insufficient
1144 to be able to do the relocation, but we are working with the
1145 NAB, with broadcasters, with the industry generally, and we
1146 are also taking certain other steps such as building into the
1147 software ways to minimize relocation costs. And that
1148 includes, you know, minimizing the number of stations that
1149 have to change channels, or taking special account of those

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1150 stations which have really expensive relocations new--and
1151 minimizing those. So we look forward to working with the
1152 industry and with everybody else, but at this point we have
1153 no reason to believe the \$1.75 billion won't be sufficient.

1154 Mr. {Guthrie.} Yeah, it was just pointed out to me, I
1155 said \$1.75 million. We couldn't do it for that, could we?

1156 Mr. {Epstein.} Billion.

1157 Mr. {Guthrie.} If we could do it for that, we could use
1158 the money for the deficit--

1159 Mr. {Epstein.} Yes, sir.

1160 Mr. {Guthrie.} --couldn't we? And I will ask Mr.
1161 Sherman, we are talking about, you know, referring spectrum
1162 through broadcasting, trying to free the bill to free
1163 spectrum through government spectrum, but outside of the
1164 crunch for procurement of more spectrum, is FCC doing to
1165 encourage more spectrum, and I--don't create spectrum, better
1166 use of spectrum, maybe sharing, efficiencies, those types of
1167 things? I have about a minute left, if you could elaborate
1168 on what you guys are doing to create more spectrum than what
1169 we have--

1170 Mr. {Sherman.} I--

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1171 Mr. {Guthrie.} --or more availability.

1172 Mr. {Sherman.} I can initially respond, but then will
1173 ask John to elaborate. But I think all of the above is what
1174 the FCC is doing. You know, unlicensed, licensed, sharing,
1175 exclusive use, we are exploring everything because we have to
1176 be as efficient as possible. And I know John has spent a lot
1177 of time working on that.

1178 Mr. {Liebovitz.} Yes, I will come back to the theme of
1179 flexibility. We have--obviously, the unlicensed spectrum is
1180 the ultimate in flexibility, and shared--and sharing and, you
1181 know, unlicensed spectrum today is where most of the spectrum
1182 sharing happens, and people don't even realize it, Wi-Fi is
1183 intensive sharing with Bluetooth and other technologies. We
1184 have secondary market rules which allow people to transfer
1185 spectrum to other--others. They can sell--essentially sell
1186 the rights so the market can work, which is really important.
1187 And then we are looking at ways to kind of push the rules to
1188 even be more flexible. I mentioned the 3.5 gigahertz item in
1189 some ways will encourage not only sharing between commercial
1190 and federal users, but also among different types of
1191 commercial users so that, for example, maybe some--in the

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1192 future some very large industries, including some that are
1193 well known by the committee, energy, and so forth, will have
1194 access to a 150 megahertz band that they can use for LTE to
1195 do lots of smart grid, deployments, other types of things.

1196 Mr. {Guthrie.} Thank you. My time has expired. Thank
1197 you, Mr. Chairman.

1198 Mr. {Walden.} Thank the gentleman for his good work and
1199 good questions.

1200 We will now turn to the gentleman from California, Mr.
1201 McNerney, for 5 minutes.

1202 Mr. {McNerney.} Thank you, Mr. Chairman. And I thank
1203 the witnesses.

1204 Mr. Liebovitz, is there any language in the current
1205 regulations that discuss how new technologies in the
1206 unlicensed spectrum should interact so that existing
1207 technologies are not unfairly hampered?

1208 Mr. {Liebovitz.} I think Mr. Knapp is probably the--

1209 Mr. {McNerney.} Okay, sure.

1210 Mr. {Liebovitz.} --best person to answer that.

1211 Mr. {Knapp.} So the way unlicensed works is the
1212 devices, they all have a little label on them that says they

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1213 are not protected against interference, but obviously they
1214 are serving a wide public grid. So when new technologies--
1215 the beauty of it is it allows flexibility for cutting-edge
1216 technologies to be introduced, but we also try to keep an eye
1217 on that there is not something that disrupts all of the good
1218 applications--

1219 Mr. {McNerney.} Yeah.

1220 Mr. {Knapp.} --that are out there now.

1221 Mr. {McNerney.} So that was kind of vague. I mean--

1222 Mr. {Knapp.} Yeah.

1223 Mr. {McNerney.} --when we expect some new technologies
1224 to come in, can't they be disruptive to existing technology
1225 like Wi-Fi?

1226 Mr. {Knapp.} What we try to do, because there is
1227 freedom there, is just keep an eye on what is going on.
1228 There is not a specific benchmark for--like in the licensed
1229 service where there is protection. And most of those
1230 technologies are built to be robust and operate in a shared
1231 environment.

1232 Mr. {McNerney.} Yeah, I am little worried though that
1233 some of the new technology can come in and be very dominant,

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1234 like the LightSquared problem.

1235 Mr. {Knapp.} Yeah, I think we are always keeping an eye
1236 on what is coming in the way of new technologies and those
1237 bands, and we have been encouraging the industries, because
1238 they normally sort out the details of the sharing, to work
1239 those things out before a new technology is introduced that
1240 is disruptive.

1241 Mr. {McNerney.} Okay. I am not sure who to ask this
1242 question, but is there any portion of the spectrum that will
1243 be reserved for small bidders in future auctions? Mr.
1244 Sherman?

1245 Mr. {Sherman.} Well, I think the question is about the
1246 ability of small bidders in future auctions?

1247 Mr. {McNerney.} Right.

1248 Mr. {Sherman.} The way the FCC has approached that in
1249 the last few years is through something called our
1250 competitive bidding rules where we have small business
1251 discounts, and that is an issue that is currently open before
1252 the commission, evaluating whether the current rules make
1253 sense or we should update them. And there are some proposals
1254 in the record to update the rules to allow small bidders to

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1255 get a more realistic opportunity to bid for a spectrum which
1256 is, you know, is pretty expensive. So that is an active
1257 proceeding that the commissioners are all engaged in.

1258 Mr. {McNerney.} Okay. I don't understand exactly what
1259 is going on with the incentive auction. What are the current
1260 holders of the 600 megahertz band and how are they going to
1261 be treated in the--in an auction?

1262 Mr. {Epstein.} Well, the--most generally, the current
1263 holders of the 600 megahertz band are UHF broadcast
1264 television stations, and the act that Congress passed was an
1265 innovative act, a way to look at spectrum in a different way,
1266 and what we are charged with by this subcommittee and the
1267 Congress and the commission with doing is having a workable
1268 back-to-back auction, and by that I mean is a reverse auction
1269 where the broadcasters will voluntarily submit their spectrum
1270 for compensation for a share of the proceeds that we will get
1271 in the forward auction from the wireless providers. And that
1272 is the challenge that Congress has put before us.

1273 There are other present users of the 600 megahertz band
1274 such as wireless microphones and unlicensed, and as part of
1275 our overall planning, we have to make transition and other

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1276 plans for them. So it is a complex of items which is part of
1277 the Spectrum Act which we are charged with implementing.

1278 Mr. {McNerney.} Okay, thank you.

1279 Mr. Chairman, I yield back.

1280 Mr. {Walden.} Gentleman yields back.

1281 Chair now recognizes, let us see, Mr. Pompeo has left,
1282 the gentleman from Ohio, Mr. Johnson, for 5 minutes.

1283 Mr. {Johnson.} Well, thank you very much, Mr. Chairman.

1284 Mr. Epstein, given the success of AWS-3 and the feedback
1285 that you have received, do you feel that you have a better
1286 idea of how much spectrum might be reallocated as a result of
1287 the incentive auction?

1288 Mr. {Epstein.} Congressman, I think we are more
1289 optimistic, we are comfortable. The success of the AWS-3
1290 auction may not be directly transferrable or relatable, but
1291 it is an optimistic and good thing, and we are noticing it
1292 not by any kind of administrative decision that the
1293 commission makes, but by the increased interest of the
1294 broadcasters in participating.

1295 Mr. {Johnson.} Sure.

1296 Mr. {Epstein.} You know, we have a very strong

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1297 broadcaster outreach program, and we are seeing a lot of
1298 interest.

1299 Mr. {Johnson.} Can--and maybe this has already been
1300 asked, and if it has just say so and we will move on. Do you
1301 have any--how did you come up, or how are you coming up with
1302 the calculations on how much spectrum is to be auctioned?

1303 Mr. {Epstein.} It is really a market-based decision
1304 that Congress put before us. We don't have a
1305 predetermination. We have put out a bunch of sample band
1306 plans, but the challenge of this auction and the new
1307 innovative thing that Congress put before the commission is
1308 it is market-based. So we will know how much spectrum when
1309 the broadcasters show up.

1310 Mr. {Johnson.} Okay. Can you be specific about maybe
1311 some of the lessons learned from AWS-3 that can be applied to
1312 this upcoming incentive auction? Mr. Epstein, that is for
1313 you.

1314 Mr. {Epstein.} Okay. There are--one of the lessons is
1315 that, as Roger noted, we have an ongoing proceeding about
1316 play--entities that are considered small businesses, and we
1317 are looking at that issue. We have to see whether there are

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1318 any lessons learned, and the Wireless Bureau and the
1319 commission has said that that will be resolved prior to the
1320 start of the incentive auction. We are looking at some of
1321 the financial results, and seeing whether any of the metrics
1322 we have in the incentive auction should be tweaked and
1323 modified. And I am sure there are other lessons that we will
1324 look at and we will learn from that very successful auction.

1325 Mr. {Johnson.} So is it safe to say that your
1326 experience with AWS-3 informs the agency's actions as you
1327 move forward with this major undertaking?

1328 Mr. {Epstein.} Yes, sir, to some extent, yes, it does.

1329 Mr. {Johnson.} Okay. Mr. Sherman and Mr. Knapp, what
1330 industry initiatives have you encountered that effectively
1331 attempt to use spectrum more efficiently and with less impact
1332 on adjacent users? And you--Mr. Sherman, you can go first.

1333 Mr. {Sherman.} I am not aware of specific industry
1334 initiatives. I know that industry is always working to be
1335 more efficient and do more with less, and are constantly
1336 changing out equip and building more facilities to be more
1337 efficient with their spectrum use, but I would defer to
1338 Juli's expertise on how it happens technically.

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1339 Mr. {Johnson.} Mr. Knapp?

1340 Mr. {Knapp.} Thanks, Roger. As I sit here thinking
1341 about it, we are seeing innovation in--as a result of
1342 flexible rules on multiple fronts. The--on the unlicensed
1343 front, one of the things that doesn't get much attention is
1344 there is spectrum that we have opened up, way up, at 60
1345 gigahertz. You are going to see what I think is a result of
1346 an industry developed standard, new unlicensed equipment that
1347 will be called Y-gig. So it is trying to use spectrum more
1348 efficiently. In the existing unlicensed bands, all of the
1349 development in the standards that have gone from the slower
1350 standards to the more faster and improved products you are
1351 seeing on the shelf has been a progression of industry
1352 initiatives. And on the license front, as we are sitting
1353 here just talking about the success of an auction that has
1354 occurred, you know, we are just moving through 4G, we are
1355 already talking about 5G. And so in--you know, I think
1356 across industry and on all fronts you are seeing lots of
1357 innovation and trying to use spectrum more efficiently for
1358 new services and products.

1359 Mr. {Johnson.} Yeah, you know, as a 30-year IT

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1360 professional myself, one of the questions that continue to
1361 go--goes around in my head, you know, with current technology
1362 there is only so much spectrum. I am wondering what industry
1363 is doing to explore the unknown. You know, how do we create
1364 more spectrum? What is the next big advance in technology
1365 that will get us there? Anybody?

1366 Mr. {Liebovitz.} I will take that. So, you know, I
1367 think there are two big trends to keep an eye on. One is the
1368 densification of the network. So using a spectrum with
1369 smaller and smaller cells, both on the license and unlicensed
1370 size--sides of the equation, so that the spectrum gets reused
1371 more effectively. And the other is, as Juli mentioned,
1372 looking at higher spectrum bands and using new technologies
1373 which I think are mainly have to do with antennas--smart
1374 antennas to focus energy in--using those higher-up bands in
1375 ways that was not practical beforehand. And that--you know,
1376 we are looking at, you know, technologies that can use--that
1377 can produce 10 gigabit speeds in the lab by using very wide
1378 channels, of course, shorter distance. So there are some
1379 really exciting things happening, and that is really the
1380 subject of the 5G--

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1381 Mr. {Johnson.} We could have some great conversations
1382 over dinner but I have run out of time.

1383 Mr. Chairman, I yield back.

1384 Mr. {Walden.} Thank the gentleman for his questions and
1385 comments.

1386 We will now go to the gentlelady from New York, Ms.
1387 Clarke. Thank you for being here and for your participation.

1388 Ms. {Clarke.} Thank you very much, Mr. Chairman. And I
1389 thank the ranking member and our panelists as well.

1390 Mr. Sherman, I wanted to ask, what is the plan to ensure
1391 that broadcasters adequately participate in the auction, and
1392 what incentives are the FCC offering to increase their
1393 engagement? Much of the incentive auction's success is based
1394 on broadcaster participation so that they will in turn
1395 provide the demand for the auction's next stage.

1396 Can you give us some insights there?

1397 Mr. {Sherman.} Sure, I can tell you that we do have a
1398 plan, and we are in the process of implementing it. And Gary
1399 Epstein is leading that effort and I think he can walk you
1400 through a number of the steps the commission is taking.

1401 Mr. {Epstein.} Yes. Thank you very much,

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1402 Congresswoman. Your point is absolutely the most crucial
1403 one. We won't have an auction unless we have broadcaster
1404 participation. And so we have done what we usually do which
1405 is meet with broadcasters and have Webinars and seminars, but
1406 we have taken two special extra steps, and we intend to take
1407 more.

1408 One of those steps is we, in response to requests from
1409 broadcasters, we have released 2 broadcaster information
1410 packages, made them available to every licensee in the
1411 country, and they contain both business information and
1412 estimated pricing information. And that, combined with the
1413 AWS-3 auction figures, has piqued a lot of interest by
1414 broadcasters.

1415 And the second major effort we have undertaken is we are
1416 going around the country on broadcaster information trips,
1417 okay, and visiting, both in general sessions and in private
1418 sessions, we are getting out of Washington, we are visiting
1419 50 cities, we are going around the country and meeting with
1420 broadcasters in order to inform them so that they can make
1421 decisions on whether to participate.

1422 Ms. {Clarke.} Have you begun receiving any feedback as

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1423 of yet? I am concerned about averting any unintended
1424 consequences to smaller, perhaps rural broadcasters, and
1425 maintaining an inclusive and diverse broadcast ownership and
1426 offerings that perhaps repackaging and channel shifting that
1427 is being proposed may inadvertently create some consternation
1428 out there. What kind of feedback are you getting?

1429 Mr. {Epstein.} Congresswoman, an excellent point. We
1430 have gotten a lot of positive feedback from a lot of stations
1431 who are interested in participating in the auction and in
1432 allowing the commission to reclaim their spectrum, and that
1433 is from small broadcasters and large broadcasters alike, but
1434 with some other broadcasters like the broadcasters you are
1435 talking about, there are other options to participate in the
1436 auction, such as channel sharing and going from U to V, which
1437 Congress has as an option in the statute. So what we have
1438 done is we have emphasized those alternatives with these
1439 other broadcasters. They can get proceeds from the auction,
1440 but continue the broadcast even after the action is over.

1441 Ms. {Clarke.} That is good news. Can you share with us
1442 how the FCC proposes to engage in repacking and channel
1443 shifting, and ensure that consumers are adequately informed

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1444 about the impacts?

1445 Mr. {Epstein.} We have learned lessons from the digital
1446 transition, and if you look at the report and order that the
1447 commission adopted in May, there is a whole section on
1448 consumer outreach. And so we have delegated to part of the
1449 commission, the CGB part, the consumer governmental part,
1450 with the responsibility to come up with an overall
1451 comprehensive plan to engage with consumers and make sure
1452 that people do not lose service.

1453 Ms. {Clarke.} Well, on that very point of consumer
1454 outreach, will--that will be necessary to minimize confusion
1455 and disruption of the stations after they are repacked. Is
1456 there any discussion currently at the FCC about how to work
1457 that out logistically?

1458 Mr. {Epstein.} Yes, there is. Okay, there is planning
1459 going on. There was--there is an obligation--a specific
1460 obligation in the commission's report and order for--at the
1461 appropriate time for the commission to come up with a
1462 specific plan. And we are at the beginning stages of that
1463 because the auction is a year away. I don't want to go
1464 beyond that, but it is an important part of our outreach

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1465 efforts.

1466 Ms. {Clarke.} Very well. Thank you very much, Mr.

1467 Chairman, and I yield back.

1468 Mr. {Walden.} Good questions. I thank the gentlelady.

1469 We will now go to the gentleman from Missouri, Mr. Long,

1470 for 5 minutes.

1471 Mr. {Long.} Thank you, Mr. Chairman. I thank you all

1472 for being here today.

1473 Mr. Knapp, I have a story here that appeared in the

1474 publication recode on March the 17th, and I would like to

1475 have that added to the record. And--

1476 Mr. {Walden.} Without objection.

1477 [The information follows:]

1478 ***** COMMITTEE INSERT *****

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|

1479 Mr. {Long.} The first couple of--thank you, Mr.
1480 Chairman. The first couple of paragraphs, he is among
1481 dozens--let us see, John Doe of 123 Jump Street, has some
1482 explaining to do. He is among dozens of questionable
1483 characters in a Federal Government database that is supposed
1484 to keep unlicensed Wi-Fi devices from knocking broadcast TV
1485 signals off the air. There are actually four John Does in
1486 the system, along with six entries for Sue Q. Public of Any
1487 Town, USA, and two from John Q. Public of the ever-population
1488 location None/None. Even a quick look at the database
1489 suggests there is something not quite right. Is there really
1490 a company called Acme at 1600 Amphitheater Parkway, an
1491 address more generally associated with Google, and does Lin
1492 Su really own 59 unregistered--or, excuse me, registered,
1493 unlicensed Wi-Fi devices, or have actual owners simply copied
1494 that name from the installer's guide of the devices that they
1495 bought? The--for instance--well, I gave you those, but is
1496 this--is it possible to go under the--to the white space
1497 databases and enter fake addresses?

1498 Mr. {Knapp.} So I think what we did is we went through

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1499 the databases. We did find the four John Does. It appears
1500 to us that these may have been for testing purposes when this
1501 was rolled out. There are some things, you know, these
1502 databases are cutting-edge, and I think from anything, there
1503 are some things that you can improve upon, and one of them
1504 maybe is the authentication of the individuals that we can
1505 work on with the database providers. But out of roughly 550
1506 records, we only found four John Does and one John Q. Public,
1507 and they are easily taken out.

1508 Mr. {Long.} Okay, so Lin Su--

1509 Mr. {Knapp.} Lin Su is with Acme Company.

1510 Mr. {Long.} Or Sun--excuse me, Lin Sun.

1511 Mr. {Knapp.} Yeah, he is an employee of a company that
1512 makes these products, and so it would not be unreasonable for
1513 them to be testing them at their location.

1514 Mr. {Long.} What is the effect of entering a fake
1515 address?

1516 Mr. {Knapp.} So bear in mind that the way the database
1517 works, the device can't operate because it has to get the
1518 available channels from the database. The database was a
1519 tool to just help us locate it--a source of interference if

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1520 it occurred. Even if the information wasn't right, we could
1521 still find the interference and take enforcement action if we
1522 needed to.

1523 Mr. {Long.} Well, is requiring GPSs for fixed white
1524 space devices, would that fix it?

1525 Mr. {Knapp.} So the things that were referred to were
1526 things like a phone number wasn't right, or the--there was an
1527 incomplete email address. So it--these weren't incorrect
1528 locations, so just having the GPS location alone is not going
1529 to address some of these other issues. But we are working
1530 with the database providers to make sure that you can't enter
1531 in something that is just erroneous.

1532 Mr. {Walden.} Would the gentleman yield?

1533 Mr. {Knapp.} Yeah.

1534 Mr. {Walden.} Mr.--

1535 Mr. {Long.} Yes.

1536 Mr. {Walden.} How will closing so many field offices
1537 help deal with interference issues in a timely manner?

1538 Mr. {Knapp.} So the restructuring of the field offices
1539 that is being contemplated, at the same time we would be
1540 looking at alternative ways that we could more effectively

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1541 get out and locate and diagnose the interference cases.

1542 There are tools that are available now to actually have

1543 sensors in place and do the outreach, and I think we are also

1544 looking at things like tiger teams that we could sent out

1545 when we had an interference case. So we are mindful of that

1546 in that exercise as well. And, of course, it is pending with

1547 the commissioners.

1548 Mr. {Walden.} Thank you. I yield back the chair--Mr.

1549 Long.

1550 Mr. {Long.} And I yield back also, Mr. Chairman.

1551 Mr. {Walden.} Gentleman yields back.

1552 We will now go to Mr. Rush, it appears is next. We are

1553 glad you are here and--

1554 Mr. {Rush.} Good morning.

1555 Mr. {Walden.} --please go ahead.

1556 Mr. {Rush.} Thank you, Mr. Chairman. And I certainly

1557 want to welcome the witnesses.

1558 I must be quite frank, I sit here as an angry, black

1559 American male. We are all aware of the scarcity of spectrum,

1560 and we just witnessed a successful AWS-3 auction where again

1561 the millionaires were able to buy up valuable so-called

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1562 beachfront property. And soon we will be witnessing another
1563 auction, the broadcast incentive auction where it seems as
1564 though, unless something drastically changes, we will have a-
1565 -the same outcome.

1566 I have been on this subcommittee--on this committee for
1567 22 years, and 20 years I have sat on this subcommittee. I
1568 was a part of the subcommittee that worked on legislation to
1569 grant the FCC its competitive bidding authority back in 1993.
1570 I was here, I was present, sitting in these very same seats.
1571 And all the major auctions, going all the way back to the C
1572 block auction, H block auction, the AWS-3, and seem to be
1573 ill-designed to enable small and minority businesses to bid
1574 and to win.

1575 The question still looms large for the FCC. In light of
1576 the abysmal failures of these last three auctions, to be fair
1577 and equitable to minority and small businesses, what can you
1578 say to us this very morning that can assure us that this next
1579 auction will give us an opportunity for small and minority
1580 bidders to fair better and to have different and better
1581 outcomes? Again, in my opinion, where some might say these
1582 auctions have been successful, success is in the eye of the

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1583 beholder, and from my vantage point, my eyes, my
1584 constituents, they are an abysmal failure. Reassure me
1585 please if you can.

1586 Mr. Chairman, with that, I think that we ought to really
1587 have some hearing in the future on the status of these
1588 auctions as it relates to the minority and small business
1589 bidding process isn't fair and equitable, some time in the
1590 near future.

1591 With that, I will ask the--Mr. Epstein, maybe you can
1592 answer the question that I have.

1593 Mr. {Sherman.} Thanks for that question, Mr. Rush.
1594 This is a priority for the commission, and last year the
1595 commission issued a notice of proposed rulemaking to focus on
1596 the issue of empowering small businesses, including
1597 businesses owned by women and minority groups. It is--the
1598 notice of proposed rulemaking recognizes that the wireless
1599 industry has changed dramatically since the rules were last
1600 updated, and that our current rules may not work anymore to
1601 get people into the business. And so what it proposed,
1602 through a number of specific proposals, was allowing more
1603 flexibility and maybe looking at business models to--updating

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1604 business models to reflect the reality that 95 percent of
1605 wireless consumers are served by four carriers. How do you
1606 allow--in such a capital-intensive business, how do you allow
1607 small entities to get into the market, and how do you allow
1608 them to acquire spectrum? That has been teed-up.

1609 In the interim, we had AWS-3 which also raised a number
1610 of questions about the designated entity program and bidding
1611 practices. So just this week, Chairman Wheeler circulated
1612 with the other commissioners a public notice asking a number
1613 of additional questions about this issue; how do we promote
1614 and empower small businesses while preserving the integrity
1615 of the auction process. And it is open, and once that is
1616 voted on by the commissioners, there will be an additional
1617 comment period. And it is something that we are going to
1618 wrap up before the incentive auctions start. So there are
1619 proposals on the table. There is a vigorous debate in the
1620 record by various stakeholders.

1621 One of the things that was in the notice of proposed
1622 rulemaking was a proposal that has been put forth by a number
1623 of groups that have been active in the designated entity
1624 space. I think it was MMTC that had a proposal about the

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1625 attributable material relationship rule, and one of the
1626 proposals was to change the way we apply that so that a small
1627 company that might have a business relationship with a big
1628 company isn't automatically excluded.

1629 These are complicated issues, and we need to make sure
1630 we do them in a way that doesn't allow for gaming of the
1631 system, but these--all of these topics are on the table.

1632 Mr. {Walden.} Gentleman's time has expired.

1633 Mr. {Rush.} Thank you, Mr. Chairman.

1634 Mr. {Walden.} Thank the gentleman.

1635 We will go now to the gentleman from North Dakota, Mr.
1636 Cramer.

1637 Mr. {Cramer.} Thank you, Mr. Chairman. I thank the
1638 witnesses.

1639 And I just--I am just going to throw it out for
1640 discussion because I have to admit, you might have to bring
1641 it down a level or two for me to really grasp this. But one
1642 of the things--I come from one of these rural places, yeah.
1643 You can make it 19 now if you--I don't know we lost, but
1644 anyway it is--North Dakota is very rural, right, and so my
1645 small market, you know, broadcasters have expressed, of

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1646 course, this concern about, you know, the repacking cost.
1647 And we have talked about whether \$1.7 million is inadequate
1648 and whether you need more, and where it would come from, and
1649 that has been fascinating, but my question more is a step
1650 even further back, and that is if a small market TV
1651 broadcaster, for example, in Fargo declines to participate,
1652 how--can we be assured that they then won't have to also then
1653 participate later in the repacking? I mean in other words,
1654 hear conflicting messages about that, so somebody really
1655 smart explain to me how either we avoid that, or secondly,
1656 what do we do to mitigate it?

1657 Mr. {Epstein.} Well, I won't claim to be real smart, I
1658 will defer to Juli on that.

1659 Mr. {Cramer.} I have set the bar very low, just so you
1660 know.

1661 Mr. {Epstein.} But let me start and Juli can pick up.

1662 Mr. {Cramer.} Sure.

1663 Mr. {Epstein.} What we are seeking to do in the--in
1664 this auction is to have a near nationwide contiguous band of
1665 spectrum, and that is the key, so that when you have your
1666 cellphone and you move from Fargo to New York, to New Jersey,

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1667 or anywhere else, it works.

1668 Mr. {Cramer.} Yeah.

1669 Mr. {Epstein.} And so if we--so two things have to
1670 happen. One, we have to get volunteers, stations to
1671 participate in the auction, especially in crowded areas, but
1672 in some smaller markets too. And then everywhere, if we
1673 cleared down from channel 51, and a station even in a rural
1674 market is at channel 47 or channel 46, we won't get that
1675 contiguous band of spectrum unless we repack them--

1676 Mr. {Cramer.} Um-hum.

1677 Mr. {Epstein.} --even though we may have room to do
1678 that. And what that--Congress did--what you did in the act
1679 is you said, yes, we have the authority to repack it, but we
1680 have to repay your expenses.

1681 Mr. {Cramer.} Um-hum.

1682 Mr. {Epstein.} And that is just from an overview
1683 standpoint why somebody in a smaller market would have to
1684 move. So we have this contiguous band of spectrum for the
1685 wireless providers in the forward auction.

1686 Mr. {Cramer.} Thank you for that very nice
1687 clarification.

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1688 Then that does bring up the rest of the questions that
1689 we have already tried to sort of ask, and that is how much is
1690 enough, and if it is not enough, how do we do it differently,
1691 but I suspect we are going to continue discover that through
1692 this process. But thank you for that 101 for the guy from
1693 North Dakota.

1694 With that, I yield back, Mr. Chairman.

1695 Mr. {Walden.} Thank the gentleman.

1696 And we will now go to Mr. Butterfield for questions.

1697 Mr. {Butterfield.} Thank you very much, Mr. Chairman.

1698 Looks like we are getting very close to votes and so I am
1699 going to forego some of the formalities that I normally would
1700 go through in the early part of my remarks, and get right to
1701 the meat of the point that I want to make.

1702 Let me just begin by associating myself with the remarks
1703 made by my good friend, Mr. Rush, from Illinois. I agree
1704 with him completely. I am the chairman of the Congressional
1705 Black Caucus, and the CBC takes the position that Mr. Rush
1706 just articulated a few moments ago.

1707 One of our top priorities in the CBC is to increase a
1708 representation of African-Americans at all levels of

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1709 corporate America. That includes the Boards of Directors,
1710 that includes executive leadership, the workforce, vendors,
1711 contractors, and even community reimbursement. And so the
1712 CBC will not only be focused on increasing diversity in
1713 general, but we are focused on African-American
1714 representation in particular. So this is not only about
1715 spectrum, this is about corporate diversity as well.

1716 And so it is in this context that I want to ask, I guess
1717 Mr. Epstein, the following question about diversity and
1718 specifically how it relates to the companies who come before
1719 the commission for a variety of matters, including those who
1720 seek to acquire spectrum. As chair of the CBC, and as a
1721 member of this committee now for 22 years, one of my
1722 priorities is to encourage companies to have both leadership
1723 and rank and file employees who better represent the makeup
1724 of their communities and their customers and our country.
1725 However, when you look closer at many of the entities that
1726 come before your commission, they do not have a very good
1727 diversity profile. That is just a fact, they do not have a
1728 good diversity profile in either the internal or external
1729 operations. And so I am wondering, how do you and other

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1730 members of the panel today think we can better address the
1731 lack of diversity in the companies that are competing for
1732 spectrum?

1733 Mr. {Epstein.} Okay. Well, let me start. My specialty
1734 and what I do 24/7 is the incentive auction, and to focus on
1735 the--your questions and Congressman Rush's questions, it is
1736 the proceeding--the general proceeding that Roger Sherman
1737 talked about, okay, where we are looking very seriously about
1738 any--generally, in auctions throughout the commission, and
1739 specifically, with respect to the incentive auction, how do
1740 we do exactly what you are talking about. How do we increase
1741 diversity? We have done things like have smaller geographic
1742 areas, and we are looking at the bidding issues which Roger
1743 talked about, but specifically with the incentive auction,
1744 those are some of the initiatives that we are undertaking.

1745 Mr. {Butterfield.} But you do acknowledge the lack of
1746 diversity.

1747 Mr. {Epstein.} We acknowledge the need for small
1748 business and diversity. This commission does, yes.

1749 Mr. {Butterfield.} Yes, all right. All right.

1750 In the interest of time, Mr. Chairman, I am going to ask

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1751 unanimous consent to enter into the record a letter regarding
1752 the FCC's designated entity program, and the letter was
1753 written to you and Ranking Member Eshoo--

1754 Mr. {Walden.} Yes.

1755 Mr. {Butterfield.} --on March 25 by the National
1756 Association of Black Owned Broadcasters. I ask--

1757 Mr. {Walden.} I--

1758 Mr. {Butterfield.} --to put it in the record.

1759 Mr. {Walden.} I have read the letter. Without
1760 objection, it will be entered into the record, sir.

1761 [The information follows:]

1762 ***** COMMITTEE INSERT *****

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|

1763 Mr. {Butterfield.} Thank you. I yield back.

1764 Mr. {Walden.} And I appreciate the gentleman.

1765 And will now move on to Mr. Shimkus of the great State
1766 of Illinois.

1767 Mr. {Shimkus.} Yeah, thank you, Mr. Chairman. It is
1768 great to have you all here, and we are getting--as you know,
1769 getting close to getting out of town. So, Roger, welcome
1770 back. It is good to see you.

1771 And the points raised by my two colleagues, Mr.
1772 Butterfield and Mr. Rush, you know, just brings me to, you
1773 know, we have--a lot of us extolled the success of the AW-3
1774 auction, everybody being pleased. Obviously, we find out not
1775 everyone is pleased, and that there are bidding rules in this
1776 process. Have--has the FCC done an after-action review on to
1777 do a lessons learned, and can you say everyone is pleased?
1778 You know, in an auction, I think there are disappointed
1779 people, right, if they don't win the auction, but are there--
1780 does anyone storm away angry, that they felt that the bidding
1781 rules may not have been adequately exercised?

1782 Mr. {Sherman.} Well, the way the process works, after

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1783 the auction we always do an after-auction review of things,
1784 and in fact, as the auction was ongoing I mentioned this
1785 proceeding that we were asking for comments on updating the
1786 competitive bidding rules. We were watching the auction
1787 develop, and we thought there might be some lessons learned,
1788 so we, on our own motion, delayed the comment period 3 times
1789 to make sure people had a chance to bring in lessons that is
1790 all public from bidding activity, that they may want to enter
1791 into the record. And I mentioned Chairman Wheeler circulated
1792 something earlier this week asking additional questions about
1793 that specific issue. There are 2 tracks. That is 1 track,
1794 the sort of forward-looking rulemaking, and what changes or
1795 tweaks we might consider in response to what happened in the
1796 auction to empower small business and make sure nobody is
1797 getting an unfair advantage through the rules through
1798 technicalities. I am not saying that occurred, but those
1799 were the questions.

1800 The other track is to evaluate the applications from the
1801 winning bidders. And a number of the winning bidders applied
1802 for a designated entity credit, and the commission has a
1803 longstanding process whereby we evaluate those requests. We

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1804 put them out basically for comment and for people who might
1805 object to weigh-in and file a petition to deny. We haven't--
1806 I am not aware of any petitions to deny being filed yet,
1807 although we have not completed our review where we put them
1808 out for public comment. We are doing that, but it is a very
1809 time-intensive process because these applications are
1810 complicated, and we want to make sure we are being very
1811 thorough.

1812 Mr. {Shimkus.} Yeah, because this broad--the whole--now
1813 moving into the broadcast debate with the next round, it is
1814 kind of different. It is almost regional, the old UHF, now
1815 the 600 megahertz, and then how do you cobble that together,
1816 which raises issues of package bidding and other ways to try
1817 to put together something that makes sense to different
1818 entities. So I think an after action review on the success
1819 or that issue will help us as we move forward. I just find
1820 it very interesting. A lot of new members on the committee.
1821 I have always said, you know, you have heard me say--you all
1822 have heard me say, you know, the great thing about this
1823 subcommittee is really technology moves faster than we can
1824 regulate. And then you all have to be involved in trying to

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1825 mitigate the interference issues or some of the complexities,
1826 but it--that--this is probably the greatest example of free
1827 and open market competition, and the ability for great minds
1828 to do great things, and--that I have, you know, experienced I
1829 think in any other area. So I enjoyed that.

1830 And final question, really directed to Roger again, is
1831 these, you know, the fragmented management process between
1832 the FCC and the NTIA on spectrum. Is there any--ever talk
1833 about how we get that all cobbled together where, when we
1834 have hearings, we are dealing with 1 and maybe not 2, and the
1835 different processes?

1836 Mr. {Sherman.} Well, I will make an observation, and
1837 then I would defer to John and Juli who spend a lot of time
1838 with the agencies and NTIA, but in my experience since I have
1839 been at the commission, the relationship with NTIA is great,
1840 and there is a lot of collaboration and coordination going
1841 on, everybody moving towards the same goal. I know John and
1842 Juli have been engaged for years, and everybody sort of has
1843 their responsibilities under the respective statutes, but I
1844 think it is all working towards getting more spectrum out
1845 there.

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1846 I don't know if John or Juli have anything to add to
1847 that.

1848 Mr. {Knapp.} No, just ditto to everything that Roger
1849 said. We know that there is--our responsibilities overlap,
1850 and that we have to work together for the good of the
1851 country, and that is what we try to do.

1852 Mr. {Shimkus.} There is no--or issues that--duplication
1853 that--in this process?

1854 Mr. {Knapp.} I don't think so much duplication because
1855 they got different systems that they are overseeing,
1856 military, justice, et cetera. What we try to do through a
1857 lot of good work, both formally and informally, is break down
1858 the barriers.

1859 Mr. {Walden.} All right.

1860 Mr. {Shimkus.} Great.

1861 Mr. {Walden.} Gentleman's time has expired.

1862 Apparently, we have had votes on, I am sorry, I didn't
1863 realize we were to that point. There are 6 minutes left, but
1864 we will--I will be happy to go to--

1865 Mr. {Collins.} Yeah.

1866 Mr. {Walden.} --the--Mr. Collins.

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1867 Mr. {Collins.} Mr. Chairman, I appreciate that. Mine
1868 may only take 30 seconds. It is for Mr. Epstein.

1869 I represent Buffalo and then the Rochester area. Our
1870 broadcasters, many of the Canadians, are getting our signal.
1871 And in spending 24/7 on the spectrum, I hope that includes
1872 some time on border coordination. And I just wondered where
1873 do we stand on border coordination specifically between the
1874 U.S. and Canada, and when do we anticipate an agreement being
1875 reached?

1876 Mr. {Epstein.} We have been working on this for a
1877 couple of years. It is really important that we do this. We
1878 have been working with Industry Canada, we have had meetings
1879 almost weekly with them. We were most pleased by about 4
1880 months ago they put out a ban plan which was analogous to our
1881 ban plan, and we are hopefully getting reasonably close.
1882 They have just got comments in what they call a consultation,
1883 which is like our rulemaking, where it is to our mutual
1884 benefit to reach agreement--

1885 Ms. {Eshoo.} Um-hum.

1886 Mr. {Epstein.} --because it gets--we will get spectrum
1887 on both sides of the border and coordination. And we are

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1888 hoping well before the auction, within a matter of months, we
1889 will be able to reach--that is our goal.

1890 Ms. {Eshoo.} Yeah.

1891 Mr. {Epstein.} Can't promise it will happen because it
1892 is a sovereign country--

1893 Ms. {Eshoo.} Right.

1894 Mr. {Epstein.} --but that is our goal.

1895 Ms. {Eshoo.} Would the gentleman yield just for a
1896 moment?

1897 Mr. {Collins.} Yeah, certainly.

1898 Ms. {Eshoo.} One of the questions that I didn't get to
1899 ask was what you just raised, and it was an issue that Mr.
1900 Dingle raised over and over again. So we will get a written
1901 response and I will share that with you--

1902 Mr. {Collins.} We--yeah, we appreciate that.

1903 Ms. {Eshoo.} --when we get it. Thank you.

1904 Mr. {Collins.} I mean as bad as the Buffalo Bills are,
1905 the Canadians still watch our team play.

1906 Mr. {Walden.} Wow. You may want to revise and extend
1907 those remarks.

1908 We will go now to Mrs. Ellmers for final questions.

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1909 Mrs. {Ellmers.} Thank you, Mr. Chairman. Thank you to
1910 our panel. And I apologize for coming in late, so if the
1911 questions I ask have already been answered, if you can just
1912 indulge me.

1913 Mr. Knapp, the commission looks at the 3.5 gigahertz and
1914 the 600 megahertz unlicensed bands. With the commission--
1915 will the commission be placing any new restrictions on
1916 unlicensed users?

1917 Mr. {Knapp.} I don't think it in terms of placing new
1918 restrictions, it is just we will develop a framework that
1919 will include the technical standards to make sure that
1920 everything works together without interfering.

1921 Mrs. {Ellmers.} Okay. Thank you, Mr. Knapp.

1922 Mr. Liebovitz, the subcommittee has heard time and time
1923 again about the value of innovation and experimentation
1924 within the unlicensed technologies. We have had--we have all
1925 been concerned that the mantra innovation without permission
1926 be applied to improve all aspects of connectivity. Is the
1927 commission planning to prohibit the use of LTEU in any
1928 unlicensed bands?

1929 Mr. {Liebovitz.} The answer is no at this time. We are

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1930 working with the parties and trying to ensure that people

1931 talk to each other so that the technical--

1932 Ms. {Ellmers.} Um-hum.

1933 Mr. {Liebovitz.} --issues don't become something that

1934 needs any involvement from the Government.

1935 Mrs. {Ellmers.} Great. Well, thank you. My work is

1936 done, and I yield back the remainder of my time.

1937 Mr. {Walden.} Appreciate that.

1938 I recognize the gentlelady from California.

1939 Ms. {Eshoo.} Thank you, Mr. Chairman. Thank you to the

1940 panel. Mr. Chairman, I would like unanimous consent to place

1941 this in the record. It is--I asked the question about

1942 competition, and this is--are the results of who did what

1943 AWS-3 auction. Thank you.

1944 Mr. {Walden.} Is this--without objection.

1945 [The information follows:]

1946 ***** COMMITTEE INSERT *****

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1947 Mr. {Walden.} That will be entered into the record.

1948 And with that, I thank the witnesses for being here

1949 today, and the good work you do at the FCC. We appreciate

1950 it.

1951 And we are adjourned.

1952 [Whereupon, at 11:54 a.m., the Subcommittee was

1953 adjourned.]