THE BROOKINGS INSTITUTION

BRIDGING THE DIGITAL DIVIDE: SPECTRUM POLICY, PROGRAM DIVERSITY AND CONSUMER RIGHTS

Washington, D.C.
Thursday, May 5, 2011

PARTICIPANTS:

Introduction and Moderator:

DARRELL WEST
Vice President and Director, Governance Studies
Director, Center for Technology Innovation
The Brookings Institution

Panelists:

UZOMA ONYEIJE
President
Onyeije Consulting LLC

MATTHEW HUSSEY
Legislative Assistant, Senator Olympia Snowe
United States Senate

CHRISTOPHER ORNELAS
Vice President and Chief Strategy Officer
National Association of Broadcasters

CHRISTOPHER GUTTMAN GUTTMAN-MCCABE
Vice President of Regulatory Affairs
CTIA

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P R O C E E D I N G S

MR. WEST: Okay. If we could have your attention, we'd like to get going. First of all, we'd like to thank you all for coming out. I'm Darrell West, Vice President of Governance Studies and Director of the Center for Technology Innovation at Brookings. I'm pleased to welcome you to this forum on spectrum policy.

This is the third forum in our series on spectrum. We did an event on this topic last fall, had a very good audience and lots of interest in that event. We did another one a few weeks ago, and it was very well attended. And today we have had lots of interest in this subject.

And we all know that the issue of spectrum is one of the most contentious issues in the technology and telecommunications areas. Most experts acknowledge a need for a more efficient and effective spectrum system. My colleague, Adele Morris, actually has co-authored a technical paper explaining ways to do this through more efficient use of existing spectrum and white space.

But as we also know, there are tremendous divisions in terms of how to do this, where the end use spectrum should come from, and what the government should do to narrow the digital divide between information haves and have-nots.

Wireless broadband is growing at a rapid rate. There's been a huge growth in terms of smart phones and people using mobile devices for communications, health care, public safety, education, and energy. There are competing claims between broadcasters, Internet providers, new application developers, public safety officials, and the Defense Department. And that's just a short list of the parties interested in this topic.

So, today we are hosting a conversation to discuss ways to move forward. How should access options be reformed? What is the impact on consumers?

How do we ensure innovation and program diversity?

We're pleased to welcome several distinguished people to this panel. Matthew Hussey is legislative assistant to Senator Olympia Snowe. He works closely with the Senator on spectrum issues, and is basically knee deep -- or maybe neck deep -- in the spectrum issue right now.

Christopher Ornelas is executive vice president for strategic planning for the National Association of Broadcasters, and that, of course, puts him right in the middle of the spectrum debate as well.

Christopher Guttman-McCabe is vice president of regulatory affairs at CTIA, the wireless association, and he's worked on a wide range of issues involving spectrum and regulatory affairs.

And Uzoma Onyeije is president of Onyeije Consulting, and he's also a former FCC broadband legal advisor to the Wireless Telecommunications Bureau under Chairman Michael Powell.

So, I'd like to start with Matthew. And, of course, you are in the Senate, on the staff. So, I'd like to get your sense or just what you think the most pressing needs are in the spectrum area and how we should address them legislatively.

MR. HUSSEY: Okay. Well, thank you very much, and I got to say I feel kind of like Admiral Stockdale at the '92 vice presidential debate given the broadcasters and CTIA are here. So, thank you very much for affording me the opening remarks. I at least get something in.

But certainly the Senator has taken a strong interest in spectrum policy because of just the amazing benefit, the balance benefits, that exist through wireless communications and just wireless services in general. And it's one of those things mainly

because she's from a rural state, wireless can increase accessibility, productivity, and communications. So, it's absolutely critical.

And just an amazing innovation that has occurred over the past decade in the wireless space is just nothing short of fascinating, to be quite honest. One of the things I like to say is we all talk about the number of worldwide Internet users, which are about 1.7 billion, maybe 1.8 billion Internet users worldwide. Well, there are over four billion wireless subscribers. So, it just shows you, I mean, wireless communications is the fastest growing sector in ICT, information communications technologies.

So, it's one of these things that is absolutely vital to developing countries and also to developed countries. And because of that growth, the Senator is also, though, cognizant that the framework that we currently have is somewhat archaic and that it needs to be updated. And that's why she has called for comprehensive spectrum policy reform for over the past two years, since the introduction of the Radios Spectrum Inventory Act, which was introduced with Senator Kerry back in March 2009.

So, that's really the crux of what she believes is necessary, is a comprehensive, multi-faceted approach to properly address this issue to meet the growing demands for spectrum that all stakeholders are using, are needing actually, not just wireless broadband, but also other non-federal entities. And also federal entities are needing greater spectrum resources to meet the changing demands in their services and what they're providing to, whether it be citizens or con

So, we have to really take that approach. And the Senator has been slightly concerned about the almost singular focus, if you will, on incentive auctions because it will only provide a fraction of what is needed to meet the long-term growth needs of the stakeholders involved.

And so, she actually just wrote a letter April 25th to the chairman, a continuation in the correspondence that they've had, asking for more detail on incentive auctions, but also stressing the need for a comprehensive approach to look at other opportunities to explore, and also taking the fundamental first step of a comprehensive inventory. It does not have to be sequential to bestowing incentive auction authority, but it's still something that is absolutely critical for moving forward with doing spectrum measurements, more robust spectrum management, such as reuse and sharing, and then also fostering greater innovation in the technologies that provide the foundation for wireless communication.

So, it's one of those things that is absolutely critical, and hopefully we can start having a more in depth dialogue on all these other issues that are necessary to address this, because the concern that the Senator has is if we just continue to focus on incentive auctions, we may fall very short in providing the whole suite of tools that both the FCC and NTI need to properly address this issue, because we hear incentive auctions, hear incentive auctions. So, Congress sometimes has a very short-term memory. They'll just pass on this, say, hey, we're done, and move on to the next issue, because there's such a whole litany of issues that are so pressing right now. And time is kind of short, to be quite honest, and so, hopefully we can have a much more constructive dialogue. I know that there's been a lot of back and forth, kind of a he said/she said, and unfortunately that is not conducive to a constructive dialogue in the legislative process and effort. So, hopefully, again, we can have a more in depth dialogue on what comprehensive spectrum reform is needed.

MR. WEST: Okay, Matthew. I think you've already exceeded the standard set by Admiral Stockdale. You're off to a great start.

Christopher Ornelas, you work for the broadcasters. What do you think is the best way to enhance and breadth of consumer access to digital technology?

MR. ORNELAS: So, I don't get my five minutes?

So, if the question is how do we increase access to digital technology for all Americans, I think you have to obviously start with a consideration of how to increase broadband in this country.

I was on the Hill for a number of years with Senator Smith prior to coming to the National Association of Broadcasters, and this is one issue that we studied quite closely in the 2006 rewrite. And it seemed to me at the time, and maybe the metrics have changed, that the way that you increase broadband adoption and deployment is by reaching the last eight percent or so in rural America who have no access or very limited access to broadband, and also at the same time drive adoption in the inner cities and in the metropolitan areas where broadband consumers may have as many as three or four broadband providers. So, if the question is how do we increase consumers' access to digital technology, I think that the roadmap has to be focused on increasing those two metrics.

I would note that in terms of the last eight percent in rural communities that currently don't have access to broadband, that there is a universal service fund that can be accessed to encourage deployment of broadband rather than plain old telephone service. And with respect to the metropolitan areas, I think the question is one more of adoption. I think Matthew would be in a better position to opine on this than I, but I think the adoption rate is somewhere around 40, 50 percent in the larger metropolitan areas.

So, as you think about the spectrum issue, the question that I've often asked is, how does allocating more spectrum in the top 25 markets or so necessarily

move the needle on either deployment to the last mile in rural America or make the value proposition such that more people will adopt in the metropolitan areas?

MR. WEST: Christopher Guttman-McCabe, you suggested that the federal government needs to ensure that more spectrum is brought to market and that auctions represent the best way to do this. How should these auctions work?

MR. GUTTMAN-MCCABE: Darrell, thank you and thank you to Brookings for having me here.

From our perspective, the way we look at this sort of broadband equation, we agree with Christopher that part of the goal should be to drive adoption and drive deployment to that remaining eight percent or whatever number, whatever you think the number is.

We also think in this space that you should continue to drive the innovation and the evolution of the wireless networks that we've seen in the last two years. And so, we look at a spectrum policy in sort of a holistic view, as Matthew had suggested and the Senator suggested. We look at it as extremely important, that it can't just be about incentive auctions. And yet, we believe that incentive auctions need to be a very key element of any plan going forward. The purpose is to find areas where spectrum is being unused or under used and repurpose it for broadband use. As Matthew suggested, there's been a lot of back and forth between CTIA and NAB, and you have an NAB representative here, and Uzoma, who recently wrote a paper for NAB. So, that debate has continued even through yesterday.

But I think it's almost silly to suggest that wireless isn't exploding and wireless won't be part of the solution to the digital divide. If you look at, I mean, just about anyone -- Mary Meeker did some interesting slides recently on the explosion in

iPads and compared the adoption in the first three quarters of the iPad to the iPod and the iPhone, and the iPad exploded comparatively, 14 times the growth in the first three quarters of those two other devices.

And so, we look at tablets and we look at smart phones as being a key part of the solution to driving adoption in that key last eight percent. And particularly if you go back and you look at some of the Pew statistics, and Pew has done a great job over the last half dozen years tracking some of this. But the adoption and usage in the African-American and Hispanic communities dramatically outpaces the adoption and usage in the Caucasian space, which I found amazing.

Additionally, they did a great report last year where they looked at 12 different uses of mobile smart phones, things like taking pictures, and web searches, and downloading videos, and access to different types of content. African-Americans and Hispanics used all 12 of those different services or applications to a greater degree than Caucasians. And so, when I do look at that last eight percent, I do believe that wireless will help drive adoption in that space.

I also believe you've got to make sure that you're facilitating the innovation that you're seeing in this space and the U.S. leadership. And I don't think there are too many areas in the tech space in our country where you can say the U.S. is driving that sector, and yet, in the wireless space you can. We have the first sort of wholesale 4G networks. The handsets are being launched first here in the United States, and it's clearly the center of the apps world.

So, what I would say is getting spectrum to market, and right now the mechanism is auctions. We believe incentive auctions will help to facilitate the relocation. But getting spectrum to market, having it be a significant focus, at least in the beginning,

on licensed will be key to help hit that eight percent, but help also facilitate continued innovation in the wireless space.

MR. WEST: Okay. Uzoma, you wrote a report saying the FCC national broadband plan has overstated the need for wireless spectrum, and that our capacity is not as limited as claimed. Could you explain how you reached those conclusions, and also what you think we need to do in order to move forward in this area?

MR. ONYEIJE: Thanks, Darrell. It's great to be here.

I wrote my paper with a pretty simple thesis in mind, and that is that before federal legislation takes place, and before we move down the road of incentive auctions, we should simply make sure that we have all the data that we need to make a great decision. And there can be no doubt that there has not been sufficient data to make the decision. When you make a decision and you back fill the data, that's not a good thing.

So, my paper simply points out what I believe is a pretty simple premise, that you have to take a look at your assumptions, because a lot of the data is based on assumptions. You have to take a look at other alternatives that are available in the marketplace, and you have to proceed on that basis.

Now, one of the things that I think is very important is to make sure that when you start analyzing data that there isn't missing pieces, or that you shouldn't just say, well, we're going to take that for granted. So, I've heard what Chris had to say, and Chris and I have known each other for a very long time. We were associates together a long, long time ago. Remember that, Chris?

MR. GUTTMAN-MCCABE: I do. Fond memory.

MR. ONYEIJE: Fond, fond memory. And I will tell you that every single

thing that Chris said was talking about demand. You just heard his statement. He constantly was referring to demand, demand, demand. And, in fact, he said it would be silly to suggest that demand isn't exploding. Well, no one is suggesting that, Chris. What I am suggesting is that you cannot have a discussion about demand without sufficiently talking about supply.

I will tell you that sea salt demand has exploded in the last few years. But thank God the world is covered with oceans and there will never be a problem with supply. So, I think that's what I'm trying to get to. We need to make sure that we have a full analysis that covers all the bases.

And I pointed out some things that simply have not been analyzed by the commission. And I think it's important, especially in light of the fact that incentive auctions require congressional action. There's no reason to rush down this road without doing sufficient data gathering.

MR. WEST: So, Christopher Guttman-McCabe, since Uzoma mentioned you and your long and friendly association, I just wanted to give you a chance to respond.

MR. GUTTMAN-MCCABE: Sure. So, I think in Washington we have a tendency to have paralysis by analysis. And so, we could continue to analyze sort of what each individual carrier spectrum position is. We could continue to analyze data demand. We could assume that CODA research and Cisco, and Informer, and Yankee Group, and Gartner, and Merrill Lynch, and Kleiner Perkins, all are part of a global conspiracy to have the carrier spend billions of dollars on spectrum that they're not going to use.

The way I look at it is we've got a window here to drive incentive auction. If broadcasters do not want to participate, they don't. It's pretty straightforward. And

what we're asking for simply is the mechanism to reallocate that spectrum if the broadcasters want to participate.

In terms of usage, if the U.S. has gotten it wrong, then so has Japan, and Germany, and the United Kingdom, and Italy, and Spain, and Canada, and South Korea. Every one of those countries has identified and allocated hundreds of megahertz of spectrum in the last two years to their mobile environment. We have 50 megahertz at most in the pipeline, and that can't be brought to market.

So, I understand the strategy of trying to delay. Uzoma has authored a paper that I think is designed to facilitate that strategy of delay. And I hope that Matthew and the Senator and others recognize that and recognize that there needs to be a comprehensive -- at the same time that we're working with Congress and NAB and others to try to identify spectrum on the commercial side, we spent weeks with NTIA on the government side trying to identify spectrum there that can be reallocated. And we spent time with the White House and others.

So, to me you could suggest that the carriers have enough or don't have enough, and yet I would say the worldwide data points to the need to bring spectrum to market.

MR. WEST: Christopher? The other Christopher.

MR. ORNELAS: Well, there are a number of issues that Christopher laid out there, and let me unpack it a little bit.

First of all, I think it's important to note in this room that which the broadcasters have been saying since day one, which is, we don't have a problem with incentive auctions that are truly voluntary. The question becomes how you define voluntary. If there are folks that have decided that it's no longer in their business interest

to continue broadcasting and they want to sell their spectrum back to the U.S. government, we don't have a problem with that.

The issue is really, when we have a broadcasting service that continues to serve upwards of 40 million plus viewers every single day and providing them with news, local public affairs programming, and access to vital emergency information during times of natural disaster, the issue is, in repacking the folks that want to continue to provide that service in local communities, how we ensure that in repacking those folks that we minimize the viewer disruption and the folks that will lose service or lose access to those vital services. So, that's the first issue.

The second issue is the one of delay. I don't think it's a delay tactic if the notion is that there is an emergency that requires immediate action on incentive auctions because the amount of spectrum that's available for broadband purposes is quickly drying up. I don't think it's a delay tactic to ask how that spectrum is presently being used. I think it's sound policy, in fact, to find out exactly what's being used by whom and how before you move forward in a way that may irreparably damage a service that has been near and dear to American viewers for decades.

Remember, once we go down this road, and once we reallocate this spectrum, and once broadcasters decide that they don't want to broadcast anymore, and once our broadcasters who do want to continue to provide service are repacked in a potentially discriminatory way, once that happens, there's no going back. We get one bite at this apple.

So, I think our position is we're there. We're happy to engage. We want to be part of the solution, a solution that includes both broadcast and broadband. But we want to do it in a methodical way that protects all the interested parties.

MR. WEST: Do we have a sense of how much of the broadcast spectrum is underutilized?

MR. ORNELAS: I'm sure Christopher does. Underutilized is kind of a pejorative term, I think. If the question is how much of our spectrum isn't presently being used to deliver programming to the American public, I would say it's close to zero. We have six megahertz for each channel, and our broadcasters in most instances are using it to its fullest capacity. In fact, I'll share with you a recent trip that I took. One of the nice things about my job at the NAB is I get to leave Washington on occasion and actually meet with real folks across the country who are providing these broadcast services.

So, I sat down not too long ago with a local broadcaster who asked me point blank, when can I get more spectrum from the FCC for my television station? After I cleaned up the milk that I had blown out of my nose, I explained to him what was going on here in Washington. And he explained to me that he's providing a high definition television service feed. He's providing some multicast channels. And he wants to get into the business of mobile DTV, and his present allotment of six megahertz simply doesn't allow him to do that.

So, when we think about spectrum policy going forward, it's those folks that we're concerned about. It's the folks that are continuing to innovate in their local communities and provide a valuable service.

So, if you're asking if there's any spectrum that's underutilized, my response would be there's not none, and there's actually a thirst for more spectrum in some markets.

MR. GUTTMAN-MCCABE: Do you mind if I just quickly hit --

MR. WEST: Yeah, if you could just respond.

MR. GUTTMAN-MCCABE: We agree that there are many broadcasters using their spectrum efficiently, but we also look at the model and the way in which they provide service, and D.C. is a great example. There are 18 high powered stations, there are seven low power, and there are three public safety. And when you add that up, that's 168 megahertz of spectrum that's being utilized for the delivery of broadcasts. There's 294 megahertz allocated in the D.C. market.

Now, the reality is that spectrum provides a buffer for the broadcast service on each side, so what's utilized in Washington generally can't be reutilized in Richmond or Baltimore. And all we're saying is if there's a mechanism to clear out some of the stations, you can then repack, and that's how you capture a significant amount of underutilized spectrum.

MR. WEST: Okay. Matthew, in your opening remarks you talked about the importance of a comprehensive approach to solving this, and auctions might part of it. But you suggested there are other things that we should be doing. What are the other things that you think would be helpful?

MR. HUSSEY: Yeah. Well, geez, where to begin?

Well, first off, I think one of the concerns is that there's this traditional thought that, and I agree with Chris Ornelas, is that utilization is very subjective. There are different definitions. What is the utilization metric for radar which has a pulse, a time line, and then may listen from T1 to T10? Is that underutilized because it's not emitting anything, but it's listening? What about GPS? What about telemetry? What are the utilizations? And that's one of the key critical issues is that there is no cookie cutter, one size fits all definition for utilization. And that's one of the things we call on with the Radios Act, which we introduced with Senator Kerry, calls for FCC and NTI to try to develop

some utilization benchmarks and metrics so that we can understand what utilization truly means across the different types of radio based services.

And I will say that if we look at utilization, though, there have been about, I think, three major studies over the past decade that have done spectrum measurements. NTI and ITS has done some shared spectrum. A company has, and then also my alma mater, Georgia Tech, some grad students did it. And all those measurements that were done in primarily shared spectrum, and Georgia Tech showed nominal occupancy rates. I mean, we're saying high single digits across very large swathes of spectrum. And so, if spectrum isn't being used 100 percent of the time in 100 percent of the country, I mean, do we have a crisis, first of all, or a crunch? And, second of all, can't we look at other ways to use the times that the spectrum is, what we say, laying fallow, or just not being used? And that's where we address really aggressive pilot programs for spectrum sharing and reuse.

So, in the times that there aren't any emissions, maybe there could be a co-primary or a secondary user using that spectrum, and you don't have to reallocate. You can delineate certain patterns of usage, and that's what will help facilitate more people in the sandbox without having to tell people to leave the sandbox.

So, I think we just have to have a more dynamic and more up to date evaluation. And when we were talking about cognitive radio, DSA, smart antennas, spatial multiplex, the list goes on and on on technologies that can help compensate greater efficiencies and capacity for spectrum. And that's another issue that we look at.

You look at the national broadband plan. Out of the 360 odd pages, the word femtocell was not mentioned once, but yet, 70 to 80 percent of carriers globally plan to use femtocells in their LT infrastructure. Femtocells are micro cell sites to help offload

cellular traffic onto broadband wire line networks. And I can tell you as an engineer, it's a lot easier to go to the back of that room to that little mini bay station than it is to go a couple of kilometers to the macro cell site.

So, these are things we have to look at. The national broadband plan did mention Peko cells, which are a little bit bigger, but only in the context of public safety. So, and that's another component within the Radios Act is where we task GSA to install femtocells in Wi-Fi hot spots to improve coverage and also to help assist and alleviate some of the congestions, because we can look at the trends. Chris at CTIA can certainly speak at length on the demand usage and usage of smart phones and et cetera, but we also have to look at the trends in how the consumer is using that data. I mean, if you look at Cisco and then also Informa, anywhere from 60 to 80 percent of mobile data traffic is done inside. And so, that's a prime example for femtocells in Wi-Fi hot spots. And with Wi-Fi hot spots, they use unlicensed spectrum, and you don't have to pay a dime for that in an auction. And so, 99 percent of smart phones will have Wi-Fi capabilities in two years. That'll be on the market.

So, I think that we just have to look at this in, again, a much more holistic view, comprehensive and address this. And to the point, yeah, I mean, there's no need to delay. I know some have suggested, well, let's take our time. I mean, we don't need to take our time, but we don't need to act hastily. Yeah, we have to really evaluate the data, but also to allow us to make sound policy decisions, because sometimes Congress unfortunately tends to overcompensate. And so, that's one of the things where we really have to look at this, but not do it ad nauseam, but at least make sound policy decisions. But the only way we can do that is we got to stop talking generalities and start peeling the layers of the onion back to get more detail so that we can then formulate the proper

reforms to the statute which are necessary.

MR. WEST: Uzoma, you have written about smart antennas and femtocells, and Matthew has mentioned cognitive radio as well. To what extent is it realistic that these types of initiatives actually would make a significant difference?

MR. ONYEIJE: I think there's a lot of folks out there that believe it'll make a significant difference. And the point of my paper was simply to say, why not collect the data? There's this quote that sort of says that you can't keep going down this road like this because the truth fears no question.

And I feel like after the paper was released, there was some fear of the questions. And, again, the word femtocell is not in the national broadband plan. It just seems like we should at least do that analysis. This is analysis and this is data that's well within the reach of the major wireless carriers. This is not burdensome, and I never once, I believe, suggested delay. I don't think delay is a great policy outcome. I worked for four and a half years with a company that was trying to access spectrum. Chris, CTIA, and his members successfully delayed that auction, not implicitly, but explicitly. It's a matter of public record. You go back into the record and you'll see the word delay throughout the record. For years, that is what they wanted as a policy outcome. That is not what I'm suggesting at all. What I'm suggesting is that if you are going to make a decision, you need the data to make that decision.

And the one thing I wanted to point out was Chris mentioned the word voluntary and how important that word is. And I think it's very important. So, I tested this out with my seven-and-a-half-year-old son.

So, I have a seven-and-a-half-year-old son, and my wife and I had twin girls last year, and they're now about 15 months old. And I said, well, you know, your

playroom has all your stuff in it, but it's really time to start incorporating some of their play stuff in that room. And this is going to be a completely voluntarily deal. Now, but if you disagree with me, I'm still going to put some of your stuff in the basement. And my seven-and-a-half-year-old responded to me, well, how exactly is that voluntary?

And I think the point of voluntary, only in Washington, D.C. would we have a debate about what the word voluntary means. Voluntary means --

MR. WEST: In D.C. we have debates about all sorts of individual words. Christopher Guttman-McCabe, you were shaking your head during some of those comments.

MR. GUTTMAN-MCCABE: Sure. So, Uzoma crossed that threshold, so I feel comfortable pointing this out. I'm going to read you a quick quote. "As a matter of policy, the delay sought by these parties is contrary to the national priority of achieving greater broadband adoption through wireless services, and would further exacerbate the ongoing spectrum crisis in the United States." That's a quote from the gentleman to my right last year, identifying that in fact there is a spectrum crisis and we need to bring spectrum to market.

What we opposed when Uzoma made a proposal to the FCC was the FCC tailoring an auction to M2Z's business model. That's what we opposed. We didn't want an auction that was designed solely to be tailored to a business model.

I completely agree with Matthew and Uzoma that we need to try to offload traffic through Wi-Fi hot spots and femtocells and Peko cells. And every carrier in our organization is doing that. Every carrier has either implemented femto- and Peko cells, micro cells, or is in the process of doing it. Every one of them is using Wi-Fi hot spots to offload traffic. And with all of that as a baseline, they still believe that there is a

need to bring spectrum to market. And it's not just the carriers. I mean, you have manufacturers who actually manufacture femtocells and Peko cells and different types of micro cells, suggesting that there's a really significant need to bring spectrum to market.

MR. ONYEIJE: Well, I'll point out that I quoted some of your members that suggested that there isn't a spectrum crisis. And so, I think going through and assuming that it is fact is an error. So, you can't just simply say this is a fact, it's undisputable, even when your own membership is divided on the issue. And so --

MR. GUTTMAN-MCCABE: I don't think our own membership is divided. I think what you see is the fact that the spectrum process, as we sit here and debate it, takes years. And so, the reality is, all of them are moving forward in the next year or two with implementing fourth generation, although that seems to be a dirty word, so we'll call it next generation technologies. And as they're deploying these next generation technologies, they see a need in the next several years for spectrum. It's been presented to us as our number one priority by our members.

And so, I'm not out here advocating simply so that my members can spend tens, if not hundreds, of billions of dollars on a resource they don't need. I think we need to get past this notion that the carriers -- we don't get it for free. We spend tens of billions of dollars. We turn around and then invest tens of billions of dollars a year after that to upgrade and update the technologies. And the reality is, in the time that Uzoma and I, since we left our old law firm, the carriers have gone from analog, to digital, to 2.5, to three, to 3.5, to 4G networks. They have implemented. They've got smart phones that do a better job of spectrum utilization, and they have implemented Wi-Fi and Peko cells and femtocells.

MR. ONYEIJE: And in that same time, their cell sizes have reduced in

size significantly --

MR. GUTTMAN-MCCABE: Exactly.

MR. ONYEIJE: -- to 10 percent of the size that they used to be.

MR. GUTTMAN-MCCABE: So that we could reuse spectrum.

MR. ONYEIJE: And where there is a crunch, they can reduce it even further.

MR. GUTTMAN-MCCABE: So says a lawyer, but my point is we've got engineers who say there is a bound -- and Matthew probably knows this better than most -- a Shannon's Bound that presents a limitation as to how far you can shrink.

But all of that is, again, every other country that we compare ourselves to, we had a debate over the last years about broadband deployment and comparing the U.S. to every other country. Every country we would compare ourselves to has gotten this and has moved ahead with identifying and allocating spectrum. And I'm debating Uzoma --

MR. ONYEIJE: But the problem is, your comparison is flawed. That's the problem.

MR. GUTTMAN-MCCABE: I don't understand how that's possible.

MR. ONYEIJE: The comparison that you make with international players is simply flawed. It does not take into account density. It completely ignores density. And this is part of the problem with this debate. You take critical elements, you ignore them, and then you have a press release that says here's what we found.

MR. GUTTMAN-MCCABE: So Japan --

MR. ONYEIJE: If you took density into account, the numbers that he floats around almost completely reverse themselves.

MR. WEST: Okay. I want to give Christopher a chance to respond, and then we're going to involve the audience.

MR. GUTTMAN-MCCABE: Just quickly, let's pick Japan and pick Tokyo and compare Tokyo to New York.

MR. ONYEIJE: Am I right that you ignored density?

MR. GUTTMAN-MCCABE: No, no. I'm going to go ahead and do it right now.

MR. ONYEIJE: Okay.

MR. GUTTMAN-MCCABE: Tokyo has 747 megahertz of spectrum in Tokyo; the United States has 400, okay? Let's go to UK and pick London. London has 707.8 megahertz of spectrum in London; the United States has 400 in New York. You could go down every one of these. If you want to do it specific to South Korea and Seoul, South Korea will have 530. The only one that doesn't work is Mexico, but of the top 10 from GDP, every one of those countries will have anywhere from 700 to 900 megahertz of spectrum throughout their country, which means in their major metropolitan areas. And the United States will have anywhere from 400 to 500, and I think it's debatable. But even if we put a 500 number out there, that's --

MR. ONYEIJE: And, again, I think the question is whether we want off the cuff analysis or we want reasoned analysis on the record at the commission.

MR. GUTTMAN-MCCABE: And all of that is at the commission, all of that data, Cisco, CODA, all of the other information.

MR. WEST: Okay. Let's move to the audience and get some of your views here. We have a person with the microphone who's moving around, so if you could just raise your hand. Here in the front row we have a question. And if you could

give your name and your institutional affiliation, that would help, too.

MR. KIBY: Paul Kirby with *TR Daily*. Matthew, your bosses talked about more comprehensive issues, and not just looking at incentive auctions, but including a more comprehensive spectrum forum.

Chairman Genachowski says the baseline inventory they've done shows that they need more spectrum if necessary, and Congress should pass incentive auctions. Why are those more comprehensive things necessary? Is there enough evidence to at least go ahead and pass his incentive auctions legislation while looking at those other things your boss wants down the road?

MR. HUSSEY: In the letter that my boss recently sent, she said, look, a comprehensive inventory does not have to be sequential to incentive auction authority. Yeah, let's pass that because, hey, it's supposed to be voluntary, so if broadcasters want to participate, that's great; if not, that's fine as well. But it is one of those things where we do have to look at.

We did also inquire if the FCC is actually going to execute a comprehensive inventory because his response to a previous letter kind of you could interpret that they may have not, that they felt that the baseline was fine. But we have to question, well, that baseline, I mean, did they just use the existing ULS records? And if anyone has ever tried to venture on the ULS, you know it's incredibly archaic and esoteric. Or did they actually go and inquire with the existing licensees to get more data than what is currently presented? Because when you look at both the spectrum dashboard and the license view, the two GUIs -- graphic user interfaces -- that they have, if you just click on them through, they go directly to the ULS record. And so, it is kind of a question of how up to date that information is, how detailed it is.

And so, hopefully the FCC chairman will provide greater detail as to what exactly was done to develop that baseline inventory, and then what are they going to do to move forward, because my boss believes that, again, a comprehensive inventory, it's not going to be the Rosetta Stone. It's not going to tell us everything. But it will provide us much more detail that we can then build much more robust management, opportunistic sharing, and other opportunities, looking at receiver standards as well.

So, again, for an agency that proclaims to be data driven, you would think that a comprehensive inventory would be one of the first things that they would do. And, again, it can be concurrently. It doesn't have to be do this first, and then we'll weigh on everything else. But do it together, and certainly we would support that.

MR. ONYEIJE: If I could just mention one thing on inventory. I think it's important to note that inventories by their very nature are granular. My in-laws just retired from 30 years of owning a health food store and restaurant, and oftentimes during the holidays we would come back and that was inventory time, and I would help them with the inventory. It was granular.

I'm not exactly sure what a baseline inventory is. But we would figure out how many agave nectars were on the shelf. I mean, not just how many agave nectars were on the shelf, but whether it was vanilla, or whether it was hazelnut. I mean, it was a very granular process.

So, if you're talking about an inventory, it has to be granular. It has to be comprehensive. Anything else won't do because you won't be able to make any of the decisions that you want to make. If we didn't know what was on the shelf, or we had some vague knowledge of what was on the shelf, or we accepted the word of some of the employees on what was on the shelf, we wouldn't be able to make decisions for the

following year.

I think if the commission moves forward before the inventory, it's making a similar mistake where it can't make -- it's impossible to make the best decision without all the data.

MR. ORNELAS: Just picking up on --

MR. WEST: Sure, go ahead.

MR. ORNELAS: -- picking up on the grocery store analogy, if you look at the commission's current inventory, the inventory upon which they're basing all spectrum decisions going forward, the inventory upon which there is a rush to reallocate some broadcast spectrum, it appears to me to be nothing more than the signs at the ends of the aisle. That is, it tells you what's where, but it does nothing to tell you how much is being used or how much is left.

And so, again, if I were still staffing Senator Smith in the United States Senate on the Commerce Committee, the questions that we'd be asking are the same as Senator Snowe are asking, which is, let's get a broader understanding of the issue before we rush forward and do something in Congress that could do irreparable harm.

MR. WEST: Okay. There's a question right here. Jim?

MR. SNYDER: Jim Snyder from iSolar, and my question is addressed to Matthew.

Some years ago I did a study that estimated that since World War II, Congress and the FCC have given $480 billion of --

MR. WEST: Jim, could you speak directly into the microphone so we can hear you?

MR. SYNDER: Yes, about $480 billion of spectrum without any public

compensation.

Now, we never hear this discussion by the Congress or the FCC because it's embarrassing to give groups like the NAB, which has some of the largest, the wealthiest companies in the world and individuals, billions of dollars of free spectrum. So, we never have that debate. So really, that is the way spectrum has been allocated primarily.

So, the question is, is there any indication that this not really what's going on right now in terms of the congressional and FCC spectrum management plan? For example, the NAB next to you is working on a strategy of delay any possibility of spectrum being taken away while they work to get more spectrum flexibility, more rights, more broadband coverage, and more flexibility. They got mobile DBP in the last decade without any public discussion, geographic service rights, and all these things. They got a dozen other plans to get spectrum flexibility so they can basically provide mobile broadband type of services, and the FCC and Congress sort of quietly go along.

Can you say anything to suggest that this below the radar strategy is not going on right now? We see with MSS, the satellite -- they got a satellite; now they're turning it into mobile TV. Sprint and the whole WiMAX type thing, the same strategy. We're talking about tens of billions of dollars. Even in the era of auctions, only a tiny percentage of that spectrum that's given away has been given away by auction. The rest is below the radar.

NAB specializes in this. They've done it just brilliantly. Is there any indication that this is not what is not what is continually going on without any public discussions?

MR. WEST: Could you turn your microphone on, please?

MR. HUSSEY: I'm sorry. There is some discussion going on. Certainly in the Radios Act we talk about having the FCC and NTI do an evaluation of spectrum incentive pricing, neat moniker for spectrum fees, because we know, like, Ofcom in the UK, they apply spectrum fees, and it seemed to be advantageous to improve efficiency. Also, Ranking Member Hutchison has her bill, the Wise Act, I think there are some provisions in there that address kind of that windfall that might, through the increase in flexibility, that might be provided to address that. So, you'd have to speak them to get more detail on to what exactly is in the provision.

So, I would say that we are looking at how we properly address this. But we also need to remember that, as you insinuated initially, that spectrum is a public good. And so, we have to look at how best to facilitate the greatest social and economic advantage to the public through the use of spectrum. So, I don't think it has to be a purely economic model because it's a public good. Sometimes it's very difficult to quantify that. But we do have to look at kind of the ripple effect, throwing a stone in a pond. Okay, well, maybe that stone was to raise a bunch of money in an auction, but if, let's say, there was some mechanism where it was given out for free, what is the economic value down the road that is generated from that service being provided? So, it has to be a multifaceted examination of that issue to determine what the actual impact would be.

But your point is well taken. And we also have to remember that while initially the spectrum was provided as broadcasters from the federal government for free, other broadcasters didn't get it for free. They, through mergers and acquisitions, had to pay quite handsomely for the spectrum licenses. And so, it's one of those things.

It's a very complex issue, and that's why, again, the Senator has been

calling for a multifaceted approach to this issue.

MR. WEST: Okay. Christopher, do you want to jump in?

MR. ORNELAS: I just want to go on the record publicly to state that NAB is not in the business of nefariously trying to figure out how to get more "free spectrum." In fact, it's just the opposite. We're trying to make sure that the spectrum that we have that serves a great public interest continues to be allocated in that manner.

With respect to spectrum flexibility, I think it's also important to note that during the DTV transition, broadcasters were given the flexibility to provide ancillary services on any excess capacity that they found they had post transition, and that as that right was conveyed, there was an obligation to return five percent of any fees that were raised using that excess capacity for the NNET flexible manner back to the U.S. Treasury.

I think Matt makes an important point. Before 1993, '94, all spectrum users got their spectrum for "free." That is, there was no lottery. There were no auctions. So, post the auction legislation, broadcasters have been under the same paradigm as every other spectrum user. There have been at least three or four spectrum auctions, four broadcast facilities in which we have participated in an open market, on an open auction with all proceeds going to the U.S. Treasury. So, the notion that we're somehow squatting on spectrum that we somehow got for free, I think, is a bit misguided.

MR. WEST: Okay, there's a question right here.

UNIDENTIFIED SPEAKER: The Shannon limit was mentioned, which is the theoretical limit on how efficiently you can encode information into a communication channel. Existing technology is actually a long ways from the Shannon limit. So, I was wondering what is being done currently in terms of finding more efficient ways to encode

information into existing spectrum?

MR. GUTTMAN-MCCABE: So, I will just point you, because, again, I'm a lawyer and I try as best I can to limit it to that. But we have a paper going in today to the FCC from Peter Osave. And for those that know Peter, he's been working for 17 or 18 years in helping to put together wireless architecture for different carriers. And so, it's just on the efficient use of spectrum in the mobile space, and it'll up on our website, I'm sure, by the end of the day. But for me to speak about that -- what we have learned from anywhere from our engineers to our CEOs is that there is a theoretical limit to how much traffic you can drive through a megahertz of spectrum, and there is a limit to how often you can split a cell site, and to the point where you begin to interfere with yourself in a way that can't be corrected. And those limitations are factored into the analysis that the carriers do when they make a determination as to whether or not they're going to participate in an auction for spectrum.

But Peter Osave. If you have questions, shoot me a question afterwards, after you look at the paper.

MR. ONYEIJE: Is there a view that there's unanimous agreement on this?

MR. GUTTMAN-MCCABE: On which?

MR. ONYEIJE: That we're reaching the limit?

MR. GUTTMAN-MCCABE: Yes.

MR. HUSSEY: And if I can say as an engineer, or at least in my former life, certainly with Shannon's Law, one of the great things is through spatial multiplexing. You can't break Shannon's law, but you can certainly bend it significantly to increase capacity. The great thing about digital signals is the ability to process them, and, through

spectrum conditioning to improve the signal to noise ratio that exists, through spectrum aggregation. There's a whole host of just amazing technologies that are developing to really increase the capacity. But that's still in the kind of conceptual stage, still in the laboratory, and we are seeing greater expansion into commercial offerings. But it's still a few years off, but I think there are great opportunities from a technology-based process to increase capacity immensely.

MR. ORNELAS: It sounds to me that the wireless folks have done a lot of studying on the issue of how their capacity is being used and how they can improve the efficiency of the use of that capacity. We'd love for you to share that information with the rest of us so we can get a better understanding of what the exact needs are going forward.

MR. WEST: Okay, other questions? Right here, Brook.

MR. BOLLICK: I have a big voice. I don't need a microphone. Hi, am I on? Brooks Bollick, *Politico*.

Christopher McCabe, explain to me how freeing up spectrum in Manhattan extends broadband in Alice Akers, Texas.

MR. GUTTMAN-MCCABE: So, the reality is that you want the ability to have someone who can utilize a device. Again, we're a mobile service. You want someone to be able to start their trip in Manhattan, New York, and end their trip in Manhattan, Texas. You want the manufacturers to manufacture devices, and you want a certain level of scale and scope that will help drive lower costs. And so, if you're building something for the nation as a whole, you get those benefits of scale and scope, and you get lower price devices. You get lower cost networks. The reality is you want a band of spectrum that works across the entirety of the U.S. because our customers are mobile.

And so, the reality is that at any one point in time, there are different impacts to different carriers in different parts of their network, but the network in its entirety is used often. And so, you need the ability to be able to service those customers wherever they are. And if it's not a piece of spectrum that is available across the United States as a whole, for an individual carrier, then carriers roam on it. But the reality is every band of spectrum that we have and that has been brought to market is nationwide in nature, and that's the same for the mobile services in each country around the planet.

MR. HUSSEY: And, if I may add, because you raise a good point, and to kind of reign in the discussion back to what this conference or briefing is for, and that is the digital divide. And one of the things that we do have to look at is how can we have a framework in place that helps facilitates new entrance into the market to gain spectrum, the smaller players. Senator Snowe, many years back, I guess right before the 700 megahertz auction, introduced the bill talking about providing smaller geographical regions licensing so that smaller rural carriers could get additional spectrum to increase their capacity and to accommodate greater growth. So, that's one thing that we have to look at. And I think it would be interesting if you look at what Chris had mentioned, some of the international auctions that have occurred in Spain, Britain, France, and Germany.

Two interesting things. Several of those countries implemented spectrum caps, and I know that can be a very controversial issue. But that's one of the things to ensure that there is a robust, healthy competition in the wireless space.

But the other thing is, the vast majority of those auctions, they auction spectrum frequencies in the 800 megahertz band and in the 2.6 gigahertz band. That's what the European countries are using for their LTE. So, I just think it's kind of an interesting note when they're doing that and we talk about international harmonization,

but we're focusing on the broadcasters from the 500 to the 700, 800 band. So, I think that's something we need to look into a little bit further as well, is if we're going to internationally harmonize, because mobility means it's going anywhere and everywhere and using a worldwide device. So, that's just an interesting point, I think.

MR. WEST: Uzoma?

MR. ONYEIJE: Again, I think one of the key take-aways should be let's make sure that technology is moving us in the right direction.

I wanted to just read to you a little quote from a filing that was put in by Qualcomm last month. And the quote says, "At the Mobile World Congress earlier this year, Qualcomm demonstrated that HetNets" -- and HetNets refer to heterogeneous networks -- "consisting of macro, PEKO, femtocells, working together through adaptive interference management and interference cancellation in the user equipment could achieve a substantial increase in network capacity as opposed to a network consisting of just macro cells."

I think we should be celebrating the fact that we have technology out there that can solve this problem. I wrote in the paper, and I believe it fully, that it is a little surprising that CTIA talks an awful lot about innovation, but when it comes to spectrum crisis, and frankly the spectrum crisis alone, the supposed spectrum crisis, their discussion of innovation ceases, and there only seems to be hurdles that can't be overcome. And if you go to Docket 06150 for the reporter, you can get that report from Qualcomm that was filed April, I believe, 11th.

But again, the point is, this filing that Qualcomm has put in, and these methods that they say will provide substantial increase in capacity have not been fully investigated by the commission. There can be no doubt that that is true. And the

question is, why would that be a delay tactic to say, let's get all the data?

MR. GUTTMAN-MCCABE: And the only thing I would add to that is I agree. I think that's great, and that's been factored in. And if you look at Qualcomm in that docket and others, they're at the forefront among the manufacturers calling for the need for more spectrum. So, the same entity that has every incentive to sell its HetNet technology and is selling it and it is being implemented, is also leading the call in the manufacturer space for bringing more spectrum to market. And that's my point, is that everything that has been discussed up here -- HetNets, and femtocells, and peko cells, and micro cells, and Wi-Fi networks -- are all being implemented. And yet the carriers are still calling for, and the manufacturers who make those technologies are calling for bringing more spectrum to market.

MR. ONYEIJE: And it seems like it would be a simple answer to my paper to say these things need to be quantified. You're saying every carrier studied it.

MR. GUTTMAN-MCCABE: You say it in your paper.

MR. ONYEIJE: And my question is --

MR. GUTTMAN-MCCABE: You said it in your paper that the technology is driving innovation and efficiency.

MR. ONYEIJE: The key point is that it has not been quantified in how the commission is moving forward.

MR. WEST: Okay. Right here in the front row?

MR. PILLSBURY: Hi. CTIA has --

MR. WEST: Sir, could you give your name and organization?

MR. PILLSBURY: John Hayne Pillsbury. CTIA has held up Japan and Korea as examples of countries that are ahead of the United States in their innovation

and deployment. CTIA data submitted in the national broadband plan docket shows the United States being vastly more efficient than Japan or Korea in number of subscribers served per megahertz of spectrum allocated. First, I'd like to make a point, and then I have a question.

The first point is that I think we've all now acknowledged that the greatest need for spectrum, if there is need, is in densely populated areas. Is that right?

MR. GUTTMAN-MCCABE: Yes, at times, but it's temporal, right? I don't think you can predict where the -- it's carrier to carrier. I think it's too simplistic to make that conclusion. It's carrier to carrier, so we have rural carriers that don't have enough spectrum in their market that need access to it. Matthew talked about that. We advocate for a range of blocks and sizes and different amounts of megahertz per license so that rural carriers can get it, too. So, I would say, no, I don't necessarily agree with that. I think that's too simplistic.

MR. PILLSBURY: Okay, but in an aggregate scenario, total amount of spectrum available to serve consumers, are you saying rural areas require as much as, like, Manhattan?

MR. GUTTMAN-MCCABE: No.

MR. PILLSBURY: Okay. So, population density does affect the total requirements for spectrum.

Okay. I'm looking at a chart that uses CTIA data that shows when you consider population density, the United States carriers are about one-twelfth as efficient as the Japanese carriers and about a tenth as efficient as the Korean carriers. CTIA data shows 409 megahertz of spectrum available in the U.S. to the carriers; in Japan 347 megahertz. When you consider population density, Japan is the second most efficient

country in terms of efficient use of spectrum. The United States is ninth out of 10 OECD countries. And again, this is using CTIA data. I'm just wondering if you can explain what Japan and Korea are doing that the United States carriers aren't.

MR. WEST: This sounds like a deposition now.

MR. PILLSBURY: I'm done.

MR. GUTTMAN-MCCABE: And I'm okay with that.

MR. PILLSBURY: That's a question I've had for a year and a half. It hasn't been answered.

MR. GUTTMAN-MCCABE: Yeah, two points. One is, so take our charts, which I noticed that the element that was left off the chart was usage, right? So, you took our chart and you carved off the usage, right? So, the average U.S. consumer uses their device 793 minutes per month. The average Japanese consumers use is 141. That's about one-fifth.

MR. PILLSBURY: I think that's --

MR. GUTTMAN-MCCABE: It is, and we have data coming out.

MR. PILLSBURY: -- that data --

MR. GUTTMAN-MCCABE: Well, but you took our chart which had our voice minutes and you surprisingly cut off the usage one. So, what we say is you could do a simplistic consumer to megahertz. You could throw in voice.

So, Japan. South Korea uses 303, about 40 percent of the U.S. usage. If you look at the data trends, the United States consumer uses a greater amount of data per consumer per month than Japan or South Korea.

MR. PILLSBURY: Over their wireless networks.

MR. GUTTMAN-MCCABE: Over their wireless networks, and then I'll

add one more. I was invited to South Korea to talk about the usage explosion in the United States and what can South Korean regulators and policy makers and carriers do to ensure that they have similar types of use, to ensure that they have similar deployment, to ensure that they have similar adoption. And I spoke in front of 1,200 people three weeks ago, so I've been invited to South Korea to talk about it. Japan is now recognizing that they while they had fantastic technology; it was the Galapagos Island of wireless technology. It didn't make its way outside of the Japanese islands. And all of a sudden, they fell dramatically behind.

So, I would argue and I would state, we have never held them out as being more advanced than us. I think in the last five years, you can't debate that carriers and manufacturers are just driving innovation in the United States comparatively. And the manufacturers are moving their R&D facilities from their host countries to the United States because of that ecosystem and what's happening here.

So, I don't think it's fair for you to say -- and that's why we have always presented this, what we call our flag chart, as a simplistic analysis. But even if you dive into it and you compare Tokyo to New York, if you say roughly similar number of subscribers, there's greater usage in the United States, and those spectrum resources are divided by another thing you didn't put in here, a greater number of carriers. So, for every Tokyo, which is three carriers, there's a New York which has seven, okay? For every London which has four, there's a New York which has seven licensed carriers that have to share those spectrum resources.

So, not only do we have less spectrum, it's divided by a greater number of carriers, and it's utilized by consumers who use their devices significantly more. So, I'll take that deposition question any day because I think when you look at this analysis, it's

only going to get more and more significant. And when we see not projections, but actual usage from tablets and the tablet usage is 120 times what a standard phone has in terms of impact on a network, and there were 13 million tablets sold last year, you start to get into the billions when you do that calculation, of new "phones" added to our network in one year.

MR. ONYEIJE: My tablet connects only to Wi-Fi.

MR. GUTTMAN-MCCABE: And some do.

MR. ONYEIJE: And you can't just simply just throw all of the data in what you do and include things that are totally irrelevant to your point.

MR. GUTTMAN-MCCABE: Okay, so reduce it by two-thirds, and if there's only one-third of them connect wirelessly, that's still 300 million new devices.

MR. WEST: Okay, Chris -- excuse me. Christopher wants --

MR. ORNELAS: I would just offer one data point to this discussion. We've talked a lot about OECD rankings and how we're falling behind or how we need to do better to keep up with the Japanese and the South Koreans. And I think specifically your question, John, was, what are they doing that makes them more efficient than what our carriers might be doing. And I think to answer that question, it's important to point out that South Korea -- well, first of all, by Cisco's reports, I think that most of the traffic that we're talking about that's going to congest wireless networks in the next five years or so is video related. And in terms of the distribution of video programming or video related material, I think it's not arguable that broadcasters have one of the most efficient technologies for distributing video to the masses.

And so, when you talk about what South Korea is doing better than the United States, well, they have in South Korea 75 percent of the country that is covered

with digital mobile broadcast. These are services that are available on cell phones, on tablets, on any number of mobile devices. There's 240 million -- I'm sorry, 23 million DMV-enabled devices that have been sold in South Korea.

So, when you step and we look again about supply and demand and whether or not we're taking a very narrow focus on reallocating broadcast spectrum for the purposes of increasing spectrum capacity for wireless carriers, I think you also have to consider how broadcasters can be part of the solution. Broadcasters and their ability to distribute video programming, which is going to congest your networks in the next five or 10 years, can be part of the solution absent just simply reallocating the asset.

MR. WEST: Okay. I'd like to get some questions from the back of the room, right there on the aisle. Yeah, right there.

MS. JALOGAD: Thank you. My name is Jennifer Jalogad.

MR. WEST: Can you speak a little more into the microphone so we can hear you?

MS. JALOGAD: Okay. My name is Jennifer Jalogad. I own a small communications boutique firm here in the D.C. area, and then I also write for *Washington Times*, "Politics 365," and I have my own polytech blog called jenniferspeaks.com.

MR. WEST: It sounds like you have five jobs.

MS. JALOGAD: Yeah, exactly. Anyway, my question is for Uzoma and my law school classmate, Chris Guttman-McCabe there -- hey, Chris. And to the extent that this symposium is supposed to be about digital divide, the haves and have-nots. And, pardon me, I got here a little bit late, but I'd like to circle it back up to that.

Late last month I read a press release that Rice University and the city of Houston had done this innovative thing, and they created what's called a super Wi-Fi.

And essentially it's almost like mesh technology, but essentially allowing for an entire city to have access to Wi-Fi. To the extent that that would be, not necessarily a solution, because I realize there's interception and there's other quality issues related to Wi-Fi. But to the extent that that could be some sort of a technology-based solution for those who cannot afford broadband or Internet access, could you guys just address that just generally and have any insights to that in terms of for bridging that digital divide?

MR. GUTTMAN-MCCABE: No, I've been talking a lot. Go get them.

MR. WEST: Well, suddenly the other to speak.

MR. GUTTMAN-MCCABE: No, I could again, but I'm getting tired of hearing myself.

MR. ONYEIJE: I think that what we need to be focused on is solutions. And I'm a naturalized U.S. citizen, and I believe in the American Dream. And I believe in innovation. And I just find it so puzzling that somehow with this debate we think that innovation and the American spirit won't solve the problem. I refuse to believe that.

And I think that the solution that you're talking about, that I'm not very familiar with, and other solutions are exactly where we need to be focused on. We don't need to be focused on things that would potentially have a very disruptive and very negative impact, frankly, on diversity. And I think that's one of the concerns I have with incentive auctions is that when you look at them, you realize that the commission does have a statutory mandate as it relates to broadcast and competition and diversity. And the question is do incentive auctions really promote that at all?

MR. GUTTMAN-MCCABE: So, to address your question, I think it's going to be a key part of the solution going forward. I think when you look at sort of a super Wi-Fi or a municipal Wi-Fi network, I think there's going to be that threshold point

that the operators of the network are going to have to get past, which is the -- not the majority, but a significant number of very high profile, fully built out and funded municipal Wi-Fi networks failed horrifically -- San Francisco, Philadelphia; you can sort of go on and on.

So, and as I said, I think Wi-Fi is key, and as Matthew pointed out, it is in every device basically smart phone that's coming out right now, and that's great.

But to get your point about access and about the ability to pay and be able to afford it, I think having other solutions out there; I think it's a great idea. And if they work, fantastic, all the better. I'm tasked with representing CTIA, and I can say I'm both proud and awed whenever I see the update in the Pew data about how we are transforming the digital divide. And I find it interesting, yes, this is a spectrum debate, but it's the wireless entities that are represented here that are going to help to build and are bridging that digital divide. And we're seeing it with the African-American community, and we're seeing with the Hispanic community. We're seeing it with folks below the poverty line, that they're utilizing wireless devices to gain access, and I think that's great. And I think we need to drive better programming and better content in order to make it a good value proposition. And we have to drive prices down.

And I think all of that is happening, and I'm excited about the future. But I agree, I don't think you close the door on any solution, any ultimate solution. All we're saying in this debate is, my gosh, if it's voluntary and NAB doesn't oppose it, there's certainly a lot of opposition going on at this table. And we're seeing it in filings at the FCC and beyond. And all we're saying is for those broadcasters that would want to exit, let's let them exit.

MR. ONYEIJE: What does it mean to you to be voluntary? What does it

mean to you to be voluntary?

MR. GUTTMAN-MCCABE: I don't understand why voluntary is difficult. If a broadcaster wants to participate in the auction, they participate in the auction.

MR. ONYEIJE: And what happens if they choose not to participate?

MR. GUTTMAN-MCCABE: They don't give up their license. They don't channel share. They don't do anything.

MR. ONYEIJE: They don't get moved?

MR. GUTTMAN-MCCABE: No, then you repack.

MR. ORNELAS: Okay. So, there's we get to the thrust of the issue. Voluntary really has two meanings: one, for those who want to exit the business, and, more importantly, or equally as important, for the folks who want to stay and remain and provide programming and video service and new mobile services to consumers across the country.

Now, this panel was seated to talk about diversity issues. And I think it's important to note that where we in 2008 had a fledgling number of multicast stations that had come to market, today we have, I think, in excess of 1,240 additional digital channels that are being provided in local markets. A hundred and forty-two of those are Spanish language networks. So, in the top 25 markets, the areas where we're talking about reallocating and moving broadcasters so that we can accommodate more spectrum for wireless carriers are some of the markets that have some of the deepest penetration of diverse programming that's being offered on these multicast channels.

So, the issue isn't whether or not broadcasters volunteer to get out. The issue is, what happens to those folks and those broadcasters who continue to provide this diverse niche programming to audiences who disproportionately rely on our service

during a repacking? How many viewers is it okay to lose in a repacking of the broadcast band so that wireless carriers can have more spectrum?

So, that's the issue. The issue has always been from day one for us -- when the President's council came out and spoke to this issue in July of last year, Gordon Smith penned a letter that said these are our issues. We need to ensure that our viewers do not lose access to the services that they are presently getting, that they don't lose access to the innovations that broadcasters are going to be providing in the future, and that they don't lose access to the service area; that is, people don't, by virtue of repacking, lose what they were getting for free and what they can only get for free in many markets right now, which is foreign language programming. Almost 50 percent of the programming that's being provided in these large markets on our multicast channels is foreign language programming.

MR. GUTTMAN-MCCABE: So, from one Chris to another, if that's all that matters, then I commit my resources, CTIA's resources, to having a discussion about what happens after repacking. And can you commit to stopping your discussions that demand is not going up, which is the filing that you made, that there's not a supply need, that there's a receiver standard problem. I've debated your boss on numerous occasions on NPR and other things, and if we get down to that about protecting the broadcasters that remain, I think that's a fantastic discussion. I absolutely think that discussion should be had. But that's not what you're saying publicly when we have these debates. You're hiring Uzoma to say that carriers need to -- Uzoma, a lawyer -- carriers need to investigate new technology solutions.

MR. ONYEIJE: No, no. You're getting it wrong now. You got it wrong in your blog yesterday, so let's clear it up.

My study was not a technical study. It was a study that said if we are going to reach this policy conclusion, we need the right data to get there. So, you can start with a false premise and build an argument on it, but sitting next to me, it doesn't usually work. It works better on your blog.

So, the whole point was to say we need the data to make a policy decision. An engineer, a lawyer, anybody who's intelligent can make that argument.

MR. GUTTMAN-MCCABE: And all I'm saying is you made a statement a year ago using the data that I've used that there was a spectrum crisis and the commission needed to move spectrum to market. And what I'm saying is everyone on this globe agrees that spectrum is going to be a significant part of the solution, except for NAB and the folks they hire. And if the debate is about let's make sure that the broadcasters remain, continue to serve the same number of eyeballs and the people that get over there at television continue to get it, great. I think that's a great debate.

MR. ONYEIJE: Maybe I'm misreading the audience, but it seems like they --

MR. WEST: Okay. Let's get some more questions here.

MR. GUTTMAN-MCCABE: Darrell, Dean has been holding his hand up for quite some time.

MR. WEST: Okay. We'll go to this gentleman, and then we'll go to Dean over there. We'll go right here, and then we'll go to Dean.

MR. TENHULA: This will be quick. I'm going to change the topic. Peter Tenhula of Shared Spectrum Company. Uzoma's paper suggests one of the efficiency measures being receiver standards. Senator Snowe/Kerry's Radios Act, Section 8, I believe, has a provision for receiver standards. So, the quick question is, does CK and

NAB support that provision or strongly support it?

MR. WEST: Great survey research there. I like that.

MR. ORNELAS: I think it's fair to say, and hopefully what's being borne out of this discussion today is that NAB supports any discussion which surrounds the efficient use of spectrum and takes a holistic view rather than a focused, targeted view. And so, if that includes receiver standards, absolutely that should be part of the discussion.

MR. WEST: Okay. Dean Garfield had a question?

MR. GUTTMAN-MCCABE: Ditto.

MR. ONYEIJE: At one time you opposed receiver standards. It was a few years ago.

MR. GUTTMAN-MCCABE: No, what we oppose --

MR. ONYEIJE: Am I incorrect?

MR. GUTTMAN-MCCABE: You are. What we oppose is the suggestion that receiver standards are the solution, and what we oppose is the suggestion that the manufacturers aren't trying to drive efficiency through their products and their receiver standards. That's what we oppose.

MR. WEST: Okay, Dean?

MR. GARFIELD: Yeah. Dean Garfield with the Information Technology Industry Council. It's a collection of the global leaders in information and communications technology, including many of the companies that you've mentioned, such as Qualcomm, and Cisco, and Microsoft, and Apple, and Google, et cetera, et cetera.

And it's fair to say that there aren't any companies in this country or anywhere who care about innovation more than we do. But we certainly strongly support

incentive auctions.

And so, let's take for granted one of the debate points or two of the debate points that have been going on thus far, one, that we need more research on the demand side, and, two, that the wireless carriers and everyone can do more to optimize their services. Taking that for granted, what irreparable harm would befall us by giving Congress the power to move forward with a market mechanism, like incentive auctions, while you continue to do that work?

MR. HUSSEY: Well, I think the only harm that could be done is if, because of this, again, singular focus on incentive auctions is that Congress only passes the incentive auction authority. That would be detrimental, I think, to the long-term health of the wireless ecosystem because, I mean, just look at it. The FCC and the Administration are saying they're going to free up 500 megahertz of spectrum. Incentive auctions are saying at best, we'll clear 120. That's not even 20 percent of the overall goal, and if you look at that maybe dated IT use study from 2006, they said we'll need anywhere from 1,300 to 1,800 megahertz spectrum for UMTF.

So, the thing is, if we're going to achieve the demand that we're seeing, we have to have a full complement of tools to address that. But again, if we keep hearing this repetitive stuff -- incentive auctions, incentive auctions, incentive auctions -- then that's the path of least resistance that will be done in Congress instead of looking at these hard, difficult issues, such as receiver standards. That's one of the things that is very clear that needs to be addressed because obviously the FCC doesn't have very clear authority with receiver standards over all the different radio-based services of their licenses. They do have on the transmitter, but the transmitter is only part of it. There's a receiver. And we're seeing it with the GPS light square problems. We saw it with WCSS

stars. We saw it with, I think, PCS H-block, I think.

There's just been a lot more frequency of the issue of interference because of receiver standards. And if they were to employ a little bit more, I guess, resilient filters in the receivers, we could alleviate a lot of these problems and also reduce the size of the guard bands, freeing up additional spectrum. If we're in a crisis, every megahertz of spectrum is important, and so that's why we have to really look at it.

And with the receiver standards, I like to make the analogy it's like building codes. You still have to adhere to the building codes, even if there's someone next to you or not. You can't be just dumping your waste into the vacant lot. And so, that's what we have to do here is ensure that the stakeholders, the licensees, employ the proper parameters with the receivers and the transmitters so that we can accommodate for the dynamic changes that occur in the various types of uses for spectrum.

MR. GARFIELD: Matthew, I appreciate you answering. You made the point earlier that you saw no real down side in proceeding in parallel.

MR. HUSSEY: Yes.

MR. GARFIELD: So, what I wanted to get a sense of is whether the other panelists agree with that perspective.

MR. ORNELAS: So, if the question is, assuming that we're going to take a more holistic view of spectrum policy going forward, which considers more granularly the demand side as well as that which the wireless carriers can be doing in their own space to be a little more efficient, assuming those two things, then the question is, is there irreparable harm, what irreparable harm could befall broadcasters, or, for that matter, any other licensee who volunteers? The answer is that it doesn't have to be irreparable harm if done properly.

If the repacking process is done in a matter that thinks through all the issues and makes as its first goal ensuring that the services that broadcasters provide to an increasing number of Americans, will not be in any way damaged, and it's done in a thoughtful manner, then I think that broadcasters volunteer. And that's really the bottom line, and that's where we've been since day one.

And notwithstanding what you read in the trades, if you go back and read each of our pleadings, beginning with the letter that we penned to Larry Summers in July of 2010, they all say the exact same thing -- do no harm. We're here to help, but do no harm. So, what we're asking for is a thoughtful consideration of those issues.

You have to remember, the NAB represents a disparate membership. We have folks that may want to get out, although we've heard from none. We have folks in medium markets, and we have folks in large markets, all of which just finished their DTV transition not 18 months ago where we gave back 108 megahertz for wireless carrier use and public safety.

During that transition, the repacking process did not go easily. And we, in fact, still have some broadcasters that are trying to replicate their full services they had prior to the transition. So, if broadcasters are a little bit apprehensive about the promise that, oh, you'll be held harmless, don't worry about it, it's because we have recent wounds from the DTV transition.

And so, we're not saying don't move forward. We're just saying let's move forward carefully. And there seems to be a rush right now in Washington to do this, give blanket authority to hold incentive auctions without fully considering what the consequences could be to viewers across the country.

MR. WEST: Okay. We are out of time, but I want to thank Matthew,

Christopher, Christopher, and Uzoma for a very lively discussion. This has to rank as one of the more lively discussions that has taken place at Brookings. But I appreciate all the panelists, as well as you, coming out. So, thank you very much.

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