

1 number of years and I think it under performs in
2 the advanced research side of the house. It does
3 very, very well in the -- what we call advanced
4 development area. And doesn't do what it needs to
5 do and there are exceptions, all cases, but I don't
6 think it devotes the long-term research it needs to
7 different ways of doing its business.

8 MR. SHARKEY: I'm not sure I would
9 agree with that. We certainly invest a lot of
10 money in research and continue to develop new
11 technology, new products and I think one of the
12 things that you see in the cellular and PCS
13 industry though is that it's kind of similar to the
14 broadcast industry. There's a large incumbent
15 base, so whenever you're looking at making changes
16 and it is -- it's got to take into account that
17 base, and the new technology has got to accommodate
18 that and it's a more gradual transition probably
19 and the technology has got to be very well proven
20 before it can be actually implemented in a large
21 scale in that type of service.

22 MR. SIDDALL: There's one thing that
23 has been brought up several times in different
24 contexts that we really haven't directly addressed
25 and that is receivers and the necessity of

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1 receivers being in some way addressed by the FCC.
2 I mean historically, the Communications Act
3 specifically declined to give the Commission
4 authority over receivers generally which is why you
5 have these provisions sprinkled throughout.
6 Section 302 allows the addition of circuitry to
7 prevent interference from what was CB transmitters
8 or other transmissions. Section 303 has certain
9 provisions that related to only TV receivers or the
10 V-chip, the closed captioning, the All Channel
11 Receiver Act.

12 Otherwise, pretty much the FCC doesn't
13 have authority there and maybe there will be
14 someone to address should the FCC have more
15 authority over receivers.

16 I'll start it by trying to put a little
17 bit of controversy on it and saying traditionally
18 it's worked that you regulate the transmitters and
19 the receivers are left to themselves because if
20 they don't get the intended transmission, they'll
21 be thrown away and some manufacturer will succeed.

22 That can receive it successfully. So it's not
23 obvious to me that at least in some context and I'm
24 thinking of the broadcasters example that was
25 brought up earlier, it's not obvious to me that

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1 there need be authority and regulation of receivers
2 as something that would be an extension of
3 authority over an area that traditionally has not
4 been within the FCC's purview, but if others have
5 other thoughts in a different context.

6 DR. FARBER: Just an aside, it's been a
7 number of years, but I think a counter-example
8 would be the FAA which does, in fact, strictly
9 regulate the receivers and that's the way they've
10 been able to move that technology much, much
11 faster, because otherwise you'd have the Wright
12 Brothers complaining about the fact that their
13 radio can't receive that new standard.

14 DR. KOLODZY: David?

15 DR. REED: I just wanted to comment.
16 It's really -- it's not a good idea to break
17 receivers off from transmitters because, in fact,
18 they're both parts of the same system. They both -
19 - my best model of the shared medium that we're
20 dealing with is something like a pond. We're all
21 living in the same pond and every little wiggle
22 that we introduce and every little attempt to
23 demodulate it -- to some extent it interacts with
24 every other one and drawing strict boundaries
25 doesn't necessarily work.

1 The problem with regulating receivers
2 and I agree with you, is that in some sense what
3 you really want as a regulation of receiver is a
4 limitation on the right to complain. That's the
5 form of regulation, not what kind of receivers can
6 be built, but if you buy them and they don't work,
7 what right does the manufacturer have to complain
8 and so forth. We've seen that recently, for
9 example, that the XM -- the satellite radio guys
10 are saying gee, we really ought to -- we're
11 complaining because the spectrum or the rules we
12 got aren't good enough to protect us from say
13 802.11. This is a hypothetical argument. I don't
14 know if it's true in practice. But in some sense,
15 the FCC could just say and in a quite reasonable
16 way well, tough, that's what you accepted and if
17 stuff leaks into your band you've got to deal with
18 it, but there is this sense that they're allowed to
19 complain and that gets into the whole question of
20 what is interference and interference is a much
21 more complicated notion that is encoded in policy
22 or worse yet and this is where I fear that we're
23 going to get into trouble, in both the courts and
24 in the Congress, we've sold this rather -- this
25 idea that interference can be understood by any

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1 human being by just thinking about things messing
2 each other up and in fact, interference is only a
3 phenomenon that happens in the receiver design.
4 Other receiver designs won't experience the same
5 difficulties and the interference happens in the
6 system design as Bruce mentioned earlier. You can
7 create transmitters that create wave forms that by
8 the FCC rules would be interfering but which would
9 interfere with absolutely no radios out there. So
10 the lack of knowledge and understanding about these
11 basic principles of what is interference and so
12 forth, I despair that our legislative or judicial
13 process can resolve them and that's one of the
14 reasons why I think we need to leave it to the
15 industry to resolve by cooperating and solving
16 those problems among themselves, trying to create a
17 rights regime to finalize that, to create a rights
18 regime where you've got property rights. Well,
19 where are property rights ultimately enforced?
20 They're enforced in the courts.

21 I can't imagine trying to -- bringing a
22 court case maybe you'd do it in small claims court
23 for a fraction of a second, so and so interfere
24 with so and so by some subtle definition of
25 interference and escalate that to the Supreme Court

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1 where the Supreme Court will try to decide what
2 interference means and come up with some reference
3 back to my childhood in Illinois when my friend
4 threw a rock at me at my house and the window got
5 broken and therefore that's the precedent, the
6 legal precedent we're going to base this all on.

7 (Laughter.)

8 MR. PITSCH: I feel you're directing
9 this to me, David.

10 DR. REED: Actually, it's not.

11 MR. PITSCH: Actually, the other David,
12 I think this receiver question is a great question,
13 a great issue because I think it implicates all
14 these interference issues.

15 First off, you can't abstract away from
16 the interference problem. We could be incredibly
17 conservative about it, at great trade off in costs
18 and efficiency and consumer welfare, right? In
19 terms of the resolution of it, there are sometimes
20 we use courts that are expert, we do that in
21 certain legal areas. I have fundamentally no
22 problem with the FCC being the body to determine
23 these issues.

24 But the issue of receiver standards, I
25 think, is worth drilling down on for a second

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1 because it raises this issue of how we define the
2 rights because in the PCS space, I would argue that
3 you see receiver improvement, a lot of times I
4 suspect the Commission doesn't see it for
5 proprietary reasons. No one has to come to the FCC
6 to get the imprimatur any more, so they don't hear
7 about it, but it's going on.

8 But in the broadcast space, we have
9 some problems and I think a lot of that is due to
10 improperly defined interference rights. And one
11 last wrinkle I'll put on it is the credibility of
12 the FCC on interference. I mean you want the
13 interference criteria to be output. You want them
14 to be
15 objective-defined, so you have transactions. You
16 want them to be enforceable which gets into the
17 dispute resolution issues and I'll tweak the
18 commons folks a little bit because that's where you
19 get the tragedy of the anti-anti commons and -- but
20 then you have credibility. Will the Commission
21 follow through when someone builds receivers that
22 foreclose uses and there are all these folks out
23 there squatting and I think that's a real important
24 issue. The Commission has to develop credibility
25 and if it can't I think that's the best argument

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1 for receiver standards, default receiver standards.

2 MS. RATH: Basically, we're running out
3 of time and I think this is about the quietest I've
4 ever had to be as a moderator and I appreciate
5 everybody's participation. I don't know if there's
6 anybody who has any sort of parting thoughts from
7 the panel here as we close out or even -- I thought
8 I saw somebody raise their hand in the audience.
9 Yes, somebody is coming around.

10 MR. STEVENSON: Yes, I think the issue
11 of receiver standards and how it affects the issue
12 of who's to blame for lack of a better term for
13 interference is something that's necessary for the
14 Commission to address in order to promote spectral
15 efficiency. Otherwise, you have the situation
16 where legacy receivers with poor performance and
17 high susceptibility to interference are permitted
18 forever and other uses of the spectrum that could
19 be possible, if there were receiver standards that
20 would eliminate unnecessary interference were
21 enforced, you end up precluding new uses and it's
22 just sort of because they're there and I don't
23 think we can afford that any more. I think this is
24 something that contributes to this artificial
25 scarcity of spectrum is that we're not exploiting

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1 all of the possibilities for sharing and for
2 frequency radios.

3 MS. RATH: Any comments? Bruce?

4 DR. FETTE: Yes. Earlier there was a
5 comment about what happens after SDR that I wanted
6 to come back to and just speak to briefly and I
7 believe it was you.

8 I wanted to address it in the following
9 way. As SDRs begin to be deployed into the -- both
10 commercial and defense environment, amongst other
11 things you'll see them implementing legacy receive
12 functions first, so that they're interoperable with
13 existing standards, but then they will begin to be
14 upgraded by people who are willing to provide
15 software for those SDRs to implement new functions
16 and fact to the extent that the technology supports
17 it, they will continue to evolve to new
18 capabilities until it runs out of horsepower,
19 somewhat like the Intel model, right?

20 So you'll see the new generation
21 followed by the new generation followed by the new
22 generation followed by the new generation. And so
23 as long as the SDR is capable of having new
24 functionality installed into it, you'll receiver
25 performance improve, new transmit wave forms and so

1 forth that will give a continuing and interesting
2 evolution of the functionality and I think what
3 we're about here is making sure that we can
4 accommodate that.

5 DR. KOLODZY: Well, thank you. Well, I
6 see it's 12 o'clock. I would like to keep things
7 prompt here with the task force as much as we can.

8 So first of all, what I'd like to do is say thank
9 you to all the panelists for taking out of their
10 valuable time and to be able to bring some unique
11 insight into this problem. I think we've had views
12 from every perspective possible here and I think
13 that's important in a sense to bring everything,
14 bring all possible ideas out into the open.

15 I also want to thank the participants,
16 the audience that actually came out today. This is
17 actually one of the cooler days we've had for the
18 Task Force. The last three have been in the upper
19 90s, but I appreciate your interaction and some of
20 your viewpoints and comments I think were very
21 useful and hopefully we can take those into
22 consideration as we move forward with some of our
23 recommendations.

24 So again, thank you and what I'd like
25 to also let you know is that we're going to start

1 up again at 1 o'clock this afternoon. For those of
2 you who are not familiar with the Commission, if
3 you want to have lunch here you need to go up one
4 floor to the courtyard and you can go out to the
5 courtyard leaving your badge and then coming back
6 and getting your badge and having lunch and then
7 we'll reconvene here at 1 o'clock.

8 I want us again to say thank you to the
9 panels and have a round of applause for all the
10 hard work.

11 (Applause.)

12 (Whereupon, at 12 noon, the meeting was
13 recessed, to reconvene at 1:00 p.m.)

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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

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(1:08 p.m.)

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MR. FURTH: Good afternoon and welcome to our second session of today's workshop. It's a beautiful August day out and less than 90 degrees and I'm impressed to see so many people who haven't chosen to hit the highway early and head to the beach. We will be talking this afternoon about modeling of licensed and unlicensed spectrum usage rights and I hope that we will have a discussion that builds on the very interesting discussion that we had this morning.

22

23

24

25

Let me introduce myself. I'm David Furth. I'm senior counsel with the Wireless Telecommunications Bureau and a member of the Spectrum Task Force. On my right is my co-

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1 moderator, Michele Farquhar of Hogan & Hartson, and
2 we will be leading this discussion today, but I
3 think that most of the interests and excitement and
4 heat and light will be generated by those folks to
5 my right and left.

6 What I would like to do, first of all,
7 is tell you that we're going to be focusing on a
8 number of issues. We have a lot of ground to cover
9 between now and approximately 3:15. Since we're
10 starting a little late, we might run a little bit
11 longer than that. We will be talking about
12 defining, trying to really come up with definitions
13 that can actually be employed, practical
14 definitions that can be employed for defining
15 spectrum rights and responsibilities and looking at
16 different models, both the unlicensed commons model
17 that we've heard about at some length this morning,
18 and in prior sessions, as well as various licensed
19 approaches to spectrum; variations on exclusive or
20 property rights that many people have talked about.

21 We'll be trying to talk about how you
22 actually come up with the basic building blocks of
23 a rights model. We'll also be talking about
24 transition mechanisms. How do you get from where
25 we are to where we want to go. So we're doing

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1 something better than what Yogi Berra talked about
2 which is if you see a fork in the road just take
3 it. We're going to actually try to have some sense
4 of direction in where we go.

5 What I'd like to start with is to ask
6 each of the panelists today to introduce themselves
7 and I hope in no more than a minute describe both
8 their background and their particular perspective
9 on the spectrum rights issues that we'll be talking
10 about today. I'm going to start on my right, at
11 the extreme right, Michael, why don't you tee off?

12 MR. CALABRESE: Okay, thanks David. I
13 am Michael Calabrese, director of the Public Assets
14 Program at the New America Foundation here in
15 Washington which is a nonpartisan public policy
16 institute. The questions that have been framed for
17 this panel are just right on the mark, particularly
18 as a wrap up because as we look at the future for
19 licensing and how it can coexist with unlicensed
20 and a commons model, you know, it will be
21 particularly important to talk about the bundle of
22 license rights, the transition to these new
23 licenses with service and market flexibility and
24 then what ongoing role for the FCC.

25 And I just want to make a couple quick

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1 points which is that the bundle of license rights,
2 you know, we believe, and I should mention, I filed
3 comments that were also on behalf of Consumer
4 Federation of America, Consumers Union, and a
5 number of -- Media Access Project -- and a number
6 of other public interests groups. And what we
7 wrote was that the bundle of license rights -- it's
8 very critical that they not be permanent,
9 exclusive, or fixed beyond the period of the
10 license because even if Congress were to change the
11 law to allow some sort of permanent rights in
12 frequencies, it would be both bad policy and
13 unnecessary.

14 Bad policy, because as we've heard on
15 all the other panels, the Commission will
16 periodically need to refashion license rights to
17 accommodate technological change and changing
18 social need. We don't want to freeze a zoning
19 system that was made around analog technology. We
20 don't want to freeze that in place forever and
21 unnecessary because we can clearly define a bundle
22 of rights with service and market flexibility that
23 are also for limited periods and are changeable
24 over time, particularly with respect to
25 interference.

1 And the last point is just with respect
2 to the transition, we would oppose any retroactive
3 and cost free giveaway of valuable new licenses to
4 incumbents for the same two reasons. It's bad
5 policy, because as CTIA, I believe AT&T Wireless,
6 Nokia, and other companies wrote in their comments,
7 in addition to violating the Communications Act, a
8 windfall to incumbents would be unfair to business
9 competitors, to the public, and would fail to
10 internalize opportunity costs efficiently.

11 And finally it's unnecessary again
12 because a number of auction and leasing fee methods
13 are available to accomplish the flexibility that
14 we're looking for. For example, incumbents could
15 be given an option to convert to these new licenses
16 with complete flexibility in return for paying a
17 market base spectrum user fee and so that would
18 just be one of several options that I could mention
19 later and which are in our comments.

20 MR. GATTUSO: My name is Joe Gattuso.
21 I'm with the National Telecommunications and
22 Information Administration at the Department of
23 Commerce. One thing I always like to say for those
24 who know or those who don't know is that NTIA has
25 two functions when it comes to spectrum management.

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1 And like Mike Marcus was saying just moments ago,
2 those are simultaneous functions. Mike was saying
3 that it's like the way of, nature of a radio wave
4 or a light wave itself, both a photon and a wave
5 but the same time. I don't think I ascribe to
6 that. But, in fact, our two functions are
7 separate, but exist at the same time; one function
8 being one that is more high profile. That is, the
9 Agency is the manager of the federal government's
10 use of spectrum, and we host the Interdepartment
11 Radio Advisory Committee which the group of federal
12 agencies that determines how spectrum is to be
13 used. We are also though the Executive Branch's,
14 the President's principal advisor on all
15 telecommunications matters. And through our
16 Assistant Secretary, Nancy Victory, through the
17 Secretary of Commerce -- we are located in the
18 Commerce Department. We have an interest in
19 developing good policy including spectrum policy
20 that affects not just federal users but all the
21 users.

22 And that is also my interest. I work
23 for NTIA's Policy Office. I think we talked about
24 this question before. You know, what's our
25 interest here, what do we hope to add? I actually

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1 hope we can think through on the panel today some
2 of these questions about what it means to have a
3 right, what rights are, and what that means. And
4 even though NTIA and the Department of Commerce has
5 its own efforts going on right now on spectrum
6 policy, we had a spectrum summit a couple months
7 ago. We have not drawn conclusions, and I say even
8 though that's a prelude to saying that I'm here
9 mostly talking about ideas that represent how I
10 view things, not my Agency or the Administration,
11 but I think this is what the workshop, what these
12 workshops have come down to because already
13 offering one of my own views, the spectrum I would
14 propose doesn't even exist. The spectrum is a
15 representation of something, and that's a range of
16 frequencies.

17 In some ways, if you look at a spectrum
18 chart, the spectrum itself is a representation of
19 various rights that are held by different parties
20 or operationally. And it comes down to a matter of
21 what are the rights today. Are they defined? Can
22 they be defined, and if you define them, how do you
23 use that then to be more efficient in serving the
24 public interest. So that's where I see the
25 discussion here and that's where I am. Thank you.

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1 MR. STROH: My name is Steve Stroh and
2 I edit a small newsletter about the broadband
3 wireless industry that I call Focus on Broadband
4 Wireless Internet Access. I'll disclose that I'm
5 not an engineer. I'm not a lawyer. I'm not even a
6 former FCC staffer.

7 (Laughter.)

8 My view is that spectrum is entirely a
9 creation of technology. The spectrum that we
10 natively are equipped to use is a relatively narrow
11 band of frequencies in the audio range and the
12 visual range, somewhere between infrared and
13 ultraviolet. Everything else we have to have tools
14 to make use of that spectrum. And the better the
15 radio, the more spectrum that there is. It's
16 totally useless to us until we have better radios,
17 and we are at the threshold now. We've crossed the
18 threshold actually of being able to make radios do
19 literally anything we can imagine that we can want
20 them to do.

21 We've got ample digital signal
22 processing. We can engage new modes that were just
23 not possible when, that were not practical that we
24 could only do with super computers and now we throw
25 just as many cheap processors as we need to to

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1 accomplish that. And I watch the license exempt
2 bands pretty closely and I'm just in absolute awe
3 of the innovation that's going on there. You want
4 long range, fine, you can have it. If you want
5 very high speeds, fine, you can have it. If you
6 want very high densities, fine, you can have it.
7 All living quite happily within the UNII Part 15
8 Rules. So I'm just watching what's happening there
9 and it just seems like it's a shame not to apply
10 those lessons more widely. That's what I would be
11 advocating.

12 I think that the most brilliant thing
13 that the FCC has ever done, I think it's a very
14 under appreciated piece of phraseology as the Part
15 15 rule that says "this device must accept
16 interference even when that such interference
17 causes undesirable operation". That phrase
18 assures, it absolutely casts in concrete that the
19 spectrum that that particular device is operating
20 in cannot stay static. It has to evolve. More and
21 more things can use it and if you want to keep
22 using it, you've got to adapt. You've got to buy
23 better devices. It just cannot -- it's not allowed
24 to stay static.

25 MR. WYE: My name is David Wye. I'm

1 with AT&T Wireless based here in Washington, D.C.
2 I guess my list of disclaimers, I'm not an
3 engineer. I'm not a lawyer. I'm not an economist.

4 But I am an FCC ex-staffer. So I'm not sure how
5 that matches up. And to complicate it another way,
6 I started out working for a research agency of the
7 U.S. Congress, as David Siddall did. I worked for
8 OTA which was a longer term think tank, if you
9 will, that was disbanded a few years ago, then
10 moved to the FCC under the good graces of Michele
11 Farquhar was her technical advisor for a couple
12 years. And now I have transitioned in my life to
13 the private sector, so I have this kind of very
14 weird, lots of different things going on.

15 I thought that actually this morning's
16 panel was quite instructive and perhaps one of my
17 favorite ones that the FCC has put together so far.

18 There were a lot of great ideas. One of the
19 things that struck me, and this is kind of, you
20 know, encapsulating what we've heard for the last
21 couple weeks, is the idea that this really is kind
22 of a mixed model. It's not a pure property rights
23 model, it's not a pure commons model. You've got a
24 little of both. It's not clear to me that you're
25 going to go in one direction or the other. I see

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1 in some sense a lot more of the same, and the
2 question I know is what's the balance, what's the
3 interplay between the two.

4 Obviously, I come from the license side
5 of the world. That is what I know the most about
6 and I would agree with Michael that the bundle of
7 rights that licensees have is absolutely critical.

8 My company holds licenses. In some cases, we paid
9 a good deal of money for those licenses. And we
10 thought we knew what we were getting. And as the
11 world has kind of played out in the last couple
12 years, it's becoming I think less clear perhaps
13 what exactly those rights really are and obviously
14 that concerns my senior management, I think,
15 especially in terms of interference. We've talked
16 about that all the way through these panels. It
17 keeps coming up and certainly I think that's the
18 preeminent issue that the task force is going to
19 have to deal with going forward as given these
20 conflicting models and many conflicting uses and
21 conflicting services, how do you treat
22 interference. How do you define rights associated
23 with and responsibilities associated with
24 interference. And so I'll be breathlessly awaiting
25 Paul Kolodzy's report when it comes out in late

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1 October.

2 And finally, and I was making this
3 point earlier today with some folks. If we think
4 about it, this goes to the last portion of our talk
5 today, it's all about transition. We're not
6 starting from scratch. There's no clean slate here
7 that we're working from. And this goes back to the
8 first point I made. So you know to talk about
9 these things in isolation at a very theoretical
10 level doesn't strike me being a somewhat practical
11 person perhaps that that's necessarily all that
12 useful all the time. I appreciated Peter Pitsch's
13 comments that you have to be very practical about
14 how you go about this, and I certainly would agree
15 with that. And I'll stop there.

16 MR. FURTH: We'll work our way again
17 from the outside coming in. Martin?

18 DR. CAVE: I'm here from Europe and
19 I've been completely fascinated. Sometimes it
20 feels almost like I'm from Mars or something --

21 (Laughter.)

22 As I witness the sophistication of the
23 debate which I'm afraid we aren't tabled to match
24 in Europe to date. The reason I'm here is that I'm
25 the author of a report. I'll hold it up like the

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1 Shopping Channel. It's 261 pages. Weighs about
2 two kilograms. It's probably a lethal instrument
3 in the physical sense, I suppose, rather than the
4 more metaphorical sense and it's a report which I
5 prepared for the British government, finishing up
6 in March of this year, as an independent review of
7 frequency management. And the British government
8 is now considering its recommendations and I hope
9 they will announce their decisions in the next two
10 weeks or so. the communications bill, which is now
11 going through our Parliament.

12 Just to relieve the suspense, I'll give
13 you two paragraphs of what I recommend. Basically,
14 I have proposed in the report a dual-track approach
15 in which a distinction is made between on the one
16 hand commercial spectrum, and on the other hand,
17 spectrum which is reserved for public services. As
18 far as commercial spectrum is concerned, the report
19 recommends the abandonment of most use restrictions
20 and the use of market mechanisms, auctions for
21 initial allocation or assignment of spectrum and
22 secondary trading.

23 This doesn't exclude the possibility of
24 unlicensed spectrum. That's a matter that's
25 discussed briefly in the report because it has not

1 yet assumed in Europe the same significance as it
2 has in the United States, and I look forward to
3 coming back to that later.

4 As far as public service spectrum is
5 concerned, the report proposes maintaining for the
6 next 5 or 10 years the system in which the
7 government can reserve a spectrum for specific
8 uses. However, in order to encourage economy of
9 use on the part of public services, it proposes
10 that administrative charge be levied for that
11 spectrum. And economies that departments of
12 government can make in use of spectrum will yield
13 savings which will be available to them to spend in
14 order to provide some sort of incentive for
15 economy.

16 The two tracks that I've described and
17 linked to the extent that I propose in the report
18 that public service spectrum should actually be
19 available for leasing across the boundary. So that
20 if, for example, our Ministry of Defense has some
21 spectrum which it will not require for five years
22 or so, it should be entitled to lease it to a
23 commercial organization and to keep the revenues
24 from that. Now, this is I recognize an entry
25 measure, this dual tracked approach.

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