

1 work as well as it used to work. And the
2 presumption, the regulatory presumption has often
3 been well, the stupid use of spectrum prevails
4 because they've been there since time immemorial,
5 like five years. And so all I'm saying is, that
6 attitude from the standpoint of the government is a
7 powerful tool that incumbents can use to protect
8 themselves against what would be better
9 technologies.

10 It's not that every use of spectrum
11 needs to be as intelligent as David Reed. It's
12 just that some uses of spectrum should, and the
13 government should punish intelligent uses against
14 the unintelligent uses. Maybe this is just a smart
15 kid trying to get revenge from high school life,
16 where the unintelligent seemed to have the bias of
17 the government on their side all the time.

18 (Laughter.)

19 PROF. LESSIG: But I think in spectrum
20 policy, it's an important rule. It seems an
21 obvious point which the FCC has not yet universally
22 grabbed onto and run with.

23 DR. LUCKY: Okay. I've been remiss in
24 asking people to identify themselves when you make
25 a comment or a question from the audience.

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1 Let me --- before I turn it over to my
2 co-moderator for the next set of questions, what
3 we've had here is everybody has said unlicensed is
4 great, and we ought to create more of it. Is there
5 anybody here who would care to give the other side,
6 that would feel that it wouldn't be right to create
7 more Unlicensed Spectrum? This is your chance.

8 MR. HADINGER: Bob.

9 DR. LUCKY: Yes.

10 MR. HADINGER: As possibly the only
11 licensee sitting at the table, I do want to take
12 the chance to say that while I believe that there
13 is great potential in unlicensed communications,
14 that that is not to say that all communications
15 should be unlicensed. And, you know, certainly
16 there are systems and processes of great
17 importance, and which have served us very, very
18 well in a licensed context. And that, in fact, you
19 know, encouraging unlicensed, which I certainly do,
20 is not necessarily to say that that should be the
21 only way.

22 DR. LUCKY: Okay. Mike, you take over.

23 DR. MARCUS: Okay. Let me follow on
24 slightly what Peter said and point out, in
25 satellite uplink bands, there are special

1 considerations for unlicensed things that don't
2 apply in other bands, and UNII, for example, is
3 one place where we address that specifically.

4 We do actually read the comments people
5 send us. People wonder if we read the comments,
6 but we actually do. And, for example,
7 Nokiapart15.org, Mutual Data Services and IEEE 802
8 all made the basic point that more spectrum is
9 needed for unlicensed devices, presumably spectrum
10 like the ISM bands where unlicensed devices have a
11 preferred frame of reference.

12 Section 15.209, which has been on the
13 books since 1989, actually allows unlicensed
14 devices sort of almost everywhere below 40
15 gigahertz, with the exception of specifically
16 enumerated bands. But I assume what most people
17 were talking about in their comments were bands
18 like the ISM band, or bands like the UNII band,
19 where unlicensed things have fewer restraints and
20 higher power than the Minus 41 DPM per megahertz,
21 which is typical of the other bands. So this set
22 of questions focuses on do we need the additional
23 bands, like the commentators have said? If so, for
24 what type of system is that needed?

25 Spectrum is not an unlimited resource,

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1 at least beach front property spectrum is not an
2 unlimited resource. If we were to create more
3 unlicensed bands below 10 gigahertz, it's a zero
4 sum gain that we have other users or request for
5 users, and if we allocate any additional bands for
6 preferred use by unlicensed things, basically
7 someone either has to be kicked out, or someone has
8 to be denied entry that they might have. So if you
9 think there's more unlicensed band, could you say
10 something about how do we prioritize it, vis a vis
11 other pending requests for under gigahertz.

12 And in addition to unlicensed, we have
13 a class of things that -- close cousins, but
14 technically called licensed by rule. For example,
15 citizen band radio service, family radio service,
16 multiple use radio service where you don't apply
17 for a license, but legalistically a license exists
18 somewhere. Family radio service, particularly in
19 the past couple of years has been a growing demand.

20 Is there a need for more expansion in spectrum for
21 that type of services too? So who on the panel
22 wants to speak first?

23 MR. CHAMBERLAIN: To address the last
24 question you had, Michael, about unlicensed
25 services like FRS. FRS has grown for a couple of

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1 hundred thousand units in 1998, to close to 15
2 million units this year. It's been a very
3 successful two-way communication device.

4 Right now it's 14 channels. Last year
5 the Commission allowed a licensed an unlicensed
6 device to be put together, an FRS and GMRS radio,
7 which allowed 22 channels, which gave more
8 spectrum, but now has put the average customer in
9 an unusual position, in that he's very - how do I
10 say it - familiar with the FRS service, and that
11 it's unlicensed, and they've been using it, and
12 they're going out to get more of these products.
13 And now they see 22 channels and they're very
14 excited. I got more than 14, but the problem is
15 that it really requires a license. And
16 unfortunately, most of our customers don't read our
17 instruction manuals. We spend a lot of time on
18 them, but they don't read them, and a lot of these
19 people are not applying for licenses.

20 So I would say FRS, its success and
21 expansion, the combined service radio into maybe a
22 license-free service would be something that the
23 Commission should consider.

24 DR. MARCUS: Anyone else on the panel?

25 MR. REED: Yeah. I think it's an

1 interesting question, or interesting thing that you
2 phrased it in terms of bands. And really, we've
3 gotten to the point where most technologies really,
4 or there are a lot of new technologies, I shouldn't
5 say most technologies, a lot of new technologies
6 that really are probably best not thought of in
7 terms of bands.

8 Narrow band radio tends to have a lot
9 of constraints on it. It's useful for voice,
10 maybe, and for low speed data, but wideband systems
11 are what we're going to need for a lot of things.
12 And extremely wideband systems, you know, where the
13 first examples are ultra wideband, but there are
14 lots of other extremely wideband options out there,
15 including the 60 gigahertz stuff here - really
16 provide a very different kind of service, and
17 almost call for sharing with other services in
18 order to get the most out of them. And then
19 there's also the geographic sharing that's
20 possible.

21 One fascinating thing I pointed out in
22 my filing, it's kind of an -- it exaggerates to
23 make a point, is that if you think about the
24 broadcast stations, regular broadcast television
25 and radio bands that are in the prime area, if you

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1 actually look in most cities, you'll find, if you
2 tune your little spectrum analyzer across the dial,
3 that most of the spectrum is unused.

4 An agile system, or an overlay system,
5 that ultra wideband can make use of that very
6 effectively without practically interfering with
7 any receiver. However, the way the regulations are
8 written about interference, the regulations refer
9 to interference at the transmitter, or in the
10 transmitted domain, not the receiver domain. So
11 we're in the position of actually having a legal
12 definition of interference that says interference
13 happens even when nobody is there to notice it,
14 like if you're sitting out in some rural area in
15 New York where you could perfectly happily use, you
16 know, the television band, and your radiation
17 wouldn't affect anybody, because nobody actually
18 uses their television antenna to receive signals in
19 your neighborhood.

20 You're still interfering if somebody
21 could potentially walk in there and, you know, deal
22 with that so -- or, you know, and turn on a T.V.
23 set and, in fact, turn on a T.V. set that was
24 designed in 1930, so it would actually suffer the
25 affects of these problems. So we're really in a

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1 position where we have a lot of beach front
2 spectrum - I hate to use that word - available now.

3 We have a legal system that makes it unavailable,
4 and a set of incumbents who find it very useful to
5 pretend that it's unavailable because it ultimately
6 eliminates competition.

7 DR. MARCUS: Is there anyone on the
8 panel who does think we need additional band for
9 unlicensed? Maybe this will make our life much
10 easier.

11 MR. REED: Well, I think we need new
12 approaches to creating unlicensed space, but what
13 we need is unlicensed radio, not unlicensed bands,
14 and we can unlicense a lot of other technological
15 approaches, while still preserving, you know, some
16 of the benefits of some certain licensed services,
17 without them even noticing that you're there.

18 DR. MARCUS: Dewayne.

19 MR. HENDRICKS: Three comments. The
20 term "beach front property" has been thrown around
21 a lot. I'd like to define it. Basically, to me,
22 beach front property is from 30 megahertz to 3
23 gigahertz. Beach front property might go up to 6,
24 that was used once. But anyway, that's my working
25 definition for beach front property.

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1 Next comment. I, personally, am not an
2 advocate for more spectrum for unlicensed according
3 to the current Spectrum Management Paradigm. Okay?

4 I don't think that we've really farmed adequately
5 the Spectrum that we have allocated for unlicensed
6 already. If you look at the historical record
7 again, there's been some more allocations for
8 unlicensed. There was the unlicensed PCS
9 experiment, which I deem failed, and that 20
10 megahertz was allocated. Apple started that. They
11 wanted 50 megahertz. The Commission allocated 20,
12 and then an additional 10 was allocated, and it was
13 never really used except for the wireless PB
14 access for the isochronous part of that allocation.

15 And then came the UNII band, 300 megahertz. Okay?

16 So the UNII band certainly hasn't been farmed at
17 all to this -- up to this point. And then 2.4
18 gigahertz, I think there's a lot more that could be
19 done there.

20 The problem I see for the current
21 unlicensed bands in terms of this meltdown issue,
22 is not a meltdown per se, but the fact that you
23 have incompatible sharing partners in those bands.

24 By that I mean, you have licensed services. For
25 instance, in 2.4 gigahertz you have four licensed

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1 services, and amateur radio is one, but there's
2 three others that most people aren't aware of. And
3 the thing about these incompatible sharing
4 partners, it means that the licensed services can't
5 go to the Commission and claim interference and
6 have the unlicensed services shut down.

7 Now this is the biggest threat that I
8 see for unlicensed, is the fact that the license
9 holders have bigger rights to those bands than the
10 unlicensed, so it's not a meltdown that I see as
11 the big threat, it's the license holders asserting
12 their rights, so that's a problem under the current
13 Spectrum Management paradigm.

14 So to sum up my second point, no more
15 unlicensed spectrum under the current paradigm.
16 Let's make better use of what we've got, use
17 Darwinian principles and let's see what happens.

18 My third and last point is that - and
19 this speaks to what Dave was saying - we don't need
20 no stinking bands - okay - any more with the
21 technologies that are available. I prefer to use
22 the term "wideband technology", which encompasses
23 not only ultra wideband, but spread spectrum. We
24 tend to forget that spread spectrum has been around
25 for a long time, has been pretty darned successful,

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1 and it's a wideband technology, so at the TAC we've
2 been using the term "wideband technology" to handle
3 -- to be the moniker for this class of technologies
4 that use more spectrum than the information
5 bandwidth.

6 Now the term has been introduced that
7 these things use spectrum overlay so they can
8 essentially transmit over existing services and do
9 no harm. Lately, Bob Pepper two months ago coined
10 the term "Spectrum Underlay", and so I'm starting
11 to use that term now, rather than overlay, because
12 I think it's more politically correct. It also
13 speaks to what's being done there, in that you're
14 basically underlying something under an existing
15 service. Okay? And this is possible with the
16 technologies that we are coming down the pike. And
17 so, now okay, yes, unlicensed but under -- more
18 spectrum for unlicensed but under a new paradigm.

19 DR. MARCUS: Okay. Peter.

20 MR. HADINGER: Thank you. A couple of
21 comments on a few of the points that have been made
22 panelists and audience up to this point. First of
23 all, just in response to what is beach front? I
24 think that it depends on who you are. Certainly,
25 in the satellite community, beach front extends

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1 well above 3 gigahertz, and we're quite happy with
2 it.

3 In terms of the concept of bands, there
4 is, I think, a need to have bands for unlicensed,
5 because again what you're trying to do, at least in
6 my view, is to try to bring things of like
7 characteristics together. And in some sense,
8 unlicensed, it may have a like characteristic in
9 the sense that it's not -- it doesn't conform to
10 rules. And maybe what you want to do is have a
11 place where such things are allowed to operate, all
12 of which realize that they may impose some
13 inefficiency in their design by adding additional
14 protocols, and layers, and so forth, to allow more
15 efficient sharing with people who also don't
16 necessarily have rules. But that making them co-
17 habitate with folks who have adopted similar
18 sharing rules, and have found very efficient ways
19 of using their spectrum is probably not the right
20 answer, so I do think that there should be
21 additional bands set aside for unlicensed. And as
22 in most cases, and probably even more so for
23 unlicensed, what these greenfields should be is
24 everywhere from D.C. to daylight to take advantage
25 of the different characteristics that exist in

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1 different bands.

2 In other words, there's certainly
3 different characteristics at VHF frequencies, in
4 terms of penetration and propagation distances,
5 than there are at 60 gigahertz which, by the way, I
6 think is a wonderful band for unlicensed, just
7 because the propagation characteristics and the
8 beam widths make it so unlikely that interference
9 would actually happen.

10 All of these are a way of saying that
11 in order for things to share, there has to exist a
12 barrier between the types of users in one fashion
13 or another. This barrier can take the form of
14 frequency, having people assigned to different
15 frequencies. It can take the form of time, having
16 people in different time slots. It can take the
17 form of having orthogonal codes or amount of
18 attenuation between types of systems, some things
19 for indoor use, some things for outdoor use. A
20 number of different places where we can have
21 sharing, but you have to have a barrier that
22 exists. You know, good fences make good neighbors,
23 and where you do that, I think that you can find an
24 opportunity for the greatest amount of sharing,
25 without creating interference that would otherwise

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1 be harmful.

2 DR. MARCUS: Okay. Now we want to
3 leave some time for the audience that may have
4 questions or statements, so Larry.

5 PROF. LESSIG: Well, I -- so between
6 these two comments, one that says that we don't
7 need no bands, and the other says that we do need
8 bands, I think the right answer has go to be we
9 don't know enough about whether we need more bands,
10 or we don't need more bands.

11 DR. MARCUS: So what question should we
12 ask?

13 PROF. LESSIG: So then we should be
14 asking, how do we facilitate the experiment to
15 allow both of these to go forward. Now in the
16 context of no bands, I mean, the work that I've
17 been reading suggests that this really is something
18 of the future here, whether we think of this under
19 the general category of wideband. But I would just
20 emphasize that when David says what we need is to
21 facilitate sharing, that opens up a huge political
22 question about what is the "sharing" going to be?
23 Can the unintelligent incumbent say that well, I
24 don't have to put any intelligence into my system
25 at all, and then say that you're not sharing with

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1 me because now we're in some sense conflicting.
2 That would be the wrong answer for the FCC to
3 adopt, so sharing must include at least some
4 reasonable and very cogent idea, cheapest, cost-
5 avoider conception about how to facilitate sharing
6 in this wideband context.

7 But the second thing that's got to
8 happen is that the FCC has got to begin to clarify
9 the distinction between technical interference and
10 competitive interference. We saw this most clearly
11 in the context of low power FM radio, where the
12 FCC, I thought, did a great job in trying to
13 demonstrate we could actually have much greater,
14 more diverse radio, FM radio. And then this was
15 attacked by Congress under the conception of
16 interference would be created by this low power FM
17 radio. But obviously, there was no technical
18 interference created by low power FM radio,
19 especially as the FCC finally approved it. The
20 interference was competitive interference. It was
21 going to create more competitors.

22 Now the FCC is obviously not the
23 ultimate policymaker, and if Congress wants to be
24 corrupt, they're allowed to be corrupt in this way.
25 That's fine.

(Laughter.)

1
2 PROF. LESSIG: But the FCC could
3 facilitate a discussion about what's the relevant
4 issue -- what's the relevant interest at stake here
5 by distinguishing between which interferences are
6 really technical interference, and then have a
7 competitive impact statement. And this will make
8 it much harder for the following people to continue
9 to do their incumbent way of doing business.

10 At least we could have a discussion
11 that said okay, you are benefitting the incumbent
12 against this new technology to do whiz-bang
13 whatever, and just bear the political cost for
14 benefitting the old against the new.

15 DR. MARCUS: David, and then we'll go
16 to the audience.

17 MR. REED: Okay. I'm not sure I'm
18 going to be quite as controversial as that, but
19 what -- I kind of disagree with this good fences
20 make good neighbors thing. And we could get into,
21 you know, the sheep versus the cattle answer back
22 in the old days, but actually, it turns out there's
23 a really great example in communications of how
24 good fences weren't needed, and that's the
25 Internet.

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1 Twenty-five years ago, or more, we
2 recognized that the applications of the Internet
3 were unknown, and the right technologies were
4 unknown, and we would need to evolve some answers.

5 We didn't anticipate that the system would last 25
6 years. Our hope was that it would last 5 years,
7 and we'd come up with some very interesting
8 research results.

9 What we learned, and what the IETF, the
10 Internet Engineering Task Force learned over time,
11 is that there is a way to manage the evolution of
12 rules among a group of not always friendly, and
13 certainly not always compatible users of a system
14 that shares a lot of resources.

15 That learning, which is based on some
16 architectural principles, one of which I'm partly
17 responsible for, called the "end-to-end argument",
18 basically says that if you find a way to get a
19 minimal standard that allows for cooperation, and a
20 process that allows you to evolve both the rules,
21 and also increase capacity as times goes on, then
22 people can do -- you know, follow a mixed strategy
23 of defining new rules where they can, creating more
24 capacity so the interference doesn't happen. And
25 what we see in wireless, I had thought 10 years ago

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1 when I got interested in wireless that the
2 rulemaking could follow the Internet model, but I
3 wasn't quite sure about whether we could increase
4 capacity over time fast enough to deal with the
5 demand if we opened up an unlicensed or unmoderated
6 space.

7 This research that I've been looking at
8 recently, which basically says that capacity and
9 all kinds of other benefits can increase with the
10 number of users bringing resources to the system,
11 independent of how much spectrum they're on, leads
12 me to believe that we could follow the Internet
13 model quite safely. We have zillions of engineers
14 involved and, you know, who have figured out how
15 to do that, working for companies ranging from
16 Cisco to, you know, Microsoft, to a lot of other
17 companies, so we know how to live in that world.

18 It may not be the case that
19 broadcasters or the cell phone operators know how
20 to live in that world, but I think they could learn
21 rather quickly. Thanks.

22 DR. MARCUS: Bob.

23 DR. LUCKY: Yeah. Let me comment on
24 that because I think the Internet is a very
25 interesting example, because it is a commons, and

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1 it does mainly work. And one of the interesting
2 things is how TCP shares the space out there by
3 everyone sort of using the same software, different
4 varieties of it that backs-off when it encounters
5 congestion. And it's a lot similar to what 802.11
6 does, in that listen before you speak kind of
7 thing. But similar to the 2.4 gig band, there are
8 other users of the Internet who don't obey that
9 courtesy protocol, like UDP, which just sort of
10 blasts out there, and you have this mixture of
11 people who are obeying rules, and people who aren't
12 obeying rules. But the bottom line is, it works.

13 MR. REED: Actually, I could -- Larry
14 hinted at why it works. I've wondered about that
15 for a long time because cooperation or defection
16 from cooperation is an interesting question. And,
17 you know, lots of people -- Bob Metcalfe is the
18 most famous person who prophesized the meltdown of
19 the Internet for precisely this reason.

20 I started to delve into that question
21 of why no meltdown. Certainly, some company could
22 come out and say I have the world's most efficient
23 protocol, and the way it gets its efficiency is by
24 blasting everybody out of the way and just doing,
25 you know, doing the best for the individual user.

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1 What tends to happen, first of all,
2 that's an observed behavior. It's measured,
3 detected, people point that out to the user.
4 Second, almost always organizations are deploying
5 these systems, not sole isolated individuals. And
6 organizations don't want to blast their other
7 users, so they have an incentive to cooperate, so
8 what ends up happening is that in the competitive
9 marketplace, if you say that, you immediately get
10 noticed as a polluter. And polluters, you know,
11 when you are selling a polluting product, even if
12 it's got benefits to the user, as long as that
13 pollution is, you know, well-known in the
14 marketplace, people don't buy it. People are, you
15 know, for the most part, you know, like the zero-
16 emission microwave ovens, you know, if they could
17 buy an alternative, you know, they'll stay away
18 from the polluting products. And, you know, that
19 doesn't always happen, but that is an aspect of the
20 market self-regulation that's not usually
21 considered in the economic model here, that it
22 happens in the competition rather than the
23 regulatory space.

24 DR. MARCUS: Okay. I'd like to open
25 the floor now for questions on the need for

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1 additional spectrum for either unlicensed or these
2 other, the cousins that are licensed by rule. And
3 could you please, when you ask a question, identify
4 yourself with your name and affiliation at the
5 beginning. Over here.

6 MR. SNYDER: Jim Snyder from the New
7 America Foundation. I'm wondering if the FCC is
8 considering any sophisticated variable power and
9 directional schemes in conjunction with unlicensed
10 spectrum. What I have in mind, in particular, is
11 what some have called the Afghan Spectrum
12 Etiquette, which is a conjunction of say GPS and
13 Unlicensed Spectrum to control power levels, so
14 that if you're in rural Wyoming, or in a low-
15 density suburb, you don't have to be restricted on
16 the current, say wi-fi, power limits. Or wherever
17 you are, there are a lot of places where it's an
18 artificial restriction, and if you could coordinate
19 via satellite. You know, in Afghanistan, the
20 military coordinated the air campaign with the
21 ground campaign.

22 MR. REED: But the current block of
23 question is do we need more spectrum, and we're
24 getting into etiquettes very quickly, but could we
25 keep this particular block of questions on do we

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1 need more spectrum? So keep that thought, the
2 person back here.

3 MR. KOB: Well, Michael, you also
4 spoke to licensed by rule, and I'd like to address
5 that, and the comment made by the gentleman from
6 Cobra. I think he put his finger on what is really
7 a terrible dilemma that is to some degree
8 Commission created, and that is the mixing, as he
9 pointed out, of a licensed by rule service with a
10 service that requires a conventional license. So
11 the end-user has this device. It's a single radio
12 unit, but some of the channels in it are exempt
13 from licensing by statute, and other of the
14 channels require an expensive government license, a
15 complex form or web procedure to get a piece of
16 paper from the government, and the radio will work
17 fine without sending the \$85 or whatever it is to
18 the FCC.

19 DR. MARCUS: Do we need another band or
20 don't we then?

21 MR. KOB: Well, I want to point out
22 that the issue is licensed by rule. And the clash
23 between users with conventional licenses and users
24 that don't require a license. And this is simply
25 going to increase. These products sell in enormous

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1 volume. And what I think the solution has to be is
2 the introduction of cognitive radio and SDR
3 techniques into these bands. And what the
4 Commission will have to deal with is how to evolve
5 these services, how to introduce this technology
6 into bands that already fill large numbers of
7 analog users.

8 I'm afraid that the Commission might
9 wait for manufacturers to come up with this
10 initiative. They may be waiting a long time. And
11 the problem is, if you do not address this, you're
12 going to perpetuate this problem of I'm required to
13 send all this money to Washington, and all I get is
14 a postcard with my name and address on it. It
15 makes absolutely no difference, and the continued
16 really increasing interference issues between users
17 who have had licenses, been there for a long time,
18 and expect disciplined operation, and then people
19 who are consumers who really are not concerned with
20 FCC rules. They just want to talk on the radio.

21 So as to the question of do we need
22 more spectrum for unlicensed, I'm a big booster of
23 unlicensed, but I think it's a myth that if you
24 allocate more spectrum, manufacturers, vendors and
25 users will automatically flow in. That's not the

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1 case.

2 DR. MARCUS: Okay. Benn, for the few
3 people in the room who don't know who you are,
4 could you please say who you are.

5 MR. KOBBS: I'm a consultant in radio
6 spectrum policy.

7 DR. MARCUS: Your name?

8 MR. KOBBS: My name is Benn Kobb.

9 DR. MARCUS: Okay. Great.

10 MR. KOBBS: So it's not just the
11 availability of spectrum. It's the availability of
12 standards, of business opportunity, of technology
13 suitable for that spectrum, and in some cases, the
14 possibility of international markets. All of these
15 are the things that draw manufacturers to a given
16 band, not simply the availability of the spectrum.

17 DR. MARCUS: Okay. Thank you very
18 much. Has anyone -- now does anyone specifically
19 say (A) we need spectrum for X, or (B), we don't
20 need spectrum for Y? Yes, sir.

21 MR. COOPER: Well, I'm going to suggest
22 a better -- Mark Cooper, Consumer Federation of
23 America. I'm going to suggest the better question
24 is not whether we need more or less today, but how
25 we'll free it when we do.

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1 Dewayne is suggesting if we really had
2 a chance to develop what we've got, we'd prove that
3 this is a better space, a better way to organize
4 the space, and so that over time the question is,
5 as that space becomes filled, how are we going to
6 get the rest of the beach front liberated from the
7 tyranny of the licenses? And I think that would be
8 a set of -- that's the better question.

9 (A) You certainly don't kill the
10 experiments today of which there is a threat. And
11 then (B), if you do conclude, as most people on
12 this panel suggest, this is a better way to
13 organize the space, then you've got the really big
14 question of how you're going to get the incumbents
15 out of their existing spaces.

16 DR. LUCKY: In the real world, you
17 know, beach front occasionally have a hurricane.

18 (Laughter.)

19 DR. MARCUS: Any other questions? Over
20 here.

21 AUDIENCE MEMBER: Yeah. I'd like to
22 just address this to anybody on the panel --

23 DR. MARCUS: Could you identify
24 yourself please, sir.

25 AUDIENCE MEMBER: -- who would like to

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