

UNITED STATE OF AMERICA

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FEDERAL COMMUNICATIONS COMMISSION

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PUBLIC SAFETY NATIONAL COORDINATING COMMITTEE

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TECHNOLOGY SUBCOMMITTEE

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THURSDAY

FEBRUARY 20, 2003

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The Subcommittee was called to order at 10:48 a.m. in Conference Room 7-B516 of the Federal Communications Commission, 445 12th Street, Southwest, Washington, D.C., Glen Nash, Chairman, presiding.

PRESENT:

GLEN NASH	Subcommittee Chairman
DON ASHLEY	Member
DAVE BUCHANON	Member
MICHAEL WILHELM	Designated Federal Official

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

2 (10:48 a.m.)

3 CHAIRMAN NASH: All right. The Technology
4 Subcommittee will come to order. I was going to say
5 that this was going to be a relatively short meeting,
6 but I have been proven wrong on that in the past.

7 I only had two items on the agenda, and
8 one was an update from TIA, but we already heard that,
9 and the only other object was a report from Sean
10 O'Hara on the unloading of the wideband channels. I
11 would like --

12 MR. BUCHANON: Before we go off on TIA, is
13 there anything that this group -- should we recommend
14 to the steering committee to approve those, or
15 consider it done, or just wait until it is all done?

16 CHAIRMAN NASH: No, and I was going to get
17 back to that. Relative to the standards for wideband
18 data, I personally would recommend that we not adopt a
19 portion of the necessary documents for an
20 interoperability standard.

21 That we should adopt -- you know, when TIA
22 finishes its work, that we adopt all of the documents

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1 that are necessary as a single action. I think to do
2 half-an-action right now is -- and am I seeing
3 comments?

4 MR. LELAND: Wayne Leland from Motorola
5 and representing TIA. I guess the question that I
6 would ask is NCC going to continue, and has that been
7 determined yet?

8 MR. WILHELM: Yes, it has. As a matter of
9 fact, the final signatures were put on it yesterday.
10 The NCC's term is extended until July 25th, 2003.
11 That should give us adequate time to receive and
12 consider the TIA recommendation.

13 MR. LELAND: Then I would agree with your
14 statement.

15 CHAIRMAN NASH: Yes. Actually, I was just
16 talking with John Oblak, and that does put a push on
17 us. Have we been looking at actually having a meeting
18 then?

19 MR. WILHELM: Yes.

20 CHAIRMAN NASH: Because my experience with
21 Washington is that this place pretty well closes down
22 on being able to do any sort of meetings or anything

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1 at that time of year.

2 MR. WILHELM: Well, I think the timing of
3 the next meeting is going to be pretty much dependent
4 on TIA's progress. As soon as the document is
5 available, we will convene a meeting.

6 And you are right, that if we listen to
7 the end of July, a lot of people are away, including
8 me.

9 CHAIRMAN NASH: Yes, I was thinking a
10 September meeting probably fits the schedule that TIA
11 is working on, and the Washington schedule, and that
12 would be past your July 25 date.

13 MR. WILHELM: Well, again, depending on
14 the progress, we can seek an extension, a further
15 extension of the charter, but right now it is July
16 25th.

17 CHAIRMAN NASH: John.

18 MR. POWELL: The question that I would
19 throw back to John Oblak is would there be benefit in
20 speeding the process of getting equipment fielded and
21 moving forward some of these -- okay. Now the
22 microphone is on.

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1 Would there be benefit in moving forward
2 or accelerating the fielding of equipment in
3 recommending some of these now, versus holding off for
4 a few months and recommending the whole package?

5 MR. WILHELM: John, what are the
6 outstanding documents? What do they concern?

7 MR. OBLAK: Actually, there are three
8 outstanding. The first one is, and that will probably
9 be the longest running, is the text messaging
10 specification, and that is right now in the drafting
11 stage.

12 And probably our plan is to have it
13 approved for publication at the June meeting, which
14 would mean that it conceivably could be published in
15 June or July. There are two other documents that are
16 in ballot right now, and that is packet data and
17 mobility management. Those -- the ballot closes on
18 those in this month, and which means that we would be
19 able to approve them for publication conceivably in
20 the April time frame.

21 So there is really only one that hangs out
22 there, and that is the text messaging, and that looks

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1 like it would be -- the target that we have is
2 authorization in June. And so it would publish
3 sometime in the June time frame, or maybe early July.

4 MR. POWELL: John, is that --

5 MR. OBLAK: I would believe so, yes.

6 MR. POWELL: That was my thought, that if
7 we moved the hardware pieces forward, there might be
8 some benefit to manufacturers that that was on the
9 horizon, and that we could get a six month jump.

10 MR. OBLAK: As I said, the documents are
11 available. They could be approved at this point if
12 you wanted to. TIA is not planning any future action
13 on the documents that have already been published, or
14 at least nothing is imminent.

15 So if you would like to authorize those,
16 or recommend those, it could be done.

17 CHAIRMAN NASH: What is the feeling of the
18 group?

19 MR. BUCHANON: I don't think we would hold
20 anything up if we waited and did it at -- whatever the
21 July meeting is.

22 MR. POWELL: John Powell. Let me just

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1 comment that from the discussions that I had with
2 manufacturers before, and maybe some of them would be
3 willing to comment on, but several said that in the
4 data arena that they didn't want to really make any
5 commitments until they knew where things were going.

6 And I think that again that we are talking
7 about several months lead time on the hardware design,
8 which is the first phase that we are all going to be
9 looking at anyway if we move things forward.

10 CHAIRMAN NASH: But, John, I would suggest
11 that they ought to know where things are going if they
12 participate in TIA. If their comment is that we don't
13 always know where things are going, they are probably
14 waiting until the Commission takes action, which kind
15 of says that if we made a recommendation now would the
16 Commission take action before July, or would they hold
17 it for a single action when they got the whole
18 package.

19 MR. WILHELM: I think almost certainly
20 that they would wait for the entire standard.

21 CHAIRMAN NASH: So do we gain anything
22 time wise? Ernie.

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1 MR. HOFMEISTER: Ernie Hofmeister, MACOM.
2 I guess I would sort of agree with your comment, Glen,
3 that I think that most of the candidate manufacturers
4 already participate, and are pretty well aware of what
5 is going on in TIA and TR-8.5, and they are aware of
6 these documents, and expect that they will get
7 approved by the NCC and then by the Commission.

8 So I would not hold that out as a
9 deterrent for people doing work and development if
10 they so wanted to.

11 CHAIRMAN NASH: Any other comments as to
12 whether we should move forward with half of the
13 documents at this meeting, and the remainder at this
14 point undisclosed future date? Or do we wait until
15 the undisclosed future date and do it all in one
16 action?

17 MR. SMITH: Ray Smith, Ohio. I would just
18 ask the FCC what would they prefer to have? I think
19 it would probably be preferred in one package, as
20 opposed to piecemeal.

21 CHAIRMAN NASH: I am kind of hearing that
22 even if we gave them half today and the other half

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1 later --

2 MR. SMITH: They would have to let it
3 rest.

4 CHAIRMAN NASH: -- that they would let it
5 sit until they had the whole package.

6 MR. SMITH: The answer is there.

7 CHAIRMAN NASH: I kind of sense that
8 having the entire package is a necessary part of this,
9 and so I would suggest that we wait until we had the
10 entire package and that we could reference as a single
11 set of documents.

12 And therefore, you know, all be
13 comfortable that it is a complete set of documents
14 that are necessary for the interoperability. Is there
15 any disagreement with that? Kevin.

16 MR. KEARNS: Kevin Kearns, King County,
17 Washington. I guess I would just ask from the
18 Commission's perspective that knowing that now a date
19 certain that can be extended has been established for
20 purposes of extending into July, if there wasn't
21 evidence in the record, at least in recommendations to
22 the NCC that we had gotten six done, and we were

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1 headed towards the final three, and here is the due
2 dates, does that give us some more ability to extend
3 beyond July, showing that we have already made
4 progress on the six?

5 I am just concerned that by holding off
6 that it appears that progress is not being made, even
7 though the record of the meeting would reflect that it
8 was reported that progress had been made, but the six
9 have not been offered for consideration already.

10 MR. WILHELM: I have to say that the
11 decision on whether to extend the NCC for another few
12 months is something that, and while I don't have
13 complete control over, I am confident that I could
14 convince the powers that be that it is warranted
15 without having part of the standard adopted.

16 I think it is pretty close to ask them how
17 we are doing, and they will know the outcome of this
18 meeting, and we have been told that if it is necessary
19 to extend it that GAO will be -- or GSA rather would
20 be receptive to it.

21 CHAIRMAN NASH: And really I think that
22 from the record of past meetings, and certainly we can

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1 make it in our record tomorrow, you know, that 4 of
2 the 7 documents are completed and ready for
3 consideration.

4 But our only reluctance is the fact of
5 wanting to have the complete suite of seven documents
6 available.

7 MR. BUCHANON: I think that will be in
8 John's group presentations.

9 CHAIRMAN NASH: Yes, it has been in John's
10 past presentations and it will be there tomorrow. Any
11 other comment? Okay. Then I think we will hold off
12 and try to deal with the wideband data standard as a
13 single action, looking at all seven documents at once.

14 The only other comment, as long as we are
15 on TIA, is that several meetings ago we had adopted
16 the common air interface, ANSI 102 document, as a
17 critical document necessary for both voice and data
18 interoperability.

19 TIA is right now finishing up work on an
20 updating of that document, which as I indicated at the
21 last meeting amongst a few other minor changes, the
22 critical change in there is the addition of an AFC

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1 message in the common air phase, which is a necessary
2 message in order to establish the frequency stability
3 of the radios, which is necessary in order to comply
4 with the FCC rules.

5 This gets us into the dilemma that we
6 talked about during John's meeting of -- you know, we
7 have a document that is currently referenced in the
8 rules. TIA is about to come out with a -- and I keep
9 forgetting the word that you used for it.

10 MR. WILHELM: An up-issue I believe.

11 MR. POWELL: It is an up-issue of the
12 document, and I think at this point that since there
13 is no -- are no systems, no equipment fielded, it
14 would be desirable for this group to recommend use of
15 the latest document, this up-issue which is pending.

16 And as John and I discussed during the
17 break, certainly the existing issue, it does not
18 address AFC, and one could argue that there is also
19 the requirement for type acceptance, and to meet the
20 FCC's frequency stability requirements.

21 And so therefore it is covered that way,
22 but as I noted to John, it does leave the door open

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1 for Manufacturer A to come up with Method A for
2 establishing frequency stability.

3 And Manufacturer B to come up with Method
4 B to do it, and then we don't have interoperability
5 between Manufacturer A and Manufacturer B equipment,
6 which is exactly what we are trying to accomplish
7 here.

8 MR. BUCHANON: Was this the wideband data,
9 or is this --

10 CHAIRMAN NASH: No, this is on the narrow
11 band, common air interface, and it affects both the
12 voice and the data, because it is the common air
13 interface document that is impacted here.

14 So TIA is just finishing up balloting on
15 that, and they should be ready to authorize that for
16 publication probably at the April meeting, John, do
17 you think, or

18 MR. POWELL: No, actually I believe it is
19 probably a cycle beyond that.

20 CHAIRMAN NASH: So it is probably looking
21 at the June meeting also, and therefore this committee
22 would need to recommend that the Commission modify the

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1 rules to reference that latest issue of the CAI.

2 So that gives us two things that we need
3 to discuss that we can't really do until documents are
4 published in the June time frame. Any other comment
5 from the audience on those issues?

6 (No audible response.)

7 CHAIRMAN NASH: Okay. I guess that brings
8 us to Sean, who has done some work at R.B. Hess at
9 looking at loading standards on the wideband channels.

10 A couple of meetings ago, I had done a very quick
11 thumbnail sketch of what a loading standard could be
12 based upon, and admittedly with very weak technical
13 justification for it.

14 MR. POWELL: That one is not going in the
15 rules.

16 CHAIRMAN NASH: Nobody had other
17 suggestions. So we are ready for Sean to give us his
18 thoughts on loading factors.

19 MR. O'HARA: Glen, at a couple of meetings
20 ago, I expressed concern that maybe the loading was a
21 little optimistic based upon the through put numbers
22 that we were looking at.

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1 That was based upon some studies that I
2 had done, and one of the studies that I did under TRE
3 18 for the through put on the project 25 packet data.
4 So I kind of had a feel for where this might be going.

5 So at the last meeting I said I would kind
6 of take a look at what the real proof was probably
7 going to be, in terms of payload, user data payload,
8 and we could probably use that against some user
9 requirements to figure out what the loading should be.

10 And I am going to kind of go over the
11 results of that here. Based on the results of the
12 analyses that I did to come up with this reasonable
13 loading criteria, and there is going to be some give
14 and take at the end, and by give and take, I expect
15 that probably it will be taken off-line at some point
16 after this, too.

17 We are concentrating on the 50 kilohertz
18 channels in the same technology here, and as I said at
19 the last meeting, and everybody agreed, I was going to
20 do this assuming that the designs for the system would
21 be based upon putting the SAM technology on to your
22 voice system infrastructure.

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1 In other words, overlaying your 50
2 kilohertz data system on top of your voice system,
3 which I think is probably the most typical use that
4 you are going to see for these kinds of things, and
5 SAM seems well suited for that type of operation.

6 AUDIENCE MEMBER: You mean the same size
7 diameter as covered circles or cells?

8 MR. O'HARA: And taking your voice system
9 sites and slapping the same bay station on to it. And
10 some people may be putting up a lot of extra sites in
11 order to get additional data through, but for most
12 people I think they will probably be hanging these off
13 their voice infrastructure.

14 And when you are close to the site, you
15 have very high data rates, and when you are at the end
16 of the cell, you still have useful data rates that are
17 at least on par with your narrow band data and still
18 better.

19 In terms of the baseline through put
20 analysis, I used some TR-8.5 material and I follow TR-
21 8.5 pretty closely, and these are the kinds of through
22 put -- and this is just a table of through put numbers

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1 that give you a feel for what kind of things we are
2 getting here.

3 We have a basically receive power and
4 symbol, energy for symbol, versus NO on the left, and
5 there is a symbol for receive power from minus 116 to
6 minus 72 dbm. And then for the various modulation
7 modes, I brought it from QPSK to 64-QAM uncoded.

8 You have basically some through put in
9 kilobytes per second. Now that is the aggregate
10 through put and that is under a faded channel
11 condition. If you look under the gross column there,
12 for each one of those modes you have a number.

13 For example, under (inaudible) coded QPSK,
14 you have a gross through put of some 76.8 kilobytes
15 per second. And that is based upon basically the
16 symbol rate times the number of subcarriers, times the
17 bytes per symbol for the modulation that it is going
18 through.

19 So basically that is just the raw number
20 of bites that are going down the pipe. When you are
21 looking at net, that basically subtracts off the bites
22 that are really going into using synchronization of

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1 pilot symbols in the OSDM modulation in order to
2 equalize the channel out.

3 And then the number which you see in the
4 table is the final number basically, and when you have
5 considered all of that, and you have also considered
6 your air control quoting, the ability to operate in
7 the faded channel.

8 And here are the channel conditions that I
9 just chose to use for the TU50 model, which is the
10 typical urban model, with a doppler of 50 kilometers
11 per hour, and a two path -- a direct path and a
12 delayed path -- at five microseconds, with a power
13 level of minus 22 db now.

14 And basically it is a two-way multipath
15 model. We are only using the first reflected rate for
16 this model. Assuming that the radio link adaptation
17 layer is operating at a hundred percent efficiency,
18 and the radio is operating at an adapted maximum
19 throughput load -- in other words, it is adapting its
20 modulation to always have the maximum throughput based
21 upon perceived power levels, you are going to see a
22 through put that will jump between modulation modes

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1 based upon power levels such as we see in this table
2 here.

3 And that is what we are going to use for
4 the rest of the study. We are going to actually
5 follow -- and in that kind of range we are assuming
6 that we are going to be operating in the QPSK mode,
7 and as we get higher power levels, we are going to
8 switch to 16-QAM, and then we are going to go to 64-
9 QAM at the highest power levels. And always operating
10 in the highest through put mode.

11 In general that gets you something that
12 looks like this, or different parts of your service
13 area that you are going to be operating at different
14 types of modulations.

15 And that is a little scalable. I mean,
16 that runs from 3 miles to 12 miles, and that is
17 assuming that the modulation is going to switch at the
18 median levels. You may want to define your cover
19 based on at least the 90th percentile, as we are going
20 to do a little later, and that will shrink the service
21 area in each one of those considerably.

22 But basically you see the kind of concept

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1 that is applied here. You are going to be switching
2 modes where you have a more higher data through put
3 closer to the site.

4 I also worked under the assumption of -- I
5 used an Okumura Hata Davidson model for the path loss,
6 with a height above average train of 50 meters, and
7 perceived height of a little over 2 meters, and based
8 upon the voice infrastructure having a 250 watt ERP,
9 and the SAM ERP being at 47 db, and basically that is
10 a 20 watt power output on the SAM radio, with a 6 db
11 antenna gain, and 2 db assorted transmission system
12 losses.

13 And then we have ranges that kind of look
14 like that. What we are going to do is we are going to
15 pretty much operate at the ranges that correspond to
16 about 40 dbu contour. We are only going to look at
17 those kinds of ranges for the rest of this study.

18 And that is again based on the fact that
19 we are going to be looking at the voice system
20 overlay. I did curve fits to the adaptive through put
21 model, and I basically did a bunch of Monte Carlo
22 integrations. I looked at an unfaded model, an

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1 unfaded system which gives you the kind of results
2 that you see on the left.

3 And which it is hard to read, as the color
4 scale is basically based upon data through put, and
5 the one on the right is based upon 7 db of log normal
6 shadowing, which is kind of a typical kind of thing
7 that you are going to see over the service area.

8 For both of those cases, we have
9 distributions of through put, and if you pick the 90
10 percent reliability level as a metric that you want to
11 operate under, and that you want to base the rest of
12 this study on, that is going to give us an adaptable
13 mode through put of between 25 kilobytes per second to
14 32 kilobits per second.

15 The median levels are about 60 kilobits
16 per second, and with mean levels a little higher,
17 almost 70 kilobits per second. And again if we look
18 at the smear through put levels over that service
19 area, this plot pretty much gives you the same
20 information.

21 And going to the results now, we have seen
22 average through put over that cell of about 66

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1 kilobits per second, with a reliable through put if
2 you needed to set a reliable metric of between 25 and
3 42 kilobits per second.

4 Again, that is going to be further reduced
5 by channel resource sharing within the user group.
6 There is going to be access slot contention, and there
7 is going to be slot scheduling, and this is going to
8 happen a lot, particularly under heavy loading
9 conditions when multiple people are trying to access
10 the system.

11 You really can't get a hundred percent
12 access to the system. That is going to reduce the
13 total through put by -- I used a factor of an
14 additional 25 percent. It might be probably more like
15 a third, but I used 25 percent to be a little
16 conservative.

17 Therefore, the data that is available from
18 that single 50 kilohertz channel or pair, depending
19 upon the mode we are going to operate, is between 68
20 and 113 megabits per hour, or 8-1/2 to 15 megabytes
21 per hour reliably, or on the order of about 22
22 megabytes per hour on average.

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1 I set this table up for some people to
2 look over, and basically this takes the PSWAC report
3 predictions for the kind of advanced services that
4 public safety is going to be using these types of
5 channels for, and I made some modifications to them.

6 I thought maybe update them a little bit,
7 and maybe fix some of the numbers, and adjust some of
8 the numbers a little. But we have services such as
9 decision processing, which is really a remote file
10 transfer from the car, and FedEx fingerprint, both in-
11 bound and out-bound, and mug shots, EMS pictures, and
12 two types of video.

13 One I put here is a slow still frame
14 video, 5 minute, which is basically 5 minutes of one
15 frame per second, 3 kilobites per frame, or 3
16 kilobytes per frame compressed video.

17 And that was the kind of thing that I felt
18 would be -- and I will talk about that in the next
19 table. And then the slow frame video of one minute,
20 which is a 384 kilobits per second compressed
21 screening video.

22 So we have a source content there, a

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1 compression level, average request per hour, some
2 notes, and basically what we have here is we have a
3 table where we can play with some of the numbers and
4 we can see where the through put levels fall with
5 respect to the number of units that were in use.

6 And we will look at that table in a
7 minute. Basically the slow frame video that I have in
8 there is kind of for officer protection type purposes,
9 where you are going to be doing remote monitoring, and
10 in that table, one suspicious traffic stop per shift.

11 In other words, a slow frame video to the
12 dispatcher just to monitor the officer as he is
13 walking back and forth through the cars, so that he or
14 she can tell if there is something going on.

15 You could also configure to monitor more
16 traffic stops with shorter monitoring periods as Steve
17 Devine noted, and you really only need to send video
18 when he is out of the car, and not when he is sitting
19 there.

20 The slow frame video that I thought would
21 be good for like a short sobriety test that you wanted
22 to send to the dispatcher for archiving, maybe a

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1 minute of that stream of video, and I have kind of
2 limited both of them purposely here.

3 There has been some resistance it seems to
4 using these channels for a lot of video, and I am not
5 exactly sure how either the committee wants to proceed
6 with that. They offer a lot of advanced
7 functionality, and allow for some new applications of
8 video that I think is certainly one of the most
9 important ones.

10 But if you limit the video utilization,
11 you can get a lot more fingerprint images and all
12 those other things on that channel. So maybe there
13 might be more appropriate channel resources to be
14 doing this video on. That is a question for you.

15 But I think that particularly sending a
16 lot of images, and fingerprints, and hey, maybe even
17 retinal scans, I think that is going to be very
18 important to track people, or to identify people that
19 maybe should not be in the country, or don't match up
20 to their identification, and that kind of thing.

21 I think those are the kind of resources
22 that are going to become important going into the

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1 future. But I will note that this loading is very
2 heavily dependent on the video utilization.

3 So skipping to the table, basically we can
4 make changes to the types of services, and the types
5 of utilization of those services, and we can kind of
6 see what kind of active units you can support on that
7 channel based upon how much of this stuff you want to
8 use.

9 And we can do that, a little bit of that,
10 now. And I will actually give this chart to Glen so
11 that everyone can kind of play with it going into the
12 future. Basically there is these red boxes right
13 here, and they are read now because we have exceeded
14 the number of units that you can support.

15 Basically, you can put in different
16 numbers of units and the through put level is going to
17 stay constant, depending on the technology. But as
18 you change things on the table here, particularly in
19 these columns, the request rates and the size of these
20 types of transactions, and you change the number of
21 active units, you can see based upon your choices what
22 kinds of the number of units that you can support

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1 based upon this channel here.

2 And I think there is going to be some kind
3 of convergence to a need to support at least X-amount
4 of officers. So I think you are going to end up
5 probably tailoring some of your applications, and
6 trimming some of them back to support a certain amount
7 of officers, or if you really want full usage of those
8 channels, and you want the video, it is going to be a
9 fact of life that you are not going to be able to
10 support the same amount of units that you thought that
11 you could on that channel.

12 And I think that this is expected.
13 Everybody knew that if they were going to throw a lot
14 of video over this channel, you are going to overload
15 it pretty quick, and it is only a 50 kilohertz
16 channel.

17 And you guys can play with that now, or
18 you can take it off-line and play with it. Based upon
19 the baseline assumptions that I had there, and this is
20 the three different -- you might want to just choose
21 to operate it at the mean level, and at the mean level
22 -- or in other words, you will reach that through put

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1 level 50 percent of the time.

2 And maybe you can support -- well, maybe
3 40 units, and maybe even more if I change the numbers.

4 If you really want 90 percent reliability on your
5 coverage, on your data coverage, which your data
6 coverage may be time critical to you, and it may not
7 be time critical to you.

8 And then you are going to have to change
9 that number to something lower based upon what you
10 have decided to use. And that is kind of how this
11 thing works.

12 And anybody who wants to play with that, I
13 will certainly get it to. Basically what I think we
14 are interested in is we are coming to a -- we want to
15 come to a reasonable convergence on how we want to use
16 these channels, and how many units we actually need to
17 support on these channels.

18 And I think that my work on here is done,
19 and it is up to you guys now to kind of look at user
20 requirements and kind of come to a balance between
21 those. Any questions? David.

22 MR. EIRMAN: David Eirman, Motorola. This

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1 is based on the FSLAC, Appendix D, tables, I assume?

2 MR. O'HARA: Based upon it, yes. I made
3 some modifications.

4 MR. EIRMAN: Okay. Was this the --

5 MR. O'HARA: Particularly in terms of
6 video and things like that.

7 MR. EIRMAN: Okay. Then is it
8 representative of the 2010 projections? I mean, there
9 were two tables in there with like current in 2010.

10 MR. O'HARA: No, this is the current --

11 MR. EIRMAN: Okay.

12 MR. DEVINE: Steve Devine, State of
13 Missouri. What might be beneficial might be if from a
14 regional planning perspective, there is obviously
15 based on Sean's information the applications that are
16 going to be used with channels directly related to the
17 number of units that it can support.

18 So perhaps some guidelines to provide a
19 regional plan, maybe this could be something brought
20 up in the implementation. Some guidelines is if it is
21 going to be used as such, and can be provided to the
22 regional planning committees to kind of base their

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1 channel loading.

2 But it seems like it is going to be far
3 more complicated than what we have seen previously,
4 which was so many units per -- you know, so many units
5 per pair. So it is going to be a bit more challenging
6 and so we are going to have to kind of go application
7 by application it appears.

8 CHAIRMAN NASH: Sean, this spread sheet,
9 could it be provided to the regional planning
10 committees to do some what if'ing.

11 MR. O'HARA: Yes. I mean, it is a complex
12 -- I mean, as long as you are kind of understanding
13 where you are going. There are different design
14 levels, and you have to kind of balance everything
15 against everything else.

16 CHAIRMAN NASH: There is a lot of
17 parameters.

18 MR. O'HARA: Yes, there is a lot of
19 parameters here, and it would be useful to the regions
20 if they really understood it when they were looking at
21 it, and so they didn't get the wrong idea what they
22 are looking at.

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1 And so maybe it would be better filtered
2 through the implementation subcommittee and their
3 recommendations.

4 CHAIRMAN NASH: And to me what really
5 stands out
6 are the two videos there, and I will admit that I am
7 one of the people that say that video was not intended
8 for the 700 megahertz band. And trying to cram 97-1/2
9 megahertz worth of stuff from the PSWAC report into 24
10 megahertz worth of 700 megahertz spectrum is not going
11 to work.

12 It never was intended to. So as you note,
13 you set those two items to zero per shift has --

14 MR. O'HARA: Now this is to subordinate
15 units now.

16 CHAIRMAN NASH: -- a rather significant
17 impact on the number of units that can be supported.
18 So --

19 MR. O'HARA: And you might want to also up
20 the amount of other services when you take the video
21 off, because I think that your daily usage is going to
22 go up the bigger the pipe that you are handed, even if

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1 you are not using it.

2 MR. BUCHANON: Well, the demand goes up,
3 and with a couple of items on that. That is active
4 units, too. That is actually units that are active on
5 the air at the same time. So you are going to have
6 more loading units than active units.

7 MR. O'HARA: Well, what I mean is how many
8 people are operating on that shift.

9 MR. BUCHANON: Yes, but I mean, you are
10 loading -- you never have a hundred percent of your
11 units on at any one time. You probably have a few
12 more units.

13 MR. O'HARA: It depends. If you share the
14 police cars, and you have equal numbers of shifts, and
15 the resources are based on the radios in the police
16 cars, you may. For some agencies, you may not.

17 MR. BUCHANON: I would like to comment on
18 Glen's point on the video. I think that is true
19 probably in the urban areas, where you have other
20 choices, but certainly in some of the rural areas,
21 where you would want to do some of those high-risk car
22 stops, and you have light loading to begin with, you

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1 are going to want to do some video because that is the
2 only way you can get the coverage.

3 And you are certainly not going to do it
4 at the 4.9 giga band. And the classic example that I
5 have is we have one data -- or actually we have two
6 data stations out in our desert, and they support two
7 resident deputies.

8 I mean, they cover two different
9 geographical areas, and so --

10 CHAIRMAN NASH: And I think that is why we
11 are suggesting that this be made available to the RPC
12 so that they make the decision that -- like in
13 downtown Los Angeles, we just cannot support video
14 applications, and so you are not going to be allowed
15 to use it for video.

16 Out in Barstow, or Baker, you know, there
17 is nobody else out there. If you want to use it for
18 video, go ahead and do it, and we will give you the
19 channels to support that.

20 PARTICIPANT: And, oh, by the way, you can
21 sell it to every other agency that is out there.

22 CHAIRMAN NASH: Yes, and I don't think

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1 that we can sit here and make a single decision that
2 applies nationwide.

3 MR. O'HARA: And this is very complex.
4 Everybody has unique requirements, and so --

5 MR. BUCHANON: It is, and I don't want to
6 take John's time, but just one other comment. If the
7 FCC was looking at us to come up with some type of
8 loading standards such as voice, where it is 70 units
9 per channel, or something like that, or a hundred
10 units, I don't think we can do that.

11 CHAIRMAN NASH: Even when the FCC did it
12 before, it was not valid.

13 MR. BUCHANON: Oh, well, I know.

14 CHAIRMAN NASH: Sorry, Michael.

15 MR. WILHELM: Best guess.

16 MR. POWELL: That's exactly right, and
17 that is what it was, and I was there when that guess
18 was made.

19 CHAIRMAN NASH: John.

20 MR. POWELL: John Powell. My comment was
21 this. I think this should go to the implementation
22 subcommittee. Sean, if we could between you and the

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1 implementation subcommittee put together some good
2 documentation to accompany this that people could
3 understand, we could then put it into the RPC guide,
4 and we do have a CD now that is included with each one
5 of those that goes out, and that the spread sheet
6 could be included so that they could play with the
7 numbers.

8 MR. O'HARA: Again, you know, it is my
9 concern that the spread sheet could be misunderstood.

10 It needs a good write-up to go with it.

11 CHAIRMAN NASH: Sean, I will you that I am
12 personally more comfortable seeing a hundred units
13 than I was seeing 25.

14 MR. O'HARA: Well, you know what? We can
15 -- what was your number before? We can make that 200.

16 CHAIRMAN NASH: I think I came up with
17 180.

18 MR. O'HARA: Yes, we have what what is
19 (inaudible) and we can make that whatever we need to.

20 CHAIRMAN NASH: And only from the
21 standpoint that we currently say that you need to have
22 35 to 40 units on a 25 kilohertz channel, and to say

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1 you can only have 25 on a 50 kilohertz channel just
2 doesn't sound logical.

3 MR. BUCHANON: It doesn't, but you know
4 what is driving that is that the uses and the amount
5 of data that they want to ship back and forth.

6 CHAIRMAN NASH: I know, and it is not
7 apples and oranges.

8 MR. BUCHANON: No.

9 CHAIRMAN NASH: Or it is apples and
10 oranges, and that is the problem. Wayne.

11 MR. LELAND: Wayne Leland, Motorola.
12 Sean, let me ask you a question. I am still unclear
13 whether the active units -- is that in this case with
14 a hundred, does that mean a hundred units are
15 simultaneously transmitting in all the interop
16 channels?

17 CHAIRMAN NASH: On a shift.

18 MR. LELAND: Okay. What percentage did
19 you use?

20 MR. O'HARA: That were turned on and
21 signed on.

22 CHAIRMAN NASH: That are trying to or

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1 could be potentially using that.

2 MR. LELAND: Okay. And what percentage
3 did you use of active units that are actually
4 transmitting?

5 MR. O'HARA: At the same time?

6 MR. LELAND: Yes.

7 MR. O'HARA: I didn't do that either based
8 upon (inaudible). I did this in terms of those
9 hundred units are contributing so many megabytes per
10 hour, and then the data type can handle so many
11 megabytes per hour, and then scale the loading based
12 upon that.

13 It is very hard to do these packet based
14 type stuff and using an (inaudible) technology, you
15 actually have to simulate everything. And that is
16 what I had to do when I did the Project 25 packet. I
17 had to simulate the bits in the channel phase and
18 chopping them up, and everything else.

19 MR. LELAND: Was that your source content?

20 MR. O'HARA: The source content is
21 basically the size, the file size in kilobyte of the
22 service that is directly to the left of it. So if

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1 they have a four page fax there, and with a source
2 content that corresponds to that is 92 kilobytes.

3 MR. LELAND: Just a further comment on
4 that. The interop channels are going to take place in
5 mostly unusual circumstances, anywhere from just
6 jurisdictions communicating when they normally don't,
7 to disasters, and I think we have got to be careful on
8 the loading, because if you get into a 9-11 type
9 thing, or something like that, all of them are going
10 to want to start to transmit.

11 CHAIRMAN NASH: And on this issue we were
12 stepping beyond the interop channels, and really the
13 question had come from the Implementation Subcommittee
14 in recognition, like in L.A., where we had 600 channel
15 requests for 50 channels, and how do we allocate them.

16 We were trying to look at, okay, what is a
17 reasonable loading standard on the general use
18 channels. The interop channels, there is no loading
19 criteria on that one. So this is trying to look at
20 normal day-to-day traffic on a system.

21 MR. LELAND: And remember, too, that --
22 and this might be a point that maybe in reality does

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1 not happen, but the standard is only required on the
2 interop channels.

3 CHAIRMAN NASH: As far as the technical
4 standard, you're right. But we did have the work from
5 the implementation subcommittee of how do the regional
6 planning committees allocate channels to users, and
7 the experience, and particularly with Region 5, where
8 you had users coming in and saying, well, I currently
9 have 10 NDT channels, and so I need 10 150 kilohertz
10 wideband channels to handle my data load, and we would
11 run out of channels.

12 MR. LELAND: No, I understand, and I think
13 Sean gave an excellent analysis. I mean, it has
14 really taken a good crack at some of the issues. But
15 again one of the problems, or at least in my
16 experience in this industry is that we are never smart
17 enough to figure out all of the stuff until we start
18 using it.

19 So we have got to be careful of going too
20 far one way or the other on some of this stuff.

21 MR. O'HARA: And the reason that I only
22 dealt with SAM is because the channel coding

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1 specification for IOTA is incomplete. I didn't have a
2 complete version of it and so I didn't even try or
3 attempt to look at the through point stuff on that.

4 CHAIRMAN NASH: John.

5 MR. POWELL: John Powell, and let me just
6 comment on the interoperability side of the house. I
7 think that it is a good matrix, even for that, because
8 some of those are going to drop to zero, and some of
9 them are going to go way up, and it can still be used
10 -- in fact, it could be used as a real time planning
11 tool for a scene commander that is trying to lay out
12 for the comm officer, and saying how many units we can
13 actually throw out there on an incident, and make
14 reliable use of the channels. It is a great planning
15 tool for that, as long as he knows how to use it.

16 CHAIRMAN NASH: It helps to make some
17 rather intelligent decisions about load control.

18 Kevin.

19 MR. KEARNS: Kevin Kearns, King County.
20 Just a question, Sean. This assumes no latency in
21 delivery. I mean, you are using a statistically
22 independent offering of traffic on a per hour basis,

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1 against a pipe capacity, correct?

2 MR. O'HARA: Yes.

3 MR. KEARNS: And so on the negative side,
4 and not negative in the work, but on the utilization
5 side, a single incident could certainly spike that to
6 a point where you end up with a higher offered load
7 against that capacity, which would add latency.

8 But then on the flip side, in the data
9 environment, latency is not necessarily a bad thing as
10 long as it is not too long, and each individual agency
11 will determine what not too long is, and that might be
12 a matter of a few seconds for some of those kinds of
13 transactions.

14 And which greatly increases the capacity
15 of the pipe, because you are using more of a best
16 effort kind of approach instead of a circuit approach.

17 MR. O'HARA: Yes, and naturally the 25
18 percent that I put in there was really to account for
19 the latency when you are trying to access a channel
20 and with multiple resources are trying to access a
21 channel, and they end up getting more or less queued
22 and they have to reaccess.

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1 CHAIRMAN NASH: On one of the prior
2 slides, at least he had discussed the issue of
3 contention. So I don't know if you built that into
4 your --

5 MR. O'HARA: Yes, that is built into the
6 last slide. And the slot scheduling and the access
7 slotting, even if you get a channel, you still could
8 never get a (inaudible) of traffic through any kind of
9 channel just because the more busier it gets, the
10 harder it is to get to it kind of thing.

11 So like I said, I put a 25 percent
12 reduction based upon that in there, and I think that
13 handles some of the latency. And I know that it
14 should be more like a third, and it probably should be
15 more like a third, although I think that the access of
16 this channel would be a whole lot more efficient than
17 with voice access to a channel, because it is done so
18 quickly.

19 CHAIRMAN NASH: And I want to thank Sean
20 for this, because this will provide some guidelines
21 and the regional planning committees can better fine
22 tune their requirements, because they are identified,

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1 and they know their needs, and they know their
2 criteria.

3 So he is providing us some guidelines
4 here, and whether the Implementation Subcommittee
5 should provide either the spread sheet that they had,
6 or literally a set of common parameters from which
7 they can base their decisions and try to find the most
8 applicable one, and either of those provides more
9 information than what they have right now, which is
10 zero.

11 MR. BUCHANON: Sean, a question. If you
12 wanted to drive that to a higher number, and adding
13 more sites and smaller cell size, and more than just a
14 voice overlay with private networks?

15 MR. O'HARA: Realistically, I think that
16 what you want to do perhaps is look at this study
17 again, but do it for perhaps an 800 megahertz urban
18 system, where the whole system is designed for in-
19 building penetration, and your through put levels are
20 going to be considerably higher.

21 The number of units that you are going to
22 support are going to be higher also, and this was kind

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1 of based upon the 40 dbu edge of service area rule,
2 which can kind of be universally applied.

3 But I think that those levels are a lot
4 higher in cities that need in-building (inaudible),
5 and so there is some level of practicality; or if that
6 level -- if the contour went up to a 50 dbu, or it
7 went up to be higher, and if it was allowed to be
8 higher as discussed in the last meeting, that those
9 levels are going to go up.

10 And then the number of units that you are
11 going to be able to support are also going to go up,
12 and their use of the spectrum is going to go up. So
13 that may be -- you know, it would be nice to take a
14 look at that in that case, too.

15 MR. BUCHANON: I think some of the larger
16 areas are, because with the number of -- or the more
17 urban areas with the number of channels that we can
18 actually assign, I think it is 48 in the general
19 category, I mean, if you look at even a hundred units,
20 that doesn't even do L.A. City, period, unless they do
21 something to drive that number up.

22 MR. O'HARA: And you have to define how

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1 many units. I mean, do you define it by units or are
2 you going to define it by radios, or are you going to
3 define it by units in the cell, or units everywhere?

4 I mean, there is some definition in there
5 that really also plays into this.

6 CHAIRMAN NASH: Sean, we have through this
7 committee made the recommendation that if in the urban
8 areas that systems be designed for a 50 dbu signal
9 criteria. Would it be possible to provide two
10 versions of this spread sheet for the RPCs?

11 One that is based on a 40 dbu, and one
12 that is based on a 50?

13 MR. O'HARA: You know, as I think about
14 this, if you design a 50 dbu system, and your
15 interference also goes up by 10 db, the system
16 performance is going to be the same.

17 MR. BUCHANON: But if you increase the
18 number of sites that should --

19 MR. O'HARA: If you increase the number of
20 sites, you are increasing the amount of interference.

21 CHAIRMAN NASH: But part of our reason for
22 again recommending the 50 dbu was for building

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1 penetration, and not just for interference reasons.

2 MR. O'HARA: What I am saying is that if
3 in your frequency coordination of the system, you are
4 still designing just a median 30 db carrier
5 interference, and you go to a 50 dbu contour.

6 That means that your interference contour
7 can be increased by 10 db without affecting system
8 performance, and you are really going to do that, or
9 else you probably need more spectrum.

10 So that 10 db gain in power that you have
11 gotten has just been offset by a 10 db increase in
12 interference, which is going to tend to take it back
13 down to this kind of level.

14 CHAIRMAN NASH: Any other comments or
15 questions?

16 QUESTION: Can we get copies of that?

17 MR. O'HARA: Yes.

18 CHAIRMAN NASH: Is this something that we
19 feel that we are ready to forward to the
20 Implementation Subcommittee with the recommendation
21 that the RPCs utilize this for allocating wideband --
22 you know, 50 kilohertz channels?

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1 MR. BUCHANON: Yes, as a tool.

2 CHAIRMAN NASH: As a tool?

3 QUESTION: Only after the general policy
4 test from the proper documentation, et cetera, et
5 cetera, or otherwise you can't do anything with it.

6 CHAIRMAN NASH: I think we need to provide
7 some guidelines as to what each of those are, and what
8 it means when you change something.

9 QUESTION: Is that the tech group or the
10 implementation group?

11 CHAIRMAN NASH: No, I think the technology
12 group would have to come up with that, and Sean is
13 probably the most familiar with it. So I have got
14 John, and David. Anybody else want to work with Sean
15 and Steve in coming up with, if you will, a set of
16 guidelines on how to use that spreadsheet? Does
17 anyone else want to? Ernie. David, you have a
18 comment?

19 MR. EIRMAN: David Eirman, Motorola. My
20 initial concern is that if we are going to let people
21 play with all the parameters in the spread sheet,
22 especially the input parameters, the different types

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1 of data, and the different sources, and the kilobit
2 loading per source and all of that, that either needs
3 to be documented or limits put on what people can
4 change or something, because documenting how to use a
5 frozen table and come out with the number of units is
6 one thing.

7 And documenting how to play with every
8 parameter that is on that sheet is a totally different
9 order of magnitude issue.

10 CHAIRMAN NASH: I would agree with you,
11 and I think given the documentation -- I mean, for
12 instance, you know, putting the number of transactions
13 to zero as a way of disallowing video I think is a
14 good way to do that, and to change it from 2800 bites
15 to 1500 bites, because that is all that we are going
16 to allow for video, I don't think you should allow
17 somebody to do that, because they don't --

18 MR. O'HARA: That queues the numbers.

19 CHAIRMAN NASH: Yes. It is not a
20 parameter that you were able to change.

21 MR. O'HARA: You might want to freeze the
22 transaction types, but just leave the number of access

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1 perhaps varied.

2 CHAIRMAN NASH: Yes. I would do that and
3 just change the number of attempts. You know, you
4 might --

5 MR. EIRMAN: Just required numbers and
6 move that into the formula.

7 CHAIRMAN NASH: David then wants to be a
8 part of it then also. Sean, will you take the lead on
9 that and bring the group together?

10 MR. O'HARA: Okay.

11 CHAIRMAN NASH: Thank you. Very good.
12 Thank you. It gets us to where we need to be. And
13 with that, we are down to -- is there other business
14 for this subcommittee? Ernie.

15 MR. EIRMAN: Maybe not business, but a
16 question, and just to refresh my memory. On receiver
17 standards, I think we have made recommendations to the
18 FCC for receiver standards, and Michael, could you
19 refresh my memory on where that stands?

20 MR. WILHELM: We developed a paragraph
21 that we approved at the last meeting and I forwarded
22 that to the steering committee, and we did not go with

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1 "receiver standards."

2 What we said was that systems should be
3 designed for 40 dbu signal within their operational
4 area, and the operational area being defined as
5 jurisdiction, plus 3 miles in the rural environment,
6 and the jurisdiction plus 5 miles in the urban
7 environment.

8 And furthermore recommended that systems
9 be designed for 50 dbu in the urban areas to allow for
10 building penetration.

11 MR. EIRMAN: I am thinking even before
12 that, and back when we are talking about narrow band
13 interoperability channels, and I think did we not
14 recommend that Class A kind of receiver-transceiver
15 performance to become part of the -- I guess I am
16 trying to inquire about what the status of that is
17 within the FCC.

18 MR. WILHELM: Only on the interoperability
19 channels. Ernie, I will have to check and get back to
20 you on the status. I know that it was forwarded and
21 it is being considered, but I don't know where it
22 stands as far as the order is concerned.

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1 CHAIRMAN NASH: Yeah, we had recommended
2 that all receivers meet Class A on the
3 interoperability channels as a minimum standard.
4 You're right.

5 MR. WILHELM: I might add that the
6 Commission spectrum policy task force recently put out
7 a report in which the set that is part of the spectrum
8 equation, you have to consider receiver performance,
9 and although the Commission has seldom imposed
10 receiver standards, it is looking in that direction in
11 its allocations proceedings.

12 CHAIRMAN NASH: Other business? Seeing
13 none, I guess we will go ahead and adjourn, and next
14 up is Teddy's committee.

15 (Whereupon, the Subcommittee meeting was
16 concluded at 11:43 a.m.)

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