

Exhibit 8

[Excerpts from] Smith Deposition Testimony

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UNITED STATES DISTRICT COURT
DISTRICT OF NEW MEXICO

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STC.UNM,)	
Plaintiff,)	
vs.)	Case No.: 10-CV-01077-RV-DWS.
)	Volume 1
)	Pages 1 to 211
INTEL CORPORATION,)	
Defendant.)	

DEPOSITION OF BRUCE SMITH
Wednesday, September 14, 2011

Reported by:
HEIDI BELTON, CSR, RPR, CRR, CCRR
Certified Shorthand Reporter No. 12885

JAN BROWN & ASSOCIATES
WORLDWIDE DEPOSITION & VIDEOGRAPHY SERVICES
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09:05:04 1 STC.

09:05:05 2 THE VIDEOGRAPHER: If there are no
09:05:06 3 stipulations, the reporter may swear in the witness.

09:05:09 4 (Whereupon, the witness, BRUCE SMITH,
09:05:10 5 having been duly sworn, testified as follows:)

09:05:17 6 MR. HUR: I'd like to represent for the record
09:05:20 7 that Dr. Chris Mack is also with us.

17:25:44 8 EXAMINATION

09:05:27 9 BY MR. STADHEIM:

09:05:31 10 Q. Dr. Smith, you were the Intel professor of
09:05:34 11 research and technology from 2000 to 2007; is that
09:05:41 12 correct?

09:05:41 13 A. **At Rochester Institute of Technology; that's**
09:05:44 14 **correct.**

09:05:45 15 Q. And did that terminate in 2007?

09:05:50 16 A. **Yes. In 2007, that time frame, yeah.**

09:05:53 17 Q. What happened?

09:05:54 18 A. **Intel no longer provides that funding to the**
09:05:56 19 **microelectronic engineering department.**

09:06:01 20 Q. What was the funding?

09:06:02 21 A. **It was a --**

09:06:03 22 MR. HUR: Object to the form.

09:06:04 23 You may answer.

09:06:07 24 THE WITNESS: It was a -- an affiliate
09:06:11 25 membership fee that Intel paid to the microelectronic

09:06:15 1 engineering department. It's common for a lot of the
09:06:18 2 affiliates of microelectronic engineering to pay the
09:06:22 3 department to support some of the activities and
09:06:24 4 students and equipment and things like that.

09:06:26 5 BY MR. STADHEIM:

09:06:26 6 Q. And that's why you have the title Intel
09:06:31 7 professor?

09:06:32 8 A. Right. In 2000 or maybe it was a year before
09:06:35 9 that, an arrangement was made between Intel and RIT's
09:06:40 10 development office that Intel would be allowed to have
09:06:44 11 naming rights to a professorship for the association fee
09:06:48 12 they paid.

09:06:49 13 Q. Kind of like how they name football stadiums?

09:06:52 14 A. Well, to a much lesser --

09:06:54 15 MR. HUR: Object to form.

09:06:55 16 THE WITNESS: To a much lesser extent. But,
09:06:57 17 yeah, universities that is a common thing.

09:07:00 18 BY MR. STADHEIM:

09:07:01 19 Q. "Lesser extent," meaning you didn't get as
09:07:03 20 much money?

09:07:04 21 MR. HUR: Object to the form.

09:07:06 22 THE WITNESS: Right. And the term was -- it
09:07:07 23 wasn't an endowment, which often these types of things
09:07:11 24 were. This was an arrangement with a limited term to
09:07:15 25 it.

09:15:22 1 question in a general sense, that's different than if
09:15:25 2 you're asking if what she said is true. I -- I -- I
09:15:29 3 expect what she said is true because she said it to me.

09:15:32 4 BY MR. STADHEIM:

09:15:33 5 Q. Was it important to you or not?

09:15:35 6 A. Okay. Is that the question, was the Intel
09:15:38 7 professorship important to me?

09:15:39 8 Q. Yes.

09:15:40 9 **A. Yes.**

09:15:40 10 Q. Very important?

09:15:40 11 A. Well, very compared to what; it was important,
09:15:47 12 yes.

09:15:47 13 Q. And you were considering at one time
09:15:48 14 increasing -- asking Intel to increase the amount from
09:15:52 15 \$50,000 to \$100,000; isn't that right?

09:15:58 16 A. Intel initially agreed to support the position
09:16:02 17 at a \$100,000 level, I believe in 2000 or maybe 1999.

09:16:10 18 A few years after that I came to understand
09:16:12 19 that Intel because of economic reasons decided for some
09:16:18 20 period of time they would reduce that to \$50,000. Since
09:16:23 21 some time had passed -- and, again, I don't have the
09:16:25 22 dates in front of me, but I see this is from 2006 --
09:16:28 23 both Ms. Stevens and I felt it might be a good time to
09:16:31 24 ask Intel if they would increase that back to what their
09:16:36 25 original promise was.

09:16:38 1 Q. But you didn't do that?

09:16:39 2 **A. Well, instead --**

09:16:40 3 MR. HUR: Object to the form.

09:16:41 4 THE WITNESS: -- you asked if I did that. I
09:16:43 5 wasn't the one that dealt with Intel. At the time of
09:16:47 6 this e-mail, I wasn't sure whether or not Ms. Stevens
09:16:50 7 had done it.

09:16:51 8 And if you see the top of this exhibit you
09:16:54 9 gave me, I corresponded with Ms. Eileen Galinski in 2008
09:17:00 10 who took over for Ms. Stevens. And you can see in those
09:17:04 11 two years that lapsed since 2006 and 2008 I hadn't heard
09:17:08 12 anything else from Ms. Stevens. So I didn't know what
09:17:10 13 the situation was.

09:17:12 14 BY MR. STADHEIM:

09:17:12 15 Q. Why was the Intel professorship so important
09:17:18 16 to you?

09:17:21 17 **A. Well, if you look at the bottom of that e-mail**
09:17:26 18 **or this exhibit, Ms. Stevens in the July 25, 2006**
09:17:33 19 **section of this exhibit says, in I believe the third**
09:17:40 20 **sentence, "I'd like to talk to you about whether we**
09:17:42 21 **should look at another company for your professorship."**
09:17:47 22 **She says that, "Intel is stating they would only be able**
09:17:50 23 **to make 50K." Again, and she wanted to go somewhere else**
09:17:54 24 **to support this professorship. Can you see I responded**
09:17:59 25 **back to her on August 9 saying well, if it's -- it's not**

09:18:03 1 all about the money. Intel does some important things
09:18:07 2 with the microelectronic engineering department like
09:18:10 3 many of our affiliates do. And I suggested to her that
09:18:14 4 there are other things besides just the money besides
09:18:17 5 just the 50K.

09:18:20 6 Q. What?

09:18:20 7 A. Well, what I've said is they hire our
09:18:23 8 students. I work with Intel among other groups and
09:18:29 9 companies on developing engineering courses. And Intel
09:18:34 10 is a member of the semiconductor research corporation
09:18:37 11 called SRC. And Intel, along with several other
09:18:40 12 industrially -- industrial partners of SRC, has helped
09:18:45 13 support an SRC research project. So I -- I was pointing
09:18:49 14 out to Ms. Stevens that there are other things that
09:18:51 15 Intel does besides just this 50K they provide to us.

09:18:55 16 Q. Other than what you said in that document,
09:18:58 17 were there any other reasons it was important to you?

09:19:02 18 A. I think I've -- in 2006 I think I stated that
09:19:06 19 pretty well, as I can recollect.

09:19:24 20 I would also like to point out that in that
09:19:25 21 August 9 correspondence I had with Ms. Stevens, I've
09:19:30 22 said that Intel has directed customization funding for
09:19:36 23 over \$300,000 between 2007 and 2009. That was not Intel
09:19:41 24 money; that was money from the Semiconductor Research
09:19:42 25 Center, SRC.

09:23:51 1 industrial affiliates and asks them for contribution to
09:23:54 2 the engineering program. She's telling me she's going
09:23:57 3 to ask them for this contribution. That's -- that's
09:24:00 4 very common. It's not unusual at all. She would be
09:24:05 5 asking Intel for a gift.

09:24:19 6 Q. Now, after you lost this title of Intel
09:24:25 7 professor, did you keep on using it?

09:24:27 8 A. I believe I may have in 2008. Again, I wasn't
09:24:32 9 completely aware of what had been going on, whether
09:24:37 10 Intel was paying these dues between 2006 and 2008, as we
09:24:43 11 see from Exhibit 2. Also, there are the nature of the
09:24:48 12 internet and the web and all, I'm sure there are legacy
09:24:52 13 references to my Intel professorship that go beyond
09:24:57 14 2007.

09:24:58 15 Q. Well, so when did you find out that you didn't
09:25:01 16 have this title anymore?

09:25:09 17 A. I believe in 2008 time frame, but I can't -- I
09:25:12 18 can't recall exactly.

09:25:13 19 Q. So you lost this and nobody told you?

09:25:16 20 A. Sounds odd, but yes, that's the way it --
09:25:18 21 that's the way it transpired.

09:25:20 22 Q. Wow.

09:25:21 23 A. Well, let me say this. We lost the financial
09:25:24 24 support. And I wasn't aware of that.

09:25:29 25 Q. But you kept the title?

09:25:31 1 A. Well, keeping the title just means whether or
09:25:33 2 not I changed that on my CV or changed that on our web
09:25:37 3 page. You know, I don't -- beyond that that's all the
09:25:40 4 title is. I think that also -- it also goes to what
09:25:45 5 this support was. It was no obligation I had to Intel.
09:25:50 6 It was only in name.

09:25:53 7 Q. A name that you were proud of?

09:25:55 8 MR. HUR: Object to the form.

09:25:56 9 THE WITNESS: Well, as I said before, I found
09:25:58 10 value in this.

09:25:59 11 BY MR. STADHEIM:

09:25:59 12 Q. Sure you did. And you kept using it?

09:26:04 13 A. I think I -- I told you I kept using it until
09:26:07 14 about 2008.

09:26:24 15 (Whereupon Exhibit 4 marked
09:26:24 16 for identification.)

09:26:24 17 BY MR. STADHEIM:

09:26:35 18 Q. Exhibit 4 is Smith document produced 11. And
09:26:43 19 the bottom e-mail here, which is dated March 31, 2009 is
09:26:53 20 an e-mail from you to Gene, and it starts, "This is
09:26:58 21 Bruce Smith, the Intel Professor of Microelectronic
09:27:03 22 Engineering at RIT."

09:27:06 23 Did you write that?

09:27:07 24 A. Yes, I did.

09:27:10 25 Q. Does that refresh your recollection that you

10:30:10 1 corners --

10:30:12 2 MR. HUR: Object to the form.

10:30:12 3 BY MR. STADHEIM:

10:30:13 4 Q. -- isn't he?

10:30:16 5 A. He -- we go back -- if you'll allow me to go
10:30:19 6 back to the paragraph we talked about at the top.
10:30:21 7 Again, the goal is to reproduce this pattern -- which is
10:30:25 8 a pattern, Figure 1 -- "with as high a fidelity as
10:30:29 9 possible." And the fidelity would include the sharp
10:30:31 10 corners.

10:30:37 11 Q. Let me read the entire sentence. "While" --
10:30:40 12 "While the image is significantly closer to the desired
10:30:45 13 pattern than the incoherent imaging results, there is
10:30:51 14 still significant rounding of the corners of the printed
10:30:53 15 features due to the unavailability of the spatial
10:30:56 16 frequencies needed to provide sharp corners."

10:31:01 17 Do you agree that what he's saying is he
10:31:04 18 desires sharp corners and he does not want round corners
10:31:11 19 or rounded corners?

10:31:16 20 MR. HUR: Object to the form.

10:31:17 21 THE WITNESS: I would agree that the
10:31:18 22 inventor -- Professor Brueck is saying that the goal is
10:31:23 23 sharp corners and he wants sharp corners.

10:31:25 24 BY MR. STADHEIM:

10:31:25 25 Q. And --

11:37:57 1 provide a multiplication of the individual images that
11:38:01 2 have been operated on independently with the nonlinear
11:38:05 3 thresholding responses of the two photoresist layers.
11:38:11 4 The composite mask patterns shows substantially right
11:38:15 5 angles at the corners as predicted by equation 6 and
11:38:21 6 Figure 6B."

11:38:24 7 Q. So the answer to my question is yes. And my
11:38:27 8 question is in all four discussions of Figures 2, 3, 6,
11:38:36 9 and 7, Dr. Brueck talks about square corners, sharp
11:38:43 10 corners, corners; isn't that right?

11:38:49 11 MR. HUR: Objection; vague. Compound. Asked
11:38:52 12 and answered.

11:38:55 13 THE WITNESS: I'm not sure that's the question
11:38:58 14 you had originally asked me, but I -- I would agree that
11:39:03 15 corners -- well-defined sharp corners are discussed,
11:39:17 16 yes.

11:39:17 17 BY MR. STADHEIM:

11:39:17 18 Q. In all four of those?

11:39:20 19 MR. HUR: Object to the form.

11:39:21 20 THE WITNESS: I think it's true, right sharp
11:39:23 21 corners are addressed in all four of these.

11:39:24 22 BY MR. STADHEIM:

11:39:25 23 Q. And in none of those discussions does he talk
11:39:27 24 about increasing pattern density; isn't that also
11:39:31 25 correct?

11:39:32 1 MR. HUR: Object to the form. Compound.

11:39:34 2 Vague. Asked and answered.

11:39:37 3 THE WITNESS: As I said before, there is no
11:39:39 4 reference to increased pattern density in those
11:39:43 5 excerpts.

11:40:28 6 (Whereupon Exhibit 5 marked
11:40:28 7 for identification.)

11:40:28 8 BY MR. STADHEIM:

11:41:06 9 Q. Dr. Smith, I've handed you Smith Exhibit 5,
11:41:09 10 which has three patterns on it, which for purposes of
11:41:25 11 what we're talking about you can assume those are
11:41:28 12 contact poles, printed and a resist. Now, if you
11:41:46 13 imagine that these patterns were formed by an imaging
11:41:53 14 tool where the -- which the image is a square hole --
11:42:08 15 let me start over again.

11:42:19 16 Assume that the mask has a square hole. Can
11:42:23 17 you do that?

11:42:25 18 **A. Okay.**

11:42:26 19 Q. Okay. And now we're going to change the
11:42:30 20 numerical aperture from low to high. Can you tell me
11:42:38 21 which of these figures would result by doing that?

11:42:43 22 MR. HUR: Object to the form. Vague.
11:42:45 23 Incomplete hypothetical. Outside the scope.

11:42:52 24 THE WITNESS: So these -- you have told me
11:42:56 25 these are features printed in a photoresist, correct?

11:58:38 1 THE WITNESS: No. I think there's plenty in
11:58:39 2 the specification that talks about increasing pattern
11:58:45 3 density. We haven't looked at it in those sections, but
11:58:48 4 there is -- there's a lot in this patent about
11:58:50 5 increasing pattern density.

11:58:52 6 BY MR. STADHEIM:

11:58:52 7 Q. I didn't ask about that. I asked about what I
11:58:55 8 asked about.

11:58:55 9 A. No, I think -- well, no, I think you did ask
11:58:57 10 me because you said most of the time it has to do with
11:59:00 11 square corners, so my answer is no.

11:59:40 12 Q. Does a low numerical -- let me start over
11:59:43 13 again.

11:59:43 14 Does a low numerical aperture imaging tool
11:59:47 15 transmit more or less spatial frequencies than a high
11:59:52 16 numerical aperture imaging tool?

11:59:55 17 MR. HUR: Object to the form. Incomplete
11:59:56 18 hypothetical. It's beyond the scope.

12:00:00 19 THE WITNESS: It should -- can you repeat the
12:00:01 20 question? I think I understand it but I want to make
12:00:03 21 sure.

12:00:03 22 BY MR. STADHEIM:

12:00:04 23 Q. Does a low numerical aperture imaging tool
12:00:08 24 transmit more or less spacial frequencies than a high
12:00:12 25 numerical aperture imaging tool?

12:00:15 1 MR. HUR: Same objections.

12:00:16 2 THE WITNESS: So if we set up a hypothetical
12:00:19 3 situation, we have to talk about the use of that tool.
12:00:21 4 So everything else being equal?

12:00:23 5 MR. STADHEIM: Yes.

12:00:24 6 THE WITNESS: I would say a low numerical
12:00:25 7 aperture tool would indeed transmit lower frequencies
12:00:34 8 than a high numerical aperture tool.

12:00:36 9 BY MR. STADHEIM:

12:00:36 10 Q. And so if we had one numerical aperture tool
12:00:45 11 and we could change the numerical aperture and we
12:00:48 12 started with A in Figure -- in Smith Exhibit 5, as we go
12:00:58 13 from A to B to C, the spatial frequencies being
12:01:05 14 transmitted would increase; is that correct?

12:01:10 15 MR. HUR: Object to the form. Incomplete
12:01:11 16 hypothetical. Vague. Scope.

12:01:15 17 THE WITNESS: You have shown me what I think
12:01:22 18 you said is a photoresist image. And the images from
12:01:27 19 these different numerical apertures that you just
12:01:30 20 described have already gone through -- have already been
12:01:36 21 operated on by this photoresist. So the photoresist
12:01:40 22 images that -- and I think I answered this already --
12:01:44 23 that would have resulted from increasing numerical
12:01:46 24 aperture -- everything else being equal -- I would
12:01:49 25 suspect that A would be the lowest, C would be the

12:01:52 1 highest numerical aperture, and B would be the results
12:01:55 2 from somewhere in between. The results printed in
12:01:59 3 photoresist in this case.

12:02:00 4 BY MR. STADHEIM:

12:02:01 5 Q. Actually, you don't just suspect that; you
12:02:03 6 actually know that, don't you?

12:02:04 7 **A. It's hypothetical.**

12:02:05 8 MR. HUR: Object to the form.

12:02:06 9 THE WITNESS: This is a cartoon on a piece of
12:02:09 10 paper. So -- unless there's some other things that we
12:02:12 11 haven't discussed or thought about, then I've got no
12:02:14 12 reason to believe it wouldn't be that direction of
12:02:18 13 numerical aperture.

12:02:37 14 MR. HUR: Can we go off the record for one
12:02:38 15 second?

12:02:39 16 MR. STADHEIM: Sure.

12:02:39 17 THE VIDEOGRAPHER: Off the record at
12:02:40 18 12:02 p.m.

12:02:42 19 (Recess taken from 12:02 p.m. to 12:03 p.m.)

12:03:21 20 THE VIDEOGRAPHER: Back on the record at
12:03:22 21 12:03 p.m.

12:03:29 22 BY MR. STADHEIM:

12:03:30 23 Q. Now still looking at Exhibit 5. As we changed
12:03:37 24 the numerical aperture from low to high and go from A to
12:03:40 25 B to C, the density of the holes doesn't change, does

12:52:56 1 sentence. The part that says, "While higher spatial
12:52:59 2 frequencies in the x-y plane do result in higher pattern
12:53:02 3 density." That sentence goes on -- that paragraph goes
12:53:05 4 on to read "higher spatial frequencies do not
12:53:09 5 necessarily result" -- I'm sorry -- "do not necessarily
12:53:12 6 result in sharper corners or smaller feature size. For
12:53:16 7 example, as stated by the applicants during the
12:53:20 8 prosecution history, a feature that is square shaped can
12:53:23 9 have the same spatial frequency as a feature that is
12:53:28 10 round even though the square has sharper corners in the
12:53:31 11 x-y plane than the round feature. Moreover, features of
12:53:35 12 larger size can have the same or greater spatial
12:53:37 13 frequency than the smaller sizes -- or smaller
12:53:42 14 features." And what I think I've said in my -- in that
12:53:45 15 same declaration is -- paragraph 7 -- "The higher
12:53:53 16 spatial frequency terms represent the finer feature
12:53:55 17 detail." and that's what I'm addressing also in
12:53:59 18 paragraph 10.

12:54:10 19 Q. Okay. You have the fundamental terms and then
12:54:14 20 the higher spatial frequency terms; is that right?

12:54:21 21 A. Higher than the fundamental, sure. But we can
12:54:23 22 also compare fundamental terms of two scenarios and talk
12:54:28 23 about whether one is higher than the other one.

12:54:29 24 Q. Let's just talk about the fundamental terms
12:54:32 25 and all the rest of them. Okay?

12:54:34 1 **A. Fair enough.**

12:54:34 2 Q. Okay. Isn't it the fact that as you
12:54:42 3 understand higher spatial frequency, the only terms that
12:54:45 4 you take into account are the fundamental terms?

12:54:52 5 MR. HUR: Object to the form.

12:54:52 6 THE WITNESS: No. I just read to you
12:54:54 7 paragraph 7 and 10 where it said higher spatial
12:54:56 8 frequency is the finer feature detail.

12:55:01 9 BY MR. STADHEIM:

12:55:02 10 Q. In Figure 6, what terms did you look at to
12:55:05 11 determine spatial frequencies?

12:55:07 12 **A. Exhibit 6?**

12:55:07 13 Q. Yeah.

12:55:13 14 **A. To answer which question? I'm not sure.**

12:55:17 15 Q. Well, you answered the question with regard to
12:55:21 16 pattern density.

12:55:23 17 **A. Yes.**

12:55:23 18 Q. And you circled three?

12:55:27 19 **A. Right.**

12:55:27 20 Q. And the rest of them didn't count, right?

12:55:29 21 MR. HUR: Objection. Mischaracterizes prior
12:55:31 22 testimony.

12:55:32 23 THE WITNESS: I said -- I said in this case
12:55:33 24 those three determine or are linked to or are related to
12:55:41 25 pattern density.

12:55:41 1 BY MR. STADHEIM:

12:55:41 2 Q. And the rest of them didn't impact it; isn't
12:55:44 3 that right?

12:55:45 4 MR. HUR: Objection; misstates prior
12:55:46 5 testimony.

12:55:48 6 THE WITNESS: In this scenario, right.

12:55:50 7 BY MR. STADHEIM:

12:55:51 8 Q. And pattern density is the way you determine
12:55:56 9 higher spatial frequencies, right?

12:55:59 10 MR. HUR: Object to the form.

12:56:01 11 THE WITNESS: No, I -- there are two higher --
12:56:02 12 there are two meanings of higher --

12:56:05 13 BY MR. STADHEIM:

12:56:05 14 Q. Higher spatial frequencies as used by you in
12:56:09 15 paragraph 10 that we've read about five times.

12:56:12 16 **A. Right. All of -- an excerpt from paragraph 10**
12:56:16 17 **or all of paragraph 10? If you'll allow me to use all**
12:56:19 18 **of paragraph 10 I'll explain it to you.**

12:56:20 19 Q. You can use all you want; I'm just -- all I'm
12:56:23 20 clarifying is that when I'm -- in my question right now
12:56:25 21 when I'm talking about higher spatial frequencies, I
12:56:28 22 mean whatever you meant when you used that term in
12:56:32 23 paragraph 10. Okay?

12:56:34 24 **A. Well, there are two -- when we talk about**
12:56:36 25 **higher, there are two ways we can talk about higher.**

12:56:40 1 I'm trying to answer your question now.

12:56:46 2 Q. I am talking about higher spatial frequencies
12:56:48 3 as you used it in paragraph 10 when you said "in the
12:56:52 4 context of the '998 patent, higher spatial frequencies
12:56:56 5 in the x-y plane do not -- do result in higher pattern
12:57:00 6 density in that plane." As you used the term higher
12:57:04 7 spatial frequencies there.

12:57:09 8 A. Right.

12:57:09 9 MR. HUR: And what's the question?

12:57:10 10 BY MR. STADHEIM:

12:57:11 11 Q. My question is the terms other than those that
12:57:15 12 you circled in Exhibit 6 have no impact on higher
12:57:25 13 spatial frequencies; is that right?

12:57:26 14 MR. HUR: Object to the form.

12:57:28 15 THE WITNESS: I didn't say that.

12:57:29 16 MR. HUR: Vague.

12:57:29 17 BY MR. STADHEIM:

12:57:29 18 Q. I'm asking that.

12:57:31 19 MR. HUR: Asked and answered several times.

12:57:38 20 THE WITNESS: There are two ways that I have
12:57:39 21 used higher than I think is consistent with the '998
12:57:45 22 patent. If I -- and you've given me the scenario to
12:57:47 23 compare. If I compare Figure 1 to Figure 2, we can talk
12:57:52 24 about higher: If we take a look at the fundamental
12:57:56 25 orders, we can also talk about higher than those

12:57:58 1 fundamental orders for any individual figure.

12:58:01 2 BY MR. STADHEIM:

12:58:01 3 Q. Which one applies to the claim language?

12:58:05 4 A. They -- they both would.

12:58:15 5 Q. When you used the term "higher spatial

12:58:17 6 frequencies," in the sentence that we've read

12:58:21 7 ad nauseam, did you have something in mind as to what

12:58:26 8 you meant?

12:58:27 9 A. Yes, I did.

12:58:30 10 Q. And which of these two higher spatial

12:58:32 11 frequencies did you have in mind when you said that?

12:58:34 12 MR. HUR: Object to the form.

12:58:35 13 THE WITNESS: All of them. This sentence has

12:58:37 14 got two parts.

12:58:38 15 BY MR. STADHEIM:

12:58:38 16 Q. So that -- I'm talking about the first part

12:58:41 17 that I read.

12:58:43 18 A. And you won't let me include the second part.

12:58:49 19 Q. Let's back up.

12:58:50 20 MR. HUR: Rolf, I mean you've been going along

12:58:52 21 for a while. I appreciate you may want to finish this

12:58:54 22 line. But when do you think we'll be able to break for

12:58:57 23 lunch? It's already --

12:58:58 24 MR. STADHEIM: Very shortly.

12:58:58 25 MR. HUR: -- 1:00.

12:58:58 1 MR. STADHEIM: Very shortly.

12:59:12 2 Q. When you said "In the context of the '998
12:59:14 3 patent, higher spatial frequencies in the x-y plane do
12:59:17 4 result in higher pattern density in that plane," when
12:59:22 5 you said that, what were you referring to, when you
12:59:27 6 said, "higher spatial frequencies"?

12:59:30 7 A. For that part of that sentence you're asking
12:59:31 8 me?

12:59:32 9 Q. That part of that sentence.

12:59:33 10 A. For that part of the sentence it is the
12:59:35 11 fundamental orders becoming higher in frequency that
12:59:40 12 correlates to a higher pattern density. That's what
12:59:43 13 that means. That's what I meant by that.

12:59:45 14 Q. Okay. And in that context, as we look at
12:59:49 15 number 1 of Exhibit 6, all the spatial frequency terms
12:59:55 16 other than the three that you've circled have no impact
12:59:59 17 on higher spatial frequencies; isn't that correct?

13:00:02 18 A. In the context of that part of that paragraph.
13:00:04 19 The rest of that paragraph, though, I'm addressing that.

13:00:07 20 Q. Exactly.

13:00:08 21 MR. HUR: Object to the form --

13:00:08 22 BY MR. STADHEIM:

13:00:08 23 Q. The answer's yes?

13:00:08 24 MR. HUR: -- it's vague. It's an incomplete
13:00:11 25 hypothetical.

14:17:10 1 above the surface?

14:17:11 2 MR. HUR: Object to the form.

14:17:12 3 Mischaracterizes testimony.

14:17:16 4 THE WITNESS: Black in what sense? I said --

14:17:18 5 BY MR. STADHEIM:

14:17:18 6 Q. The color black as opposed to the color white.

14:17:21 7 A. **This isn't a black fill. This is an outline.**

14:17:24 8 **This figure shows outlines. This isn't a figure that**

14:17:27 9 **depicts black and white. This is a figure that --**

14:17:30 10 Q. How do you know that?

14:17:31 11 A. **Because there's no fill. I'm looking at it**

14:17:33 12 **and all I see is outlines. I don't think you can tell**

14:17:39 13 **me that there are lines and spaces depicted here.**

14:17:46 14 Q. If it were black, would it make a difference?

14:17:49 15 A. **If it were black it wouldn't show what the**

14:17:51 16 **picture intends to show. This picture intends to show**

14:17:54 17 **the difference between the outline of a photoresist**

14:17:56 18 **pattern in solid and the outline of the masked dash. If**

14:18:00 19 **they're filled in, you wouldn't be able to recognize one**

14:18:04 20 **over the other.**

14:18:05 21 Q. Let me ask you this: When you prepared your

14:18:08 22 **declaration, did you look at this figure?**

14:18:13 23 A. **I'm sure I did. I looked through most of**

14:18:14 24 **Dr. Mack's book as I was finding examples that showed**

14:18:23 25 **black-and-white-filled lithography patterns.**

14:18:28 1 Q. And you chose not to include this figure in
14:18:29 2 your declaration exhibit; is that right?

14:18:33 3 **A. It's not a figure that shows black-and-white**
14:18:36 4 **filling.**

14:18:38 5 Q. The answer --

14:18:38 6 **A. It's a different --**

14:18:39 7 Q. The answer to my question is yes?

14:18:41 8 **A. Can you ask your question again.**

14:18:42 9 Q. You chose not to include this figure in the
14:18:44 10 exhibit to your declaration; isn't that right?

14:18:49 11 **A. I think Dr. Mack's got hundreds of figures.**
14:18:52 12 **I've only included a few.**

14:20:17 13 **(Whereupon Exhibit 9 marked**
14:20:17 14 **for identification.)**

14:20:17 15 **BY MR. STADHEIM:**

14:20:32 16 Q. Okay. I've handed you Exhibit 9 which is a
14:20:41 17 patent, number 5,067,002. And this was a -- or is a
14:20:55 18 patent that Intel is relying on as part of its
14:21:06 19 allegation that the patent here in suit is invalid.

14:21:18 20 Would you please look at Figure 4A.

14:21:38 21 **A. I see that.**

14:21:38 22 Q. And look at reference number 92 and also look
14:22:00 23 at column 7, line 61.

14:22:06 24 MR. HUR: Counsel, I'm going to object to any
14:22:07 25 questioning about prior art references. That is

14:28:02 1 white.

14:28:06 2 MR. HUR: This just highlights the point,
14:28:08 3 Rolf, that if you're going to ask him a question about
14:28:10 4 this patent, you've got to give him time to review it.
14:28:14 5 92 does cover -- appears, at least on first glance, to
14:28:16 6 cover a whole bunch of parts of that figure.

14:28:26 7 BY MR. STADHEIM:

14:28:27 8 Q. So your position is you'll need an hour to
14:28:31 9 study this patent to see whether that's a hole or not?

14:28:34 10 MR. HUR: Well, why don't you give him some
14:28:36 11 time to start?

14:28:37 12 THE WITNESS: Whether to say what that is. I
14:28:39 13 don't know what that is.

14:28:39 14 BY MR. STADHEIM:

14:28:40 15 Q. You'd take an hour to find it out?

14:28:48 16 A. It might.

14:28:48 17 (Whereupon Exhibit 10 marked
14:28:48 18 for identification.)

14:29:30 19 BY MR. STADHEIM:

14:29:38 20 Q. I've handed you Exhibit 10, which is patent
14:29:58 21 number 5,741,625. And this is another patent that Intel
14:30:06 22 is relying on in this case for its assertion that the
14:30:10 23 patent-in-suit is invalid.

14:30:15 24 Would you please look at Figure 3D and column
14:30:21 25 5, line 42, please.

14:30:53 1 A. (Witness reviews document.)

14:30:55 2 I see that.

14:30:56 3 Q. Do you see 38A in Figure 3D?

14:30:59 4 A. I see that.

14:31:00 5 Q. And that is white; is it not?

14:31:05 6 A. In a -- it appears white, yes. But it's
14:31:09 7 surrounded by -- it's bounded by black.

14:31:22 8 Q. If it weren't bounded by black you couldn't
14:31:25 9 see it, could you?

14:31:26 10 A. That's a very good point.

14:31:28 11 Q. So why did you say it's bounded by black?

14:31:31 12 MR. HUR: Counsel, again, you're pointing to
14:31:32 13 one line of a patent he hasn't seen that's on our prior
14:31:36 14 art list. It's not a deposition about our prior art. I
14:31:39 15 think you've got to give him a fair chance to review the
14:31:42 16 patent if you're going to be asking him questions about
14:31:45 17 it. This is not like the '998 that he's, you know,
14:31:48 18 pretty familiar with.

14:31:55 19 BY MR. STADHEIM:

14:31:55 20 Q. Is 38A a hole?

14:32:01 21 MR. HUR: Same objections. I think the
14:32:02 22 witness -- you should give the witness whatever time he
14:32:04 23 needs to review the patent.

14:32:09 24 THE WITNESS: Well, what I've said in my
14:32:11 25 declaration, I've used the word "convention" and I've

14:32:19 1 used the word "typical." Although I haven't read
14:32:24 2 through the '625 or '002 patent, I'm not surprised that
14:32:31 3 you could find references that show things contrary to
14:32:35 4 the convention or what I've said is typical.

14:32:39 5 For the '625 patent -- although I haven't read
14:32:41 6 any of it; this is the first time I've ever seen it --
14:32:44 7 as I said, 38A is bound -- it's outlined by a dark line.
14:32:49 8 And what you said is well, if it wasn't, you wouldn't
14:32:52 9 know it was there. That's exactly the point is this is
14:32:54 10 not a color photograph. If it was a color photograph,
14:32:58 11 it might have a color. The fact that it's white or
14:33:01 12 clear doesn't necessarily mean it's a hole.

14:33:10 13 BY MR. STADHEIM:

14:33:10 14 Q. It's not a hole, is it?

14:33:11 15 A. I don't have --

14:33:12 16 MR. HUR: Object to the form --

14:33:13 17 THE WITNESS: I don't have reason to believe
14:33:14 18 it's a hole and now --

14:33:15 19 MR. HUR: -- way outside the scope.

14:33:16 20 THE WITNESS: -- I don't have reason to
14:33:19 21 believe it's anything.

14:33:20 22 BY MR. STADHEIM:

14:33:20 23 Q. You can't look at that picture and say it's
14:33:21 24 not a hole?

14:33:22 25 MR. HUR: Counsel, that's not fair.

14:33:24 1 Objection. Either you're going to give him a chance to
14:33:26 2 fairly review it to fairly answer your question or I'm
14:33:30 3 going to object that it's outside the scope and
14:33:34 4 incomplete hypothetical.

14:33:36 5 THE WITNESS: I could tell you what that is if
14:33:38 6 I'm given enough time to read the patent.

14:34:35 7 (Whereupon Exhibit 11 marked
14:34:35 8 for identification.)

14:34:35 9 BY MR. STADHEIM:

14:34:49 10 Q. Okay. I've handed you Smith Exhibit 11, which
14:34:52 11 is patent number 6,022,815. And this is still another
14:35:00 12 patent that Intel is relying on in this case for its
14:35:07 13 allegation that the patent-in-suit is invalid.

14:35:10 14 Would you please look at Figures 2F, 1 and 2;
14:35:20 15 and also Figures 245 -- I'm sorry -- 2C and 2D.

14:35:53 16 A. I see that.

14:35:56 17 Q. Okay. Let's look at Figure 2C. You see some
14:36:00 18 hash-marked material that's referenced 230, right?

14:36:07 19 A. I see that.

14:36:09 20 Q. And then above that you see a layer that is
14:36:14 21 white, 220?

14:36:19 22 A. I see that.

14:36:21 23 Q. And then you see another layer that's hash
14:36:26 24 marked the opposite way; that's 210?

14:36:29 25 A. I see that.

14:51:05 1 BY MR. STADHEIM:

14:51:05 2 Q. A bar that was clear rather than opaque. You
14:51:09 3 mean a hole versus a bar?

14:51:14 4 A. No. I mean a bar that was clear rather than
14:51:17 5 opaque.

14:52:01 6 (Whereupon Exhibit 12 marked
14:52:01 7 for identification.)

14:52:02 8 BY MR. STADHEIM:

14:52:04 9 Q. Okay. I've handed you Exhibit 12. And this
14:52:10 10 is your patent. U.S. 6,881,523 B2; is it not?

14:52:19 11 A. I see that, yes.

14:52:22 12 Q. And you are the Bruce W. Smith that's named
14:52:25 13 the inventor?

14:52:26 14 A. That's right. That's me.

14:52:33 15 Q. Would you turn to page 3 -- column 3 and at
14:52:38 16 line 15.

14:52:46 17 A. Yes, I see that.

14:52:47 18 Q. It says, "Examples of such sub-lithographic
14:52:50 19 features are scattering bars and anti-scattering bars."

14:53:01 20 A. I see that.

14:53:05 21 Q. And the "anti-scattering bars," what does the
14:53:07 22 "anti" modify; scattering or bars?

14:53:12 23 A. Well, it's -- as I said a few minutes ago,
14:53:14 24 it's anti, dash, scattering.

14:53:20 25 Q. So as -- you're testifying that these bars are

14:53:27 1 anti-scattering?

14:53:28 2 MR. HUR: Objection; vague.

14:53:31 3 THE WITNESS: What I've listed here is
14:53:32 4 examples from a patent, the '014 patent, which I don't
14:53:47 5 see right away as a reference.

14:53:55 6 The reason why the inventors of this patent,
14:54:00 7 the '014 patent used the word "scattering" and
14:54:05 8 "anti-scattering," I'm not entirely clear. In both
14:54:15 9 cases these are bars, consistent with what Dr. Mack has
14:54:20 10 written about in terms of bars.

14:54:22 11 What I'm saying here is basically there are
14:54:25 12 bars that are two types. The scatter bar -- the
14:54:30 13 scattering bars are dark and the anti-scattering bars
14:54:33 14 are light; they're both bars.

14:54:35 15 And you see in the drawings that I've used,
14:54:36 16 the bars that I've drawn follow the convention that we
14:54:41 17 talked about where the speckled area is the presence of
14:54:49 18 something and the clear or white area is the absence of
14:54:52 19 something.

14:55:04 20 BY MR. STADHEIM:

14:55:05 21 Q. Okay. So you're saying that an
14:55:06 22 anti-scattering bar is still a bar; it's not a hole?

14:55:14 23 MR. HUR: Objection; mischaracterizes his
14:55:16 24 testimony. It's vague.

14:55:17 25 BY MR. STADHEIM:

14:55:17 1 Q. Is that correct?

14:55:18 2 A. No, I didn't say that. I didn't know what --
14:55:22 3 what I said is that the bar can either be clear or
14:55:25 4 opaque. A scatter bar is opaque, an anti-scatter bar is
14:55:30 5 clear. Which means a bar can be either a hole or a --
14:55:38 6 an opaque feature. I think it's all consistent.

14:55:44 7 Q. My question is what does "anti" modify? Does
14:55:50 8 it mean it's not a bar or is it not scattering?

14:55:54 9 A. I hope I've already answered that.

14:55:56 10 Q. Well --

14:55:57 11 A. It says "anti-scattering," so it modifies
14:56:00 12 scattering. Technically beyond that we'd have to look
14:56:02 13 at the '014 patent to see why the inventors chose to use
14:56:07 14 the words "scattering" and "anti-scattering." In both
14:56:10 15 cases it's a bar.

14:56:11 16 Q. It seems to me what we're talking about here
14:56:13 17 is what you said. You said, "Examples of such
14:56:18 18 sub-lithographic features are scattering bars and
14:56:21 19 anti-scattering bars." I presume when you said that you
14:56:24 20 knew what you were talking about; is that correct?

14:56:26 21 A. Well, it's --

14:56:27 22 MR. HUR: Object to form.

14:56:28 23 THE WITNESS: Well, let's finish the sentence.
14:56:29 24 I said, "Such as disclosed in U.S. Patent Number
14:56:32 25 5,821,014 (incorporated herein by reference)." So --

14:56:37 1 BY MR. STADHEIM:

14:56:38 2 Q. And my question is you understood what you
14:56:39 3 were talking about when you said "anti-scattering bar";
14:56:43 4 isn't that right?

14:56:44 5 **A. I knew that these are examples of**
14:56:46 6 **subresolution lithographic features, yes.**

14:56:49 7 Q. And you're saying that you believed at that
14:56:52 8 time and still believe that an anti-scattering bar is
14:56:58 9 not a scattering bar?

14:57:00 10 MR. HUR: Objection; vague. Object to the
14:57:05 11 form.

14:57:07 12 THE WITNESS: What I'm saying here and I still
14:57:09 13 believe today is that US Patent '014 talks about both,
14:57:13 14 scattering bars and anti-scattering bars.

14:57:16 15 BY MR. STADHEIM:

14:57:16 16 Q. A scattering bar scatters light; does it not?

14:57:21 17 **A. It's not that simple; and the word**
14:57:23 18 **"scattering" may not be appropriate -- an appropriate**
14:57:26 19 **name which is why I said it's a name that is more of a**
14:57:29 20 **marketing name than what is physically taking place.**

14:57:31 21 Q. What do you understand a scattering bar does?

14:57:34 22 **A. A scattering bar influences the defracted**
14:57:40 23 **energy field of a mask pattern and its projected image**
14:57:46 24 **through the optical system.**

14:57:48 25 Q. Does an anti-scattering bar do the same thing?

14:57:50 1 **A. It will do -- it will carry out a similar**
14:57:53 2 **function, yes.**

14:57:54 3 Q. So whatever scattering is in there for, both
14:57:58 4 an anti-scattering bar and a scattering bar does the
14:58:02 5 same thing?

14:58:03 6 MR. HUR: Object to the form.

14:58:04 7 THE WITNESS: They're both bars.

14:58:07 8 BY MR. STADHEIM:

14:58:08 9 Q. That wasn't my question.

14:58:12 10 **A. Okay. Do they do the same thing? They serve**
14:58:18 11 **the same function for different applications.**

14:58:21 12 Q. And whether it's a marketing term or however
14:58:23 13 it came out to be, the word "scattering bar" refers to
14:58:29 14 that function?

14:58:32 15 MR. HUR: Objection; vague.

14:58:36 16 THE WITNESS: The scattering bar, the physical
14:58:38 17 real thing that's used -- forget about the name --
14:58:41 18 carries out that function. The anti-scattering bar,
14:58:43 19 that feature, also carries out that same function for a
14:58:51 20 different type of -- different type of mask feature.

14:58:53 21 BY MR. STADHEIM:

14:58:54 22 Q. And the difference between a scattering bar
14:58:57 23 and an anti-scattering bar is one is a bar, and one is a
14:59:03 24 hole or a trench; isn't that right?

14:59:06 25 **A. That's wrong.**

14:59:07 1 MR. HUR: Objection --

14:59:08 2 THE WITNESS: That's wrong.

14:59:09 3 MR. HUR: -- to form.

14:59:10 4 BY MR. STADHEIM:

14:59:11 5 Q. What's the difference?

14:59:12 6 **A. They are both bars. A scattering bar is**
14:59:14 7 **opaque. An anti-scattering bar is clear.**

14:59:17 8 Q. So what is the difference between
14:59:19 9 anti-scattering bar and a scattering bar?

14:59:21 10 **A. I just finished saying that. A scattering bar**
14:59:23 11 **is opaque. An anti-scattering bar is clear.**

14:59:25 12 Q. When you say opaque, what do you mean?

14:59:27 13 **A. It means there is -- there is material in the**
14:59:37 14 **bar. There is -- there is opacity, there's opaqueness.**
14:59:46 15 **There is something there.**

15:00:20 16 Q. All right. Let's turn back to your
15:00:22 17 declaration.

15:00:39 18 Looking at the first sentence in paragraph 4
15:00:47 19 you say, "I note that an essential element of Dr. Mack's
15:00:51 20 logic turns on his assumption that the white rectangles
15:00:54 21 of Figure 1 of the '998 patent represent upward
15:00:58 22 projecting 'posts' or 'pillars' rather than 'holes'
15:01:07 23 (openings)," -- italicized -- "and that therefore all
15:01:17 24 white or clear portions of all figures in the patent
15:01:21 25 represent posts rather than holes."

15:50:13 1 4; that Dr. Brueck is assigning a 1 to the presence of
15:50:20 2 resist and a 0 to the absence of resist?

15:51:05 3 **A. I'm not sure if that's what that tells me.**
15:51:08 4 **But since it's using tau, it may be consistent with**
15:51:11 5 **that.**

15:51:17 6 Q. Is this a situation where you need more time
15:51:19 7 to study it?

15:51:25 8 **A. Yes. Give me a few more minutes.**

15:51:40 9 MR. HUR: I'm also going to object to the
15:51:42 10 scope.

15:53:28 11 THE WITNESS: (Witness reviews document.)

15:53:28 12 Okay. What was your question again?

15:53:30 13 MR. STADHEIM: Read the question, please.

15:53:50 14 (Record read.)

15:53:54 15 THE WITNESS: If I look at the equation, the
15:53:56 16 top of 13, which I think is called equation 6, Brueck
15:54:03 17 describes that as spatial frequency multiplying. And as
15:54:09 18 the spatial frequencies are multiplied, I would agree
15:54:15 19 that what he shows is this is a function of tau.

15:54:24 20 BY MR. STADHEIM:

15:54:25 21 Q. Does that also teach you that -- or confirm
15:54:30 22 what you already concluded from Figure 4; that he's
15:54:37 23 assigning a 1 to the presence of resist and a 0 to the
15:54:41 24 absence of resist?

15:54:44 25 **A. For the case of spatial frequency multiplying,**

15:54:49 1 **I believe that's what he's doing.**

15:55:30 2 Q. All right. Now would you turn to column 13 of
15:55:34 3 the patent, Exhibit 1, please.

15:55:36 4 A. Okay.

15:55:37 5 Q. And specifically lines 32 to 36.

15:55:54 6 A. Okay.

15:55:56 7 Q. Is tau being applied there?

15:56:10 8 A. Well, it says it's a similar calculation, so I
15:56:13 9 assume that means it was similar to what was done in
15:56:16 10 equation 6.

15:56:22 11 Q. And is 1 being assigned to resist and 0 to
15:56:25 12 absence of resist in that section? Column 13, lines 32
15:56:40 13 to 36?

15:56:57 14 MR. HUR: Object to the form.

15:58:25 15 THE WITNESS: Although we have just stepped
15:58:26 16 through the assignment of tau values of 0 and 1,
15:58:30 17 actually, I don't believe that's correct. And as I look
15:58:36 18 closer at columns 13, tau is the thresholding function
15:58:40 19 and the values of 0 and 1 are the developed photoresist
15:58:47 20 thickness. Tau of E1X and E2X simply means that that
15:58:52 21 thresholding has been applied. It doesn't imply that
15:58:56 22 values of 0 and 1 are associated. Those are the
15:58:59 23 developed photoresist thicknesses, not the values of
15:59:03 24 tau.

15:59:05 25 BY MR. STADHEIM:

15:59:28 1 Q. What is the value of the output of tau then?

15:59:33 2 MR. HUR: Object to the form.

15:59:36 3 THE WITNESS: Tau is a thresholding operation,
15:59:37 4 which gives -- which turns the aerial image E1 of X into
15:59:45 5 a steep profile pattern. It's the operation of
15:59:50 6 thresholding. So equation 6 says a thresh- -- the
15:59:55 7 multiplication -- shows us the multiplication of two
15:59:59 8 threshold resists.

16:00:00 9 BY MR. STADHEIM:

16:00:14 10 Q. Does it have a numerical value as its output?

16:00:20 11 **A. Brueck doesn't tell us what the numerical**
16:00:22 12 **value is or how it's calculated. He emphasizes in**
16:00:28 13 **Figure 5 that tau produces resist features with steep**
16:00:36 14 **side walls. If it was important to Brueck --**
16:00:38 15 **Dr. Brueck, the value -- the values of those -- that**
16:00:47 16 **profile, I suspect he would have included it in Figure**
16:00:52 17 **5B.**

16:00:53 18 Q. But didn't we learn this from looking at
16:00:56 19 Figure 4?

16:00:59 20 **A. Didn't we learn what?**

16:01:01 21 Q. That the 1's and 0's are assigned.

16:01:05 22 **A. No. This isn't a plot for assigning 1's and**
16:01:08 23 **0's.**

16:01:10 24 Q. No, no. But didn't we learn that from Figure
16:01:12 25 4 already?

16:01:13 1 MR. HUR: Object to the form.

16:01:16 2 THE WITNESS: The output for Figure 4 is
16:01:18 3 developed photoresist thickness. If all your
16:01:22 4 photoresist thickness remains, I agree that that in
16:01:26 5 thickness terms is a thickness value of 1. Tau is a
16:01:30 6 thresholding function. Equation 6 says that that
16:01:35 7 thresholding function operates on an exposure dose. The
16:01:39 8 output of that thresholding function is Figure 5B or
16:01:44 9 things that look like that. There is no assignment in
16:01:47 10 the patent that shows tau to be numbers.

16:01:55 11 BY MR. STADHEIM:

16:01:56 12 Q. You're not disagreeing, however, that 1 is
16:02:03 13 being assigned to resist and 0 is being assigned to the
16:02:07 14 absence of resist, are you?

16:02:09 15 A. In terms of normalized thickness, I agree with
16:02:13 16 that.

16:02:13 17 Q. And when you were -- decided to do your
16:02:21 18 exercise per paragraph 8 of your second declaration
16:02:26 19 where you assign the 1's and 0's, did you take Figure 4
16:02:30 20 into account?

16:02:32 21 A. **Figure 4 -- yes, I did. Figure 4 provides the**
16:02:34 22 **thresholding, which eliminates all possibilities but**
16:02:38 23 **resist being there or resist not being there.**

16:02:43 24 Q. Did you -- did you know at the time that you
16:02:51 25 did the work for paragraph 8 in your declaration that

16:13:19 1 into said substrate using a combined mask, ' not just
16:13:24 2 some of the pattern."

16:13:26 3 My question is do you agree with the first
16:13:27 4 portion of that statement that says "The claim language
16:13:31 5 makes clear that all of the first pattern and all of the
16:13:34 6 second pattern must be transferred into the substrate"?

16:13:39 7 MR. HUR: Object to the form. Object to the
16:13:42 8 scope.

16:14:17 9 THE WITNESS: I agree that all of the first
16:14:20 10 pattern and all of the second pattern must be
16:15:04 11 transferred, yes.

16:15:05 12 BY MR. STADHEIM:

16:15:05 13 Q. Now would you look at your second declaration
16:15:16 14 Exhibit 7, paragraph 8.

16:15:23 15 **A. Okay. I'm there.**

16:15:25 16 Q. And what you have depicted there is what is
16:15:31 17 taught in Figure 8 of the patent-in-suit; isn't that
16:15:37 18 right?

16:15:38 19 **A. That's -- that's right.**

16:15:48 20 Q. And the resulting pattern you depict on the
16:15:53 21 right-hand side where it says "Pattern multiplication";
16:15:58 22 is that right?

16:16:00 23 MR. HUR: Object to the form.

16:16:01 24 THE WITNESS: Can you -- I didn't understand
16:16:03 25 the question. Can you repeat the question?

16:16:05 1 BY MR. STADHEIM:

16:16:07 2 Q. You have -- you have three drawings there,
16:16:11 3 first pattern, second pattern, multiplication.

16:16:14 4 A. **That's right.**

16:16:15 5 Q. Okay. And the final of those, the one above
16:16:19 6 pattern multiplication, that's the result of combining
16:16:24 7 the first and second pattern, correct?

16:16:29 8 A. **That's correct, yes.**

16:16:37 9 Q. And that does not show that all of the first
16:16:39 10 pattern and all of the second pattern is transferred
16:16:43 11 into the substrate; isn't that correct?

16:16:45 12 MR. HUR: Object to the form.

16:17:45 13 THE WITNESS: No. I think that shows that all
16:17:47 14 of the first pattern and the second pattern on top of it
16:17:50 15 is transferred onto the substrate.

16:17:54 16 BY MR. STADHEIM:

16:18:03 17 Q. As you look at the final pattern, which is
16:18:10 18 above pattern multiplication in your paragraph 8 in
16:18:15 19 Exhibit 11, the portion that is white in the colored
16:18:21 20 picture is what is in the substrate; isn't that correct?

16:18:26 21 A. **That's right.**

16:18:27 22 Q. And none of the rest of it is in the
16:18:28 23 substrate?

16:18:30 24 A. **That's correct.**

16:18:31 25 Q. So how can you possibly say that all of the

16:18:34 1 first pattern and all of the second pattern was
16:18:38 2 transferred into the substrate?

16:18:44 3 **A. I stand corrected. It doesn't show all of the**
16:18:47 4 **first pattern and all of the second pattern transferred**
16:18:50 5 **into the substrate.**

16:18:51 6 Q. So what is wrong? Is it your interpretation
16:18:54 7 as set forth in paragraph 8 or Intel's assertion on page
16:19:00 8 24 of its first brief Exhibit 13?

16:19:05 9 MR. HUR: Object to the form.

16:19:21 10 THE WITNESS: Well, I don't think it's
16:19:28 11 necessary that Figure 8 be covered by claim 6. This is
16:19:37 12 a discussion of claim 6 in the mask patterns related to
16:19:46 13 claim 6.

16:19:48 14 BY MR. STADHEIM:

16:19:48 15 Q. Well, if Figure 8 is not covered by claim 6,
16:19:51 16 why were you talking about it?

16:19:57 17 **A. It was addressed -- it was to -- it was in**
16:19:59 18 **response to Dr. Mack's declaration. That our**
16:20:10 19 **assignment -- I'm sorry -- that staggered bars must be**
16:20:14 20 **opaque.**

16:20:47 21 Q. Are you familiar with Intel's interpretation
16:20:53 22 of combined mask?

16:20:58 23 **A. Yes, I believe I am.**

16:21:04 24 Q. If one employs that interpretation and one
16:21:16 25 uses your assignments of the 1's and 0's, can you get

16:21:21 1 addition in Figure 8?

16:21:27 2 MR. HUR: Object to the form. It's vague.

16:21:33 3 Compound.

16:21:33 4 THE WITNESS: Can we get addition in Figure 8?

16:21:35 5 I haven't looked at whether or not we can get addition

16:21:38 6 in Figure 8.

16:21:39 7 BY MR. STADHEIM:

16:21:46 8 Q. Did you figure out or did anyone tell you that

16:21:50 9 if Intel's construction of combined mask were adopted,

16:22:06 10 that in Figure 8, depending on how the numbers are

16:22:19 11 assigned, either you can't get addition or you can't get

16:22:23 12 multiplication; you can only get one of them?

16:22:27 13 MR. HUR: Objection; vague. Compound. Object

16:22:31 14 to the form.

16:22:32 15 THE WITNESS: I guess I'm not really clear on

16:22:34 16 "getting." I think using this convention that I show

16:22:38 17 here I've showed multiplication, how it would work in

16:22:41 18 a -- in an embodiment of the '998 patent, particularly

16:22:45 19 the Figure 8 embodiment. The addition embodiment you

16:22:50 20 can see in Figures 9 and 10 that work with this

16:22:53 21 convention of white areas depicting holes and being

16:22:58 22 represented by the number 1. Addition would work for

16:23:01 23 Figure 9 and 10.

16:23:03 24 BY MR. STADHEIM:

16:23:03 25 Q. I'm not talking about 9 and 10. I'm talking

16:23:05 1 about 8. And I'm asking you a question of whether you
16:23:10 2 figured it out or somebody told you that if Intel's
16:23:18 3 construction of combined mask were adopted, then either
16:23:22 4 you can't get addition in claim 8 or you can't get
16:23:26 5 multiplication, depending on how you assign the 1's and
16:23:30 6 0's?

16:23:30 7 **A. In claim 8.**

16:23:32 8 MR. HUR: Object.

16:23:33 9 BY MR. STADHEIM:

16:23:34 10 Q. I'm sorry. Figure 8.

16:23:35 11 MR. HUR: Object to the form. It's vague.

16:23:36 12 It's an incomplete hypothetical.

16:23:57 13 THE WITNESS: I believe you can get addition
16:23:59 14 and multiplication.

16:24:02 15 BY MR. STADHEIM:

16:24:03 16 Q. I didn't ask whether you can get addition and
16:24:05 17 multiplication. I'm asking if you assign the 1's and
16:24:08 18 the 0's in a particular way -- 1's mean one thing and
16:24:15 19 0's mean another thing. If you get multiplication, you
16:24:19 20 can't get addition. If you assign it the other way, you
16:24:22 21 can get addition but you can't get multiplication. I'm
16:24:25 22 simply asking you did you figure that out, or did
16:24:28 23 somebody tell that you?

16:24:29 24 MR. HUR: Objection. It's vague. It's
16:24:32 25 compound. It's an incomplete hypothetical.

16:24:39 1 THE WITNESS: I really don't know how to
16:24:40 2 answer that question because I think I've answered it.
16:24:43 3 I believe you can get addition and multiplication using
16:24:46 4 this numbering.

16:24:46 5 BY MR. STADHEIM:

16:24:47 6 Q. So the numbers you've assigned where the white
16:24:51 7 is -- is 1 and the dark is 0. You believe you can get
16:24:57 8 both addition and multiplication of Figure 8. Is that
16:25:06 9 what you're saying?

16:25:09 10 A. Figure 8 --

16:25:10 11 MR. HUR: Objection to form.

16:25:10 12 THE WITNESS: -- is a multiplication figure.
16:25:11 13 That's where I don't understand the question. Figure 8
16:25:16 14 is -- it says "Figure 8 shows an exemplary result" --
16:25:22 15 I'm reading from column 13 -- "of multiplying two
16:25:25 16 patterns." It's multiplication.

16:25:39 17 BY MR. STADHEIM:

16:25:40 18 Q. Okay. Let's just talk in general. Did anyone
16:25:48 19 tell you or did you figure out yourself that if Intel's
16:25:52 20 construction of combined mask were adopted, the result
16:25:57 21 would be that you can either get multiplication or
16:26:03 22 addition, but you can't get both?

16:26:06 23 MR. HUR: Object to the form. It's even more
16:26:09 24 vague than the last question. It's an incomplete
16:26:11 25 hypothetical. It's compound.

16:26:18 1 THE WITNESS: So you're asking me to assume
16:26:18 2 that you can't get both and asking me if somebody told
16:26:22 3 me that.

16:26:22 4 BY MR. STADHEIM:

16:26:23 5 Q. I'm asking you a factual question about
16:26:25 6 whether one, you figured it out yourself or two,
16:26:28 7 somebody told you. Either of those. That either
16:26:31 8 happened or it didn't happen. The answer is either yes
16:26:33 9 or no or you've forgotten.

16:26:37 10 MR. HUR: I think -- I think you've admitted
16:26:38 11 that it's compound at least. It's still vague. It's
16:26:42 12 still compound. It's still an incomplete hypothetical.
16:26:44 13 It clearly cannot be answered by a yes or no, given
16:26:49 14 now -- especially now how you've just described it.

16:26:53 15 THE WITNESS: It sounds like something that
16:26:54 16 I -- that I wasn't told and I don't believe that's a
16:27:06 17 conclusion that I've drawn.

16:27:20 18 BY MR. STADHEIM:

16:27:20 19 Q. Have you considered one way or the other
16:27:21 20 whether Figure 8 of the patent is covered by claim 6?

16:27:32 21 MR. HUR: Object to the form.

16:27:49 22 THE WITNESS: I don't believe that Figure 8 is
16:27:51 23 covered by claim 6.

16:28:03 24 MR. STADHEIM: Let's take a quick break here
16:28:06 25 and I'll try to wrap things up.