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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SEMICONDUCTOR COMPONENTS INDUSRIES, LLC,

Petitioner,

v.

GREENTHREAD, LLC,

Patent Owner.

IPR2023-01242 (Patent 11,121,222 B2)
IPR2023-01243 (Patent 10,510,842 B2)
IPR2023-01244(Patent 11,121,222 B2)

Record of Oral Hearing
Held: November 13, 2024

Before GRACE KARAFKA OBERMANN, JON B. TORNQUIST, MONICA S. ULLAGADDI, and JULIA HEANEY, Administrative Patent Judges.

APPEARANCES:

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The above-entitled matter came on for hearing on Wednesday, November 13, 2024, commencing at 1:00 p.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

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JUDGE ULLAGADDI: You may be seated. Good afternoon. We are here today for oral arguments in *inter partes* review matter numbers 2023-01242 involving U.S. Patent Number 11,121,222; 2023-01243 involving U.S. Patent Number 10,510,842; and 2023-01244, also involving U.S. Patent Number 11,121,222. In these cases, Semiconductor Components Industries and Texas Instruments constitute Petitioner and Greenthread is Patent Owner. I am Judge Ullagaddi. The Panel for IPR2023-1242 includes Judges Ullagaddi, Obermann, and Tornquist. The Panel for IPR2023-1243 includes Judges Heaney, Ullagaddi, and Tornquist. And the Panel for IPR2023-01244 includes Judges Ullagaddi, Obermann, and Tornquist.

Would like to start by getting appearances of counsel. Who do we have on behalf of Petitioner?

MR. FULGHUM: Good afternoon, Your Honor. Roger Fulghum, lead counsel for Petitioner, Semiconductor Components Industries, LLC. And with me today is Mark Speegle. Mr. Speegle will be handling the argument. And also with us today is our client representative, Josh Engel of Onsemi.

JUDGE ULLAGADDI: Thank you.

MR. WHITEHURST: Good afternoon, Your Honors. Alan Whitehurst from McCool Smith, lead counsel for Patent Owner, Greenthread. And with me today to my left, your right is my colleague Nicholas Matich. And also with me is my colleague Arvind

1 Jairam. And on the line we have Dr. Mohan Rao, the inventor of the
2 patents. And also on the line is Gerald Amen, president and head of
3 licensing for Greenthread.
4 JUDGE ULLAGADDI: Thank you, Counsel. The Judges have
5 the parties' demonstratives. Please remember when referring to the
6 demonstratives to identify what slide number you're on so that we can
7 all follow along and make the record clear. I would also like to
8 remind everyone that recording of this proceeding either by audio or
9 video is prohibited.
10 As set forth in our oral hearing order, each party will have 60
11 minutes to argue. We will begin by hearing the non-confidential
12 portion of the arguments first. Petitioner, who bears the burden to
13 show unpatenability of the challenge claims by preponderance of the
14 evidence, will begin by presenting its case in brief -- in chief. Patent
15 Owner will then respond to Petitioner's arguments and thereafter
16 Petitioner may use any time that it has reserved for rebuttal to respond
17 to Patent Owner's arguments. Petitioner's rebuttal may not be more
18 than half of the allotted time. Thereafter, Patent Owner may use any
19 time that it has reserved for surrebuttal to respond to Petitioner's
20 rebuttal.
21 We will then proceed to the non-confidential -- to the
22 confidential portion of the hearing. The public's access to the hearing
23 via telephone, video conference, or in-person attendance will be
24 closed and limited to authorized persons only at this time. Counsel

1 will ensure that all individuals that are present are authorized under
2 the protective order to be present.
3 All right. With that said, Petitioner's Counsel, would you like
4 to reserve any time for rebuttal today?
5 MR. SPEEGLE: Yes, Your Honors, I'd like to reserve 15
6 minutes.
7 JUDGE ULLAGADDI: So would that be 45 minutes for your
8 main case, the public portion?
9 MR. SPEEGLE: Yes, Your Honor. I don't think any of my
10 portion is going to be confidential. I think that you all have seen the
11 slides. Is there a portion of it that you think needs to be off record?
12 MR. WHITEHURST: I believe we can help simplify things.
13 We don't intend to cover any confidential information today.
14 JUDGE ULLAGADDI: Okay.
15 MR. WHITEHURST: So if Petitioner would like to use all of
16 their time for the non-confidential, that would be fine of us.
17 JUDGE ULLAGADDI: Okay. Thank you, Counsel, for
18 clarifying. That's helpful.
19 MR. SPEEGLE: It would be 45 minutes on my opening and
20 the 15 minutes rebuttal, all of it non-confidential.
21 JUDGE ULLAGADDI: Okay, got it. All right. When you're
22 ready, you may begin.
23 MR. SPEEGLE: Thank you, Your Honors. This is Mark
24 Speegle with Baker Botts for Petitioner Semiconductor Components

1 Industries, LLC. I'll be referring to them by their corporate nickname
2 Onsemi, as we discussed today.
3 So, turning to slide 2 of my presentation, I have seven topics I
4 plan to cover in my presentation. I'm going to begin with an overview
5 of the two patents that are at issue, the '842 and the '222 patents, and a
6 short summary of the instituted grounds patents. I'll explain how the
7 prior art discloses all the claim limitations that are in the challenged
8 patents. Most of those limitations are not in dispute, so I'm not going
9 to spend a lot of time on them. Then I will turn to the three areas of
10 the claim limitations that are in dispute. The most important dispute
11 being about the aid carrier movement limitations. I'll then address the
12 opposite in conductivity limitations and the isolation regions that
13 appear in some of the dependent claims. After that, I'll address Patent
14 Owner's arguments about secondary considerations of non-
15 obviousness. And I'll be happy to answer any questions Your Honors
16 may have about whether the petition is timely based on Patent
17 Owner's privity argument that appeared in the preliminary response.
18 So, turning to slide 5 and jumping into the patents that are at
19 issue, I have here a cover from the '842 patent and claim 1 of the '842
20 patent, which is the parent of the '222 patent. And I think it's helpful
21 by just briefly discussing the elements of claim 1 which will guide our
22 discussion today.
23 The claim recites a semiconductor device comprising a
24 substrate with a first doping type. As Your Honors likely know, when
25 we say a doping type of a substrate, in this context we're referring to a

1 p-type or an n-type substrate. Claims then recite a first active region
2 disposed on the substrate with a opposite doping type. So if the
3 substrate is a p-type substrate, the first active region is supposed to
4 have an n-type doping. Then claims recite a second active region and
5 then transistors formed on both of the active regions.
6 Then the last element I've bolded from claim 1 because this is
7 where most of the disputes in the case are. And this is the limitation
8 that recites, "at least a portion of at least one of the first and second
9 active regions having at least one graded dopant concentration to aid
10 carrier movement from the first surface to the second surface of said
11 [*sic*] substrate." Now, we'll talk about this limitation quite a bit today
12 and similar limitations throughout the patents, but I want to start here
13 by emphasizing that this is a device claim and a physical component
14 of the device. We're not dealing with a method claim that has an
15 affirmative step of aiding carrier movement. When the claims say,
16 "one graded dopant concentration to aid carrier movement," the aid
17 carrier movement limitation is modifying a characteristic of the
18 graded dopant concentration.
19 So turning to claim 1 of the '222 patent, you can see the
20 elements are generally the same. The main addition is the last
21 element which recites at least one well region adjacent to the active
22 region that has a graded dopant region similar to the graded dopant
23 concentration in the prior element. But this one appears in the well
24 region and it similarly is -- has a limitation of "to aid carrier
25 movement" from one place to another place.

Now, claim 44 of the '222 patent is slightly different and this is the claim that we split out into a separate IPR. This is the only claim that's at issue in the 1244 IPR. And the reason that we split it into a separate IPR is that it just recites, and I'm on claim 7 -- or page -- slide 7 by the way, is this claim recites the drift layer, which is just a different element that's required in the physical configuration. It does have similar language about "to aid carrier movement." And this time in the context of the drift layer it says, "the drift layer further having a first static unidirectional electric drift field to aid the movement of carriers from the surface layer to an area of the substrate where there are no active regions."

Now, most of the technical disputes between the parties on the "to aid carrier movement" limitations are going to apply equally throughout the three different patents and three different claims you just looked at. But we have some different prior art with some different structures to account for the drift layer that's present in claim 44 and not the other claims.

So, turning to slide 9 and the Instituted Grounds. These are the Instituted Grounds from the 1242 IPR, which is the first IPR on the '222 patent. And it covers all the claims except for 44. That's challenged separately. And there are six grounds in this IPR. They're based on two primary grounds, one of which is a single reference ground for *Kawagoe* and then another is a combination of two references, the *Wieczorek* and *Wolf*. And those two grounds are the primary grounds. And we have two secondary references that we've

combined with each of those grounds, and that is *Gupta* and *Silverbrook*. And so that gives us a total of six grounds for this IPR.

Turning to slide 10, on the -- this is the Instituted Grounds for the '842 patent. You can see they overlap considerably with the prior grounds. And again, it's *Kawagoe*, *Wieczorek*, and *Wolf*. And then a secondary reference of *Gupta* that's combined with each of those references.

On slide 11, we have the claim 44 grounds and these are in the 1244 IPR. And this is a single reference ground for *Payne* and then a combination of *Sakai* and *Kawagoe*. And that is the same *Kawagoe* reference that's at issue in all three of these IPRs.

Turning to slide 13 and digging a little bit more into the prior art here, *Kawagoe* is the reference we'll talk about the most today. It's present in all three of the IPR petitions. And the most important part of *Kawagoe* is what you can see here on slide 13 is figure 17 of *Kawagoe*, which has a graph disclosing the concentration of dopants throughout the depth of the semiconductor device. You'll see that it refers to this as an impurity concentration on the Y axis of figure 17. "Impurity concentration" and "dopant concentration" mean the same thing in this context. We're just talking about how many of the additives are present on the semiconductor device for each given area.

And what you can see on figure 17 is that there's the top line that's labeled NW. And from the very surface of the device, which is depth zero, that line NW goes down and decreases all the way through

the depth of the device from the very surface until it passes WW, which is the depth of the well.

On slide 14, you can see we've lined up the disclosure from figure 17 on the right-hand side of the figure with the figure 23 in *Kawagoe*, which discloses the physical components of the semiconductor device. And you can see that we've identified the channel region in purple in both of these figures. The channel region is in between the source and drain in the active region. And just a refresher, the transistor works by having a source and a drain of one doping type that's separated by a different material that can be activated with a gate to create a connection between the source and drain and complete the circuit. So this surface region that is in between the source and drain is part of our active region. And it's going to have the graded dopant concentration highlighted in yellow on figure 17 of *Kawagoe*, which, again, is that line that decreases from the very surface and goes down throughout the depth past WW, which is the bottom of the well region.

Now, *Kawagoe*, in addition to actually disclosing this graded dopant concentration, actually tells us what that graded dopant concentration does. And if you look at the text from *Kawagoe* that we've excerpted on the right-hand side of the screen, it's describing what the graded dopant concentration does by reference to an example where you might have an alpha-ray strike in the device.

Alpha-rays are part of cosmic radiation. They just happen randomly all around us. And when an alpha-ray interacts with silicon

in a semiconductor device, it can create excess electrons. And those electrons, they can sometimes cause issues in semiconductor devices. And so *Kawagoe* is describing how the graded dopant concentration would interact with those electrons if you have that kind of alpha-ray strike. And what it says is the electrons produced by the alpha-ray are attracted to the substrate body 2s by that concentration gradient and prevented from entering the p-well 6P.

And it's important, I think, to clarify that this is not something that gets only activated when you have an alpha-ray strike. The graded dopant concentration is a permanent feature of the device in *Kawagoe*. And this is *Kawagoe*'s description, the author's description of what that device and that feature would do all the time. And it's saying if you introduced electrons into the area where you have a graded dopant concentration, and whether it's from an alpha-ray or something else, it doesn't matter, those electrons will be interacted with the gradient and that gradient will attract them to the substrate and prevent them from entering the p-well, which is in the opposite direction.

So let's talk about how this lines up with the claim language. And you can see here we've mapped the elements of claim 1 from the '222 patent with the figures on *Kawagoe* that we just discussed. It starts with a substrate. *Kawagoe* teaches that this could be a p-type substrate. And then it requires a first active region, which, again, is supposed to have an opposite doping type. And so we've mapped that to the NMOS side of *Kawagoe*. *Kawagoe* is a CMOS device. CMOS

means complementary. And it's going to have both a PMOS on one side and an NMOS on the other side. And it's Onsemi's position that an NMOS with an n-type source and drain is opposite in conductivity type to a p-type substrate. So that's what we've identified as the first active region in *Kawagoe*.

Now, the second active region in *Kawagoe* is just the mirror on the left-hand side of that, which is the p-type transistor. It's the PMOS that has p-type source and drain. And there are transistors formed in these regions as you kind of see identified as 4P and 4N on the figure.

Now, the purple region, the "at least one portion of at least one first and second active regions having at least one graded dopant concentration," you can see that's what we've identified in the purple channel region and highlighted in yellow with the graded dopant concentration. And it's Onsemi's position that this graded dopant concentration does meet the limitation of being to aid carrier movement in the direction recited by the claim. *Kawagoe* also discloses the green-well region, which is below the active region and corresponds to the "at least one graded dopant region" with similar language in the last limitation.

Turning to slide 16, we have the claim 1 of the '842 patent. I'm not going to go through all these limitations again. They're virtually identical to what we just discussed with claim 1 of the '222 patent. But we do have these mapped to *Kawagoe* and as laid out in the petition.

1 Now turning to *Wieczorek*, which is another prior art reference
2 at issue here, this is a very similar reference that has a disclosure with
3 the active region, that's the channel region between a source and a
4 drain, and a well region, that as you can see on the right-hand side of
5 what I have on slide 18, has a graded dopant concentration that
6 continually decreases from the surface. And as you go from the
7 surface, where the graded dopant concentration this time is on the X
8 axis to the right, that dopant concentration or impurity concentration
9 decreases as you go deeper and deeper into the well. And that's what's
10 happening in *Wieczorek*, just like we saw in *Kawagoe*, where the
11 graded dopant concentration continually decreases along the depth of
12 the device.
13 Now, we've combined *Wieczorek* with a series of textbooks
14 that we called the *Wolf* reference. And the reason we've combined
15 them with the *Wolf* reference is because the *Wolf* reference describes
16 some of the basic building blocks for the semiconductor devices and
17 specifically a substrate that you could use with the active and well
18 region disclosed in the *Wieczorek* reference. And specifically it could
19 be a p-type or an n-type substrate according to *Wolf*.
20 Now, there's no dispute about this combination. There's
21 nothing -- the Patent Owner hasn't challenged whether this
22 combination would be made. All the disputes are about the "at least
23 one graded dopant concentration" element.
24 So turning to the claim language, like we saw with the
25 *Kawagoe* reference, all these claim limitations line up with what we

1 see in *Wieczorek* and *Wolf*. A substrate, like I said, *Wolf* teaches that
2 it could be p-type or n-type. The first active region would be disposed
3 and would be a CMOS device, so we'll have one that's opposite to the
4 either p- or n-type substrate. The second active region, which would
5 be the other side of the CMOS device, transistors formed on those
6 regions and the "at least one graded dopant concentration to aid carrier
7 movement" in the direction recited is going to be met by the
8 continually decreasing graded dopant concentration you see on the
9 graph. And that would continue through the at least one graded
10 dopant region in the well region for the last element. And same thing
11 for the '842 patent on slide 22.
12 All right. Slide 23 and I'll just jump straight to slide 24 and
13 talk about the *Payne* reference. This is the primary reference in
14 ground 1 of the 1244 IPR. And you can see what's different about this
15 reference is we've introduced a drift layer and that drift layer is the
16 part we've shaded in orange here. And you can see that there's a
17 figure 11 in *Payne* that shows a continual decrease through the drift
18 layer where the graded dopant concentration, again, gets lower and
19 lower as you go deeper into the device.
20 Turning to slide 25 and where we have the figure from *Payne*
21 on the left-hand side and then the claim 44 of the '222 patent on the
22 right-hand side. You can see how all these elements line up again
23 with the surface layer, the substrate in gray, active region on the
24 surface layer. The single drift layer is this orange region. And again,
25 it's our position that this drift layer does have a unidirectional electric

field to aid the movement of the carriers in the direction recited by the claims. And then we also have the well region as recited here as well.

So on slide 26 we have the *Sakai* reference. And then turning to slide 27 we have a short summary of what's in *Sakai*. And you can see we have a similar structure to what we talked about in *Payne*, where we have multiple different types of wells and *Payne* describes these as a shallow well and a deep well. And specifically it talks about the shallow well having a higher impurity or dopant concentration than the deep well. And so there's not a graph like we have in *Kawagoe* which shows the total levels on each spot, but it's consistent with the reference to have more dopants at the top and less dopants as you go deeper.

So the combination we're proposing here is to use the actual graded dopant concentration from *Kawagoe*, which lines up with that continually decreasing figure 17 in *Kawagoe*. And again, there's no dispute about making that combination. The only disputes are about whether *Kawagoe* would meet the to aid the carrier movement or movement of the carrier's limitation within the single drift layer.

All right. I want to talk briefly about the two secondary references I mentioned before. And I have this on slide 30, talking about the *Gupta* reference. And the *Gupta* reference is being introduced to address a potential interpretation of the claims where you're required to have multiple transistors or devices in a single region. And *Gupta* shows that that kind of efficient layout was well known at the time. There's not any disputes about that element or that

1 combination, but that's what we included the *Gupta* reference in the
2 petition for.
3 And then the *Silverbrook* reference, we included *Silverbrook*
4 to address certain dependent claims that recite a CMOS image sensor.
5 And what we have on slide 32 you can see is the CMOS image sensor
6 disclosed in *Silverbrook* and how you would use the CMOS
7 techniques from *Wieczorek* or *Kawagoe* or *Payne* in the context of a
8 CMOS image sensor. And again, there's no dispute about the
9 *Silverbrook* reference or the image sensor claims.
10 All right. So I want to dive into what we have actual disputes
11 on. And so turning to slide 34, I want to talk about the "aid carrier
12 movement" limitation, and I want to start by talking about some of the
13 aspects of this that are undisputed. And to begin with, it's undisputed
14 that each of the prior art references we've talked about here, the
15 *Kawagoe*, *Wieczorek*, and *Payne* reference, they have graded dopant
16 concentrations and we've identified the figures that show those graphs
17 with continually decreasing dopant concentrations. And there's no
18 dispute that we have those concentrations identified. The dispute is
19 on whether those concentrations meet the further limitation of being to
20 aid carrier movement in a given direction.
21 Now, I'm going to show you some testimony from the experts
22 that I think will show that in Onsemi's position it's clear that you will
23 have electric fields and forces extending from these graded dopant
24 concentrations that will tend to move carriers or aid the movement of

1 carriers in the directions recited. And that's why Onsemi believes that
2 these limitations are included in the prior art.
3 Turning to slide 35, this is a slide with some testimony from
4 Dr. Glew. Dr. Glew is Patent Owner's expert. And I want to show
5 you some of the areas where there's no dispute about how graded
6 dopant concentrations physically relate to electric fields and the forces
7 that would extend from them as they interact with different carriers.
8 So I asked Dr. Glew in his deposition, how does a graded
9 dopant concentration relate to the idea of carrier drift? And Dr. Glew
10 answered that the gradient of charge or gradient of charged particles,
11 we have a distribution of charged particles results in an electric field.
12 And the slope of the charged densities are proportional to the field
13 that's given off. So what happens here is you have a graded dopant
14 concentration, so you have more dopants in one area than another
15 area, and that causes the charged particles to be distributed non-
16 uniformly. And now that you have a difference in the amount of
17 charge in one part of the device compared to another, that distribution
18 of charge results in an electric field. And this is Patent Owner's own
19 expert telling us this, that you have a graded dopant concentration,
20 that means you're going to get an electric field.
21 But what does an electric field do? Both of the experts
22 testified about electric fields in their depositions and we have some
23 testimony from Dr. Blalock, who's Petitioner's expert, on the top and
24 then more testimony from Dr. Glew, Patent Owner's expert, on the
25 bottom. This is slide 36. And Dr. Blalock, in his deposition, he was

1 asked if he was just relying on the idea that if the slope is downward,
2 then carriers will move. Was that the logic he applied? And he
3 disagreed with that. What he said, he said, no, as I've said before, if
4 you have a downward graded dopant concentration, "we know from
5 the basic physics, that will lead to an electric field, and that will create
6 a force which tends to move the carriers." So that's the idea. You
7 have the dopant concentration, you get an electric field, and that
8 results in a force pushing in one direction.
9 Dr. Glew testified similarly in his deposition. I asked Dr.
10 Glew in his deposition about a paragraph where he was discussing
11 whether an electric field would aid or impede movement in different
12 contexts. And my question was whether that has a direction to it,
13 right, that it can't be agnostic to the direction. And he agreed. And
14 what he said is, "Well, a field will provide a force in a direction aiding
15 movement in the direction of the force. That's just basic physics."
16 So this is their own expert's words. Their expert says, if you
17 have an electric field, that will provide a force aiding movement in the
18 direction of the force.
19 JUDGE TORNQUIST: So, Counselor, can I ask a question?
20 MR. SPEEGLE: Absolutely.
21 JUDGE TORNQUIST: Is it your position that all you need to
22 show is that there's a force created by this downward sloping gradient
23 or that you need to show that there's a net force when you take
24 everything into consideration?

MR. SPEEGLE: Well, Your Honor, I believe that the important thing is that there is a force that would move the carriers in the right direction. It's not just that you have to have any force pointing in any direction. It's that the graded dopant concentration has to be responsible for a force in the correct direction.

And in terms of the net force issue and whether there are other hypothetical forces, I do have some slides on that I can jump to in a little bit. The idea is, none of the prior art references talk about having other forces interfere with this thing. Like, our expert testified in his deposition that you could hypothetically imagine, you know, connecting an external voltage to your device or having an external magnetic field or something that would mess with the device. But none of that's in the prior art. The prior art doesn't talk about that. What the prior art says, what *Kawagoe* says, is that electrons are attracted to the substrate.

So no matter how much force *Kawagoe* is actually putting on, it's enough to attract electrons to the substrate. That's what *Kawagoe* says. And because *Kawagoe* says electrons are attracted to the substrate, that tells us that, you know, no matter what number of newtons it is, it's enough to aid movement in that direction.

JUDGE TORNQUIST: So I guess the question is, whose burden is it, either production or proof, to show that there isn't something else in these references, even though they're not talked about?

1 MR. SPEEGLE: Well, I think the ultimate burden of, you
2 know, showing that the references meet the prior art is on Petitioner. I
3 think that the references, we're supposed to see what would a POSITA
4 understand from the references? And here I think the idea is that I
5 think we have put forward, as Dr. Glew says and as Dr. Blalock have
6 said, when you have an electric field and it's going to generate a force,
7 people understand that will aid movement in the right direction.
8 And so, based on the expert's testimony and then the language
9 from *Kawagoe* itself, this is on slide 38 that I've jumped to, electrons
10 are attracted to the substrate body. I don't think we need to question
11 whether what *Kawagoe* says is right. When *Kawagoe* says electrons
12 are attracted to the substrate body, we don't need to prove the
13 underlying assumptions to show that that's true. The fact that
14 *Kawagoe* tells us the electrons are attracted to a body, a POSITA
15 would take that at its face, and the POSITA wouldn't try to disprove it
16 by imagining hypothetical things that are not discussed in *Kawagoe*.
17 Did that answer your question?
18 JUDGE TORNQUIST: Yes. And I think their response to I
19 think it was something that was said in another IPR was that, okay, we
20 know what it's doing at the interface right there at the substrate, but
21 what's it doing up at the active regions? And the fact that it's being --
22 you know, the electrons are held at the substrate doesn't show what's
23 going on higher up.

1 MR. SPEEGLE: Yes, I'll respond to that point here in a minute.
2 I have some testimony from that. And we actually asked our expert
3 about that exact issue.
4 JUDGE TORNQUIST: Okay.
5 MR. SPEEGLE: And we showed him figure 17, and he agreed
6 with us, that from the very surface of *Kawagoe* at depth zero, all the
7 way through the end of the well, depth WW, there is an electric field,
8 and there is a force pushing electrons down. All right.
9 So I do recognize the Greenthread has four specific arguments
10 that I want to respond to that include some of the issues that Your
11 Honor just raised. There are some claim construction questions about
12 whether Onsemi is seeking a construction that "graded" means
13 "aided". That's not what we're asking for and I'll explain that. We've
14 always applied the plain and ordinary meaning and that's what we're
15 still asking for today.
16 Greenthread has argued that the direction of the slope is
17 insufficient to show that a given graded dopant concentration will
18 meet this limitation. There's a suggestion they have to be sufficiently
19 graded or graded above a certain magnitude, but there's nothing that
20 supports that interpretation from the patents or the prosecution history.
21 And it's contrary to what Greenthread has said in prior litigations.
22 Greenthread's also talked about external hypothetical forces
23 like we were just mentioning. And I think the primary thing I want to
24 draw Your Honors' attention to is that that's not in the prior art. The
25 prior art just says the electrons are attracted to the substrate and they

1 don't talk about any hypothetical changes where you can modify the
2 prior art to break it or something.
3 JUDGE ULLAGADDI: Counsel, I have a question.
4 MR. SPEEGLE: Absolutely.
5 JUDGE ULLAGADDI: If a person of ordinary skill in the art
6 would have been aware of external hypothetical forces, would they
7 not have considered compensating for them or addressing them in
8 some way?
9 MR. SPEEGLE: So let me back up to some language in
10 *Kawagoe*. And so this is slide 14 that I've gone back to. And I think
11 it's relevant to look at the very first line of what we excerpted on slide
12 14. And so the answer to your question is, yes, they would
13 compensate for them, and yes, they would understand that *Kawagoe*
14 compensates for them. And you can see this from the very first line of
15 what we've excerpted on page 14. This is from *Kawagoe*'s column 6,
16 lines 2 through 11. And it says, "Thus the impurity concentration of
17 the p-well 6P is given such a gradient that it is gradually lowered, so
18 that the influence to be caused by the carriers or electrons due to the
19 alpha-ray is lowered."
20 So what it's telling us is that they've intentionally picked the
21 gradient in *Kawagoe* so that it will handle whatever other fields and
22 forces may be going on here to the extent you needed something else
23 to make sure these electrons are attracted to the substrate. That's what
24 this is saying. It says you give it such a gradient that the result is
25 attracting electrons to the substrate, which would overcome whatever

hypothetical external forces Patent Owner might want to imagine here.

All right. I'm going to get back to slide -- I'm going to go on to slide 41. And this is about the claim construction issue. And I want to first kind of unpack the shorthand that you hear from Patent Owner about whether "graded" means "aided". And that's really kind of cutting these claims short because the claims don't just require aiding carrier movement in the abstract. The claims talk about aiding movement in a specific direction. And that's our position, these claims are really about that direction.

And so when Patent Owner says we're reading this limitation out of the claims, we really disagree with that. And we're not saying that all graded dopant concentrations would meet these claims because the claims require specific movement in a direction. So it's not the case that all graded dopant concentrations would necessarily meet this claim language and we're trying to, you know, exit out of the claims. It has meaning. It just tells the person of ordinary skill in the art how to orient the graded dopant concentration so that you know which direction you want the claim -- the carriers to go in.

In terms of our claim construction specifically, we're asking for plan and ordinary meaning. This is the first construction that we put forward in the petition. We asked for plain ordinary meaning, and we pointed to this exact language from *Kawagoe* to support it, that the electrons produced by the alpha-ray are attracted to the substrate. We

1 believe that attracting electrons to the substrate is right in the core of
2 the plain and ordinary meaning of "to aid carrier movement."
3 We did address an alternative narrower construction in our
4 petition, and this was a construction that came from a prior litigant.
5 And the prior litigant had argued that "aid carrier movement" should
6 be interpreted as sweeping the carriers in a specific direction. And
7 based on some statements in the prosecution history, we concluded
8 that this narrower construction would also be satisfied. But we're not
9 asking for that narrower construction here. We think the plain
10 ordinary meaning is just fine. We just wanted to be thorough in our
11 presentation and also consider the narrow construction that we were
12 aware of when the petition was presented.
13 So the next argument I want to address, and this is on slide 45,
14 and I'll just go to slide 46, is about whether the specification or the
15 patent requires a sufficient amount of grading or a specific threshold
16 amount of grading that you need to reach. And there's nothing in the
17 claims and nothing in the patent that would support that kind of
18 interpretation. The specification refers to the aiding drift field coming
19 from a relative slope. And Greenthread actually told us in some more
20 recent prosecution history what "relative slope" means. And relative
21 slope, according to Greenthread, and this is on slide 47, in a response
22 to an Office Action in a child patent from August of 2024,
23 Greenthread says relative slope "means nothing more than the fact
24 that one side is relatively lower than the other."

1 So let's think about what that means. If Greenthread's -- if the
2 patent says that relative slope creates the aiding drift field, and
3 Greenthread says relative slope just means one side is lower than the
4 other, that means they're not worried about the magnitude. The
5 magnitude doesn't matter. It's just the direction, which side is lower.
6 It doesn't have to be lower by 50 percent, it doesn't have to be lower
7 by any certain number. It's just which side is lower and that gives you
8 the drift field in the direction that you need to worry about.
9 Greenthread did mention in its surreply, and this is on slide 48,
10 that there was some specific dopant concentrations in the
11 specification. I want to emphasize that those numbers that
12 Greenthread cites, they all come from a discussion of a completely
13 different embodiment that's not covered by the claims. The
14 embodiment in the specification that talks about specific numbers is
15 from a -- is from an embodiment where the aiding field is going from
16 the emitter to the collector.
17 So, remember, our claims are talking about moving electrons
18 away from the active region. And the example in the specification
19 where they specify, okay, you need 10 to the 18th to 10 to the 20th on
20 one side and 10 to the 14th to 10 to the 16th on the other side, that is
21 about a different limitation or different embodiment where you're
22 moving electrons from an emitter to a collector. So this is a side-to-
23 side motion within a different construction. What we're talking about
24 going away from the source and drain. So totally different
25 embodiments here.

JUDGE ULLAGADDI: Counsel, that embodiment is not covered by the challenged claims?

MR. SPEEGLE: That's correct. And I'll tell you why it's not covered is good. The claims all recite aiding carrier movement in a way that goes away from the active regions. And these numbers that they're talking about are all within a single active region in between the emitter and the collector. So that's how you know this is not covered by the claims.

All right. Turning to slide 49, I'm just going to flip to slide 50 in the interest of time. So this is about some litigation statements that Greenthread made. And this is a statement that Greenthread made when it was arguing in the district court in a prior case that did not involve Onsemi. Greenthread was arguing about what does aid carrier movement mean? And what Greenthread said in this section is that that the electric field must move the carriers in a particular direction. It's all about the direction. It's not about the magnitude, it's not about how strong the field is, it's just the direction.

And Greenthread went further and actually said, "Whether the carrier movement has a particular speed or acceleration is beyond the scope of the claim." I think that's really telling because let's remember our basic physics. Force equals mass times acceleration. So if the magnitude of my acceleration doesn't matter, that means the magnitude of my force doesn't matter either. So if I don't care about what acceleration or what speed I'm actually giving the particles, that tells me I just care about the direction of the force. And that's the

1 plain and ordinary meaning of "aid carrier movement" that we're
2 arguing for today.
3 All right. This is a topic that we talked about a little bit
4 already, I'm on slide 52, about whether there are external forces. And
5 this is the testimony from Dr. Blalock that I was referencing before
6 that none of these external forces that Greenthread talks about are
7 covered -- are talked about in the prior art. These are things outside
8 the scope of the prior art, ways that, you know, Greenthread is
9 proposing to basically change the prior art reference so it doesn't
10 practice the claims. And that's not right.
11 We have a prior art reference that tells us electrons are
12 attracted to the substrate. And Greenthread is basically saying, well,
13 if you add a different field to it, they wouldn't be attracted to the
14 substrate anymore. That's not what we're here to do. We have a
15 reference that says electrons are attracted to the substrate and that's
16 what we should focus on.
17 Now, I think on slide 53 I have some language that I want to
18 highlight from *Kawagoe* and also from an Institution Decision in a
19 related IPR. And this is something that I was glad the Board picked
20 up on, it was very important and correct, is that the Board recognized
21 that *Kawagoe* also says electrons are prevented from entering the p-
22 well. And when it tells us that electrons are prevented from entering
23 the p-well, what that means is that the graded dopant concentration
24 and the field from that graded dopant concentration must be stronger
25 than any other forces or fields that could be happening in *Kawagoe*.

1 Because if there was some other external field that was stronger than
2 our graded dopant concentration in *Kawagoe*, well, electrons would
3 go the other direction. If they had that force behind them from a
4 different field, they would make it to the p-well. But because
5 *Kawagoe* tells you that electrons do not interact the p-well, they're
6 prevented from entering the p-well, as the board correctly recognized,
7 that is strong evidence that the downward-facing electric field is not
8 negated.
9 Turning to slide 54 another argument that we've heard from
10 Patent Owner is that the Examiner said during prosecution that
11 "without knowing other parameters of the device, one cannot say
12 whether the field would aid carrier movement." And we really
13 disagree with that characterization of what the Examiner said. And
14 the most important reason we disagree with that is because the
15 Examiner wasn't talking about this claim language. What we heard
16 from the Examiner was about claim language that said, "draw all
17 minority carriers" from said surface to said substrate. That's what the
18 Examiner was complaining about, said we don't know if you would
19 actually draw all of the minority carriers based on this graded dopant
20 concentration.
21 Well, look at what Greenthread did in prosecution after the
22 Examiner said that. After the Examiner said, hey, I don't know if you
23 can all the minority carriers, Greenthread changed the language. And
24 that's when Greenthread introduced the idea of having claims say to
25 aid the movement of minority carriers. And not only did Greenthread

1 change the language, and now we're going to have the looser language
2 and go away from actually drawing all the carriers to just aiding the
3 movement, they also said in the record when they were arguing about
4 this, they said that you don't need to know those other parameters.
5 They said the only thing you need to know is this inherent built-in
6 unidirectional electric field is the singular additional parameter for
7 ensuring that all minority carriers are being moved.
8 So let's backtrack here. It's not that -- the Examiner didn't say
9 you have to know more to know if you're aiding carrier movement.
10 The Examiner said you have to know more to know you're drawing all
11 carriers in a direction. Greenthread changed the language to now have
12 aid carrier movement and then now also argued with the Examiner
13 and said, by the way, you don't need to know anything else. All you
14 need to know is that you have this unidirectional electric field. That is
15 the parameter, singular, that ensures this is going to be met.
16 All right. I want to turn to on slide 57 arguments about
17 whether *Kawagoe* is interacting with the correct electrons. This is an
18 argument from Greenthread that the language in *Kawagoe* is referring
19 to electrons that are only present in the body or the substrate. And
20 this is missing the point because, as I pointed out earlier, *Kawagoe* is
21 illustrating how the permanent graded dopant concentration works
22 when it talks about alpha-rays. Talking about alpha-rays it's not like
23 that graded dopant concentration only activates when you have an
24 alpha-ray strike. The graded dopant concentration is always there and
25 it's always active. And the alpha-ray strike is just one source of

1 electrons. But Dr. Glew, Patent Owner's expert, again, he confirmed
2 there are other electrons in the device. You have to have other
3 electrons throughout the device in order to establish that the transistor
4 would work.
5 And then this language I referred to earlier on slide 58, and
6 this is the language where Dr. Glew agreed with us that there is an
7 electric field from the surface depth zero all the way past WW, there
8 is an electric field pushing electrons downward. I asked him that at
9 his deposition and he said, "Yes, there's that field shown in figure 17."
10 So what Greenthread's expert says is that you see figure 17 and you
11 can understand from there, there is an electric field pushing electrons
12 downward throughout the entire device. It's not limited to one part or
13 one portion. Everywhere that you have that graded dopant
14 concentration in *Kawagoe*, you have an electric field pushing
15 electrons downward. Dr. Glew agreed with us that that was correct.
16 Now, I think some of the confusion that you see from Patent
17 Owner about whether the field in *Kawagoe* would aid carrier
18 movement or prevent carriers from moving, I think this is kind of a
19 confusion and misunderstanding about how vector fields work.
20 Because electric fields are vectors. That means they have both
21 magnitudes and directions. And Dr. Glew explained this in his
22 deposition and he was clear that when you have an electric field it will
23 aid movement in the direction of the field. And then I asked him, and
24 it impedes movement in the opposite direction? He says, "Yeah, in

the 180 degree opposite direction, yes, it will repel, and it pushes away."

So when *Kawagoe* says electrons are attracted to the substrate and prevented from entering the p-well, that's just describing this fundamental quality of a vector where it pushes in one direction and it stops movement in the other direction. That's how vectors work because they have a direction to them. When you help something go one way and it's going to stop you from going the other direction. It doesn't mean that the graded dopant concentration is only working in one part of the device or the other part of the device. As Dr. Glew said, that field is working from the surface 00 past WW, there is a field pushing electrons down.

All right. I do have some slides here about the *Nishizawa* reference. And this was an argument from Greenthread, and I'm on slide 60 now, about whether there were actually going to be electrons created in the source and drain region when you have an alpha-ray strike. This is, again, it's really beside the point because the claims don't require electrons from an alpha-ray strike. The claims require electrons from anywhere. And that's what -- there's no dispute there are electrons throughout *Kawagoe*. But to the extent it matters, if you read *Nishizawa*, it actually says that several 10,000 electrons would flow into the n-plus type region 13, which is part of the active region. And I confirmed that with Dr. Glew at his deposition. So *Nishizawa* itself tells us that when you have an alpha-ray strike, you have tens of thousands of electrons in the active region. Now, you might have

1 more electrons somewhere else, and that's fine, but you still have tens
2 of thousand in the active region if you need it.
3 And again, on the *Wang* reference, there's a suggestion that
4 we're trying to modify *Kawagoe* in view of *Wang*. That's not right at
5 all. *Kawagoe* doesn't need to be modified in this regard. It has a
6 graded dopant concentration shown in figure 17 that meets the
7 requirements of the claims. *Wang* was just cited in the petition to
8 explain the alpha-ray illustration in *Kawagoe*, but we're not modifying
9 *Kawagoe* in any way.
10 All right. I'm going to turn on slide 63 to arguments about the
11 doping type. And this is an argument from Greenthread that the --
12 that we've misidentified which active region should be the first active
13 region. And what Onsemi believes is that when you look at the
14 NMOS device that has an n-type source and drain, that is opposite to
15 the P-type substrate. And we just think that's an easy call, we have
16 NMOS and p-type substrate. That's an opposite.
17 Greenthread's -- and before I move on, I want to also point,
18 this is page 64, this is what you see actually in figures 5B and 5C. In
19 5B you can see, which is the closest to the claims, is what you see in
20 5B. And you see you have an n-type source and drain, that's NT, and
21 a p-type substrate. That's exactly what we've pointed to in *Kawagoe:*
22 n-type source and drain, p-type substrate.
23 And I also asked Dr. Glew about this in his deposition and I
24 asked him about the n-type source and drain in *Kawagoe*. And I got
25 him to agree that, yes, the n-type source and drain in *Kawagoe* is

1 opposite to the p-type substrate. And he also agreed that the n-type
2 source and drain is part of the active region. So when their expert has
3 agreed that part of the active region does have an opposite doping
4 type, I think that should be sufficient here.
5 Now, if -- excuse me. Now, Greenthread's position is that you
6 shouldn't look at the source and drain, and you should only look at the
7 channel region. And the reason they say that is they say, well,
8 hypothetically, you could have an active region that doesn't have a
9 source and drain and only has active -- it only has channel region. I
10 don't know if that's true. I don't know if you actually have an active
11 region like that. But it's not the active region in *Kawagoe*. The active
12 region in *Kawagoe* has a source and drain that Dr. Glew just agreed is
13 part of the active region.
14 But setting all that aside, if at the end of the day the Board
15 agrees that we're only going to look at the channel region, *Kawagoe*
16 still discloses that. And it's what we identified as the second active
17 region in *Kawagoe*. And the second active region in *Kawagoe* is the
18 PMOS. Remember, this is a CMOS device. So we have an NMOS
19 on one side and a PMOS on the other side. And if we adopted
20 Greenthread's unusual construction, where we're going to ignore the
21 source and drain and just look at the channel, it would just change
22 what we've identified as the first active region and the second active
23 region. We just switch those words first and second, and everything
24 else stays the same.

1 And actually, if you look at page 20 of the petition, actually,
2 on the 1242 petition, you can see where we actually mapped the
3 graded dopant concentration in the second active region to the same
4 lines that you saw in *Kawagoe*. So it wouldn't change that analysis at
5 all. And the PMOS would be just fine to identify as the first active
6 region.
7 All right. Isolation regions, I'm turning to slide 68 now. And
8 there's four dependent claims that mention isolation regions. Now, all
9 of them talk about a first and second active regions being separated by
10 at least one active region, but they do not say how much separation is
11 required, it just says separated. And so in view of that, what Onsemi
12 identified as the isolation region in *Kawagoe* is on slide 69. You can
13 see that the NMOS and the PMOS are separated by insulating film 3,
14 which is highlighted in orange on this figure. And you can just look
15 at that figure and see that physically, that film right there separates
16 those two MOS.FETs.
17 Now, Greenthread has argued that they don't think that
18 insulating film 3 would actually separate because they think it sits on
19 the surface of the semiconductor device. That's not right. And we
20 know that's not right because *Kawagoe* says that insulating film 3 is
21 formed by the LOCOS method. And we asked Dr. Glew about this in
22 his deposition, and he explained that the LOCOS method is a step
23 where you actually consume the silicon and work your way
24 downward. So it's not like this insulating film is just sitting on top of
25 the NMOS and PMOS. It actually works its way down physically into

1 the semiconductor device, which, in our view, confirms that it is
2 separating the surface NMOS and PMOS.
3 Now, if there was still some question here, and the Board
4 determines that you need a more complete separation, *Kawagoe*,
5 again, would meet that construction as well, because *Kawagoe* also
6 discusses a channel stopper region, which is formed below the
7 insulating film 3. And Dr. Glew recognized in his deposition that a
8 channel stopper region would "stop errant carriers from migrating
9 from one transistor to another." So if there is a construction where we
10 needed a more complete separation, again, *Kawagoe* would disclose
11 that as well.
12 JUDGE TORNQUIST: I have a question before you move on.
13 MR. SPEEGLE: Yes, sir.
14 JUDGE TORNQUIST: Looking at your slide 61.
15 MR. SPEEGLE: Is it 61 or 71?
16 JUDGE TORNQUIST: Sixty-one.
17 MR. SPEEGLE: Sixty-one, turn back.
18 JUDGE TORNQUIST: My understanding from your petition
19 was that you showed this sloping gradient from the channel region
20 down through the substrate. Does it matter now that you maybe are
21 not saying the channel region is part of the active region?
22 MR. SPEEGLE: The channel region is part of the active
23 region.
24 JUDGE TORNQUIST: Okay.

1 MR. SPEEGLE: And so are you talking about -- yes. So the
2 channel region is absolutely part of the active region. That's not in
3 dispute. I think what Onsemi's position is, is that the doping type of
4 the channel region does not define the doping type of the active
5 region. We would look to the source and drain as the doping type of
6 the source and drain, which aligns with the overall convention in
7 Semiconductor Industries to refer to p-type transistors and PMOS
8 based on what the source and drain doping type is. Right?
9 JUDGE TORNQUIST: So you're saying just ignore the fact
10 that the channel region could be p-type and just look at the n-type
11 active regions in the source and drain.
12 MR. SPEEGLE: I think for determining what is the doping
13 type, that's what we would say is, yes, the doping type of the source
14 and drain would matter. And essentially, there's three ways you could
15 interpret these claims. You could say you only look at the source and
16 drain, you only look at the channel region, or you look at either one of
17 them. And we don't think the Board needs to resolve that dispute
18 because *Kawagoe* would show this no matter which way you define it.
19 Onsemi's position is that the way you should look at it is that
20 the source and drain, that's what tells a POSITA if it's an NMOS or a
21 PMOS, look at the source and drain. At a minimum, Dr. Glew agreed
22 that the source and drain were part of the active region. And so being
23 part of the active region would also be a way you could interpret these
24 claims. And again, if you go with Greenthread's construction, which

only looks at the channel region, the PMOS in *Kawagoe* would still meet that limitation.

JUDGE TORNQUIST: Okay.

MR. SPEEGLE: All right. I'm turning now to slide 73. And this is on the secondary considerations of non-obviousness. And I think the most important thing here to talk about is the law and -- because what Greenthread is relying on is license agreements. And the Federal Circuit has told us that there's an extra requirement: when you're trying to rely on license agreements as secondary considerations, you have to have some affirmative evidence of nexus. You can't just look at license agreements and say this is secondary considerations by itself.

And the reason for that, to quote the Federal Circuit, is "because it is often cheaper to take licenses than to defend infringement suits." So if a party's taking a license, that by itself is not enough to tell us that we have secondary considerations of non-obviousness. You have to have some extra affirmative license -- affirmative evidence of nexus.

On slide 74, I want to respond to an argument that Greenthread makes in its Patent Owner's response. And in its Patent Owner's response Greenthread says that "licenses that are part of litigation settlements can also be probative of non-obviousness." And Greenthread supported that citation with a citation to *Fox Factory v. SRAM*. And the problem for Greenthread is that this decision that Greenthread is relying on was vacated by the Federal Circuit. And the

1 Federal Circuit vacated it because they found that the Board in that
2 case had erroneously presumed nexus and had not given enough
3 scrutiny to the license agreements that were at issue. On remand,
4 when the Board with that guidance looked at those license agreements
5 that were related to the litigation settlements, the Board found that the
6 claims were unpatentable because Patent Owner shows us a weak
7 nexus for some licenses and no nexus for the licenses that did not
8 mention the patents at issue.
9 So let's take a look at what our evidence of licensing is in this
10 case. The only witness from Greenthread or anyone who has talked
11 about these licenses is Mr. John, the former president of Greenthread.
12 And in his deposition, I asked him what he knew about the patents and
13 if he could provide some kind of connection to the actual patents in
14 dispute here, and he could not.
15 I asked him, "Have you looked at the claims of the '842
16 patent?"
17 "No."
18 "Have you looked at the claims of the '222 patent?"
19 "Not that I can remember."
20 "Are you aware of any connection between the '222 patent and
21 the license agreements in your declaration?"
22 "Not being an engineer, no."
23 Same question for the '842 patent. "Don't remember."

"At any time during the negotiations of any of the license agreements, did any of the licensees mention a specific claim from the '842 or '222 patents?"

"I don't know."

So what we're hearing from Mr. John is that he simply doesn't have any idea what these patents are connected to for litigation or the technology. And there's no affirmative evidence of nexus here.

Last thing before I reserve the rest of my time, there are some licenses you'll hear about that were not directly connected to litigation, but they were made in connection with RPX, who is a well-known entity that is all about saving litigation costs. So anyone in that space would understand that if you're doing a deal through RPX, that's certainly going to be motivated by litigation cost.

And unless Your Honors have further questions, I'll reserve the rest of my time for rebuttal.

JUDGE ULLAGADDI: Thank you, Counsel. You have about 14-1/2 minutes for rebuttal.

Counsel, would you like to reserve any time for surrebuttal?

MR. WHITEHURST: Yes, please. We'd like to reserve 10 minutes. And bear with me while -- sir. Sorry, technical difficulties.

JUDGE ULLAGADDI: When you're ready, you may begin.

MR. WHITEHURST: Yes, may it please Your Honors. Good afternoon. Alan Whitehurst for the Patent Owner, Greenthread. I want to put everything into proper perspective. I'm sure you have lots of questions for me and I'm ready to address those questions.

1 We heard a lot of arguments about aided carrier movement
2 and I even heard that Greenthread's confused about vectors. But I'm
3 going to show you in a few minutes that it's not Greenthread that's
4 confused about vectors. It's Onsemi. And I'm going to go through
5 their own demonstratives to show you why there's no aiding of carrier
6 movement from the active region or the surface to the substrate. Their
7 own demonstratives are going to show why Greenthread's correct and
8 their arguments are wrong.
9 Now, we've heard lots of discussion today about graded
10 dopant concentrations and that these graded dopants create fields and
11 these fields create a force. But that's not what the claims are about.
12 The claims are about using a graded dopant concentration to aid
13 carrier movement from the active region to the surface. And I heard
14 Your Honor ask about the active region.
15 The importance of the invention when you read this
16 specification was getting these unwanted, spurious minority carriers
17 away from the active region because they were hurting the
18 performance of the transistor. And that's what we see in the claims.
19 The claims are not just claiming any graded dopant concentration. It
20 must aid carrier movement from the active region to the substrate.
21 And I'm going to show you today why this is a major problem for the
22 Petitioner. There's no evidence for any of the references that this ever
23 occurs.
24 Now, we're going to start today with slide 19. We heard a lot
25 of argument about *Kawagoe*, and I'm going to go through the air

1 demonstratives for *Kawagoe* in just a few minutes. You'll see on your
2 screen figures 23 and 17 from *Kawagoe*. And you'll see in their
3 demonstratives how they annotate these figures. Those annotations
4 support us, not them. You'll see that they are arguing that figure 17 is
5 a graded dopant concentration that's going to do what the claims say.
6 That's not true.
7 If we could please go to slide 22. The specification is
8 explaining what's really going on here. It's talking about these alpha-
9 ray strikes, and I'm not going to go into a lot of detail today about
10 alpha-rays, but the patent describes that the alpha-rays is creating
11 electrons in the region that's been shaded yellow. Now, there's a lot of
12 uncertainty. *Kawagoe* is about as clear as mud. But one of the few
13 things it does make clear is that whatever figure 17 is doing, it is
14 intended to prevent these electrons from the alpha-rays from getting
15 into the p-well. That's all we know. There's no discussion in
16 *Kawagoe* about carriers in the -- we've heard it called the active
17 region, the channel region, whatever's up at the surface of the
18 semiconductor. There's no discussion about that in *Kawagoe*. And
19 believe me, rest assured, if *Kawagoe* described what was going on
20 with the carriers in the active region, we would have seen it. There
21 was no description of that. And that's why Petitioner's relying on this
22 one paragraph in isolation that's telling us that figure 17 prevents these
23 electrons from entering the p-well.
24 Well, that's a real problem for the Petitioner because there's no
25 description of what figure 17, what effect, if any, it would have on a

1 carrier, not down in the yellow region, but up at the top in the active
2 region. That's what they need to show. And they have nothing to
3 explain, nothing to point to in *Kawagoe* that says figure 17 would take
4 something up in the active channel region and do what the claims say.
5 So they've taken some liberties with the figures and shaded them.
6 Now, they're trying to show you some things today that are at
7 odds with the laws of physics and what we all learned in basic math
8 class and physics. And they're trying to take out of context some
9 testimony from Dr. Glew. But I'm going to walk you through their
10 own demonstratives and show how there's no way what they pointed
11 to can possibly aid carrier movement from the active region, which
12 would be up at the top of the p-well, to the substrate.
13 Now, with that, I'd like to go to Petitioner slide 14. And you'll
14 see that Petitioner is actually helping clarify my point for us. And
15 that's why I took a little offense at the comment about the vectors,
16 because it's not us that's confused about the vectors, it's the Petitioner.
17 Now, you have to use your imagination a little bit, because
18 what's on the left, figure 23, is showing it from the side, and figure 17
19 over there is on its side. But you'll see that they have annotated and
20 added purple in figure 23 on the left and then done some similar
21 purple shading on the right to figure 17. And they've helped us out
22 here by shading the green on the left and they've shaded the green on
23 the right. And then they've even labeled for us the graded
24 concentration. And you can see that the graded concentration up at
25 the surface, NW, is higher than at the bottom of the well, NS. Now,

that line is showing what's called a p-type dopant. There is more p-type dopant at NW than there is at NS. So as you go deeper into the p-well, the amount of p-type is decreasing.

And if we go to Petitioner's slide 35, whoever made these slides understood physics. They probably had a physics background. And they have drawn on slide 35 a big red arrow. Now, you will see the red arrow is on figure 17. But if we were to turn that on its side and put it over there in figure 23 on the left, that red arrow would be pointing down.

Now, I'm going to show you on this slide and then on the next slide, 38, why we are right and they are wrong. We have said from the beginning, from the outset, that whatever figure 17 is doing, it was intended to keep them out of the p-well. Well, their own slide is going to prove our point that if an electron happens to be in that p-well, the figure 17 is not going to help sweep it or pull it out. No, it's going to do the exact opposite.

And what they've done today, I heard a lot of times that a force going from the active region to the substrate would meet the claims. That's not true. We all know that forces affect different charges directly.

Now, the next slide that I'm going to show you, you're not going to see the red arrow, so I may come back. But I want -- before we move on, you'll see that the red arrow goes from the surface down to deep in the substrate. And that's correct, because any time a p-type dopant decreases, the field is going to go towards the decrease.

1 Now, if we could please go to slide 38. This is where
2 Petitioner went wrong. And this slide right here shows why
3 Greenthread wins and Onsemi is trying to pull a fast one. We have
4 told you from the very beginning that figure 17 doesn't do what
5 Petitioner says it does. We've tried, we've done everything we can in
6 this IPR and other IPRs, but this slide right here sums it all up. And if
7 you remember nothing from my argument today, I want you to just
8 remember this slide.
9 You'll see that they have taken electrons. Now, we've said
10 figure 17 was keeping them down in yellow. They tried to do some
11 hand-waving and say, oh, well, electrons could be up in the p-well.
12 Well, they've shown these as red circles. And whoever made this
13 slide understood polarity because they didn't just put an E, they
14 actually put a negative sign. And that's important because electrons
15 have a negative charge. And then whoever made this line took a little
16 dash, dash, dash, and did arrows going to the right in figure 17. And
17 if we were to turn that on its side, it would be going down in figure
18 23. Because they want you to believe that any time you have a force
19 going down, it's going to take those electrons and cause them to move
20 in that direction. That's not true.
21 We in this room, a lot of us have physics, engineering
22 backgrounds, and we learned how electric fields work. When you
23 have a positive charge interacting with a positive, it pushes it. I mean,
24 if we were to do little magnets on a table, it would push it. But
25 electrons do something very different. As they say, opposites attract.

1 So when an electron sees a field, if we could go back to 34 real quick,
2 like the one that they drew in 34, now if we could go back to 38,
3 please, it doesn't do what the pink arrows do. It does the exact
4 opposite. When you take an electron and put it in figure 17, it's not
5 going to go in the direction of the pink arrow. We don't know what
6 it's going to do, but it's not going to do what they say it does. If
7 anything, it's going to do the exact opposite. When you have a field
8 and you have a negative electron, they go opposite.
9 So if you were going to make this slide correct, and we have
10 lots of disputes with their characterizations of 17 and 23 and my
11 colleague Mr. Matich is going to address some additional
12 mischaracterizations of *Kawagoe*, but this slide right here is definitive
13 proof why Petitioner cannot possibly prevail on *Kawagoe*. They had a
14 burden in their petition to set forth their arguments with particularity.
15 And they have been talking about electrons, electrons, electrons, and
16 they've drawn a force, and then they want to pull a fast one and say,
17 you got a force, you got an electron. They go opposite directions. So
18 what they identified in their petition and what they're relying on,
19 wrong, it's not us that's confused about vectors. It's them.
20 Now, if you --
21 JUDGE OBERMANN: Counsel?
22 MR. WHITEHURST: Yes.
23 JUDGE OBERMANN: What's your best evidence to prove that
24 the electrons are not going to move downward?

1 MR. WHITEHURST: They're not. Well, we don't know for
2 sure what, if anything is going to happen in the p-well. That's been
3 our point from the outset. But it's not going to do what's shown here.
4 And we explain this in pages 3 and 5 of our Patent Owner's response,
5 that the direction of movement when something's free to move, we
6 were very clear that not everything moves, but when it's free to move,
7 if it doesn't have external forces or resistance and things are free to
8 move, a positive charge moves in the direction of the field, a negative
9 moves the opposite. This is basic physics. It's what we all learned in
10 school. We all had to study this and it makes sense.
11 I mean, you can kind of think of this electron as looking for a
12 warm hug. This electron is looking for something with a positive
13 charge. So if we look at figure 38, where is it warm and cozy and
14 something a positive charge that it can go hug? If you look, and you
15 heard Counsel explain it to you, the most positive charge is at NW.
16 This is basic physics. The lowest, coldest, most uninviting place is at
17 NS. So what does an electron that's attracted to a positive charge do?
18 Does it head towards the lower positive charge at NS or does it go
19 towards the higher positive charge at NW?
20 JUDGE TORNQUIST: Okay. Counsel, Kawagoe says that the
21 electrons are prevented from entering the p-well due to this field. If
22 you're right, they should be sweeping up towards NW -- or just
23 explain it to us scientifically.
24 MR. WHITEHURST: So I don't have the burden of proving
25 *Kawagoe*. *Kawagoe* has flaws all over it. It's clear as mud. When

1 you look at the p-well, all we know from the face of *Kawagoe* is that
2 whatever figure 17 does, it was to keep the electrons out of the p-well
3 altogether. That much we know. What do we know beyond that? We
4 don't know. And that's why there's no evidence to support Onsemi's
5 petition. *Kawagoe* never describes what happens to an electron in the
6 p-well. It only describes what happens to an electron when it's down
7 in the yellow highlighted region, which is where they originate.
8 So to answer your question, to the best of my understanding,
9 figure 17 kept them in the yellow. Our position from the very
10 beginning is these alpha-ray electrons never get up to the p-well
11 because if you do, you're in bad shape. It's not going to do what
12 Onsemi says. These electrons, which *Kawagoe* is desperately trying
13 to keep away from the active circuitry at the surface, whatever it's
14 doing in figure 17 is going to propel them, your point, right up to the
15 active circuitry. It's going to allow them into the chicken coop. I
16 mean, it's going to let those electrons go right to the top and damage
17 the active and channel region.
18 So my best reading of *Kawagoe*, and it's not my burden of
19 proof to prove what is or is not in *Kawagoe*, is that the only thing
20 figure 17 is doing is keeping them out of the p-well. Because if they
21 get in the p-well, it's not doing what's shown in slide 38. It's going to
22 propel them towards the surface. It's going to do harm to the
23 transistor. So we have a real problem.
24 JUDGE OBERMANN: I want to ask you one more time
25 because you just said it again, and I know you're presenting it as a

1 very basic concept that that's exactly what would happen to electrons
2 in that region. What is your best evidence for that?
3 MR. WHITEHURST: Best evidence? It was in Dr. Glew, 121
4 and 122. Counsel asked him, if an electron is in an active region,
5 would it be pulled or drawn? I can't remember Counsel's exact
6 question, but it is on slide 64 of our demonstratives.
7 JUDGE OBERMANN: Thank you. And that's the best
8 evidence --
9 MR. WHITEHURST: Dr. Glew --
10 JUDGE OBERMANN: -- of that?
11 MR. WHITEHURST: I'm sorry?
12 JUDGE OBERMANN: That's the best evidence for your
13 proposition that the electrons would not move in the direction that's
14 depicted on page is it 38 of the Petitioner's demonstratives?
15 MR. WHITEHURST: As we also discussed on our response 3
16 and 5 and the declaration portions that are cited in there, we explained
17 that electric fields act on different carriers and it will depend on their
18 charge. So we know that opposites attract. So an electron wants to go
19 towards a positive charge, not away from it. So what you see in 38 is
20 that the electron is not going to go in the direction of the pink arrow.
21 JUDGE OBERMANN: Yes, I understand what you're arguing.
22 I just want to make sure that I have in front of me what you consider
23 your very best evidence on that point, that the electrons would not
24 move in the direction depicted in Petitioner's demonstrative number
25 38.

1 MR. WHITEHURST: Correct. And here you see that Dr.
2 Glew was asked about this during his deposition, "And this electric
3 field resulting from the graded dopant concentration of figure 17
4 would sweep these electrons from the active region down into the
5 substrate?"
6 "It doesn't disclose that. The patent only describes that this
7 doping gradient is able to keep SEU electrons out of the well. It
8 doesn't tell you what's happening in the well."
9 JUDGE OBERMANN: And what are you reading from right
10 now?
11 MR. WHITEHURST: I am reading from demonstrative 64, and
12 more specifically, Exhibit 1052 at 121 -- page 121, lines 11 through
13 17, and page 122, lines 6 through 9.
14 JUDGE OBERMANN: And what I'm seeing here is that he's
15 saying the reference doesn't disclose that. But do you have anything
16 in the record that supports your view that you just said, you know, in
17 demonstrative number 38, that the electrons would not move in that
18 direction?
19 MR. WHITEHURST: Yes. The declaration, which was cited
20 in our pages 3 and 5 of our response, describes that different carriers
21 move differently in the direction of a field. It depends on the polarity
22 of the carrier. So in this case, an electron would move opposite of the
23 field.
24 Dr. Glew, during his deposition, also talked about diffusion,
25 that an electron moves towards the positive charge. He testified at

1 length that charges try to distribute themselves evenly in the silicon.
2 In this instance, the electron that is shown in Petitioner's
3 demonstrative 38, you heard Counsel himself say that the highest
4 positive charge is at NW. Based on Dr. Glew's testimony, that means
5 that the electron would gravitate towards the higher positive charge.
6 It would do the opposite of what's shown by the pink arrows in
7 Petitioner's demonstrative 38.
8 This is something that's basic math. We all know that
9 polarities move electrons. And it goes back to Ben Franklin. He was
10 the one that when we were describing electricity, when we do circuits,
11 electrons move opposite of the field. And that's exactly why
12 Petitioner's demonstrative 38 is wrong. The electron does not move in
13 the direction of the field. It moves opposite to the extent it moves at
14 all. But this just confirms why figure 17 was never intended to act on
15 carriers in the p-well itself.
16 You heard from Counsel about a passage from Dr. Glew. He
17 never testified that the p-well and what is shown on demonstrative 38
18 would take an electron from the active region and move it towards the
19 substrate. In fact, he said the opposite. He never testified that. When
20 he was asked about the cumulative effect from zero to WW, he
21 repeated back exactly what we see on the face of the specification,
22 that it would prevent the electrons from entering the p-well. This is
23 not our burden to show what an electron would do or not do in the p-
24 well, but it's certainly not going to do what the pink arrows say.

1 That's not what *Kawagoe* says, and that's contrary to the basic laws of
2 physics.
3 Figure 17, this is proof that whatever figure 17 was intended
4 to do, it was not to sweep or pull electrons from the active region. If
5 anything, it would do the opposite. What Figure 17 was intended to
6 do was keep them in the yellow highlighted region below the p-well.
7 JUDGE TORNQUIST: But you're saying that wouldn't do that.
8 You're saying you don't know what this reference is doing because
9 that's not what the actual gradient would do.
10 MR. WHITEHURST: That is correct. I mean, there are a lot of
11 variables in any semiconductor structure. Silicon itself has a basic
12 resistance in order to overcome the resistance of silicon or other
13 external forces. This is why in column 2 of the patent Dr. Rao
14 discusses the relative slope and whether it generates a suitable electric
15 field.
16 I want to make it abundantly clear that this patent is not about
17 all graded dopant concentrations and it's not about all electric fields.
18 It requires more. It requires a suitable electric field, to use Dr. Rao's
19 own words, that, and I heard Counsel say over and over again, move it
20 in the correct direction. Well, you need to move it from the active
21 region to the substrate. And whatever *Kawagoe* is doing, it's not
22 doing that.
23 JUDGE ULLAGADDI: Counsel, I have a question about that.
24 MR. WHITEHURST: Yes, Your Honor.

JUDGE ULLAGADDI: Does the specification make clear what "suitable" means?

MR. WHITEHURST: I believe it does. And if we could go to Patent Owner's slide 7, I would like to address that point.

You know, *Phillips* taught us how we should do claim construction, and we all know that we're supposed to follow *Phillips* here. I believe the plain meaning of the claim, the fact that it says, "graded dopant concentration to aid carrier movement from the surface to the substrate," tells you on the face of the claim that it's not inherent. My point is that whatever the graded dopant concentration is, it's not going to necessarily aid carrier movement at all and much less in a particular direction. And that's why when you look at column 2, lines 54 to 64, that we see on Patent Owner's demonstrative 7, we see that discussion of relative doping concentrations, and we even see a discussion about 10 to 100x.

Now, we have a different view. We believe this is relevant to the challenged claims, that there's nothing in this paragraph that's at odds with the transistors claimed in the challenged claims. And you see a discussion here that you look to the relative slope in order to determine whether it's a suitable aiding drift electric field.

Now, it says "slope," and that's a very important point, one that we tried to stress. And I don't know whether we've successfully gotten that point across.

JUDGE ULLAGADDI: Counsel, can I ask another question about that section that you're pointing to? So, is it Patent Owner's

1 position that this portion in column 2, lines 54 to 64, is covered by the
2 challenged claims, particularly the part that says at the end, "to help
3 the holes p-n-p transistor transverse from emitter to collector"?
4 MR. WHITEHURST: Well, some of the claims are limited to
5 source and drain in a particular type. So I don't mean to imply that all
6 of the challenged claims are, but I do believe it's applicable to at least
7 some. And when you look to construe claim terms across related
8 patents, you want to construe them consistently. So in that regard,
9 while not every claim would directly read on a BJT, some of them
10 may. And in that regard, because we want to construe the claim terms
11 consistently, it would be applicable. But --
12 JUDGE ULLAGADDI: But maybe during the rebuttal, you
13 could point to which ones do and which ones don't. That would be
14 helpful for us.
15 MR. WHITEHURST: Okay.
16 JUDGE ULLAGADDI: Thank you.
17 MR. WHITEHURST: Thank you, Your Honor. We will
18 endeavor to do that.
19 But, you know, when *Phillips* was construing the claim term
20 "steel baffle," they gave us a very important example that's applicable
21 here. When they were construing steel baffle, and we're now looking
22 at Petitioner's -- I'm sorry, strike that, Patent Owner's demonstrative 4.
23 When they were construing the term "steel baffle," they gave us some
24 guidance about how we should construe claim terms. We start with
25 the claim language itself and we endeavor to give it its plain meaning.

1 When you look at the example that *Phillips* gave us, steel baffles, they
2 told us that the fact that it's a "steel" baffle tells us that it does not
3 inherently have to be made of steel.
4 And I believe that applies to the claim language at issue here.
5 When we have "graded dopant concentration," and we're now on
6 demonstrative 5, you see additional limitations beyond graded doping
7 concentration. Looking at this exemplary claim, our demonstrative 5,
8 you'll see highlighted in red "graded dopant concentration". But the
9 claim doesn't stop there. It says, highlighted in green, that this graded
10 dopant concentration must "aid carrier movement". And then it
11 continues on. It doesn't just cause the carrier to move, it causes it to
12 move in a particular direction. And in this case, highlighted in
13 yellow, it's "from the first and second active regions towards an area
14 of the substrate where there are no active regions."
15 So right on the face of the clay, just like we see with steel
16 baffles, the claim instructs us that not all graded doping
17 concentrations are necessarily going to aid carrier movement, number
18 one. And they're certainly not going to aid carrier movement from the
19 first and second active regions. And that's what we saw in Petitioner's
20 demonstrative 38. Even if it makes it move, it still has to make it
21 move in the correct direction, and it's certainly not going to move in
22 the direction of the pink arrows.
23 If we could go to slide 6, please. You'll see the similarities
24 across the other claims. Just like we see in claim 1 of the '222 patent,
25 we see it in the claim 1 of '842, and we see it in claim 44 of '222. In

1 each claim, you're talking about a point A and a point B. If we look to
2 the left at claim 1 of the '222, it's talking about from the active region
3 to where there's no active region. If we go to the right, we talk about
4 the first surface and the second -- I'm sorry, if we go to the middle, my
5 apologies, it says from the first surface to the second surface. But up
6 above, it informs us that the first surface is where the active region is.
7 And the parties don't dispute that the active region is going to be at the
8 surface of the semiconductor device. And if we go to the right, you'll
9 see again, it's talking about from the surface layer to the substrate.
10 This is important. Greenthread was never just trying to claim
11 graded dopant concentrations. It wasn't trying to claim a carrier
12 movement. Dr. Rao understood that there was a problem with
13 spurious, unwanted minority carriers at the surface. And that's why
14 you see consistently through these claims, not just that there were
15 graded dopants, not just that they aid carrier movement, but that they
16 moved them from the active region or the surface to somewhere else.
17 And when you look at *Kawagoe*, it wasn't concerned with that
18 problem. It was concerned with the alpha-rays and keeping the
19 electrons out of the p-well. There's no discussion anywhere in
20 *Kawagoe* about what happens up at the surface where the active
21 region. And that's fatal for Petitioner's petition. The only way that
22 they could try to connect the dots to fill this lack of evidence was to
23 annotate figure 17 with some pink arrows, trying to imply that the
24 electrons would move in that direction. But that's something they

1 raised for the first time in the reply. It's not in the petition. They're
2 the ones making this belated incorrect argument, not us.
3 JUDGE TORNQUIST: Counsel, a question. What spurious
4 minority carriers was the patent concerned in moving?
5 MR. WHITEHURST: So if, for example, you were talking
6 about a p-channel device. Excuse me, let's suppose you have a p-well,
7 with an in-channel device. You have a p-well, that tells us that the
8 first doping type is the same as the well. In this case it would be p-
9 type. To form the source and drain you actually counter-dope. And
10 in this case you would be putting heavily in doped into the p-well.
11 In this case you're trying to create a channel of electrons.
12 Well, if you have in this case, because we're talking about an NMOS,
13 the majority carrier would be what's forming the channel, in this case
14 an electron. So the problem is if you have holes that get sticky and
15 want to linger around the surface, they impede the -- turning on the
16 transistor and forming this channel for connecting the source and
17 drain. That's why Dr. Rao described this problem that you have these
18 unwanted minority carriers. And in this case, the unwanted minority
19 carrier would be a hole.
20 And that's why if we go to demonstrative 8, you see the
21 discussion in figure 5B of the graded dopant region. And again, it's
22 not any graded dopant region, it's a graded dopant region to pull these
23 minority carriers from the surface because that's what's impeding the
24 formation of the channel between the heavily doped. And you can see
25 it there, there's a typo, it says NT it should be n-plus. But those holes

1 are impeding the formation of the channel between the source and
2 drain. Dr. Rao never intended to claim all graded dopant
3 concentrations. He never intended to claim electrical fields. He was
4 trying to solve a real problem with transistors. This came from his
5 years and years of work, his two Ph.D.'s. He understood transistors
6 and he understood that if you can pull from the active region, which
7 *Kawagoe* does not do, you can turn the transistor on more quickly
8 than you otherwise would.
9 And that's why when we look at the claims, we don't just see
10 graded dopants. We see a reference to moving carriers. And we see
11 from a point A that happens to be the active region to somewhere
12 that's not the active region.
13 But don't take my word for it. You can look at Dr. Blalock's
14 own declaration. He instructs us that when he read -- if we could stay
15 on that previous slide, please, staying on slide 8, you'll see that when
16 Dr. Blalock opined that construction for "aid carrier movement" could
17 be "sweep," he was taking that word from column 3 of the patent.
18 When Dr. Rao was describing his invention, he chose the word
19 "sweep." If you look over on the left, he chose the word "pull." Now,
20 we all know that if we use a broom to sweep something, you're
21 moving it. If you're not moving whatever it is you're sweeping, you're
22 not doing a very good job of sweeping. And that was the point here.
23 You need to actually move it from -- in a particular direction. And
24 whatever that direction is, it's not the pink arrows in Petitioner's
25 demonstrative 38.

JUDGE OBERMANN: Counsel, I hate to beat a dead horse, but I keep hearing you say that 38 is wrong, that pink arrow is wrong. But I see your own witness on Petitioner's Exhibit 36 and 37 saying that it's basic physics, that you're going to get aiding of the movement in the direction of the force. And what I'm hearing you say is that it's not in the direction of the force, it's opposite.

MR. WHITEHURST: It does not aid an electron. Now, two points on that. Holes and electrons act differently. That's true. But what he was testifying was, and if you look at his answer, he's not talking about what would happen to a carrier in the channel region. He testifying about from zero to WW, what would be the effect on something? And he's repeating back what *Kawagoe* says, because on 121 and 122, when he was asked specifically about the active region, he made it clear that it is not drawing or pulling or sweeping minority carriers.

So I strongly disagree with Petitioner's characterization of that testimony. He was not testifying about what a carrier in the active region was doing. He was --

JUDGE OBERMANN: I think you're getting to what I've been asking all along. You referred to some other testimony that he gave, and I think you said on 122 or something?

MR. WHITEHURST: I apologize, I thought I read it into the record. If we could go to demonstrative 64, please. I would like -- he was specifically asked about figure 17 and whether it would sweep those electrons. And you see his testimony there in 121, lines 11

1 through 17 and 122, 6 through 9. In the previous question, he was
2 asked about from zero to WW, and he was repeating back what the
3 specification says, that when you look from zero to WW, it prevents
4 the electrons from entering. But when he was asked about the active
5 region, he made it abundantly clear that it's not pulling or sweeping
6 electrons from the active region for the reason --
7 JUDGE OBERMANN: Can I just stop you for a second? I am
8 looking at your Exhibit 64. Maybe I'm reading this incorrectly, but
9 I'm reading when he says, "It doesn't disclose that it does that," he's
10 saying you can't tell what it does. And you're reading that to say it
11 does that. He's actually saying it goes in the other direction?
12 MR. WHITEHURST: Well, he was asked about electrons,
13 whether it would pull and that would mean going in the direction of
14 the pink arrows. And he was saying it doesn't do that.
15 JUDGE OBERMANN: He doesn't say it doesn't do that. He
16 says it doesn't disclose that it does that. So when I read that, I thought
17 he was saying, well, we -- I can't tell what it's doing. I don't hear him
18 saying that there's some principle from, you know, Benjamin
19 Franklin's time that says it would have gone in the other direction.
20 MR. WHITEHURST: Well, to be clear, we have always said
21 that different carriers move differently. We say that right in our
22 Patent Owner response on pages 3 and 5.
23 JUDGE OBERMANN: I need evidence. Because you're
24 telling me there's some basic principle that goes opposite of the --
25 opposite the direction that's depicted in their Exhibit 38.

1 MR. WHITEHURST: Right. And I'm going to, at this time,
2 reserve my time and I'm going to do the best I can on the fly. I
3 certainly appreciate -- I want to be as helpful as I can.
4 JUDGE OBERMANN: I want to have an opportunity to know
5 exactly what evidence you're relying on. Because you're basically
6 saying that -- I'm hearing two people, two sides, say there's very basic
7 physics here and that they're very different in your interpretation.
8 Sometimes I'm hearing you say, well, it's their burden and they haven't
9 proven it. But a lot of times I'm hearing you say that you have
10 evidence that there's this basic principle that we're missing, and I want
11 evidence of that. So maybe in your reply you can do that.
12 MR. WHITEHURST: Thank you, Your Honor.
13 JUDGE OBERMANN: Thank you.
14 MR. MATICH: Hi. Good morning, Your Honors. I'm going
15 to address the issue with the remaining 10 -- we reserved 10 minutes
16 for rebuttal, but then we have 10 minutes left of the main argument.
17 I'm going to address the points about --
18 MR. FULGHUM: Is it possible to split arguments between
19 Counsel in this way?
20 JUDGE ULLAGADDI: We allow it, but --
21 JUDGE OBERMANN: I'll let you speak.
22 JUDGE OBERMANN: We generally allow it when it's
23 presented in the beginning. I usually ask who's going to be speaking.
24 Do you have an objection to that?

1 MR. FULGHUM: No, I would just -- if it's something that's
2 allowed, then let's go forward. I just did not know it was the practice.
3 JUDGE OBERMANN: Well, we do it quite a bit. A lot of
4 times they'll bring in even a more technical person for some issues.
5 So unless there's an objection, we usually allow it.
6 MR. FULGHUM: No objection. Let's proceed.
7 JUDGE OBERMANN: Okay.
8 MR. MATICH: Thank you, Your Honors. And I'd like to go to
9 our demonstrative 79. So this -- I'm going to be addressing the
10 mismatch between the substrate and the active region.
11 So the argument, the claims, you know, are fairly long, but the
12 argument is relatively straightforward. The active region and the
13 substrate, the claims require that they be opposite doping types. What
14 Petitioner identified as the substrate and the active region have the
15 same doping types. Therefore, what Petitioner mapped in its petition
16 does not meet the claim limitations.
17 Now, you heard my friend on the other side, Mr. Speegle,
18 make some arguments about why they think what they did works. But
19 we strongly disagree. First, their claim construction argument, that
20 was raised for the first time in their reply. The Panel should not
21 consider that at all because if they wanted to make that claim
22 construction argument, it was their obligation to put it in the petition.
23 But even if you were going to consider that, it's wrong and you
24 don't need to take my word for it. But can we pull up -- this is from
25 their exhibit, *Wolf*, the very last sentence on the page, it says, "An n-

1 type implant heavy enough to overcompensate the boron implant."
2 that's a p-type implant, "in the active region." So Mr. Speegle said he
3 wasn't sure if an active region could have a p-type or an n-type before
4 it had a transistor. Their textbook, *Wolf*, says it absolutely can. And
5 then it says the n-channel device -- you have to implant additional n-
6 type to overcome the p-type doping that already exists in the active
7 region. And the patent makes it also very clear that the active region
8 exists prior to the transistor because it says the transistor is formed in
9 the active region. If my house is built on a hill, the hill preexists my
10 house, but the hill still exists and has whatever qualities it has.
11 JUDGE ULLAGADDI: Can I clarify for the record? Is this
12 Exhibit 1008A, B, C, or D?
13 MR. MATICH: I'm sorry, Your Honor. This is Exhibit 1008A
14 at page 123.
15 JUDGE ULLAGADDI: Thank you.
16 MR. MATICH: But I want to emphasize again that the primary
17 reason the board should not consider this is that it wasn't in the
18 petition and Petitioner did not raise it until they realized their mistake
19 in the reply. We could -- the patent could have claimed opposite the
20 source and drain. It said active region, which is separate.
21 As for Dr. Glew's testimony that the source and drain are in
22 the active region, we don't dispute that. But the fact that something is
23 in the active region does not mean that the doping type of the active
24 region is that thing. My house is built of brick, but my house also
25 contains metal because there's pipes and wires in it. But it's still

1 perfectly appropriate to say that my house is a brick house, and an
2 active region is a p-type active region, notwithstanding the fact that it
3 contains an n-type source and drain.
4 The Petitioner's second argument is that the Panel should look
5 to the other transistor adjacent to it. We can go back to the 82, please.
6 I'm sorry, the 79. Petitioner's second argument is that you can look at
7 the transistor in the n-well. That doesn't work for a number of
8 reasons. Again, that's not in the petition and that's a new argument
9 Petitioner raised in the reply. There's straightforward Federal Circuit
10 case law that you can't use some other feature of the prior art when it
11 wasn't mapped to the claims in the petition to invalidate the patent.
12 But more fundamentally, even if the Petitioner could
13 overcome that problem, there's no evidence that that transistor would
14 actually meet the claim elements. So, for starters, what they rely on
15 for the dopant gradient, figure 17, we heard a lot of discussion on both
16 sides that it keeps the electrons out of the p-well, and so that means it
17 doesn't keep them out of the n-well. The dopant gradient they point to
18 is not the dopant gradient that goes through the n-well, so if they
19 wanted to rely on that transistor, even if they could, they would not be
20 able to do -- they wouldn't be able to meet the other claim limitations
21 of having a dopant gradient. Leaving aside all of the disputes about
22 whether or not it meets the aiding carrier movement issue.
23 I'd also like to point out on the claim construction point, if we
24 go to page 82, the patent actually depicts active regions without a

1 specific transistor in them. So there can be active regions that do not
2 have a transistor in them.
3 Lastly, I'd like to briefly address what Mr. Speegle said
4 regarding our licensing evidence as to there being no nexus. I'll
5 address this at a high level. The specifics are in our papers. But at
6 bottom, there are two sophisticated companies that paid a lot of
7 money for licenses who were under absolutely no threat of litigation.
8 The only thing that those licenses covered was the patents and the
9 challenged family. There was absolutely nothing else. To say that
10 there's no nexus is to say that -- no nexus between that payment and
11 the claims at issue doesn't make any sense. If I pay $5 and the only
12 thing I get is a hamburger, then there is a clear nexus between the
13 hamburger and the $5. If I pay the $5 and I get a hamburger and a
14 Coke and fries, maybe what I was really after was the Coke, maybe it
15 was the fries. Who knows? Here all there was was the hamburger.
16 The only thing those companies paid $5 million apiece for was these
17 patents. It is undisputed that there was absolutely no threat of
18 litigation.
19 Now, he critiques Mr. John's testimony. I think we relayed to
20 the Board, and it's also in our papers, that Mr. John was undergoing
21 chemotherapy and the morning of his deposition, his feeding tube fell
22 out. We offered them the opportunity to depose another expert -- to
23 depose another person, Dr. Rao, on the same issues due to Mr. John's
24 health issues. They did not take us up on that offer. Regardless, it
25 doesn't matter if the parties -- there would have been no reason for the

1 licensees to address those specific patents because there was a very
2 small universe of patents they were buying a license to.
3 Lastly, Mr. Speegle points to the RPX documents, but there's
4 no evidence that our licensees ever read those, were aware of them, or
5 that they had anything or that there was any evidence that litigation
6 costs were at issue. Again, it's undisputed that the parties were not
7 under threat of litigation.
8 And unless the Panel has questions, I'm happy to reserve the
9 bulk of my time for Mr. Whitehurst.
10 JUDGE ULLAGADDI: Thank you, Counsel. Any questions?
11 Great. You have about 11-1/2 minutes.
12 MR. WHITEHURST: With the one minute remaining, I could
13 read into the record answers to questions.
14 Your Honor, to answer your question, Exhibit 2057, the Glew
15 decoration, paragraphs 33 through 36, address electric fields and the
16 movement about holes and carriers, how they move in opposite
17 direction depending on the polarity . And, Your Honor, Judge
18 Ullagaddi, the -- specifically we believe claim '222 -- I'm sorry, the
19 '222 patent, claim 1, and '842 patent, claim 1, are not limited to
20 CMOS. And BJT would be relevant. If you look specifically at
21 dependent claim 13 of the '222, it limits it to CMOS, which under the
22 doctrine of claim differentiation would tell you that one is not limited
23 to CMOS. Similarly, in the '842 patent, dependent claim 18 limits it
24 to CMOS. Again, under the doctrine of claim differentiation would
25 tell you that '842 is broader. '222, claim 44, on its face does mention

1 CMOS, so we do not contend that that claim would read our non-
2 CMOS transistors. Thank you.
3 JUDGE TORNQUIST: I have one just quick question. If they
4 had changed their argument from the p-well to the n-well about
5 electrons, would that change your answer?
6 MR. WHITEHURST: No. Well, I mean, that's the issue. We
7 never had an opportunity to depose their expert on the n-well. You
8 know, all their positions were supposed to be in the petition. They
9 picked electrons in a p-well. They know that the field goes in a
10 particular direction and an electron in the presence of that field is
11 going to move in the opposite direction.
12 I want to make our position clear. We're not here today to
13 take a position what is or is not going to happen. But I can just tell
14 you that under the basic laws of physics and math, whatever they are -
15 - for the first time, we've never seen demonstrative 38 before this --
16 the last two weeks. It was not in their briefs. This is a new
17 demonstrative we've never seen. They added the pink arrows and we
18 just want to make it clear.
19 JUDGE TORNQUIST: I understand. I just want to make sure.
20 There might be a difference if it was the n-well or the p-well. And
21 you're just saying it might be, but you haven't addressed it.
22 MR. WHITEHURST: We haven't addressed it, but -- well, let
23 me rephrase that. We've said that, you know, this is true for the other
24 -- *Wieczorek* and *Payne*. Any time you're talking about a
25 semiconductor device, silicon is going to have a resistance. You're

1 going to have external forces. So, you know, whether it's in the n-well
2 or the p-well, we still don't know whether it's going to move and
3 we've not taken a position on what direction it would move.
4 You know, when you look at the other references, you know,
5 we dispute lots of things about *Wieczorek*. What they contend is a
6 graded doping concentration, the patent actually calls it uniform. I
7 think our point is, without knowing more, some discussion, you just
8 don't know whether it's going to aid carrier movement in a particular
9 direction. You have to know, is the carrier an electron or a hole? We
10 don't know what they're pointing to in any of these references.
11 You have to know the doping. Is it p-time? Is it n-time? You
12 have to know whether the doping is increasing or decreasing. Based
13 on the dopant, the increasing, decreasing. You have to then look at
14 the field, then you have to look at the polarity. But then you also have
15 to consider the resistance of the silicon, the external forces.
16 The Examiner during prosecution actually said there are a lot
17 of factors at play. We completely agree with that. And that's why
18 there's no evidence by the Petitioner for any of these references.
19 There's no mention of carriers and what happens to them in the other
20 references, *Wieczorek* and *Payne*.
21 So to answer your question n-well and p-well, our position
22 would be the same and we're not taking a position or, you know, what
23 direction the arrows. But I can tell you, whatever it is, it's not what's
24 in 38. Hopefully, that answered your question.
25 JUDGE TORNQUIST: Okay, thank you.

MR. WHITEHURST: One final note, and I know I'm eating in now, but I'm going to reserve, you see this in the prosecution history. You heard about this during the opening. I hope the Panel appreciates that it was a 112, first paragraph rejection. The claims were different. It said the word "all," the discussion by the Examiner whether it was sufficient to move all of them.

Now, when Dr. Rao, Applicant, replied to that rejection, he never ever said that every graded dopant concentration is going to aid carrier movement. He was very specific, said it depends on the slope. He could have said the polarity or the direction of the slope. He didn't. He said slope. We all know that slope is rise over run. It has a magnitude and a polarity. The reason why he said it depends on the slope is because in order to move all of them, you have to have a very large magnitude, something on the order of closer to 100. And you'll see that consistently throughout the prosecution history and the most recent continuation application because it's reflective of what we see in column 2 of the patent and the importance of the slogan. And that's what determines whether it would be a suitable electric field.

Thank you. I'll reserve the rest of my remaining five and a half minutes.

JUDGE ULLAGADDI: Thank you, Counsel.

MR. SPEEGLE: May it please the Board. Okay. So I'm going to respond to things in a little bit of the reversed order from what we heard. I'm going to start by responding to the secondary considerations arguments that we heard.

1 There was a suggestion about, you know, we don't need -- that
2 the license itself had its own nexus kind of built in. And that's
3 ignoring the Federal Circuit case law that says you have to have some
4 other affirmative evidence of the nexus. And I think the actual license
5 agreements at issue is a good illustration of why that is. Because if
6 you actually dig into the RPX agreement that was entered into by
7 those companies, it included other things besides a bare license, and it
8 most notably included some provisions related to patent peace to
9 make sure that Greenthread couldn't sue these entities for anything
10 under the umbrella of the RPX agreements. And so you see this in
11 some of the footnotes that Greenthread mentions about how they've
12 acquired some other patents that are now licensed, but they weren't
13 part of the original licensed patents. That's because there were these
14 patent piece provisions that ensured there were not going to be any
15 other conflicts between the parties.
16 To use, you know, Counsel's example, that's the fries and the
17 drink. And we don't know how much the fries and the drink mattered.
18 When you have these patent piece and litigation related provisions
19 that RPX provides, we have to have some evidence to say you really
20 cared about the burger instead of these litigation patent peace
21 provisions that show up in the RPX agreement.
22 Now, on the arguments about the doping type of the active
23 region, can I have that book that you guys had open? Can we put that
24 on the ELMO again? I believe it was Exhibit 1008 at 123.

MR. WHITEHURST: You're welcome to plug that in the ELMO.

MR. SPEEGLE: Well, if you don't have it, that's fine. But I believe what it said at the end is that it was -- don't worry about it. I thought you had the physical book. It says that the n-type n-channel device has to be counter-doped heavily, n-type dopants to create that type of construction and for an n-channel device. And I think it's really important that they were saying that was evidence of a -- evidence of that you could have this active region without the source and drain. But it's describing that region with reference to the source and drain doping type. It's still talking about that n-channel region and the NMOS that it was forming there. It never once described that as a p-type active region. It was describing it as an n-channel device still, because that's what's going in the source and drain.

Now, in terms of whether we should have raised this as a claim construction dispute in our opening petition, we had no idea this was disputed. And our claim interpretation that you should focus on the source and drain is very clear from the petition. And we didn't hide the ball on here at all. And you can see from what we put in the petition that we were focusing on the source and drain. And we responded in our reply to the new idea that you might have some narrow construction that only focuses on the channel region.

What do I need to do to put something on the ELMO? Is that something -- okay. So this is -- you know, part of what we also heard is that the -- there was no disclosure in the patent or in the petition

1 about switching from the first active region to the second active
2 region to address the other limitations, like the graded dopant
3 concentration. And this is page 20 of.-- let's see if I can get it to
4 focus. Well, page 20 of the 1242 petition, and there are similar
5 petitions in the '842, similar provisions in the '842 [*sic*]. And it's
6 showing that you can map these limitations to the PMOS, to the other
7 side of the CMOS device. And if you read *Kawagoe*'s description of
8 figure 17, and this is at the bottom of column 15 in *Kawagoe* into the
9 column 16 of *Kawagoe*, it talks about the PMOS being formed in that
10 same retrograde style with the dopant concentration decreasing from
11 the surface down into the well.
12 So if we did have this other construction, there is disclosures
13 in the petition to show that these elements would be met. And again,
14 it's not necessary to resolve it because *Kawagoe* discloses it either
15 way.
16 Now, Your Honors, on the question about -- and we can take
17 the ELMO down, the question on whether claims 1 of the '842 and the
18 '222 patent are covered by the example in the specification that deals
19 with the side-to-side motion. And I'll get that slide up here in a
20 second. I believe this is slide 41 I need.
21 Right. So this is slide 41 of Petitioner's demonstratives. It's
22 not about whether it's limited to CMOS or not. That was the
23 argument you heard from Counsel at the end, was that claims 1 of the
24 '842 and the '222 were not limited to CMOS and, therefore, it could be
25 covered by the part of the specification that talks about moving

1 electrons in between the emitter and the collector. That's not right,
2 because it's not about whether it's CMOS or a BJT. It's about whether
3 you're moving within the active region or out of the active region.
4 And every one of these claims, and you can see it here on slide 41,
5 every one of these claims requires that the direction be away from the
6 active region. It's either if the active region's on the first surface, you
7 go to the second surface, or it just says to an area with no active
8 regions. And that BJT embodiment that they're talking about with
9 those specific numbers, that's limited to moving within a single active
10 region.
11 Now, I also want to talk about this idea that we don't know
12 what's happening, I believe, on slide 38. And there's a lot of
13 confusion here about slide 38. But what I didn't hear Counsel address
14 at all is the statement right above the graph in slide 48 -- slide 38,
15 where *Kawagoe* says electrons are attracted to the substrate body.
16 And there's no dispute that the substrate body is to the right. That's
17 where those electrons are going. They're attracted to the substrate
18 body. And I don't know where the electrons would be if they're going
19 to the substrate body, but somewhere outside of the substrate body,
20 like the p-well, going to the substrate body and away from the active
21 region.
22 I think some of the confusion from Counsel maybe rose from
23 the idea that NW was the amount of charge. And that's not what NW
24 on this graph is. This is not showing the amount of charge baked into
25 the semiconductor device. When you're making a semiconductor

1 device, you don't dope it with charge. You dope it with phosphorus or
2 boron, which is an acceptor or a donor molecule, and that, you know,
3 leads to a diffusion force which will then distribute charge across the
4 device.
5 And your question was very insightful, Your Honor, about
6 whether it would change if it was a PMOS or an NMOS because
7 figure 17 in *Kawagoe* does apply to both a PMOS or an NMOS. And
8 in any case, what that would still do is move the minority carriers
9 away from the active region. And that's because you're doping it with
10 the -- you're using these retrograde dopings. And so it's going to
11 change whether it's the dopant donors or the dopant acceptors,
12 whether the charge gradient that results from that diffusion force has
13 more charge at the active region or less charge at the active region.
14 But no matter which way the charge is going to go, the minority
15 carriers are swept away from the active region.
16 And the *Kawagoe* example, where you're talking about the
17 spurious carriers created from the alpha-ray strike, that's talking about
18 the p-well. So the minority carriers are these electrons that are
19 moving to the dopant -- sorry, to the substrate body.
20 Now, we also heard over and over from Counsel that they
21 didn't know what was happening in the p-well for the -- in the p-well
22 of *Kawagoe*. And that's interesting because their expert certainly did
23 know what was happening in the p-well of *Kawagoe*. And their
24 expert was asked in his deposition about the p-well in *Kawagoe* and

1 specifically the depth of *Kawagoe* from zero past WW. That covers
2 the entire p-well that we're talking about.
3 So I asked him what's happening in that p-well, and he agreed
4 that there is a force -- there's an electric field pushing electrons
5 downward. That was what their expert said. So even if Counsel is not
6 sure what's happening, their expert said there's a field and it's pushing
7 electrons downward. And whether that field is going to aid carrier
8 movement, well, again, I would refer again to what their own expert
9 has already told us. Their own expert says a field will provide a force
10 in a direction, aiding movement in the direction of the force. That's
11 just basic physics.
12 So I don't think *Kawagoe* is unclear. I think *Kawagoe* has told
13 us what the electrons are going to do. They're going to be attracted to
14 the substrate and prevent it from entering the p-well. And their expert
15 is also clear. He says there is a downward force. It pushes on the
16 electrons into the substrate. And he's also clear that is aiding
17 movement in the direction of the force. That's their own expert's
18 words, and that's why we think that is satisfied in this case.
19 JUDGE OBERMANN: Counsel, I think on the previous slide,
20 you had their expert referring to electrons or did I just misread it?
21 MR. SPEEGLE: Yes, Your Honor. This slide 58, is that what
22 you're referring to?
23 JUDGE OBERMANN: Is that slide 58?
24 MR. SPEEGLE: Yes, Your Honor.
25 JUDGE OBERMANN: That's -- okay. Let me just get there.

1 MR. SPEEGLE: Yes, and this is a statement from their expert
2 that in *Kawagoe* --
3 JUDGE OBERMANN: Oh, yeah.
4 MR. SPEEGLE: Yeah. Throughout its depth, from the surface
5 zero, which is where the active region is going to be, all the way past
6 the end of the well, there is an electric field pushing electrons
7 downward. We think that's what we need to show here.
8 JUDGE TORNQUIST: If we were talking about holes instead,
9 would they still be pushed downward in the other well?
10 MR. SPEEGLE: In The p-well -- or, sorry, I guess in the
11 opposite well, for the PMOS, it would be the n-well, the holes would
12 be pushed downward. And then *Kawagoe* says that both wells are
13 given this retrograde doping to do that.
14 JUDGE TORNQUIST: Okay.
15 MR. SPEEGLE: And that's, again, on slide 20 -- or page 20 of
16 our petition, is where you can see the mapping for the graded dopant
17 concentration on the PMOS.
18 Thank you, Your Honors. If there's no other time -- other
19 questions, that's it. Thank you.
20 JUDGE ULLAGADDI: Thank you.
21 MR. WHITEHURST: Your Honors, with the limited amount
22 of time that I have remaining, I'd like to clear up the confusion about
23 this word "attracted to". I think we're -- "attracted," Petitioner is
24 trying to tell you that it necessarily means move. I think a lot of the
25 confusion is you got to realize where the electrons from the alpha-rays

1 started. They're starting here, looking at Patent Owner's
2 demonstrative 22. They originate in the yellow region. So when it
3 says they're attracted to, it doesn't mean move. It says we're going to
4 stay here. I like it here in the yellow highlighted.
5 What you just saw from Counsel, he's trying to tell you --
6 Petitioner's Counsel is trying to tell you that "attracted" means
7 "move". That's not what's happening in *Kawagoe*. It simply means
8 we're not going to go into the p-well. We're going to stay in the
9 yellow active region -- or, I'm sorry, we're going to stay in the yellow
10 substrate region. They've never --
11 JUDGE HEANEY: Counsel, sorry to interrupt, but which --
12 where are you looking in *Kawagoe* to say that the alpha-rays originate
13 in the yellow region as you've shaded it on slide 22?
14 MR. WHITEHURST: Correct. It says here it's referring to 2S,
15 and it's saying that they're prevented from entering the p-well 6P.
16 And there's never been an assertion that they come from the top down.
17 They come from the bottom up. And that's what's being described
18 here in column 15, lines 62, through column 16, lines 11, of Exhibit
19 1007.
20 And so when you put all this into context and understand that
21 these electrons that are coming from the alpha-ray strikes are starting
22 down in the substrate body, it makes sense that whatever you're seeing
23 up above is keeping them there. It's preventing them from entering.
24 So if we could go to our 38 -- I'm sorry, Petitioner's 38. What
25 we're seeing here is when you see attracted to the substrate body 2S,

1 it's staying put, not that they're moving. They're changing the word
2 "attracted to" to "move," but they started out in the substrate body,
3 and there was no reason that they would want to leave.
4 If we could go to slide 58, I want to make it clear that they are
5 misconstruing Dr. Glew. He is not saying that an electron was up in
6 the well region and that it's being pushed back to where it originated.
7 What he's saying is that the cumulative effect from zero through WW
8 is keeping the electrons where they originated.
9 And if we go to slide 52, which was later in the same
10 deposition, you can see how Petitioner's taking his testimony out of
11 context. If we could please go to Patent Owner's demonstrative 52.
12 When he was specifically asked about the active region and whether
13 the electrons would be swept from the active region down into the
14 substrate, he made it abundantly clear that that's not the case. When
15 he was asked about the active region, he explained that they're not
16 going to be swept downward. When he was asked about from the
17 zero to the WW, he was explaining that they would be kept in the
18 yellow highlighted substrate. And when we see the word "attracted,"
19 it doesn't mean moved. It simply means that they stay put.
20 And I would like to add to the record that Dr. Blalock, their
21 expert, admitted that the electrons are produced in the substrate body
22 and the site would be Exhibit 1003, paragraph 94, footnote 6. So their
23 own expert is telling you that the electrons are produced down in the
24 substrate, which tells us that when we're seeing the word "attracted,"

1 it's not meaning move, it's meaning they're staying where they
2 originated.
3 Hopefully, that clears up, addresses any outstanding questions.
4 With that, I'll --
5 JUDGE OBERMANN: I do have one question. What's your
6 response to your expert saying that there is an electric field pushing
7 electrons downward?
8 MR. WHITEHURST: So I believe the testimony, when read in
9 its entirety, is explaining that whatever figure 17 is doing between
10 zero and WW is that it's keeping the electrons in the substrate body
11 where they originated and preventing them from entering the p-well.
12 When he was asked later specifically about the active region, he made
13 it clear that nothing about figure 17 would sweep or pull.
14 Hopefully that addresses your question, answers your
15 question. Any further questions that I can address.
16 JUDGE OBERMANN: No.
17 MR. WHITEHURST: Thank you very much, Your Honors.
18 JUDGE ULLAGADDI: Hearing no further questions, we thank
19 you for the opportunity to investigate the record with you and your
20 attentiveness to our questions. We invite you to remain present to
21 clarify anything the court reporter needs. And with that, we are
22 adjourned.
23 (Whereupon, the proceedings at 3:06 p.m. were concluded.)

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