UNITED STATES
INTERNATIONAL TRADE COMMISSION

In the Matter of:	)	Investigation No.
CERTAIN LIGHT-EMITTING DIODE	)	337-TA-1213
PRODUCTS, FIXTURES, AND	)	
COMPONENTS THEREOF	)	

OPEN SESSIONS

Pages: 752 through 987 (with excerpts)

Place: Washington, D.C.

Date: May 6, 2021

HERITAGE REPORTING CORPORATION
Official Reporters
1220 L Street, N.W., Suite 206
Washington, D.C. 20005
(202) 628-4888
contracts@hrccourtreporters.com

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

BEFORE THE HONORABLE CLARK S. CHENEY

Administrative Law Judge

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

In the Matter of:	)	Investigation No.
CERTAIN LIGHT-EMITTING DIODE	)	337-TA-1213
PRODUCTS, FIXTURES, AND	)	
COMPONENTS THEREOF	)	

- - - - - - - - - - - - - - - - - -

United States

International Trade Commission

500 E Street, Southwest

Washington, D.C.

Thursday, May 6, 2021

EVIDENTIARY HEARING, Volume IV - REMOTE PROCEEDINGS

The trial commenced remotely, pursuant to the notice of the Judge, at 9:07 a.m. EDT

Reported By: Marjorie Peters, RMR, CRR, FAPR

APPEARANCES:

For Complainant IDEAL INDUSTRIES LIGHTING L.C.C. d/b/a CREE LIGHTING:

S. ALEX LASHER, ESQ.
MADELINE M. SMEDLEY, ESQ.
PETER BENSON, ESQ.
Quinn Emanuel Urquhart & Sullivan LLP
1300 I Street, N.W., Suite 900
Washington, D.C. 20005

RAYMOND N. NIMROD, ESQ.
RICHARD W. ERWINE, ESQ.
MATTHEW D. ROBSON, ESQ.
Quinn Emanuel Urquhart & Sullivan LLP
51 Madison Avenue
New York, New York 10010

NATHAN HAMSTRA, ESQ.
Quinn Emanuel Urquhart & Sullivan LLP
191 N. Wacker Drive, Suite 2700
Chicago, IL 60606

KEVIN JANG, ESQ.
Quinn Emanuel Urquhart & Sullivan LLP
865 S. Figueroa Street, 10th Floor
Los Angeles, CA 90017

APPEARANCES (Continued):

For Respondents RAB LIGHTING INC.:

DAVID A. HICKERSON, ESQ.
GEORGE C. BECK, ESQ.
BRADLEY ROUSH, ESQ.
MOLLY HAYSSEN, ESQ.
Foley & Lardner LLP
Washington Harbour
3000 K Street, N.W., Suite 600
Washington, D.C. 20007
202-672-5300

JONATHAN E. MOSKIN, ESQ.
MITCHELL POIRIER, ESQ.
Foley & Lardner LLP
90 Park Avenue, 39th Floor
New York, New York 10016
212-682-7474

RICHARD SPENCER MONTEI, ESQ.
Foley & Lardner LLP
321 North Clark Street Suite 3000
Chicago, Illinois 60654-4762
Rmontei@foley.com
312.832.4354

APPEARANCES (Continued):

KIRI LEE SHARON, ESQ.
Foley & Lardner LLP
3000 K Street, N.W., Suite 600
Washington, D.C. 20007
202-672-5300

** Index appears at end of transcript **

P R O C E E D I N G S (9:07 a.m.)

JUDGE CHENEY: We're on the record now in the 1213 Investigation.

Before we concluded yesterday's hearing, we were listening to the direct testimony of Respondent RAB's technical expert, Dr. Jiao, who is testifying concerning the '819 and '531 Patents.

Dr. Jiao, welcome back to the stand this morning. I'll remind you that you remain under oath.

Before we resume the examination, let's doing any housekeeping matters.

MR. HAMSTRA: Your Honor, Nathan Hamstra on behalf of Cree Lighting.

Last evening, RAB, pursuant to the parties' agreed schedule, served Dr. Josefowicz's, RAB's expert on the '570 Patent, his demonstratives. We have met and conferred, but we have a -- we have sort of reached an impasse on a broad category of objections, namely as to references that were discussed only as background or only as secondary obviousness references.

Dr. Josefowicz is now offering anticipation opinions, four or five new ones based on these references that were, at one point, only obviousness references.

We've met and conferred to some extent with opposing counsel this morning, but we're initially just

seeking some guidance as to when and whether you would like us to raise that issue.

JUDGE CHENEY: So Dr. Josefowicz?

MR. HAMSTRA: Dr. Josefowicz, I believe.

JUDGE CHENEY: Thank you.

So Dr. Josefowicz is going to testify later today; is that right?

MR. HAMSTRA: Yes, he should be today.

MR. MOSKIN: That's correct.

JUDGE CHENEY: Is he immediately following Dr. Jiao?

MR. HAMSTRA: No.

MR. MOSKIN: No.

MR. HAMSTRA: Mr. -- or Dr. Akemann, is that the right name, the economics expert will be testifying in the interim.

JUDGE CHENEY: Okay. Well, why don't we hash this out right now.

Let me hear from counsel for RAB about what exactly they want Dr. Josefowicz to say that is being objected to. I am open to looking at materials on the screen, if that will make this discussion more organized.

MR. MOSKIN: Let me -- yeah, let me address this, at least at a high level, and we did -- as Mr. Hamstra noted a moment ago, we had a meet and confer

about 20 minutes ago or half an hour ago, and what I promised to do, but we're still in the process of assembling is what we believe is a considerably more extensive discussion in the prehearing brief about these four or five, I think it's four, prior art references that -- about which Mr. -- Dr. Josefowicz contemplates offering testimony.

Naturally, because he's not a lawyer, he's not going to purport to opine on either obviousness or anticipation, but rather, simply to identify these prior art references of which he's aware and identify similarities as a non-lawyer.

We've also suggested that because there's -- we've just begun the process of -- we have about ten pages of text from the prehearing brief addressing these issues, and one of the things that I proposed to Mr. Hamstra is that if the testimony were to proceed, we have no objection to them reserving their right to continue to pursue this move to strike testimony after the hearing.

It's obviously considerable volume of material to go through and consider whatever prejudice there is or isn't, and whether we have complied or haven't complied with Your Honor's ground rules. I think we're -- our view is from our initial assessment that we're -- you know, we are on reasonably strong footing.

I would concede, and I offered this to Mr. Hamstra, there's one patent that's really more in the nature of background. It's a 70-year-old patent, from 1949, and I offered that we wouldn't -- just to facilitate this issue and move on, we would not address that in Dr. Josefowicz's testimony, but the rest, I think we can adequately support that we've given ample disclosure to Cree Lighting.

I would say also, even as to that one other 70-year-old patent, the -- most of Dr. Josefowicz's deposition testimony concerned it so I don't -- but again, we would -- it's not my decision to make. It's Your Honor's. We would, if it facilitates resolution of this matter so we can at least present the testimony and be considered in full, when the parties have an opportunity to adequately present the -- first, to complete their meet and confer, and then if need be, brief the issue to Your Honor, that would be our proposal.

JUDGE CHENEY: Okay. My initial reaction is that it's way too late for all of this, for meet and conferring. We've had Motions in Limine. If this was something that the other side had notice of -- and I think we had a Motion in Limine on this very topic, and I'm concerned that this is all coming up right now.

MR. HAMSTRA: Your Honor, if I may respond

briefly to that point.

JUDGE CHENEY: Sure.

MR. HAMSTRA: So the reason why we're so concerned about all of this is that there was no way for us to be aware of these opinions, that he was intending on delivering these opinions until last night. They were not part of his expert reports, they were not part of his deposition testimony, and they were not part of the prehearing brief.

So we are raising this issue as soon as we possibly can, and these -- and to call them anything other than new anticipation opinions is beggaring belief.

They go through limitation by limitation, and map every limitation to these pieces of prior art that were, at one point, only background or secondary obviousness references.

JUDGE CHENEY: So, Mr. Hamstra, do you concede that Dr. Josefowicz did describe the scope and content of references in question in his expert report?

MR. HAMSTRA: Some of the references --

JUDGE CHENEY: The scope and content, did he describe the scope and content of the references?

MR. HAMSTRA: Some of the scope and content for all other than the 70-year-old reference, which was not discussed until his rebuttal report.

JUDGE CHENEY: Okay. That 70-year-old reference was never on a notice of prior art that was required to be filed before the expert reports anyway?

MR. HAMSTRA: That's correct.

MR. MOSKIN: No, it was not.

JUDGE CHENEY: Sorry. I need one person at a time.

Mr. Hamstra.

MR. HAMSTRA: I will defer to Mr. Moskin's admission in that regard.

JUDGE CHENEY: Mr. Moskin.

MR. MOSKIN: Yeah, I -- I didn't mean to speak over Mr. Hamstra. I took that as a question directed to me.

And that's correct, Your Honor. That's also what -- go ahead. I'm sorry.

JUDGE CHENEY: Okay. So the 70-year-old reference is out. We're not going to talk about that.

The other references, Mr. Hamstra, do you have any objection to Dr. Josefowicz describing the scope and content of the other references in question so long as he does not offer an opinion at the hearing that those references anticipate the inventions in question?

MR. HAMSTRA: To the extent the discussion of the scope and content was earlier disclosed, no objection,

Your Honor.

JUDGE CHENEY: Okay.

So that sounds like what Mr. Moskin wants to happen today. He wants -- is that right, Mr. Moskin, you want Dr. Josefowicz to be able to describe the scope and content of the references on the record today?

MR. MOSKIN: That's correct, Your Honor.

JUDGE CHENEY: Okay. So I think we can do that much.

Now, as for attorney argument later about anticipation, I'm not going to allow new arguments that contradict my ground rules. That just undermines the whole point of these rules, and preparing for an orderly trial that the other side has notice of.

So I will not entertain arguments that my ground rules say needed to be raised earlier.

Does that resolve the issue from your perspective, Mr. Hamstra?

MR. HAMSTRA: Yes. The issue we raised this morning. Yes, it resolves that issue.

JUDGE CHENEY: Okay.

Mr. Moskin, any further comment or question?

MR. MOSKIN: No. Thank you, Your Honor.

JUDGE CHENEY: Okay. Always the PTAB, if you want to run off to the PTAB, and make some new arguments.

Mr. Hamstra, any other housekeeping matters before we go back to testimony?

MR. HAMSTRA: No, Your Honor. Thank you.

JUDGE CHENEY: Is there any motion for --

MR. ERWINE: Your Honor.

JUDGE CHENEY: Oh, sorry.

MR. ERWINE: Yeah. Apologies. There was one housekeeping item with respect to exhibits from yesterday, which I think you were alluding to. I believe it is the exhibits from the testimony of Dr. Katona and Dr. Shackle. I don't believe there's any disputes at this point, so I guess I would move to admit those exhibits into evidence, and continue to work with the court reporter as we have done in the past.

JUDGE CHENEY: Mr. Moskin, any objection to the list of exhibits identifies by Mr. Erwine?

MR. MOSKIN: No objection, Your Honor.

JUDGE CHENEY: Okay. The exhibits that were used in the testimony of Dr. Katona and Dr. Shackle will be entered into the record, and counsel should coordinate with the court reporter to ensure accurate transcription of that list.

(Exhibits, as submitted by counsel and reflected in the attached index, were received into evidence.)

MR. ERWINE: Thank you, Your Honor.

JUDGE CHENEY: Now, what about exhibits for the first part of Cree's -- sorry, of RAB's defense; is there a motion for admission of those?

MR. MOSKIN: Your Honor, I didn't -- excuse me.

Mr. Roush, do you want to respond to that?

MR. ROUSH: We'll similarly move to admit the exhibits before he is through, Dr. Shackle and Dr. Katona.

JUDGE CHENEY: I'm sorry. You're going to have to repeat that.

MR. ROUSH: What was your question again, Your Honor?

JUDGE CHENEY: Is there a motion to move for the admission of exhibits from RAB's witnesses that testified yesterday?

MR. ROUSH: Yes, Your Honor. We would like to move for admission of the exhibits that we put forth through Dr. Shackle and Dr. Katona.

JUDGE CHENEY: What about Mr. Barna? What about Dr. Jiao's opening?

MR. ROUSH: Oh, yes, Your Honor. We would also like to move for the admission of exhibits put forth through -- for Mr. Barna.

I think the part -- since Dr. Jiao's testimony is yet to conclude, I think we have been moving for exhibits after the conclusion of the testimony. So we were

planning to move for Dr. Jiao's exhibits tomorrow morning.

JUDGE CHENEY: Okay.

So what we have on the table now is exhibits used in a cross-examination of Dr. Shackle and Dr. Katona and the direct examination of Mr. Barna; is that right, Mr. Roush?

MR. ROUSH: Yes, Your Honor.

JUDGE CHENEY: Any objection to the admission of those exhibits?

MR. ERWINE: Yeah. Just to be clear, Your Honor. And I apologize. I was -- I was speaking for both -- one of our witnesses, and one of RAB's witnesses.

Dr. Katona is Cree Lighting's expert. Dr. Shackle is, in fact, RAB's technical expert. So when I spoke, I was just basically speaking for both.

So there's no dispute or disagreement there.

With respect to Mr. Barna, I do not believe any documents were identified, and so there would not be any exhibits that would be entered into evidence through his testimony.

MR. MOSKIN: That's correct, Your Honor.

JUDGE CHENEY: Okay. So from this explanation, it sounds like there doesn't need to be a second motion.

The things that were admitted earlier cover everything up to now; is that right, Mr. Erwine?

MR. ERWINE: That is correct.
JUDGE CHENEY: Is that right, Mr. Roush?
MR. ROUSH: Yes, Your Honor.
JUDGE CHENEY: Okay. Any other housekeeping matters that we need to go over this morning?
MR. ERWINE: Nothing for Cree Lighting, Your Honor.
JUDGE CHENEY: Anything for RAB?
MR. ROUSH: Nothing from RAB, Your Honor.
JUDGE CHENEY: Can we go off the record for a minute.
(Off the record.)
JUDGE CHENEY: We're back on the record now after taking a moment to work out some audio issues.
Sounds like we're now ready to resume the direct examination of Dr. Jiao, who, as a reminder for me and the transcript, is RAB's technical expert on the '819 and '531 Patents.
Good morning, Dr. Jiao. Can you see and hear me?
THE WITNESS: Good morning, Judge Cheney.
JUDGE CHENEY: Okay. Mr. Moskin, the floor is yours.
MR. MOSKIN: Now that I'm unmuted, thank you very much, Your Honor.

CONTINUED DIRECT EXAMINATION

BY MR. MOSKIN:

Q. When we broke yesterday, Dr. Jiao, we were discussing the Ibbetson report, and I think I think one last question about that before we move on.

Does the Ibbetson report, as you understand it, disclose a lighting device that receives power from a wall plug?

A. Yes. That's my understanding.

Q. Is that necessary for any LED lighting device to operate?

A. Yes.

Q. Does the Ibbetson report say anything about the drive current at which the modules were operated?

A. It describes the LED level's current density.

(Clarification requested by the Court Reporter.)

Q. Can we -- Mr. Haw, can we pull up Exhibit RX-493, and which shows the cover page of US Patent 8,125,137.

I just ask if you recognize this patent?

A. Yes.

Q. If I refer to it as "Medendorp," will we understand one another?

A. Yes.

Q. Let's go to slide 64 of your demonstrative

exhibits.

Are you aware whether the Medendorp patent has -- what is the filing date?

A. Perhaps we can --

May 2, 2007.

Q. Thank you.

Broadly speaking, what does the Medendorp patent disclose?

A. This patent discloses a light fixture, and it's, namely, as a lamp, and that lamp was able to achieve efficacy at 65 to 85 lumens per watt with a high CRI value of 90.

Q. Does the lighting device described in the patent receive power from a driver?

A. It does.

Q. And would that be the control circuit?

A. Yes. You may allow me to clarify.

In the United States, we have standard terminologies to describe LED lighting devices. In such standards, namely, ANSI/IES RP16, the driver is defined as the operation unit that converts AC to DC and operating the LEDs with control circuits or circuitry.

The various different users may use the word interchangeably with the driver. In this particular patent, per my understanding, the circuitry is referring to

the driver, which is the standard definition.

Q. I think you mentioned this a moment ago.

Does the Medendorp patent disclose particular efficacy ranges of the device tested or the device shown?

A. Yes. 60 to 85 lumens per watt.

Q. Now, is it your opinion that the Medendorp patent discloses each of the claims of the '531 Patent?

A. Correct.

Q. Why is that?

A. It is achieved 65 lumens per watt.

Q. It also achieves efficacies of 80 -- discloses having achieved efficacies of 85 lumens per watt; correct?

A. Correct.

Q. Let's pull up RX- -- oh, excuse me.

Before we move on, Dr. Wetzel offered an opinion that Medendorp does not meet the limitations of the '531 claims because a control circuit is not a driver.

Do you agree with Dr. Wetzel's opinion?

A. I disagree.

Q. Is that for the reasons you explained a moment ago?

A. Correct. Again, the driver is a standard terminology, and circuitry often was used to describe the driver when they had not fully understood the industry terminology definition yet.

Q. Can I turn your attention -- excuse me, let's pull up RAB Exhibit RX-38.

Can you identify what is now being shown as RX-38?

A. Yes. This is a publication by Narukawa dealing with high-efficiency white LEDs.

Q. Let's go to the demonstrative slide Exhibit 5 -- or page 65, and ask if you can explain what is shown here?

A. This publication of prior art demonstrates in the LED level, and a high efficacy was achieved, in particular, and the current dependency of efficacy is shown in this figure.

At the lower driving current for the LEDs, with these points being measured, and in between is the line reflects the trend. And this chart shows at lower current, and the efficacy is higher than -- could be higher 174 lumen per watt.

Q. What was the lower current disclosed; is that 20 milliamps?

A. Well, 20 milliamps is where the circled, yes.

Q. Can you explain what Narukawa discloses about the efficiency of white LEDs?

A. This work demonstrates in LED package level or light source level, very high efficacy can be achieved, in particular if it is operated in a lower current.

Q. Does Narukawa explain the lumen efficacy of 174 lumens per watt can be reached at 20 milliamps?

A. This figure demonstrates in the statement just stated in the lower current, 174 lumens per watt of efficacy can be achieved -- was achieved.

Q. Does Narukawa offer any -- provide any statement or explanation or statement about the goals of replacing existing lighting with higher efficacy goals -- higher efficacy levels, excuse me?

A. This is demonstrated their work, and yes, the goal is to continue to improve the LED source level efficacy.

Q. Does the Narukawa reference disclose a light fixture?

A. No. It is a light source level -- LED light source level of efficacy.

Q. Can you explain how the efficiency of a white LED package relates to the wall plug efficiency of a full LED light fixture?

A. The light source efficacy is the light -- the capability of the light source itself, and in order to integrate the light source into a lighting device, namely, a lamp or a luminaire, and other devices must be used such as a driver, optics, sometimes, and other mechanical devices.

And we may -- it may introduce -- further introduce electrical optical thermal losses.

So in general, the lighting device level of efficacy is lower than light source level of efficacy.

Q. What was the typical efficacy for LED drivers at the time?

A. The driver at the time of the patent -- asserted patent was filed, it was not too bad. I think there's -- one of the patents introduced the commercially available driver.

By looking at these driver data sheets, it could be in the range of 90 percent electrical efficacy.

Q. What were the efficiency levels, to your knowledge at the time, of high process -- or highly reflective optical components?

A. Optical efficacy can be high. In particular, it depends upon the different lighting applications, and there's -- even the patent discloses the optical efficiency is above 90 percent.

Q. Let's call up RAB Exhibit 24.

Do you recognize this document, which is Patent Number 7,737,643?

A. Yes.

Q. What do you recognize it to be?

A. This is the patent for the driver used for LED

lighting devices filed July 20, 2007.

Q. Let's go to the demonstrative exhibit, slide 66.

Does this reference disclose anything about the power conversion efficacy of power supplies?

A. It does. The driver is the standard terminology again, that includes the power supply, and that converts AC to DC, and regulates the current to operate the LED.

So this patent discloses that device that was capable to achieve 80 percent electrical efficacy.

Q. Let's pull up RAB Exhibit 54, RX-54.

And do you recognize this document?

A. Yes.

Q. What do you recognize it to be?

A. This is a product spec sheet from the driver manufacture, Supertex, Inc., was referring to a specific model of the driver that was disclosed in the '531 Patent.

Q. What was the efficacy levels disclosed?

A. 90 percent.

Q. Let's pull up JX-157.

Do you recognize JX-157?

A. Yes.

Q. What is it?

A. This is a letter from an individual from Cree, whose name is Mark McClear.

Q. Addressed to whom?

A. I believe it's addressed to DOE, right.

Q. Okay. Let's go to demonstrative slide 1 -- 68. Excuse me.

Does this letter disclose any information about efficiency of Cree's own drivers?

A. This particular letter did describe the driver loss, according to the letter, which it was estimated was 15 percent driver loss, electrical loss.

Q. Can you provide a conservative estimate as the percentage relationship between efficiency or efficacy of white LED package and the wall plug efficiency of a light fixture using such LED packages?

A. At the time frame these two asserted patents were filed, the -- there is a various of estimations regarding the LED light source level of efficacy to the LED lighting devices level of efficacy, and typically 70 percent of overall conversion is very conservative number.

Q. In a laboratory environment, could losses be minimized further?

A. Yes.

Q. Could you explain that a little bit further?

A. Laboratory level, and I also demonstrate it through other prior arts, and the driver's electrical efficacy can be very, very high, so as the optical efficacy for the optical elements. For that reason, in a laboratory

environment, you can achieve very high efficacy of these conversions from light source to lighting devices, and over 90 percent is feasible.

Q. How do you calculate or obtain accurate wall plug efficiency numbers for an LED lighting device?

A. Oh, you must measure. And these things -- actually, you don't measure the efficacy. You can only measure the luminous fluxed, which is total lumen using photometers. Anything related, photometric measurement, then you measure the input power, but the definition has to be a real power to the device.

And these measurements have to be repeatable, reliable, consistent. That's why these measurements are truly important.

Q. Let's pull up Exhibit 745, RX-745.

Do you recognize this document?

A. Yes.

Q. What do you recognize it as?

A. This is a presentation made on July 16, 2008, by the two inventors for '819 and '531 Patent.

Q. Let's go to slide 69.

Can you explain what the underlying Exhibit RX-75 disclosed about light fixture efficiency levels?

A. This is disclosed the concept of optical loss, electrical loss, and thermal loss that is integrating the

LED light sources into a lighting fixture or light fixture or lighting devices.

And this presentation provides estimated number of 60 percent efficacy from source level to the light device level, lighting device level.

Q. I want to refer you to -- we can take this slide down -- the '531 Patent, the claims of the '531 Patent.

Would a person of ordinary skill have had a reason to build a lighting device with a package at the efficiency level of 174 lumens per watt, such as that disclosed by Narukawa?

A. Yes. If the LED light source efficacy was available, then yes.

Q. Okay. Was it -- do you have an opinion whether it was well known how LED packages are used for this purpose?

A. Yes. With that prior art disclosed LED package level efficacy, and also known at the time the driver's efficacy, LED lighting device levels, wall plug efficacy could be achieved as claimed.

Q. I'm sorry. I didn't mean to speak over you.

Can you provide a conservative estimate as to the wall plug efficiency of a lighting device that could have been made using the Narukawa white LED packages?

A. I think I testified earlier, industry has --

during that time frame, has a pretty conservative estimate of 70 percent.

Q. Applying that estimate to the -- a device using the Narukawa package, what would the overall fixture efficacy be, as you can -- as best you can estimate?

A. I estimated that with that kind of level of LED device efficacy, with all the losses estimated, all the claims in '531, 85 lumen per watts or other claims can be achieved.

Q. Can you give a specific number?

A. At least more than 113.5 lumen per watts.

Q. Okay. Thank you.

Before we move on, can we just pull up the Medendorp patent, which is Exhibit 493?

While that is being done, I'm going to want to direct your attention to Claims 12 and 22 of the Medendorp patent.

I apologize for the brief delay.

I'm just showing you on the screen what's disclosed in Claims 12 and 22. Is this correct, is this your understanding of what the Medendorp patent discloses, a lighting device having at least 85 lumens per watt?

A. That is correct. And also, CRI at least 90.

Q. Correct. All right. You can take that down.

Dr. Wetzel opined that the '819 and '531 Patents

solved a long-felt but unresolved need.

Do you have any opinion, view as to whether Dr. Wetzel is correct?

A. I disagree with him.

Q. Why is that?

A. These two patents did not disclose any solutions for improving the LED lighting level of efficacy other than disclose a method of using BSY+R, which is not being used today for the industry.

More importantly, the LED lighting device level of efficacy is -- highly depends upon -- essentially depends upon the LED source level of efficacy, which was not disclosed at all in these two patents.

Q. Thank you.

I believe you also testified yesterday that none of the test data from CSA and NIST exceeded 113.5 lumens per watt.

Do you recall that?

A. Yes.

Q. Those tests by CSA and NIST were on LLF prototypes that used blue-shifted yellow emitters in combination with red LED emitters; is that correct?

A. Yes.

Q. In your view, is there anything in the '819 or '531 Patent specifications that teaches how to make a light

fixture with a wall plug efficiency greater than 60 lumens per watt using only phosphor-converted LEDs emitting white light?

A. No, it did not.

Q. Just one last thing, for housekeeping purposes, I wonder if we can call up Exhibit RX-756, and just simply have you identify the underlying document for the record.

Can you simply identify what's shown on the screen now as Exhibit 756?

A. This is a publication that's integrated into the proceedings SPIE by George Craford.

MR. MOSKIN: Thank you, Dr. Jiao. I have no further questions.

JUDGE CHENEY: Is there any cross-examination for this witness?

MR. ERWINE: Yes, Your Honor.

JUDGE CHENEY: Please proceed when you are ready, Mr. Erwine.

MR. ERWINE: Thank you very much.

CROSS-EXAMINATION

BY MR. ERWINE:

Q. Good morning, Dr. Jiao. Nice to see you again.

A. Good morning, Richard. Nice to see you, too.

Q. Just for record, Richard Erwine of Cree Lighting. I have a few questions for you today, Dr. Jiao.

Dr. Jiao, did you listen to the opening statements in this trial?

A. Yes, I did.

Q. And were you present for Mr. Negley's testimony?

A. Yes, I was.

Q. How about Mr. Edmond?

A. Yes, partially.

Q. All right. How about Dr. Wetzel?

A. Yes.

Q. Now, Dr. Jiao, you've testified yesterday and today regarding the validity of the '819 and '531 Patents; correct?

A. Correct.

Q. But you were not asked to provide opinions disputing infringement of the asserted claims of the '819 Patent; correct?

A. Correct.

Q. Nor were you asked to provide any opinions disputing technical domestic industry of the asserted claims of the '819 Patent?

A. That is correct.

Q. And you were not asked to provide any opinions disputing infringement of the asserted claims of the '531 Patent?

A. Yes, correct.

Q. Nor were you asked to provide any opinions disputing technical domestic industry of the asserted claims of the '531 Patent; correct?

A. Yes.

Q. You understand that RAB stipulated to both infringement and technical domestic industry for the asserted claims of the '819 and '531 Patents; correct?

A. Yes.

Q. Now, Dr. Jiao, do you recall that you testified at length yesterday and today regarding this BSY+R color scheme used by the '819 and '531 Patent inventors?

A. Yes, I did.

Q. The '819 and '531 Patent specifications discuss the BSY+R color scheme; correct?

A. Correct.

Q. But you agree that none of the asserted claims by their terms recite the BSY+R color scheme?

A. That's correct.

Q. Now, for purposes of enablement yesterday you discussed something called Wands factors, W-A-N-D-S; correct?

A. That's correct.

Q. And you discussed a few of those; is that right?

A. In the testimony, and I was asked a few questions that related to a few Wands factors.

Q. One of those included the Wands factor, the breadth of the claims; is that correct?

A. That is correct.

Q. You testified that the breadth of the claims covers all lighting applications for both the '819 and '531 Patents; is that right?

A. That is correct.

Q. But you agree that the '819 Patent claims are only directed to lighting devices using at least one LED; correct?

A. Correct.

Q. So it's not all lighting applications. It's LED lighting applications; correct?

A. What I said is LED lighting applications for all application -- all lighting applications.

Q. Okay. You agree that the '531 claims are only directs to lighting devices using one solid-state light emitter; correct?

A. Yes.

Q. Now, for this Wands factor, you also testified that the claims offer all approaches, and are not limited to BSY+R; correct?

A. That is correct.

Q. For purposes of your prior art analysis, you did not prior that the prior art you rely on show this BSY+R

color scheme?

A. No, because that BSY+R, as you stated, Mr. Erwine, was not in the claim.

Q. All right. So is it your view that the asserted claims are only enabled for BSY+R?

A. It's my view that the asserted claim has not enabled anything.

Q. So it's your view that the asserted claims are not enabled for the BSY+R color scheme?

A. It is my opinion, and -- first of all, in '819 Patent, the first embodiment was not the same as the test numbers that submitted to the non-provisional application, 79.79 lumens per watt. It is my opinion that approach is BSY+R, but it's not a first embodiment.

It is also my opinion that '531 Patent discloses 113.5 lumens per watt. That is only for BSY+R.

Q. Thank you, Dr. Jiao. I would appreciate it if you would try to stay focused on my question.

What I'm trying to understand, is it your view that the asserted claims are only enabled for the BSY+R color scheme?

A. Yes.

Q. All right. So it's your view that they are only enabled for the BSY+R color scheme; is that correct?

A. Correct.

Q. All right. Thank you, Dr. Jiao. Let me move on.

You have offered opinions in this investigation that the '819 and '531 Patent specifications failed to enable the asserted claims of those patents; is that correct?

A. That is correct.

Q. You understand that the '819 Patent was asserted at a previous ITC investigation; correct?

A. As far as I remember, yes.

Q. Do you recall that that was the '947 investigation?

A. I do not remember the investigation number.

Q. Okay. Do you recall that in that investigation the ALJ issued an initial determination?

A. I think in my deposition one of your attorneys mentioned that.

Q. Okay. Well, let me ask you this: In formulating your enablement opinions, you did not consider that initial determination from the 947 Investigation, finding that the '819 Patent claims were enabled; correct?

A. That didn't change my opinion. Even with my awareness for that decision, it did not change my opinion.

Q. But you didn't consider it at all in formulating your opinions; correct?

A. No.
Q. In fact, you did not even review the ALJ's idea at all in formulating your opinions?
A. I did not.
Q. All right. Now, Dr. Jiao, you also testified that you reviewed the '819 prosecution history in formulating your opinions; is that right?
A. Yes, I reviewed specific related sections.
Q. Did you review the whole thing?
A. I read through the whole thing, but I believe it's thousands of pages --
Q. Okay.
A. -- or hundreds of pages.
Q. You understand that the PTO examiner considered certain 112 issues during prosecution of that patent; correct?
A. Correct.
Q. Including enablement; correct?
A. Correct.
Q. The PTO examiner found that the '819 Patent satisfied the enablement requirement and ultimately issued the patent; correct?
A. Well, there is an argument for enablement in the prosecution history where encountered the argument -- the inventors submitted two reports, and that's where the

argument -- it was not further discussed.

I did not understand why the examiner didn't further discuss that subject. The enablement was clearly argued during the prosecution history.

Q. You agree that the enablement argument was ultimately rejected, and the patent was issued; correct?

A. Well, patent was issued. That's why we're here. We're disputing that.

Q. But in your view, the patent and trademark examiner got it wrong in rejecting that enablement argument?

A. In my opinion, that opinion was not further discussed. For whatever reason, I cannot speculate.

Q. Thank you, Dr. Jiao.

Now, Dr. Jiao, you agree that the 2006 to 2008 time period is the relevant time period for considering enablement; correct?

A. Yes.

Q. One considers the time of the invention for purposes of enablement; is that correct?

A. Correct.

Q. Now, in that time period, in the 2006 to 2008 time period, a person of skill in the art would have been knowledgeable about different types of LEDs that could be used in a lighting device; correct?

A. My answer was yes, correct.

Q. I'm sorry. I did not hear you. I apologize.

In the 2006 to 2008 time frame, a person of skill in the art would have been knowledgeable about different types of phosphors that could be used in an LED package; correct?

A. That is correct.

Q. In that time frame, a person of skill in the art would have been knowledgeable about the efficacies of LED light sources; correct?

A. That is correct.

Q. So in your view, a person of skill in the art at the time -- at the time of the invention would have been able to determine such efficacies for such LED light sources?

A. The light source efficacy was -- at that time frame was typically disclosed by the source manufacturers.

Q. In that same time frame, the 2006 to 2008 time frame, a person of skill in the art would have been knowledgeable about different types of lighting applications such as troffers and downlights; correct?

A. Correct.

Q. In that time period, a person of skill in the art would have been knowledgeable about desired color temperatures in the different types of lighting

applications; correct?

A. That is correct.

Q. A person of skill in the art at the time of the invention would have been able to choose an LED based on what the desired color temperature range was; correct?

A. That is correct.

Q. Now, you testified yesterday that a person of skill in the art at the time of the invention would not have been able to determine the color content from the '819 and '531 Patent specifications; is that right?

A. That's correct.

Q. All right. Could I ask, Dr. Jiao, that you take a look at JX-1, which is the '531 Patent. And I'm hopeful that my colleague, Mr. Jay, can pull that up.

I'd ask if you can take a look at Figure 1 of the '531 Patent, and let me know when you see that.

A. I have seen that, yes.

Q. Okay. You agree that Figure 1 relates to what you call the only disclosed embodiment of the '531 Patent?

A. That is correct.

Q. All right. If we can pull up next to Figure 1 an excerpt from the '531 Patent, specifically column 21, lines 32 to 45.

Do you see that excerpt from the '531 Patent specification, Dr. Jiao?

A. Yes.

Q. And you see that this is describing the LEDs 30 and 32 that are used in Figure 1?

A. That is correct.

Q. I ask if you could -- if you could read into the record the language that begins on line 34, starting with "the LEDs 30 and 32 are selected."

A. "The LEDs 30 and 32 are selected so as to provide the desired mixed color point."

Q. I would ask if you could read the rest of the excerpt, Dr. Jiao.

A. "In particular, the LEDs are phosphor-converted LEDs having color points that are close to the line between x, y coordinates of 1931 CIE diagram of 0.3431, 0.3642, and 0.3625, 0.3707, and LEDs having color points that are close to a line between x, y coordinates are 1931 CIE diagram of 0.3638, 0.4010, and 0.3844, and 0.4400."

Q. The remaining text says, "The phosphor LEDs have outputs that range from 108.2 lumens to 112.6 lumens at 350 milliamps. The saturated LEDs have color points at x, y coordinates of the 1931 CIE diagram of about 0.6809, 0.3189, and a peak wavelength of about 622 nanometers."

Did I read that correctly?

A. You read it very correctly.

Q. Was this something that you considered when you

reached the conclusion that the '531 Patent specification did not describe color content for the LEDs?

A. That's exactly correct.

Q. All right. Thank you very much, Dr. Jiao.

Now, back to the 2006 to 2008 time frame that we mentioned.

A person of skill in the art would have been knowledgeable about different types of thermal components that could be used in a lighting device; correct?

A. Yes.

Q. In the 2006 to 2008 time frame, a person of skill in the art would have been knowledgeable about different types of drivers that could be used in a lighting device; correct?

A. That is correct.

Q. Now, I'd like to ask you some questions about the prior art, if I could. I'd like to start with the Fini/Nakamura report.

Do you recall that piece of prior art, Dr. Jiao?

A. Yes, I do.

Q. You have opined that the Fini/Nakamura device achieved a wall plug efficiency of 78 lumens per watt; is that right?

A. Yes.

Q. In fact, you testified yesterday that Fini

discloses an even higher lumens per watt value; is that right?

A. Correct.

Q. Higher than 85 lumens per watt; correct?

A. Correct.

Q. I'd ask if you could take a look at one of your demonstratives. This is RDX-0002.54. And if you could take a look at Figure 65.

Do you see that, Dr. Jiao?

A. Yes.

Q. You testified that based on Figure 65 of the Fini report, the lumens per watt value of the fixture would be even higher at a current lower than 50 milliamps; is that right?

A. That is correct.

Q. But Fini itself does not disclose any lumens per watt values other than at 50 milliamps and higher; correct?

A. It discloses the test point. More importantly, it discloses the trend between the test point. That indicates, for any POSA, the trend is to be used to determine current dependency for efficacy.

Q. But that measurement on Figure 65 stops at 50 milliamps; correct? It doesn't go any farther towards a lower current -- anything below 50 milliamps; correct?

A. The measurement stops at 50 -- oh, collected the

50 -- the information disclosed, a POSA would understand, that's an example. The trend is to indicate the current dependency. At the time frame, POSA would know the lower current was absolutely feasible, and how the lower current worked is follow the trend.

Q. You're basing that trend on the way you see the red arrow -- I'm sorry, the red line moving as the current decreases; correct?

A. That is correct. That's the purpose of the line.

Q. All right.

A. That's the purpose of the test points, to form the line.

Q. And the test point stops at 50 milliamps; correct?

A. The test point was selective. They picked 50 milliamps, which is very common, but more importantly, it forms the line of the trend.

Q. You said that they picked 50 milliamps, but they didn't pick any number lower than 50 milliamps; correct?

A. Not in the report, but it demonstrates the trend.

Q. Okay. Now, according to you, Dr. Jiao, the Fini report is dated July 30, 2005, and was published on March 27, 2006; correct?

A. I believe what I previously described in my report is that there is a submission date, then there is a standard procedure when you submit to the DOE, and DOE has a period of time to release the report.

I don't recall what exactly the releasing date is.

Q. Well, let's pull up your report, just to make sure we're on the same page.

And, John, if you could pull up Paragraph 391.

Looks like you've got it here. I just want to confirm that we have -- that my understanding of your dates are correct.

If you see in Paragraph 391, you say the Fini/Nakamura technical report is dated July 30, 2005.

Do you see that?

A. That is correct.

Q. And you also state that you understand this to be the date that the report was submitted to DOE; is that right?

A. That is correct.

Q. In Paragraph 393, you state that this report was published, according to you, on March 27, 2006; is that right?

A. Correct.

Q. All right. I just wanted to make sure that we

had the dates correct.

Now, if we could pull up RDX-0002.52. Let me ask you a few more questions about the Fini reference.

The Fini reference does not disclose anything about how the fixture was tested to capture the results that are shown here; correct?

A. The Fini report disclosed efficacy at the fixture level. The test method was not described.

Q. For example, you don't know how long in minutes or hours the Fini/Nakamura device was powered on before the measurement was taken; correct?

A. Not disclosed in the report.

Q. Okay. So there's simply no indication in the report concerning how the device was tested?

A. There's no description for test method.

Q. Okay. You agree that the device was tested at some point before July 30, 2005?

A. Oh, before that, before the test report was submitted.

Q. So then you agree, Dr. Jiao, that the test results in the Fini report would be inconsistent, unreliable and non-reproducible; correct?

A. Well, it is the same thing for all the patents' test report.

Q. Okay. So you agree that the test results that

are set forth in the Fini/Nakamura technical report would be inconsistent, unreliable and non-reproducible?

A. What I said in my testimony was it's important to have industry testing standards. Without testing standards, the test report, including the prior art as well as '819 Patent, '531 Patent, the test report could be inconsistent, not reliable or not repeatable.

Q. So let's pull up exactly what you said, Dr. Jiao.

And I'd ask, Mr. Jay, if you could pull up the trial transcript from yesterday. In particular, page 718, starting at line 19, and running through page 719, line 7.

Once we have that, I'll read it for you, Dr. Jiao.

You were asked, "Question: As of 2006 to 2008, were there clear or established standards for measuring and testing LED lighting devices?

"Answer: Not yet. The industry was pretty aggressively working on standardization for measuring LEDs and LED lighting devices during that time frame. The first standards we published was 2008.

"Question: In your opinion, would it be important to -- that there be established testing standards to determine efficacy?

"Answer: Very important, because the LED

lighting test conditions and -- has to be clearly define, and otherwise, the test result will be inconsistent, unreliable, non-reproducible."

Did I read that question and answer segment correctly?

A. That is correct. That is still my opinion.

Q. Thank you.

Now, let's pull up the Fini/Nakamura technical report itself. That's JX-150. And if we could turn to page 64. Mr. Jay, I would ask if we could focus on the text underneath the heading "LED Fixture Using SPE Packages."

A. Yes.

Q. Now, Dr. Jiao, this paragraph that we have on the screen describes the LED fixture that, in your opinion, achieves an efficacy in the range of 36 lumens per watt to 78 lumens per watt; correct?

A. That is correct.

Q. It discloses that the machine reflector used in the fixture has a 94 percent efficiency; correct?

A. That is correct.

Q. And it discloses that the microlens diffuser used in the device has a 93 percent efficiency; correct?

A. That is correct.

Q. But nowhere does the Fini/Nakamura reference

disclose any efficiency for the electronic driver; correct?

A. No.

Q. It does not state anywhere what kind of driver was used?

A. It does not, but describe the drivers integrated with the heat sink.

Q. So let's turn to the image that's shown on page 65 of JX-150.

Here on the screen is the lighting fixture that's discussed in the Fini/Nakamura reference; correct?

A. That is correct.

Q. Just to repeat, as what's shown in Figure 64, is it shows a machine reflector with a 94 percent efficiency as part of the lighting device; correct?

A. That is correct.

Q. But you believe that reduction in efficiency can be ignored, based on what you said yesterday; correct?

A. I did not.

Q. Is it your view that that 94 percent efficiency should be taken into account as part of the efficacy measurements?

A. I disagree. I explained it yesterday clearly.

That reflectance loss is only aimed for the light that hits on the reflector from the LED. If the light does not hit the reflector, that loss doesn't

occur -- does not occur.

Q. Let me ask you about the diffuser that's shown in Figure 64. That shows a microlens diffuser with a 93 percent efficiency; correct?

A. Yes.

Q. Do you believe that the diffuser's optional, and therefore, any diffuser losses should be ignored; correct?

A. Clearly. If you look at the lower figure, there's no diffuser.

Q. When you say "the lower figure," what are you referring to, sir?

A. The one right beneath what you just pointed.

Q. When you say right beneath --

A. The little one.

Q. -- what I just pointed to, are you talking about the picture?

A. Yeah, -- well, the figure has two. One is a configuration illustration. One is the light fixture being lit. The one beneath that, yes.

Q. So in your view, the picture of the actual image that's in black and white does not show a diffuser?

A. There is two images on your screen. On the top is the configuration illustration. On the bottom is the assembly of such light fixture when it is lit.

As you can see, from the same figure, the lower

portion of Figure 64, when the fixture is being lit, there's -- no diffuser was used.

Q. So in your view, what's identified as the microlens diffuser, that piece that can slide in and out on the top portion of Figure 64 is not included in what's shown in the image in the bottom of Figure 64?

A. That is my view.

Q. Okay. Let's go back to the driver for a moment.

I think we established previously that you agree that the Fini and Nakamura report provides no details about the driver at all; correct?

A. No. No details.

Q. Okay. You have no way of confirming whether any losses associated with that driver are accounted for; correct?

A. Incorrect.

Q. Other than what's shown in Figure 64, and what's described as a aluminum heat sink plus electronic driver, there's no disclosure in the Fini or Nakamura report concerning the losses that we associated with that driver; correct?

A. Incorrect.

Q. What is it that you are relying on that tells you what the efficiency losses would be for the driver that's disclosed in the Fini/Nakamura report?

A. Mr. Erwine, driver is a necessity device. When operating the light fixture, lighting device, it must have a driver. This report clearly reports the light fixture level of efficacy where drivers loss were included.

And there is no LED lighting device that can operate without driver and POSA knows.

Q. So it's your view -- and I just want to make sure that I understand your opinion.

You said something about without a driver, and then -- did you say and a POSA knows that?

A. Yeah. A person of ordinary skill in the art knows, in order to measure the light fixture, lighting device, namely, the lamp, luminaire level of efficacy, the driver must be used.

The drivers also must be included in the overall efficacy. There is no LED lighting devices that can operate without driver.

Q. So in your view, an LED lighting device absolutely cannot function without a driver in any and all circumstances?

A. That is absolutely correct.

If you want to operate an LED, make the lighting devices, and in particular, your claim is lamp or luminaire -- lamp and luminaire are standard terminology that is defined by ANSI standards.

That luminaire or lamp is connected to AC plug that operates through the AC voltage to the LED devices, must have a driver.

Q. So whenever someone uses the word "lamp," that means it must have a driver that converts AC power; is that correct?

A. That is correct. Specifically, in ANSI standard, we clearly defined lamp and the luminaire together -- called light devices -- must have a driver.

The only case if you operate low-voltage lamp, that without the driver, we have to distinguish stating lamp as not integrated. That's the only case without driver, or external driver.

In all other cases, the terminology of lamp, a luminaire, or lighting device, or light fixture, for LED source to be used to -- to use it as a light source, driver must be included.

Q. We can agree that for purposes of your opinion with respect to Fini and Nakamura, it's purely based on the sole reference in Figure 64 of an electronic driver; correct?

A. It is correct. It is also based on the person of ordinary skill of art would read this as a light fixture, and driver by default is included.

Q. Thank you very much.

If we could also turn to -- just give me one second, and I'll find the right RDX.

MR. JAY: I apologize. I thought I had this in my chart, so...

Q. Mr. Jay, let's make this easier. If we could just turn, again, to page 65 of the Fini reference. It's JX-150.

Mr. Jay, if you could focus on the bottom portion underneath the figure.

Dr. Jiao, do you see the reference to CCT?

A. Yes.

Q. You understand that to mean color correlated temperature?

A. Yes.

Q. There it refers to a color correlated temperature -- I'm sorry, a correlated color temperature, as the reference describes it, of 6500 kelvins; is that right?

A. Correct.

Q. It's your understanding that this is what's referred to as cool white; correct?

A. Yes.

Q. Not warm white?

A. Correct.

Q. All right. Let's move on to the Ibbetson report. That's JX-151.

Now, Dr. Jiao, you have opined that the device that's described in the Ibbetson report obtained a wall plug efficiency of 87 lumens per watt; is that right?

A. Correct.

Q. In fact, you testified yesterday that Ibbetson discloses an even higher lumens per watt value; correct?

A. With a lower current density, yes.

Q. So let's pull up your demonstrative, RDX-2.63.

Dr. Jiao, you testified that based on Figure 16, the lumens per watt value of the fixture would have been even higher at a current density below 50 -- is it 50 amps per centimeter squared?

Did I read that correctly?

A. That is correct.

Q. All right. Let's get some context about Ibbetson.

Now, according to you and your -- your expert report, it's your opinion that Ibbetson describes work done between October 1, 2003 and December 31 2006, and was submitted to DOE on April 18, 2007.

Does that sound right?

A. I think so. This is a three-years project. Yes.

Q. All right. Again, you rely on the test results that are shown in Table 2 and Figure 16; correct?

A. Correct.

Q. Now, if we could pull up JX-151 again, and in particular, the color version. I know you used a black-and-white version yesterday.

If we could kind of highlight what's shown in Figure 15 along with Table 2 next to it.

So what I'm asking, Mr. Jay, is if you could highlight the lower portion of that page exactly.

Thank you very much.

Now, Dr. Jiao, do you see here Figure 15 from Ibbetson depicts an experimental high-flux lamp module consisting of an array of individual emitters on a metal core circuit board; is that right?

A. Correct.

Q. So the device shown here has 11 individual emitters that we can see on a metal core circuit board?

A. This figure shows the experimental configurations. I also introduced another figure for the assembly.

Q. You would agree, right, that there is no secondary optic covering the set of 11 individual emitters; correct?

A. This figure doesn't.

Q. There's no diffuser, for example, covering all 11 individual emitters; correct?

A. The figure doesn't disclose what emitters primary optic is used, whether they have diffused elements or not.

The figure itself, you cannot tell precisely what optical element was used.

Q. It's your view that this is the module that was tested, that achieved the results that are shown in Table 2; correct?

A. My view is the report demonstrates LED lamp that shows the efficacy value with operating current density. The entire report described a lamp.

The figure itself discloses this particular experimental lamp module, yet the report is the essential basis for my opinion, and the report is for a lamp.

Q. But you agree that the information that's shown in Table 2 and Figure 16 is directed to what's shown here in Figure 15; correct?

A. I read this information disclosed is in this report, the lamp level efficacy report. The figure, one place or another, shows the module, and also shows the assembly.

If I read the entire prior art, the article, and this particular report demonstrates the LED lamp-level

efficacy in this number on Table 2 was achieved.

Q. So let's go back to what I believe you're referring to as Figure 12 of the Ibbetson report.

And, Mr. Jay, if you could turn back to Figure 12.

Is that the final assembly you're referring to, what's shown there in Figure 12?

A. This is the example of the assembly of the prototype as a whole lamp. You can achieve a thousand lumen. My opinion is based on the entire report that described that LED lamp-level efficacy was achieved.

Yes, there are certain figures that demonstrate the different configurations, but important part is the report demonstrates the capability of LED lamp achieving wall plug efficiency or efficacy number that shows in the table.

Q. But it's your opinion that the information that's shown in Table 2 or in Figure 16 is based on testing performed on what's shown in Figure 12; is that right?

A. It's incorrect.

My opinion, the Table 2 is the test result for the entire lamp. The report --

Q. So --

A. The report emphasizes lamp.

Q. So in your opinion, the test results could

relate to either Figure 15 or Figure 2 and are not limited to Figure 15?

A. My -- reading this prior art, the Figure 2 is the result that the report demonstrates that LED lamp, that inventors or the writers can achieve.

Figures helps to understand the different assembly or --

MR. MOSKIN: If I can interrupt, Your Honor, we seem to have lost the volume from Dr. Jiao or the entire portion.

THE WITNESS: -- entire lamp level --

MR. MOSKIN: Now it's back.

We're having a technical person go check to see.

(Clarification requested by the Court Reporter.)

MR. ERWINE: Yeah. I think I can pick it up.

Q. I think that my question that was cut off is, so in your opinion, the test results could relate to either Figure 15 or Figure 2, and are not limited to Figure 15; is that right?

A. Correct. It may not limit it to even more figures. They may not need it to demonstrate that the important part of the report is the result they achieved. They used precisely the lamp.

Q. So you don't know whether the results that are shown in Table 2 and Figure 16 are based on testing

performed on the modules shown in Figure 15 or the module that's shown in Figure 12; correct?

A. I do know. The report demonstrates the lamp level of test results. And figures, again, are used for referencing a different configuration.

Q. Well, let me ask you this question: JX-151, the Ibbetson report, does not describe how the array or module was tested; correct?

A. Mr. Erwine, can you repeat your question?

Q. Again, JX-151, the Ibbetson report, does not describe how these results that are shown in Table 2 and Figure 16, how the array was tested to achieve these results; correct?

A. The report didn't describe the methodology of testing.

Q. All right. It doesn't state, for example, whether the array was tested at thermal equilibrium; correct?

A. I don't remember that particular statement. In my -- if I recall, it does not describe any test methodology.

Q. You don't know how long in minutes or hours the device was powered on before that -- those measurements were taken; correct?

A. The report does not disclose that.

Q. You agree that the device was tested at some point before December 31, 2006; correct?

A. That is correct.

Q. So again, you agree that these test results would be inconsistent, unreliable and non-reproducible; correct?

A. That is my opinion regarding all the reports, including the reports in the patent.

Q. All right. If we could go back, Mr. Jay, to just Figure 15.

Now, Dr. Jiao, the Ibbetson report does not state whether any driver losses were taken into account; correct?

A. No, but the tests at the entire lamp level, one more time, the driver was inclusive, if you test on the lamp.

Q. You're basing that purely on the statement that what's described in the Ibbetson report is a lamp; correct?

A. Yes. Another statement, and you can take as record, is LED lamp or LED lighting device, light devices, cannot be function or tested without driver.

Q. All right. Now, there's no indication about a driver at all in the Ibbetson report; correct?

A. There's default indication because these lamps must use a driver. Just like there's no indication these

lamps using specific type of electricity; this is a default. The driver is a part of the lamp.

Q. Well, all we actually see in Figure 15 is those clips, those red and black clips; correct?

A. Yes, but these clips are connected to the driver that you do not see.

Q. So you believe that the clips are connected to a driver, but you don't know what those clips are connected to; correct?

A. I do know. As a POSA, the LEDs cannot function without a driver.

Q. The LEDs receive DC current; correct?

A. From the driver, yes.

Q. Okay. And you understand from Dr. Shackle's testimony yesterday that there are drivers that simply provide DC power, they're not connected to a wall plug; correct?

A. Not in United States. Not in the ANSI definition of driver.

ANSI definition of driver includes power supply with AC to DC conversion, and regulated current to output to LEDs.

Q. But there's no --

A. In other countries --

Q. Sorry. Go ahead.

A. -- or in other industry, such as automotive, you don't need a converter, they also call that driver.

But in general lighting industry, driver must include power supply from AC to DC conversion.

And this figure and as demonstrated in the laboratory, these LED tested for achieving these kind of numbers must have a driver.

Q. But there's no indication in the document itself that such a driver exists. That's -- you're basing that on what you think a POSA would know; correct?

A. I base on the concept of this report is a DOE's report of a lamp level of achievement. The lamp in the DOE's mind, in the industry's mind, in the entire field's mind, the lamp is connected to the AC power -- AC wall plug.

Q. So let me do this: Let's turn to your definition of lamp. I'd ask if you could take a look at RDX-2, one of your demonstratives, in particular, number 20.

Do you recall preparing this demonstrative, Dr. Jiao?

A. Yes.

Q. You testified about this demonstrative yesterday; correct?

A. Yes.

Q. In fact, this is a disclosure from the '531 Patent specification; correct?

A. Correct.

Q. It refers to Cree LED packages as lamps; correct?

A. Incorrect.

Q. Okay. Let me see if I can highlight the sentence that says, "The phosphor-converted LEDs, 30, are Cree XLamps from Cree Incorporated."

Did I read that correctly?

A. You read it correctly. I also testified yesterday, Cree Lamp, if you pay attention, the "Lamp" is capitalized. Cree Lamps are the trade names of the Cree LED die. It's not a generic term of the lamp.

If you look at my testimony, the record, I stated Cree XLamp is a trademark for Cree LED blue die.

Q. So this is an instance where Cree uses the word "lamp" to describe a blue die; correct?

A. That's their trademark.

Q. All right. Let me go back quickly to JX-151, this is Ibbetson. If we could go to page 17, in particular, Table 2.

I ask you, Dr. Jiao, do you see the row that's labeled "CCT"?

A. Yes.

Q. Is that the same correlated color temperature that we were speaking about with respect to the Fini reference?

A. It is.

Q. You would agree that those ranges, 5850, 5900 and 5950, are within a cool white range?

A. It is correct.

Q. All right. That's not warm white; correct?

A. Correct.

Q. Now, switching gears for a moment, Dr. Jiao, do you agree that a lighting device has a theoretical maximum lumens per watt value; correct?

A. I didn't say agree.

Q. You do not believe that it has a theoretical maximum lumens per watt value?

A. Can you repeat your question?

Q. Sure.

I said, you agree that a lighting device has a theoretical maximum lumens per watt value; correct?

A. I did not say I agreed. I never said I agreed.

Q. Okay. So do you disagree with that statement?

A. The statement, you're using words "lighting device," which means the light source itself to be integrated into lighting device to achieve maximum efficacy value.

I do not know what that value is.

Q. So let's turn to your opening expert report, Dr. Jiao. In particular, if we could go to Paragraph 302. Let me know if you agree with what's written here.

In Paragraph 302, it says "Because white light is a combination of monochromatic light, there is no single theoretical maximum efficacy for white light. Rather, it depends on the particular spectral distribution used to produce white light. That said, it is generally understood that LEDs theoretically could produce white light at a maximum of 300 lumens per watts."

Did I get that right?

A. Did you. I used the word "could."

Q. All right. Now, you were present for Mr. Moskin's opening statement; correct?

A. Yes.

Q. And you heard him reference a theoretical efficiency limit of upwards of 300 lumens per watt; is that correct?

A. I don't remember the number he was using. I did remember Dr. Wetzel's testimony.

Q. Understood. I was actually asking about Mr. Moskin's testimony.

A. Right, but I -- I'm sorry. I do not remember the precise number he was quoted.

Q. All right.

MR. ERWINE: Your Honor, I have a few more topics. Would this be -- I know we're at 10:45. I'm happy to keep going. I just figured this might be the time for the break.

JUDGE CHENEY: Okay. Let's take our morning break. We'll be off the record for 15 minutes.

Dr. Jiao, please don't discuss your testimony while we're on break.

THE WITNESS: Okay.

(Whereupon, the morning recess was taken, 10:46 a.m. - 11:00 a.m.)

JUDGE CHENEY: We're back on the record in the 1213 Investigation.

Before the break, we were hearing the cross-examination of Dr. Jiao, who is RAB's technical expert on the '819 and '531 Patents.

Please continue, Mr. Erwine.

MR. ERWINE: Thank you, Your Honor.

BY MR. ERWINE:

Q. Dr. Jiao, welcome back.

I want to ask you a few questions about the Medendorp reference.

Mr. Jay, if you could pull up RDX-0002.64.

Dr. Jiao, do you recall testifying about the

Medendorp reference this morning?

A. Yes.

Q. Do you recall your testimony that, according to you, Medendorp anticipates all the asserted claims of the '531 Patent?

A. That is correct.

Q. Your understanding is that Medendorp discloses lumens per watt values that range from 60 to 85 lumens per watt; is that correct?

A. That is correct.

Q. Are you familiar with dependent Claim 11 of the '531 Patent?

A. You may have to pull it up to let me read --

Q. Sure.

Mr. Jay, if you could pull up JX-1, and in particular, Claim 11.

Do you see that Claim 11 refers to a wall plug efficiency of at least 110 lumens per watt?

A. Yes.

Q. Is it still your view that Medendorp anticipates Claim 11?

A. I think my statement is 85 lumen per watts, and according to this patent, that would be the first claim for 381.

Q. Okay. I just wanted to make sure I understand.

It's still your position that Medendorp anticipates Claim 11 of the '531 Patent?

A. Well, by looking at the figures, it's not 110. It's 85 lumen per watts.

Q. Okay. And let me ask again.

Is it still your opinion that Medendorp anticipates Claim 11 of the '531 Patent?

A. No.

Q. All right. If you could also look at Claim 12 of the '531 Patent.

And, Mr. Jay, perhaps you could pull that up as well.

Do you see that Claim 12 refers to a wall plug efficiency in the range of from about 100 to about 113.5 lumens per watt of said electricity?

A. Yes.

Q. Now, earlier, you had testified that Medendorp anticipates Claim 12 of the '531 Patent.

Do you still hold that opinion?

A. If you look at my testimony, what did I say about this particular claim?

Q. My understanding is that you said that Medendorp anticipates all asserted claims of the '531 Patent; is that correct?

A. I'm -- if that was the statement, what I

believe -- I believe that was a question.

What I meant was Claim 1.

Q. Thank you very much.

Dr. Jiao, let's turn now to the Narukawa reference that you talked about this morning.

Do you recall speaking about that?

A. Yes.

Q. You testified this morning that the Narukawa reference discloses white LED packages with efficacies of up to 174 lumens per watt; is that right?

A. That is correct.

Q. In your opinion, a person of skill in the art at the time of the invention would have been able to build a lighting device that had a wall plug efficiency of 119 lumens per watt using Narukawa's LED package; is that right?

A. I don't recall where the 119 number comes from.

Q. Well, let's take a look at your expert report, Dr. Jiao. If we could look at your opening report, Paragraph 493.

Do you see the reference in Paragraph 493 to a wall plug efficiency of 119 lumens per watt?

A. Yes. That was based on the 70 percent of loss estimate.

Q. That's the loss estimate that you spoke about

earlier this morning; is that right?

A. The loss estimate combining optical, thermal, electrical.

Q. All right. You agree that Narukawa does not disclose how long the LED package was running before the measurements were taken that show the 174 lumens per watt; correct?

A. You mean long in terms of lumen depreciation or long in terms of -- what do you mean long?

The measurements were taken.

Q. The disclosure --

A. There's no disclosure when the measurements was taken.

Q. You expressed no opinion as to whether the -- Narukawa's measurement was taken at thermal stability; correct?

A. But that was LED-level measurements, and any LED manufacturers would disclose their measure the lumens per watt efficacy. And typically, they do not disclose the measurement method -- method of measurement.

At that time, again, there's no standard.

Q. Okay. So at this point, we wouldn't know; correct?

A. We wouldn't know is based on their reported number, and no one disclosed at that time a method of

measurements.

Q. Excellent. Now, I asked if we could pull up Figure 1 of Narukawa, and that's RX-38.2.

Mr. Jay, if you could focus on Figure 1.

Let me know when you see that, Dr. Jiao.

A. Yes.

Q. Do you see the reference in the lower right corner, the "at pulse"?

A. Yes.

Q. I think I said -- yeah. Do you see that?

A. I do.

Q. Now, that indicates that Narukawa measured the LEDs under something called a pulsed operation; is that right?

A. That is correct. That's one of the standard methods today. You can operate LED measured in pulse operation, yes.

Q. And specifically Narukawa discloses that the LEDs were measured under pulsed operation having a duty cycle of 1 percent; is that correct?

A. That is very commonly used, yes, correct.

Q. That means the current was supplied in pulsed intervals; is that right?

A. Yes. The pulse method is very commonly used. And the current itself is -- average current is -- pulse

itself is applied to the current, correct.

Q. So it's like a square wave, the current is turned on and off; is that correct?

A. Usually. Usually, yes.

Q. All right. Let's turn back to some of your testimony from yesterday about some of the CSA prototypes that were tested.

Now, in your opinion, Dr. Jiao, the lighting device that's described as the first embodiment in the '819 Patent could not achieve the claimed wall plug efficiencies; correct?

A. That is my opinion.

Q. All right. Let me ask you a few more questions about that.

The first embodiment identifies a specific model of LED die used, namely, that C460XT290 blue LED that comes from Cree Incorporated; is that right?

A. Correct.

Q. And in your opinion, the prototype that was tested by CSA in February of 2006, which reported that 53.5 lumens per watt, according to you, that corresponds to the first embodiment that's described in the '819 Patent; correct?

A. According to my opinion, that is not first embodiment.

Q. Got it.

Mr. Jay, if you could pull up RDX-2.49.

Do you recall preparing this demonstrative, Dr. Jiao?

A. Yes.

Q. Do you recall testifying about it yesterday?

A. Yes.

Q. This is the spreadsheet that, according to you, shows which LED dies were used in the February 2006 prototype; correct?

A. That is correct.

Q. The spreadsheet indicates that XT-24 was used in the February 2006 prototype; correct?

A. Correct.

Q. Now, in your opinion, the XT 24 is the Cree XT LED die disclosed in connection with the first embodiment of the '819 Patent, namely, that C460XT290; correct?

A. That is correct.

Q. But this spreadsheet also indicates that XT-27 LED dies were used; correct?

A. That's true.

Q. In your opinion, the XT-27 is not related to that C460XT290 model number; correct?

A. Correct, based on my understanding of the data sheet.

Q. So is it still your view that the February 2006 prototype is the first embodiment?

A. Well, partially used that particular LED parts. So therefore, they only disclosed one part. If the some parts matches, then this could be. I think that was my opinion. This could be the first embodiment.

Q. But you're not sure?

A. I'm not sure because it discloses more than one LED die was used. More than first embodiment disclosed.

Q. Thank you, Dr. Jiao.

I think you indicated that you were here for Mr. Negley's testimony; is that right?

A. Yes.

Q. Did you hear Mr. Negley testify that in his view Figures 4 and 5 of the '819 Patent relate to the prototype that was tested at CSA in April of 2006?

A. Yes.

Q. You agree that Figures 4 and 5 of the '819 Patent depict what's referred to as the first embodiment; correct?

A. I'm sorry. The figure -- I'm sorry. If you don't mind pulling up that particular figure.

Q. Absolutely.

If you could pull up, Mr. Jay, the Figures 4 and 5 of the '819 Patent. I believe it's JX-2.

A. Correct. Yes.

Q. Just so the record is clear, you agree that the Figures 4 and 5 of the '819 Patent depict what's referred to as the first embodiment?

A. Yes.

Q. But in your direct examination, you testified that the prototype that was tested by CSA in April of 2006 cannot be the first embodiment of the '819 Patent; is that right?

A. That is my opinion.

Q. As the basis for that opinion, you testified that the XT-31 LED die used in the April 2006 prototype cannot be the C460XT290 die identified in connection with the first embodiment in the '819 Patent.

Did I get that right?

A. That is my opinion.

Q. All right. Let's take a look at the data sheet that you cited in support of that, which is JX-159.

Mr. Jay, if we could kind of focus on the middle part that's in blue.

Now, Dr. Jiao, you identified that the data sheet only identifies up to XT-24, but not XT-31; is that right?

A. Correct.

Q. Now, you agree that an XT-21 has an optical

power of 21 milliwatts; is that right?

A. XT-21 is a bin wider than XT-24. If you understand the binning concept, you would know that XT-21 means, and within that bin, you have the optical output power that's lower as 21. The upper bound is 24.

Q. All right. What would that -- what would that be for XT-24?

A. The XT-24 is the highest bin, which means in the distribution of producing this die, if you happen to sort them -- we call that binning, even according to Mr. Negley, that's poor sound distribution or normal distribution. Whatever distribution is, 24 is the highest this model can produce.

If in order to purchase -- obtain 24 milliwatts bin, it would be a very narrow portion of the entire distribution with this die.

It's very narrow, very small portion of that die can produce 24, highest.

Q. So from that bin, you could get a -- an optical power of greater than 24 milliwatts; correct?

A. Generally speaking, the data sheets give you the upper limits per se.

Q. Although it's not shown here, would an XT-31 bin have an upper limit of 31 milliwatts?

A. We don't know. That could be, but it may not

be.

Q. Okay.

A. Completely different die.

Q. All right. Let's take a quick look back at JX-2 in the '819 Patent.

In particular, Mr. Jay, if you could go to column 16, lines 39 to 45.

Dr. Jiao, I believe you testified about this language yesterday. Let me know if you see that.

Do you see the reference or the statement that says, "Namely, a Cree XT LED, C460XT290 die with a peak wavelength range of from about 450 nanometers to about 465 nanometers, and optical power greater than 24 milliwatts"?

Did I read that correctly?

A. I do.

Q. So here the first embodiment is disclosing using a Cree XT LED die having an optical power greater than 24 milliwatts; correct?

A. Yes, and defines that's the highest bin of that particular model of die.

Q. You agree that the XT-31 is a Cree XT LED; correct?

A. It is -- it's unclear what exactly XT-31 is. It does not match this particular model number. And even Mr. Negley testified, he doesn't recall.

Q. But you would agree that based on the data sheet you looked at, that an XT-31 would have an optical power greater than 24 milliwatts; correct?

A. Yes. I also agreed that's not the same die -- may not be the same die.

Q. So the XT-31 used in the April 2006 prototype would meet the description of a Cree XT LED identified in the '819 Patent in connection with the first embodiment; correct?

A. Incorrect.

Q. You agree that it would meet the requirement of having an optical power greater than 24 milliwatts; correct?

A. Greater than 24 milliwatts, but it doesn't match the model number disclosed.

Q. You're saying it doesn't because it doesn't have the C460XT290 model number, that it couldn't meet the qualification in the '819 Patent?

A. That's correct.

MR. ERWINE: Thank you very much, Dr. Jiao. I have no further questions.

JUDGE CHENEY: I have just a couple of questions, Dr. Jiao.

I recall you giving some testimony about LED drivers and their efficiencies; is my recollection correct?

THE WITNESS: Yes.

JUDGE CHENEY: What is an LED driver?

THE WITNESS: According to the industry definition, ANSI -- in ANSI/IES RP-16, LED driver fundamentally is between the LED and to the wall plug. An LED driver consists of a power supply converted the power from AC to DC and regulate the current to operate the LED. LED driver is serving as -- LEDs are serving as load to the driver, and driver is connected to the AC plug.

That's the definition.

JUDGE CHENEY: Is there ever an LED driver between a power converter and the LED?

THE WITNESS: That's not according to the industry definition. Power supply is part of the driver, or power converter is part of the driver.

JUDGE CHENEY: Is there such a thing as an LED driver that has a DC input?

THE WITNESS: Automotive lighting, yes. Automotive lighting, all the power is DC. LED drivers only use DC. Therefore, the drivers for automotive lighting devices, they're DC to DC operation.

General lighting, in the United States in particular, all drivers are connected to the AC plug.

JUDGE CHENEY: That's very helpful. Thank you.

Can we pull up Dr. Jiao's demonstrative exhibit

RDX-0002.053?

While that's coming up, I have a question about drivers one more time. You gave an example of automotive circuits that have DC power driving DC LEDs. What about an LED flashlight, a handheld flashlight, would that have a DC driver in it?

THE WITNESS: That's correct. Anything that is not connected to the wall plug. ANSI standards doesn't include a flashlight, if you have a handheld device, but you have to have some electronic devices to regulate LEDs. If it's a very cheap handheld, you probably don't. Just connect to the battery.

JUDGE CHENEY: What about a battery-operated -- lithium-ion battery-operated piano lamp?

THE WITNESS: Usually, any battery-operated devices, they do have current regulation devices, if the LEDs are -- if you have used more LEDs or high-power LEDs. If it's very simple device, you can just simply connect the battery to LED directly without regulations.

JUDGE CHENEY: Okay.

Here on JX-0150.0066, which is shown in your demonstrative slide 53, does Figure 65 from this Fini technical report show the current that achieved the reported 78 lumens per watt efficacy?

THE WITNESS: Yes.

JUDGE CHENEY: Where is that on the chart?

THE WITNESS: If you look at the right dot, and each dot indicates different current. If you follow the dot -- the very last one was tested at 50 milliamps, it's 75 -- 78.

JUDGE CHENEY: So the efficacy is shown on a y-axis on the right side of Figure 65; is that right?

THE WITNESS: Correct.

JUDGE CHENEY: Is it your understanding that the blue square on the far right represents the current at which the 78 lumens per watt was achieved?

THE WITNESS: No. The blue square underline reflecting -- actually a diamond shape, reflecting the flux, the luminous flux value achieved for this lamp.

So in the lower current, that would be the far, far left one, that would be the total flux, luminous flux produced by this lamp at the 50 milliamp.

JUDGE CHENEY: I see. So the red line represents the efficacy. The blue line represents the lumens?

THE WITNESS: Luminous flux, yes.

JUDGE CHENEY: Okay. Each of the vertical lines, the spacing between those lines represents how many milliamps?

THE WITNESS: That's correct.

JUDGE CHENEY: What is the numerical value of the number of milliamps between each of the vertical lines?

THE WITNESS: It's probably 50, 150, 100, 150, somewhere maybe 40 to 50 milliamps. I'm assuming. So if you look at 0 to 200, how many increments, one, two, three, four, five, so that would be 40 milliamps per increment.

JUDGE CHENEY: Okay. So we see a red circle just past 40 milliamp line on the far left of the figure, so that's what represents the 50 milliamp.

Is it appropriate to call that the 50 milliamp driver current?

THE WITNESS: The 50 milliamp is the operating current to the LEDs. You can also say it's driver output current that operating the LEDs.

JUDGE CHENEY: Okay. I don't see any data marked on the chart to the left of that red dot around 50 milliamps, do you?

THE WITNESS: I do. The very last one is around 50 milliamps or about 78 lumens per watt. The very last one, if you look at the chart.

JUDGE CHENEY: Do you see any data to the left of that 50 milliamps?

THE WITNESS: No. As I testified, these particular LED fixtures, they put it together, they only tested at 50 lumen. Lower is the one they tested 50

milliamp.

But I also stated, the test point is the reference to generate that trend, that solid line. Therefore, the solid line is used for the POSA to reference the relationship between efficacy and the current. But for the reduced current, efficacy can further increase.

JUDGE CHENEY: What changes would need to be made to the driver to lower the current?

THE WITNESS: Usually, the driver current change is rather simple. You can just tune down the current from the driver. From the output, you can tune the driver.

JUDGE CHENEY: But it would require changing the hardware on the driver?

THE WITNESS: Most of the drivers are designed in such a way, you can -- you can change the operating current. You can set -- you can do two things.

You can preset a regulated current, or you can continue to reduce the regulated current. Both are applicable -- both are feasible.

JUDGE CHENEY: You say they're feasible. What would you need to do; how does that change happen?

THE WITNESS: The change happens in the driver design. Most of the driver design, it should have the ability to have a multi-level of current driving.

You also have a driver can be easily designed

into a so-called tunable, which means by digitally or dialing the current down to reduce the LED operating current.

JUDGE CHENEY: Do we know if the driver in this lamp in this report was tunable?

THE WITNESS: In this report, it has to be in the way, because you certainly see these drivers. This -- the driver driving this particular light fixture were operated in multiple current. It is my observation, this driver is changeable for inputting current. You can see they collect the 8 points, and I certainly believe they can collect more points, if they wish.

JUDGE CHENEY: Does a tuning mechanism have any limits?

THE WITNESS: The only limit -- it can turn to zero. The only limit is for the performance requirement that if you want to dim -- in some cases, dim the LEDs, in today's regulation or even previously, the regulations, you typically have to dim to at least 10 percent, which means you can't just -- you can't dim it to 50 percent, and the driver doesn't work. Most of the drivers can go below 10 percent of light output.

JUDGE CHENEY: Okay.

So we know that this particular fixture can produce at least 500 lumens. Does that mean it can't

produce less than 50 lumens?

THE WITNESS: This chart almost shows, if you look at the last blue dot, it's almost 50, a little more than 50. The last blue diamond shape on the left.

JUDGE CHENEY: So is that the limit?

THE WITNESS: I'm not saying this is the limit. This is demonstration. This driver is operable in different currents, in different -- different lumen output, and associated efficacy. This demonstrated this driver is capable to do a pretty wide range of driving current. Whether that's the limit, I -- in my opinion, it's not, because they certainly use the solid line to demonstrate.

JUDGE CHENEY: We can put this demonstrative away. In fact, we don't need any more demonstratives.

Were you here at the hearing when we heard Dr. Wetzel testify about theoretical limits in wall plug efficiencies for lighting devices?

THE WITNESS: I was here, yes.

JUDGE CHENEY: Do you recall him saying that such a limit would be around or between 2 to 300 lumens per watt?

THE WITNESS: I heard he said three different -- two different range, and one of them was incorrect.

JUDGE CHENEY: What is your opinion on the correct theoretical limit or wall plug efficiencies for an

LED lamp?

THE WITNESS: Your Honor used the word lamp. Let me first go into the concept of -- the physiological concept of converting radiated power to luminous flux. There is a conversion factor, 683.

That 683 is one watt of radiated power equal to 683 lumens at 555 nanometer, for human eyes, the most sensitive response. The one watts equal 683 lumen is the conversion factor artificially chosen by, you know, a group of people to determine that's the highest number that watt-to-lumen conversion is.

So meaning corresponding to the human eye's sensitivity where the most sensitive wavelength goes close to greenish is 555 nanometers. If the light is emitted -- radiated power is emitted in that particular wavelength, that number is 683 lumens.

So that's the physiological combined with the physics conversion factor.

So the physics limit is if you have any emitter, LED or other, 100 percent electrical input is converted 100 percent optical output, radiated power, 1 watts to 1 watts, that 1 watts happens to be producing 555 nanometers of light, then the highest number you can convert is 683 lumens per watt with a single color.

That's the theoretical -- what we call the

theoretical, which, really, artificially we have chosen 683. That theoretically is 100 percent electrical input, becomes 100 optical input, happens to be one particular wavelength, that is 683 lumens.

JUDGE CHENEY: So is that opinion something that you agree or disagree with Dr. Wetzel about?

THE WITNESS: He said it's some kind of range. There is no range. There is no 600 to 700. It's a number. It's a conversion number.

JUDGE CHENEY: Okay. You agree that the number that you have identified, 683, is in the range that Dr. Wetzel testified about?

THE WITNESS: Again, the conversion is not a range. It's --

JUDGE CHENEY: Do you disagree that it's in the range that Dr. Wetzel testified about?

THE WITNESS: Yes. Sure.

JUDGE CHENEY: I'm sorry. Do you agree or disagree?

THE WITNESS: Yes -- well, the number is in that range, but --

JUDGE CHENEY: Okay.

THE WITNESS: -- it's -- conversion is not range. Conversion is define the number.

JUDGE CHENEY: Okay. So Dr. Wetzel also gave

another range, 200 to 300. Do you agree or disagree with his opinion there?

THE WITNESS: Well, there's no agreed-upon theoretical limit for white light. For the reason that white light is perceived white. It really depends upon how white is white.

For the reason for that, you can do theoretical calculation by combining single spectrum, and to achieve much higher lumens per watt number versus if you are using broader phosphor converted, a broader spectrum, and that lumens per watt number is lower.

It's from 200, 300 -- in my report, I mentioned it can be 300 lumens per watt. That's the only word I said. There's no agreed upon what should be the theoretical limit for LED lamp level.

JUDGE CHENEY: Thank you. That's all the questions I have.

Does anyone have redirect for Dr. Jiao?

MR. MOSKIN: Just a few questions, Your Honor.

JUDGE CHENEY: Please proceed when you are ready.

MR. MOSKIN: Thank you.

REDIRECT EXAMINATION

BY MR. MOSKIN:

Q. Let's start by bringing up a section of the '531

Patent starting at column 21, line 32.

Dr. Jiao, do you recall that Mr. Erwine pointed you to certain lumen outputs at the LED package level in the '531?

Do you recall that?

A. Yes, I do.

Q. Now, are these lumen output numbers sufficient to build, in your opinion, a BSY+R device like the one tested by NIST?

A. Well, the test report shows the number. But if I look at all of these descriptions, in my opinion, there's two things caught my eye.

One is Mr. Erwine pointed out all of these CIE diagram coordinates numbers. If you can highlight all of them. That describes the BSY color boundaries. And these BSY color boundaries is a very broad color space of yellowish light.

Given that as it may, the yellowish light, which is the person of ordinary skill in the art would not know which point to pick it up other than knowing this big color space.

Knowing that, if you have that particular light produces 108 to -- 108.2 or 112.6, that's only the lumen amount number. That one doesn't disclose anything for efficacy.

So this disclosure doesn't describe, even with a yellow light, how much efficacy is needed in order to produce that highest 113.5 lumens per watt.

That's where I argued the enablement.

Q. So we can take down that slide.

Mr. Erwine asked you some questions about the testing methodologies used by Mr. Nakamura and Mr. Ibbetson.

And first of all, Mr. Nakamura is, I think you mentioned, is a Nobel laureate; correct?

A. Yes.

Q. I think you testified that the purpose of the report was to demonstrate efficacy of a fixture using the SPE technique; is that correct?

A. That's correct.

Q. Do you have any opinion whether it would have been reasonable for Mr. Nakamura to have conducted testing for efficacy in a manner that was reasonable and reliable and was thermally stable?

A. Well, in order to establish the report that being acceptable by Department of Energy, and my understandings of all of these reports, including the test results, and should be done as much as objective as possible without the industry standards, that's the best they could do.

Q. So the same question is to the Ibbetson report submitted to the Department of Energy.

Do you have any reason to believe that Mr. Ibbetson tested the device shown or the devices shown in an inherently unreliable way?

A. No, I have no reason. Again, the DOE report tends to have a pretty -- pretty sophisticated review process, and I don't think anybody who obtained DOE funding provided a report will fabricate any result or improperly produce any result.

Again, without industry standard in that time frame, and each researchers or whoever contributed a report, in my opinion, they probably did the best they could.

Q. Okay. Now, one last series of questions. It will be short.

Mr. Erwine asked you if -- at the beginning -- sort of early in your testimony on cross-examination whether the asserted claims of the two lumen per watt patents are enabled as to the BSY+R approach.

I think you said initially they were not, and I thought I heard you say that they were. I want you to clarify.

Is it your opinion that the asserted claims of the '819 and '531 Patents would enable a person of ordinary

skill to practice the BSY+R approach?

A. In my opinion, they still have a very critical missing content. I think in my testimony saying that the BSY is such a wider -- wide color space, R, the -- combining them, I still believe they're missing the recipe of color content and efficacy of each.

So I should clarify, it's not enabled.

MR. MOSKIN: Thank you. I have no further questions.

JUDGE CHENEY: Okay. Any further cross?

MR. ERWINE: No, Your Honor.

JUDGE CHENEY: Thank you so much, Dr. Jiao. Thank you so much for giving us so much of your time across two days.

Your testimony really helped me understand the case better.

You may step down.

THE WITNESS: Thank you.

JUDGE CHENEY: Will RAB call its next witness.

MR. MOSKIN: RAB will. It's Dr. Akemann. I think we just need a moment to get him set up at his -- at the workstation -- computer workstation.

My colleague, Mr. Hickerson, I believe, will be -- excuse me, Mr. Montei would be conducting that examination.

JUDGE CHENEY: Welcome to the podium, Mr. Montei.

Let's go off the record for just a moment.

(Off the record.)

JUDGE CHENEY: Back on the record after taking a short break to deal with some audio issues.

We are now moving on to RAB's next witness, Dr. Akemann.

Doctor, if you will please raise your right hand, I will administer the oath.

MICHAEL P. AKEMANN, Ph.D.,

a witness, having been first duly sworn, was examined and testified as follows:

THE WITNESS: I do.

JUDGE CHENEY: Thank you. Please proceed with your examination, Mr. Montei.

DIRECT EXAMINATION

BY MR. MONTEI:

Q. Dr. Akemann, thank you for being here today.

Can you let everyone know where you are testifying from currently?

A. I'm in the Washington, D.C. offices of Foley & Lardner in what I believe we're referring to as the witness room.

Q. In addition to any electronic exhibits that we may go over today, do you have any hard copy materials with you?

A. No, I didn't bring anything to the witness room. I do have a hard copy of my expert report across the hall should it be necessary.

Q. Dr. Akemann, can you briefly describe your educational background?

A. Certainly. I have a BA in economics and political science from the University of California at San Diego and a M.A. and A Ph.D. in economics from UCLA.

Q. Can you briefly describe your experience performing economic and financial analysis, particularly as it relates to the economic prong of the domestic industry requirement?

A. I have been conducting economic research and consulting for about the last 20 to 25 years since getting my Ph.D.

Much of my work has focused on patent matters, including district court litigations, and then over the last five or seven years, several matters here before the ITC.

At least a few of those matters have involved studying the economic prong of the domestic industry issue.

Q. Thank you.

Could we call up RX-852, please?

Dr. Akemann, do you recognize this document?

A. I do. It's a copy of my CV.

MR. MONTEI: Your Honor, as previously discussed in the context of Mr. Bakewell's direct examination, Dr. Akemann, like Mr. Bakewell, subject to the parties' stipulation regarding expert qualifications, in view of his testimony and that stipulation, we would offer him as an expert in economic and financial analysis as it relates to the economic prong of the domestic industry requirement.

JUDGE CHENEY: Based on the stipulation and hearing no objection, Dr. Akemann will be accepted as an expert in the fields tendered.

BY MR. MONTEI:

Q. Dr. Akemann, you were retained on behalf of RAB Lighting in this investigation; correct?

A. That's correct.

Q. Could you provide a high-level summary of your assignment?

A. My basic assignment was to review and analyze the expert report of my counterpart, Mr. Bakewell, and offer some opinions related to his analysis of the economic prong of the domestic industry requirement.

Q. Are you familiar with the testimony offered by Mr. Bakewell regarding the economic prong of the domestic

industry requirement?

A. I am. I had a chance to review the transcript when I arrived in DC earlier this week.

Q. Would you mind giving us a brief summary of the opinions you've made in this investigation?

A. I have two broad sets of opinions.

The first relate to the '449 Patent. Based on my own contextual analysis of that issue, I concluded that the investments in domestic industry products related to the '449 Patent are not significant.

The second broad set of opinions relates to Mr. Bakewell's analysis of all of the patents at issue here, and I concluded that there were some important conceptual problems with the way that he considered and analyzed the data in context.

Q. At a high level, can you briefly describe what your opinions are based on?

A. My opinions are based on the usual set of things that I would consider in a case such as this, that would include deposition testimony, and exhibits, documents and data produced by the parties. Third-party industry information that I gathered on my own, and some of which perhaps was also produced by the parties.

I also conducted interviews with RAB Lighting's technical experts to get some background information

regarding the patents at issue in this investigation.

Q. Thank you.

I'd like to move to a discussion of the economic prong in this investigation, Dr. Akemann, in more detail.

Did Mr. Bakewell reach any conclusion with respect to subsection C of the domestic industry requirement?

A. No, he did not.

Q. Moving on to the some R&D activities particularly relating to the '449, '531 and '819 Patents, does Mr. Bakewell say anything about foreign research and development of domestic industry products?

A. Both in his report and in his testimony earlier in the week, I think he acknowledged that there may have been some foreign activity, but at least in his report, he said that everything is currently happening in the US.

Q. What is your understanding of foreign R&D activities pertaining to the '449, '531 and '819 Patents?

A. My understanding is that there is evidence in this case that at least some of the R&D activity related to those three patents occurred overseas, and in particular, in Hong Kong.

Q. With respect to the '531 and '819 Patents in particular, are you aware of any evidence relating to specific development activities occurring in Hong Kong?

A. I am. With respect to those two patents, one of the named inventors is listed as resident in Hong Kong. I believe that was Mr. Tony Van de Ven, if I'm pronouncing his last name correctly.

I also saw, in addition to the patents, an announcement by an entity called LLF, which has some operations in Hong Kong, regarding the prototype or product development activities that appear to relate to those two patents. Those were also done, it seems, in Hong Kong.

Q. With respect to these three patents, would an understanding of the R&D activities and related investment that occurred in Hong Kong have been relevant context for Mr. Bakewell to consider in forming his opinions in this investigation?

A. I think it would have been relevant. We can see some US activities, R&D activities related to those three patents. But with respect to the '449, for example, those amounts are not very large, and they occurred fairly distant in time. I think it would have been relevant context to consider how those amounts compared, for example, to whatever activities took place in Hong Kong.

Q. In addition to the relevant investment amounts, would it have been prudent for Mr. Bakewell to consider what aspects of the products practicing these three patents were designed in Hong Kong relative to what aspects of

those products were designed here in the United States?

A. I think it would have been relevant context. For example, Mr. Bakewell focuses in part on the current profitability of some of the domestic industry products. It would have been, I think, relevant to understand what's currently driving the profitability, and in particular, what R&D activities related to different features of the product might be relevant for considering current profitability, as an example.

Q. I'd like to move to talk a little bit about Cree Lighting's claimed investments and the DI products relating to the '449 Patent in particular.

Dr. Akemann, under what subsection is Cree Lighting's claimed investments relating to the '449 Patent occurring?

A. Those are occurring under sub-prong B.

Q. In your understanding, sub-prong B relates to labor and capital; is that right?

A. That's correct. And specifically here, we're focused on production labor and capital, and R&D labor and capital together.

Q. Do you recall the names of the product that Cree Lighting alleges practiced the '449 Patent?

A. Yes, there are three product families at issue. The CRT downlight -- or excuse me, the CR downlight, the

CRT, and the DDS product families.

Q. Thank you.

If I refer to those products collectively as the '449 DI, or domestic industry, products will you understand that I'm referring to those three products that you just identified?

A. I will, and that will be useful shorthand.

MR. MONTEI: Your Honor, at this point, given that we will be discussing Cree Lighting financial information that's been designated, I'd like to move on to the Cree Lighting confidential record.

JUDGE CHENEY: Let's go on to the Cree confidential record. If you're not authorized to view Cree confidential information, please move yourself into the breakout session.

(Whereupon, the trial proceeded in confidential session.)

O P E N S E S S I O N

JUDGE CHENEY: We're back on the public record now after completing the direct examination of Dr. Akemann, who is RAB's economic expert.

Will there be cross-examination of Dr. Akemann?

MR. LASHER: There will be, Your Honor.

This is Mr. Lasher.

JUDGE CHENEY: Okay. We will conduct that cross-examination after lunch.

We'll now take a one-hour recess. We're off the record.

(Whereupon, the lunch recess was taken at 12:32 p.m.)

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

(1:31 p.m.)

JUDGE CHENEY: Back on the record now in the 1213 Investigation.

Before our lunch break, we finished up the direct examination of RAB's economic expert, Dr. Akemann, and Cree indicated it had some cross-examination. I see Mr. Lasher at the podium.

Please proceed when you are ready, Mr. Lasher.

MR. LASHER: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. LASHER:

Q. Good afternoon, Dr. Akemann. It's nice to see you again.

A. Good to see you, Mr. Lasher.

Q. Thank you.

Before we go into the details of your slides, I'd like to make sure we're on the page -- same page conceptually on a couple of things.

Do you understand that the research and development expenditures in this investigation that were analyzed by Mr. Bakewell were done so under sub-prong B; correct?

A. I do understand that.

Q. I think you noted in your direct examination

that you had been -- that you testified in a number of ITC investigations previously; correct?

A. That's correct.

Q. All right. So you understand that under sub-prong B, investments in labor and capital only need to relate to the DI products as a whole, and not specific patented features; correct?

A. I have a general understanding of that issue, but I'm not a lawyer, so I'm not certain I have a complete understanding.

Q. Okay. Does that sound familiar to you, that concept?

A. It does.

Q. Okay. Thank you.

Let's go to your slides right now.

MR. LASHER: Your Honor, at this point, I'd like to go on the Cree Lighting CBI. This is internal investment data.

JUDGE CHENEY: Okay. Let's go on the Cree confidential record. If you're not authorized to hear that information, please remove yourself to the breakout session.

(Whereupon, the trial proceeded in confidential session.)

O P E N S E S S I O N

BY MR. LASHER:

Q. Dr. Akemann, you had a slide to that effect. I won't bring up that slide so we can stay on the public record.

But you had a slide that referred to multiple ways why you believe the '449 Patent investments were not significant; correct?

A. That's correct.

Q. Okay. I'll come back to '449 in a minute, but before doing so, for the remaining four patents, you've not offered an affirmative opinion that the domestic investments associated with these patents are not significant; correct?

A. That's correct.

Q. All right. Dr. Akemann, I am not sure if you were at the hearing on Monday or -- I couldn't tell from your testimony, but did you review or attend the hearing on Monday?

A. I was not able to attend live, but I have had a chance to review the transcript from that day.

Q. Were you able to review the transcript from yesterday, by any chance?

A. Portions of it. I did not review the entire transcript.

Q. Okay. So in addition to the trial transcript, you also reviewed Mr. Wilcox's deposition transcript and other Cree Lighting employees' deposition testimony in this case; correct?

A. That's correct.

Q. You have no reason to believe that the Cree Lighting witnesses provided inaccurate or untruthful testimony; correct?

A. That's correct. I'm not disputing the factual accuracy of statements they may have made.

Q. Along those same lines, you'd agree with me that the Cree Lighting witnesses had more factual knowledge about Cree Lighting's business than you; right?

A. I would agree with that, yes.

Q. Cree Lighting employees had more factual knowledge than you about Cree Lighting's production facility, and costs as well; correct?

A. I would assume that's correct, yes.

Q. And Cree Lighting's employee have more factual knowledge than you about employee counts, and the employees' roles at Cree Lighting; correct?

A. I would assume that's correct, too.

Q. Okay. Cree Lighting's employees have more factual knowledge than you about Cree Lighting's research and development projects, and costs as well; correct?

A. That's correct.

Q. All right. Finally, Cree Lighting's employees have more factual knowledge than you about Cree Lighting's business strategy; right?

A. I think that's probably correct as well.

Q. Okay. So let's turn to our discussion of the '449 Patent.

You would agree with me that there is no minimum monetary expenditure that a Complainant must demonstrate to qualify as a domestic industry; correct?

A. That's certainly my understanding of the legal framework, and how, I guess, the Commission has in the past addressed these issues. I'm not aware of any legal minimum.

Q. Okay. You also understand that there's no requirement that a Complainant manufacture products domestically at all to establish a domestic industry; correct?

A. Again, that's correct, to my general understanding, yes.

Q. It's also your understanding that a Complainant may base its domestic industry on domestic labor and capital for research and development solely; correct?

A. As far as I know that's correct, yes.

MR. LASHER: Your Honor, I'd like to go back on

the Cree Lighting CBI record.

Again, it's internal both investment data and sales data.

JUDGE CHENEY: Okay. We're back on the Cree confidential record.

(Whereupon, the trial proceeded in confidential session.)

O P E N S E S S I O N

BY MR. LASHER:

Q. Dr. Akemann, on direct, I believe you had some discussion with counsel about comparing foreign and domestic investments.

Do you remember that?

A. I do.

Q. You would agree with me that the Commission doesn't require a Complainant to offer a comparison between its foreign investments and domestic investments; correct?

A. To my understanding, that's correct. There's no requirement that the Commission consider that evidence.

Q. Okay. I believe you also had a brief discussion with counsel about some component sourcing and sampling. This is near the end of your direct.

Do you recall that?

A. I do.

Q. I believe counsel asked you about Mr. Bakewell's selection of the sample SKUs.

Do you remember that?

A. I remember the general line of questioning, yes.

Q. Okay. But you understand that the sample SKUs were not, in fact, selected by Mr. Bakewell or his team; isn't that right?

A. That is my understanding, and I didn't mean to

suggest in my direct testimony that he had done so.

Q. Okay. Well, one sample was selected as the highest volume SKU from a particular family, and the second sample was selected by RAB's counsel's team; correct?

A. I'm not sure specifically. I wasn't involved in any of that aspect of this investigation.

Q. Okay. All right. Let's switch gears slightly.

You would agree with me that in analyzing the significance of the '449 investments it's relevant to consider the location of where the '449 products were designed; correct?

A. I think that's a factor that one should consider in context, yes.

Q. Okay. You read -- did you read Mr. Wilcox's testimony when he stated that all the detailed work involved in the engineering details for and the rest of the R&D realization for all of the '449 products over multiple generations was done by the team in Durham, North Carolina?

A. I do recall Mr. Wilcox's testimony generally on those issues. I don't know that I recall all those specific details that you just enumerated, but that's consistent with my recollection of his testimony.

Q. Again, you don't dispute the accuracy of Mr. Wilcox's testimony; correct?

A. I'm not debating the accuracy of that testimony,

that's correct.

Q. Okay. Would you agree with me that for companies like Cree Lighting and RAB, that at least do some contract manufacturers overseas, it's important for those companies to develop and engineer the products in the United States?

A. I'm not sure what you mean by important for them to do so. Could you clarify that question?

Q. Well, let's look at some testimony from Mr. Wilcox from Monday. This is at pages 94 and 95, starting at line 20.

So Mr. Wilcox was asked, "Do you know why Cree Lighting used its team in Durham to engineer, develop and commercialize those products?"

Mr. Wilcox responded, "We found through the years that having the expertise of all the different aspects of, you know, LED, optical and system design that we developed in the States led to the best results even if we ended up manufacturing a few of the more commoditized products overseas, that we got the best results with those teams doing the work on those products."

Do you see that, Dr. Akemann?

A. I do.

Q. Okay. Now, can we pull up Mr. Barna's testimony from yesterday? This is page 596, starting at page 5.

And he said -- or the question was, "So you can't speak to whether or not it's important for RAB to have US-based engineering resources even if its products are manufactured overseas?"

His answer was, "Oh, sure, sure. Thanks for clarifying. I don't think it matters where the products are manufactured. As a matter of fact, we do manufacturing in New Jersey using our union workforce. Engineering capabilities in the US are of critical importance to RAB."

Do you see that?

A. I do.

Q. So would you agree that for companies like Cree and RAB who do at least some contract manufacturing overseas, it's still important for them to have their engineering resources in the US?

A. Yeah. That's consistent with my understanding, that both companies here find business advantages to doing R&D in the US. I agree with that.

Q. Okay. Let's turn to your opinion that Cree Lighting's investments have been declining. Okay?

A. Okay.

Q. Now, as an initial matter, you understand that the Commission normally determines whether domestic industry requirement is satisfied at the time the complaint is filed; correct?

A. That's correct, and considers data up to that point.

Q. You also understand that the Commission may consider new, relevant and timely disclosed evidence after the filing of the complaint; correct?

A. I'm aware that in some circumstances, the Commission can choose to consider later information.

Q. Well, in some of your slides, you included post-complaint data; correct?

A. I did.

Q. All right. Let's take a look at one of those slides.

Let's pull up RDX-008C.8.

A. This has confidential information.

Q. I'm sorry, yes. Thank you so much.

MR. LASHER: Your Honor, this is -- we'd like to go on the Cree Lighting CBI record. As Dr. Akemann pointed out, this does have Cree Lighting internal data.

JUDGE CHENEY: Okay. Let's go on the Cree confidential record.

(Whereupon, the trial proceeded in confidential session.)

O P E N S E S S I O N

JUDGE CHENEY: Back on the public record now after finishing the cross-examination of Dr. Akemann.

I didn't have any questions for the expert, and there was no redirect.

So RAB, do you have another witness to call?

MR. MOSKIN: Your Honor, we do. Dr. Jack Josefowicz, who is being set up in front of the computer terminal, just vacated, I believe, by Dr. Akemann.

JUDGE CHENEY: Okay. Let's go off the record while we get set up.

(Off the record.)

JUDGE CHENEY: Okay. Let's go back on the public record.

We're back on the public record now after getting things situated for our next witness, which is Dr. Josefowicz.

Dr. Josefowicz, will you please raise your right hand so I can administer the oath.

JACK JOSEFOWICZ, Ph.D.,

a witness, having been first duly sworn, was examined and testified as follows:

THE WITNESS: I do, Your Honor.

JUDGE CHENEY: Thank you.

Please proceed with your examination,

Mr. Moskin.

MR. MOSKIN: Thank you, Your Honor.

DIRECT EXAMINATION

BY MR. MOSKIN:

Q. Could you please state your full name for the record?

A. Jack Josefowicz.

Q. Dr. Josefowicz, have you prepared a set of demonstrative exhibits to help illustrate some of your testimony today?

A. I have.

Q. Can you let us know whether the demonstrative exhibits being shown now, RDX-006, are those exhibits that I just mentioned?

A. Yes, they are.

Q. Let's also pull up RX-854, and I'll ask you whether this is your curriculum vitae.

A. It is.

Q. Okay. Does this accurately -- well, let's go to the demonstrative slide 2, and as summarized here, is this a fair summary of relevant experience of yours?

A. Yes, it is.

Q. Okay. Does your -- the entire CV reasonably -- or is it a reasonably accurate summary of your background and qualifications?

A. Yes, it's up to date.

Q. Okay. Dr. Josefowicz, have you ever designed streetlights?

A. Yes, I have.

Q. Could you briefly describe your work doing such design work?

A. Yes. I was involved with a startup of a company that is listed here, LED Roadway Lighting Limited.

I was in at the very start of this startup, with four people, and brought it to 200 people in manufacturing and shipping LED streetlights around the world.

I led all of the technical design elements that went into the streetlight including the fixture, the electronics and the optics for the LEDs.

MR. MOSKIN: Your Honor, pursuant to the parties' stipulation regarding expert qualifications, I'd like to offer Dr. Josefowicz at this point as an expert in optics and lens design.

JUDGE CHENEY: Based on the stipulation, and hearing no objection, Dr. Josefowicz will be accepted as an expert in the fields tendered.

BY MR. MOSKIN:

Q. If I may, Dr. Josefowicz cut out briefly there. I'm just going to ask somebody to have our technical person check his sound.

It's fine now, but I don't want, you know, further interruptions, so --

JUDGE CHENEY: Let's go off the record for a moment.

MR. MOSKIN: I can proceed, Your Honor. I think we can -- I just wanted to let you know I was having a little problem with the audio. I wanted to make sure we don't have any further interruptions.

JUDGE CHENEY: Okay. Please proceed, Mr. Moskin.

BY MR. MOSKIN:

Q. Thank you.

Dr. Josefowicz, are you a lawyer?

A. I'm not.

Q. In your testimony today, are you providing any legal opinions?

A. I'm not.

Q. Okay. Did the attorneys for RAB describe to you any relevant legal standards to assess infringement and validity?

A. They did.

MR. MOSKIN: There does seem to be some network connectivity problem. We should go off the record briefly.

JUDGE CHENEY: Okay.

MR. MOSKIN: Dr. Josefowicz, can you hear me?

THE WITNESS: I can hear you.

MR. MOSKIN: All right. Good. Maybe we're all right now.

BY MR. MOSKIN:

Q. My question to you, Dr. Josefowicz, was whether RAB's lawyers described to you any relevant legal standards to assist in your -- your opinions regarding infringement and invalidity?

A. Yes, they did.

Q. Showing you now what's in your demonstrative exhibits, slide 3, does this summarize your understanding of what is meant by the level of ordinary skill in the art?

A. Yes, it does.

Q. Okay. Did you apply that level of understanding -- or that understanding of the level of ordinary skill in the art in developing your opinions regarding the '570 Patent?

A. I did do that.

Q. Let's pull up slide 4. We heard some testimony from Dr. Lebby about standard illumination output distribution, in particular levels T2, T3 and T4.

Would a person of ordinary skill in the art working on roadway design, in your opinion, be familiar with such standard illumination output distributions?

A. Yes, they would.

Q. Why is that?

Perhaps you can explain what we're looking at on the slide as well.

A. Yes. It's important to understand -- to answer this question, it's important for me to explain that what I show here, which is that in 1983, the Illuminating Engineering Society of North America, which is a globally recognized organization that sets standards and specifications for lighting, including street lighting, published the distribution set we're looking at schematically here, Type 1 through Type 5.

They were explicitly formulated for primarily streets, highways, and parking lots.

The Type 1 is a distribution that would be appropriate for two-lane road, a narrow road so that if you think about it as kind of a rectangular in shape, it's the longest rectangle.

Type 2 would be for a wider -- a wider road, maybe a three-lane road. Type 3 for an even wider, maybe four-lane road, and so on.

What's important also to understand is that after these specifications for types of distribution were published, essentially all of the world's manufacturers of streetlights needed to provide evidence that their streetlights produced one or other of these distributions.

So, for example, if you were intending to sell a light or providing a response to a request for quote, for a community of 50,000 lights, you would have to provide evidence that your light would produce one of these types of distributions.

And there were testing methods for the light that would analytically measure the output from the light and its distribution to identify the type of distribution that we're looking at here.

Q. So would these distribution patterns or standards be well known to designers of lighting devices for -- roadway lighting devices in particular?

A. Yes, it would be not only that they would be well known, but it would be required that they understood them.

Q. Is it implicit in these standards that lens designers would need to be able to distribute light from a light-emitting source to particular directions where it was needed?

A. Yes. And it would be essential that they understood the relationship between the lens design and what it would produce. If it was a streetlight, it would need to be one of these distributions.

And as I said, these would normally be part of a series of specifications that a streetlight manufacturer

would provide potential customers, or they -- or for the most part, they wouldn't be included.

Q. When you say, "they wouldn't be included," they wouldn't be included in the bidding process?

A. That's right.

Q. Okay. Let's pull up the next slide, 5, and I'd like to ask you whether in considering your opinions regarding the validity of the asserted claims of the '570 Patent, did you understand that claims of an issued patent are presumed to be valid, and must be shown invalid by clear and convincing evidence?

A. I do understand that.

Q. Looking at the cover page of the '570 Patent, is that the patent that you looked at in connection with this case?

A. That is the patent --

Q. Okay.

A. -- I looked at.

Q. Right. I would like first to discuss your opinions concerning any technical analysis you did.

Were you asked to do a technical analysis of the '570 Patent?

A. I was asked to look at this patent from a technical point of view, yes.

Q. Do you understand that the term "preferential

side" -- let's go to, I guess, slide 6 -- has been construed in this case as having a specific meaning?

A. Yes, I do.

Q. The meaning shown here is, "An off-axis direction with respect to the emitter axis to which a majority of the light is distributed."

Is that what you understand is how preferential side has been construed?

A. I understand it that way.

Q. Yes. Is that the interpretation or construction of this phrase that you used in formulating your opinions?

A. It is.

Q. Do you have a general sense of what the earliest priority date of the '570 Patent is?

A. Yes. I understand it to be May 23, 2008.

Q. Okay. Let's pull up slide 9.

And do you have an understanding of what claims are being -- of the '570 Patent are being asserted against RAB in this case?

A. Yes. As listed on this slide, it's Claims 1, 3, 4, 5 and 10.

Q. Okay. Let's go back to slide 7. Yes. Or let's go to slide 7. Yeah.

Do you understand what is -- can you briefly summarize, you know, what's shown here, as claimed in the

'570 Patent?

A. This is a cross-section of the lens that is the sole embodiment of this patent. To me, this is -- I would -- the term I would use for this lens is it's a free-form lens, meaning it doesn't -- it's not a lens that would be termed classical optics, according to the terminology in physics, but classical optics lens like a bispherical convex lens or a lens like that, but it's a free-form lens clearly designed using computer-aided design.

Q. Why do you say it is clearly designed using computer tools?

A. Because it's extremely complicated, and no human being could design all of these complex lens shapes and surfaces without the assistance of computer and ray trace analysis to determine how all of this complexity translates into a distribution that it produces on a surface.

In this case, you also see, I just should add, that there is an emitter which in the patent '570 is a light-emitting diode, LED.

Q. Okay.

A. And there is an emitter axis also present, which appears to be at the central part of the LED device which is annotated by a number 3.

Q. Okay. Now, do you understand -- well, first of

all, did you listen to Dr. Lebby's testimony the other day, I think it was Monday?

A. I did.

Q. Do you understand that Dr. Lebby testified that RAB's LOTBLASTER and TRIBORO products infringed the '570 Patent?

A. Yes, I did hear him say that.

Q. Do you agree with him?

A. I don't.

Q. Do you have an opinion whether RAB's products infringe or do not infringe the '570 Patent?

A. My opinion is they don't infringe on the '570 Patent, and they don't comply with all the limitations in the '570 claims.

Q. Are there principal limitations you believe that they do not comply with?

A. Yes. The front and back sector.

Q. Okay. Let's look at slide 11.

Does this slide depict some of the examples of RAB's LOTBLASTER and TRIBORO products?

A. They do.

Q. Have you looked at other photographs and engineering drawings for these products?

A. I have.

Q. Can you briefly describe what -- pertinent

features of the two products?

A. Yes.

Well, as noted below, at the bottom of the slide, these are able to produce IES Type 2, Type 3 and Type 4 that we discussed earlier.

In particular, they have characteristic streetlight design features. You see, what we're looking at is slightly from the top view. We see at the front of both lights, you have a thin structure, which is a passive cooling thermal management system for the LED light engines that would sit below, on a plane below the fins, looking out and down from the fixture. The optics, the lenses that we're talking about here, would be over the LEDs on the other side.

Typically, the design of these features a compartment at the back that has these two circles, and what looks like a cylinder on the right one. Underneath that surface, typically resides the power supply driver, which converts AC input to the light to DC current for the LEDs.

Q. All right. And you noted that these -- the RAB products are made to comply with Type 2, Type 3, and Type 4 IES distributions.

Does that tell you anything about the intended applications or uses for these products?

A. These would -- I assume these would be streetlight or roadway light fixtures, would be the application.

Q. Let's go to slide 12.

I believe Dr. Lebby has supplied these figures to show the RAB products, and I believe how they meet the preamble of Claim 1 being a lens for distribution of light, predominantly toward the preferential side, from a light emitter, having an emitter axis and defining an emitter plane.

Do you agree that that's what these show?

A. Yes. These are photometric report files for how, for example, the one on the left, the Type 2 LED light fixture, and its lenses and its LED emitter, produce a distribution on a roadway. This photometric graph features isocandela lines that are denoted by numbers here, 2, 1, .5 and .25. Each line has sequentially lesser illuminants or intensity. And we can follow the isocandela line so that we can understand the uniformity.

But, you know, the IES Type 2 distribution has specific callouts for intensity that's required to be met, for a Type 2 distribution or Type 3, the one beside it, and the one on the right.

So these are -- as I spoke to the IES distributions earlier, these are something that's part of

the specification package for an LED luminaire such as these that would be used by the potential client to determine which manufacturer or which product they wanted to purchase because this is a very important comparison specification when somebody's doing an assessment of which manufacturer they're going to go with.

Q. But in short, you agree with Dr. Lebby, that the RAB lenses are designed to distribute light predominantly toward a preferential side from a light emitter?

A. Yes. To that point, one more clarification.

There's a dot there. The dot represents where the luminaire is located.

Q. Okay. Thank you.

A. So --

Q. Let's --

A. So I was just going to say that if the luminaire is located on the line there, which is the side of the street labeled zero, at a height of 35 feet, which is called out as the mounting height, then in order to produce this type of distribution, by definition of this -- of this distribution, you would need to redistribute the light from the emitter, the LED emitter, towards the street side in a very special way in order to get this kind of uniformity.

Q. All right. Let's pull up slide 13.

And Dr. Lebby supplied this teardown photograph

in his report to show that RAB lenses distribute light from a light emitter having an emitter axis.

Would you also agree with Dr. Lebby in this respect?

A. Yes, I agree.

Q. Okay. Let's call up slide 14.

Dr. Lebby has supplied these illustrations to show that the RAB products meet Claim 1A, the feature that it have an outer surface configured for refracting emitter light predominantly toward a preferential side.

Would you also agree with Dr. Lebby that's what's shown here?

A. I agree.

Q. Great.

Let's move on to the -- oh, still -- I'm sorry. Don't move on.

Dr. Lebby's also supplied these illustrations to show, I believe, that RAB products have, as recited in Claim 1B, a refracting inner surface configured for refracting light from the emitter, the refractor inner surface then comprising, which we'll go on to describe.

Do you agree with Dr. Lebby that that's what's shown here?

A. It is. I agree.

Q. Okay. Let's turn to talk about the front

sector, and move to the next slide, 15.

Okay. Yes. So Dr. Lebby testified that RAB emitters have a front sector centered on the preferential side. And according to Dr. Lebby, that's where the front sector is, and the T2, T3, T4 products, is -- what has Dr. Lebby identified as the front sector in his drawings?

A. Dr. Lebby's definition for what the boundary is for the front or preferential side sector of the lenses versus the non-preferential back sector side of the lens, according to Dr. Lebby, is based on a vertical line that comes off the emitter axis.

So in this case, the blue line would be aligned with the emitter axis. The emitter axis, I assume he meant the center point of the LED.

Q. And is the front sector simply what is highlighted in green to the right of the emitter axis?

A. Yes.

Q. As defined by Dr. Lebby?

A. As defined by Dr. Lebby, the part of the lens to the right of that emitter axis demarcation is the front sector. And --

Q. Okay.

A. Yeah.

Q. I'm sorry. I didn't mean to cut you off.

A. No, that's -- that's right. The green line on

the lens shows the front sector part of the lens.

Q. Okay. Let's go, then, to the next slide, 16, that -- which requires a back sector centered on the non-preferential side radially opposite the preferential side, and having a surface configuration differing from the surface configuration of the front sector.

Just according to Dr. Lebby, where is the back sector in these three, T2, T3 and T4, lenses?

A. So with reference to what I just explained, Dr. Lebby's definition is for the demarcation line, then the same demarcation line would be the dividing point for the back sector, as he showed in these slides that he presented.

Q. And that's highlighted in pink; correct?

A. Yes. Except that he only -- he only has a demarcation of part of the lens, which I don't understand if -- the definition.

Q. Okay. We'll come back to that.

A. Yeah.

Q. Just to be clear as to your understanding, what has Dr. Lebby used as the defining condition for -- or boundary condition to delineate or distinguish between the front and back sectors?

A. So the definition for the demarcation point or line or plane for the front sector and back sector is that

which comes off the emitter axis.

Q. Thank you.

Applying this interpretation of using the emitter axis as the boundary condition for the front as against the back sector, do you understand that Dr. Lebby contends that the accused products infringe Claim 1?

Do you understand that?

A. Yes, I do.

Q. Do you agree that the RAB products have a back sector as required by Claim 1?

A. No, I don't.

Q. So is it your opinion that the feature back sector as understood, in light of the '570 Patent, is not present in any of the RAB products; is that correct?

A. Correct.

Q. Let's pull up the slide 17, which shows Figure 6 from the patent -- from the '570 Patent.

I'd like to ask you to explain what the '570 Patent itself says about the front versus the back sector.

Have you annotated here in Figure 6 of the '570 Patent to help distinguish between the two?

A. Yes, I have. I have colored the front sector this -- I don't know what you see, but it's blue here for me.

Front sector is also marked as number 20 in

Figure 6, and back sector is marked 30, and it looks orange for me. It's those arcs between 323 and 322, the back sector. Further --

Q. Okay. Go ahead.

A. I want to explain so we all understand what this is.

This is an expanded view, a top view, of half of the lens. So there would be another half of this lens below the line marked 4.

Q. And in this view, is the emitter axis, which you defined here as the z-axis, is this coming straight out at us?

A. Yeah, so in the lower right-hand corner, I have an x, y, z Cartesian coordinate marked out. So we should understand this to mean that x and y are in the plane that we're looking at, and z is coming out towards us, out of the plane, perpendicular to the plane.

So with that coordinate system defined, although I have drawn a line in green referred to as emitter axis, it's actually coming straight out towards us, perpendicular. It's 90 degrees to the surface.

Q. Okay. As shown here, is the front sector bounded by the emitter axis?

A. It is not.

Q. Okay. Does -- do you see a physical demarcation

or discontinuity here in Figure 6 between the front and back sectors?

A. I do. And in the Patent '570 text, and also in one of the claims, this interface between front sector 20 and back sector 30 is referred to as a juncture.

Q. Let's --

A. So -- so basically, from my perspective, having experience with lens design, these would be -- I could consider these two lens elements that have a juncture, which is the line that you see between 30 and 20.

Q. Okay.

A. And that the arc subtended by 20 passes the -- the delineation here that I have for the emitter axis towards the left side of the lens.

Q. Let's pull up slide 18, which is Figure 5 from the '570 Patent, and ask you if this helps clarify what is the distinction between or the relationship between the front and back sectors as referenced in the '570 Patent?

A. Okay. So now we're looking at -- again, we're looking at a top view, and this top view now has the entire lens shown, including the bottom half that was left out before. And that we're seeing the entire lens from the top view.

So that same x, y, z coordinate space applies here, and I've drawn a line that I annotate plane. It's

going through the emitter axis. So it's in the plane now. So we can better understand the significance of the front sector.

So the front sector, again, is colored blue, and the back sector is colored in orange, or whatever it is, the color you see -- different from blue.

And that you can see that the front sector, as defined in the text, and in the diagrams, in the figures, in Patent '570 have a front sector that looks like, in this case, in two dimensions, a circle with a wedge taken out of it.

And inside the wedge is the back sector that fits inside the wedge and forms this juncture that's referred to in Claim 19 for where the front and back sectors meet.

'570 Patent, Claim 19 text refers to the meeting point of those -- meeting surface of those two sectors as a juncture.

Q. Let's move on to slide 19. I think it's the final illustration I want to show you right now from the '570 Patent. It's Figure 4.

What does this figure show about the relationship between the front and the back sectors?

A. So we have, now, a cross-section view instead of a top view.

Again, you can see the cross-section of the LED marked point 3 in this figure. We have the emitter axis coming through the center of the LED, coming up through the cross-section that's annotated number 2, and it, as we can clearly see, with sector 20 identified, again, in blue -- colored blue, it passes through the front sector, and the front sector proceeds to be a part of the left side of this lens, beyond the emitter axis and meets the back sector further back, as we saw in the previous figures.

Q. All right. Let's look at some of the language of the '570 Patent, and if we could call up slide 20.

I'd like to ask whether this -- any of the descriptions of Figures 20 and 30 -- well, the descriptions in the specifications of the patent help inform your understanding what is the distinction between the front and the back sectors?

A. Yeah. So as we saw in Figure 5, which is referred to here, that the front sector, 20, that blue-colored sector extends about the axis, 2, which is the LED axis, as we saw in the figure, along an arc, 24, which is in that figure also, annotated. And that the back sector extends along an arc, 31.

So it passes the LED axis into the other side of the lens beyond the emitter axis. That's what this is referring to.

Then the text below it, for further clarity, it states that the front sector preferably extends about the emitter axis along an arc that is greater than the arc along which the back sector extends.

So it's clearly -- that arc clearly passes the demarcation line of the LED axis.

And in the preferred embodiment, it even states that the inventive lens, the back sector arc is about half the front sector arc, as we saw it is in the figure.

Q. Right. All right. Let's go back, then, to Figure 6, which is slide 17, I think.

Is this consistent -- as you highlighted it, is this consistent with the text of the specification that you just read?

A. Yes, it is consistent.

Q. In your opinion, is this description consistent with the -- what we just saw in Figures 4 to 6?

A. Sorry?

Q. In the text of the patent -- yeah. Is it consistent with the figures that we were looking at a moment ago?

A. Oh, I see. When you said figure, you cut out.

Q. Oh, I'm sorry.

A. Yes.

Q. In fact, doesn't it show that the -- that the

arcs are not bounded by -- simply by the emitter axis?

A. It shows clearly that the delineation between the front sector and back sector is not bounded by the emitter axis?

Q. Let's turn to slide 21.

Is this the language you were mentioning earlier which the patent refers to a juncture?

A. Yes. This is was what I was referring to.

Q. Okay. Let's go to slide 22.

These are images from Dr. Lebby's report, and do you recognize the images below as being Dr. Lebby's annotations from his --

A. I do. I do.

Q. Can you describe the difference between what's labeled as the front sector in green and the back sector in pink between these two figures as shown by Dr. Lebby?

A. Yes. The definition for front sector and back sector is simply erroneous here. It doesn't comply to the figures or language that's used in Patent '570, neither in the claims, nor in the text.

Q. In your -- as you understand it, has Dr. Lebby's interpretation included in the back sector part of what actually is in the front sector?

A. Dr. Lebby's interpretation does not comply with the explicitly clear definition of where the back sector

and the front sector meet.

Q. All right. Let's turn to -- I didn't mean to interrupt you.

A. Just a point that the definition that Dr. Lebby uses is shown here, that the emitter axis in Figure 3 determines where the front sector is, which he marked in green, which it isn't, because as we saw in the previous figures, that arc continues until it meets the back sector, and he cuts that off here.

On this Figure 5 -- sorry. Were you going to say something?

Q. Would you say there appears to be a pretty big gap in there?

A. That's correct. There's --

Q. Okay.

A. And on the right, Figure 5, we can see where the LED is. The axis for the LED would be coming -- that's the top view that we looked at before -- would be coming straight out at us from the center of this.

You know, we -- this figure has some circles and a square, you know, imposed over it, but you can see at the very center where the LED platform is, the base, and the center of it, there's a red dashed line through it.

But that axis would be coming straight out at us from the LED, yet Dr. Lebby highlighted the part that he

referred to as the front sector, which is 20 that we saw in the previous figures, and when asked, he agreed that this was the front sector, which it clearly isn't.

Not only is it not the front sector, but it also contradicts his interpretation of what he calls the front sector in Figure 3 right beside it.

They're both in contradiction to each other.

Q. Thank you.

Let's go to the next slide, 23.

Do you recognize the image on the left from Dr. Lebby's demonstrative earlier this week and the image on the right from his report?

A. Yes, I do.

Q. Did you observe Dr. Lebby's presentation this week -- earlier this week?

A. I did.

Q. Do you recall that Dr. Lebby was asked on cross-examination whether his labeling the front sector in green was accurate?

A. He said yes.

Q. Well, do you -- did you recall that he also said that it could be -- that it could be more than what's shown in -- shaded in green in Figure 5?

A. Yes. I understand he said, when asked, that it could be more.

Q. Okay.

A. But he didn't say how much more.

Q. Okay. Let's turn to the next slide, 24.

What do these annotations on Figures 3 and 5 show in your opinion?

A. So I've taken these figures and annotated them and colored them in to show what Patent '570 means, and what the definition for the front sector -- front and back sector are.

And if Dr. Lebby took the interpretation that's written and shown in Patent '570 accurately, then the front sector would be colored as I have shown in Figure 5, blue, using the same color as I have throughout the slides.

And on the left where he used the emitter axis to demarcate the front sector which he colored the arc in green, to the right of the emitter axis and orange to the left, that arc should continue as described in Patent '570 language to the back sector.

And it's not truncated, as Dr. Lebby did, using the emitter axis as a demarcation line.

Q. Okay. And let's turn to the next slide.

Would you say that, under your understanding of what the '570 Patent teaches, that that's different from what -- Dr. Lebby's opinion?

A. It's absolutely different. They bear no

relation to each other.

Q. In your opinion, would a person of ordinary skill understand that the back sector is bounded by the emitter axis, or not?

A. I believe if a person who understands optics read Patent '570 and understood it, they would understand that -- two things.

They would understand that nowhere in Patent '570 does it define the front sector to be referenced to the emitter axis. There's no text that explains that definition anywhere in the text.

And that indeed, that the front sector and back sector are defined by a juncture that is not delineated by the emitter axis.

Q. Do the terms "front sector" and "back sector" have any accepted meaning, to your knowledge, to -- in the field of lens design or the design of -- particularly, the design of free-form lenses?

A. Well, in my opinion and my experience, free-form lenses don't comply with classical optics in terms of, as I said -- mentioned before, like you'd have a spherical concave lens, a bispherical concave lens, where if you shine parallel beams perpendicular to the plane of the lens, that you get a focal point. All the rays become focused to a focal point.

In a free-form lens, every point on the refractive surface has its own focal point. And that's why it's so effective. You can take light that's symmetric from an LED and use a free-form lens to produce a wide distribution with a controlled uniformity.

So unlike classical optics, free-form lenses don't have a singular focal point, and typically, they don't have a singular what I would call center, or a singular front sector or back sector. You would have to define them as they have been defined in Patent '570.

In Patent '570, the front sector and back sector were defined relative to some lens elements that are part of the design of the free-form lens.

Q. All right. Let's go to the next slide, 26.

And just to summarize your opinions regarding infringement, is it your view that the RAB products can be divided into a front sector -- the RAB lenses that is, can be divided into a front sector and back sector as recited in Claims 1 and 10 of the '570 Patent?

A. I believe that they do not comply to the limitations in Claim 1 and 10 that have been stroked out.

And the reason -- sorry.

Q. Go ahead.

A. And the reason --

Q. Go ahead.

A. The reason that they don't comply is that nowhere in the lenses that RAB designed, that we saw the cross-sections of, is there a front sector and back sector that come together as a juncture, that well-defined juncture. They're just free-form lenses with continuously varying surfaces.

Q. To confirm, I think you touched on this earlier, can you achieve a type -- achieve an IES Type 2, 3 or 4 distribution without building a front and back sector into a lens?

A. Yes, you can. And most lenses do without a juncture.

Q. Let's pull up slide 27. I want to turn the focus to your opinions regarding invalidity.

At the outset, could you briefly summarize any problems you understand the teachings of '570 Patent purported to solve?

A. Yes. They -- what is discussed in the '570 Patent is to be motivated to make improvements in efficiency, as I've listed here, control and managing trespass lighting.

I would add that efficiency of a luminaire is something that motivates every -- has motivated every designer, engineer, optics specialist, for many generations, because it speaks to lumens, how many lumens

you can get out of the luminaire versus how many plug watts you put into the luminaire.

It really is a matter of how efficiently can you move light to where you want it without wasting any, as well as other things that affect efficiency like power supply efficiency and other things, but when it comes to the optics, that's a major part of the efficiency.

So maximizing efficiency would be to put the light where you want it, for example, in a streetlight, you want the majority of the light or all of it, if you could, to be in this uniform distribution, for example, if it's an IES Type 2 distribution, you would want as much of the -- if you are using an LED as a light source, as much of the LED light to be projected in a pattern that's defined onto the street, and not waste any anywhere else, including, for a streetlight, the house side of the street, because the luminaire would be on -- typically, the pole would be on the sidewalk or near the sidewalk, and the house would be behind it.

You don't want to put any extraneous light to the back or, as it's referred to in the industry, trespass light, that would cause a lowering of efficiency.

Q. Were these -- I'm sorry, I didn't know -- I didn't mean to cut you off if you're not done.

A. No, that's all.

Q. Okay.

A. That's all.

Q. Were these issues or concerns unique to the time frame around 2008 or were these issues that were present in the lighting industry from long prior to that?

A. Well, from the beginning of street lighting, which takes us to the early 20th century, designers and engineers were concerned about this. Of course, they didn't have computers, so they had to design lenses by hand using ray traces that they drew by hand, but they were -- they were concerned about this as they are today. No different.

Q. Are these concerns also expressed in writing in the IES standards that you were discussing previously?

A. Regarding the IES, I would say that decades before the IES published the IES types of distributions, that luminaire designers who actually produced luminaires could use testing tools, one of which is a gonio photometer, which was invented in the early 1900s. You could use a gonio photometer -- let me just explain for those who don't know what that is.

It's basically you put the luminaire in a fixture, and then there's a very large swing arm that can rotate around the luminaire in three dimensions, capturing the light coming out of the luminaire in every direction,

in three dimensions, and collecting data for the output intensity for that luminaire.

That is one way that those photometric graphs that we looked at earlier that denote Type 2, Type 3, those curves, those isocandela lines that we saw, could be generated from data that you produce from a gonio photometer.

So what I'm saying is in the mid-20th century, although there weren't computers to design lenses or luminaires that produced street lighting, they did have the gonio photometer, and they could measure the distributions that were produced by the luminaires that they manufactured and designed.

So they had motivation to keep improving that, but in 19 --

Q. If I may -- yeah, maybe you're coming to that. If I may, Dr. Josefowicz, these were also expressed in the 1983 IES standards?

A. I was just going to mention that.

Q. Yes, I thought so.

JUDGE CHENEY: Well, let's look forward to the exciting 1983 IES standards after our afternoon break.

Let's take 15 minutes.

MR. MOSKIN: Thank you.

JUDGE CHENEY: I'll remind you, Dr. Josefowicz,

don't discuss your testimony with anyone during the break.

We're off the record.

(Whereupon, the afternoon recess was taken, 3:02 p.m. - 3:18 p.m.)

JUDGE CHENEY: We're back on the record now in the 1213 Investigation.

We are listening to the direct examination of RAB's technical expert, Dr. Josefowicz, telling us about the '570 Patent.

So let me just now turn the time back over to Mr. Moskin.

MR. MOSKIN: Yes. I'm sorry for speaking over you. I just wanted to speed it up.

BY MR. MOSKIN:

Q. To wrap up what we were just saying before the break, are the -- the IES standards that you testified about, is it fair to say they are effectively an embodiment of the same concerns, the teachings of the '570 Patent that you've identified?

A. They are.

Q. Okay. Let's move on to discuss the specific prior art. And if we can call up Exhibit RX-759.

And I'd ask you, Dr. Josefowicz, if you can identify what's shown here, which is -- I'll just state for the record, is Europe Patent Application EP 1920973?

A. I do identify it.
Q. What is it?
A. It's Europe patent application, or prior art. It's prior art.
Q. Is the named inventor, his last name Mandaluniz?
A. It is.
Q. If I refer to this reference simply as Mandaluniz, you will know what I'm talking about?
A. I will.
Q. Let's go just briefly to slide 28, which is simply the same cover. We don't really need to dwell on this. Maybe move on to slide 29.
Claim 1 of the '570 Patent teaches -- or recites, rather, a lens for distribution of light toward -- predominantly toward a preferential side from a light emitter, having an emitter axis and defining an emitter plane, and do you believe these features are present in the Mandaluniz reference?
A. I agree that it does.
Q. Where are those shown here?
A. We have a light source being an LED, as we can see demarcated by point 1. And it emits an output distribution onto the lens, which is marked 3, point 3. That lens has a number of lens elements of different kinds on the inside surface and some on the outside surface,

marked 9.

The light from the LED is incident on the -- all those various lens elements that are designed to bend the light in a certain direction. As we can see from the four ray traces that are in the patent application, that this lens is designed to redistribute the light from the LED, which is typically a Lambertian symmetric output distribution to a surface, they call Plate 2.

So it does what Claim 1 -- the Claim 1 limitation suggests.

Q. Let's go to the next limiting feature of Claim 1, which in the next slide, 30, is an outer surface configured for refracting emitter light predominantly toward the preferential side, and do you believe that this feature is found or limitation is found in Mandaluniz?

A. I agree.

Q. Is that also shown as the ray traces from -- item 9 in the drawing?

A. That's correct. Item 9 points to the outer surface.

Q. Okay. Let's go to the next slide, 31, which from the '570 Patent recites a refracting inner surface configured for refracting light from the emitter, the refracting inner surface comprising.

Is that shown in the Mandaluniz reference?

A. It is shown.

Q. That's at the interface labeled 4?

A. Or 8. The segment 8. You can also see how the light is refracted by the dashed line through the lens. You can see how the light is bent as it enters the lens, and how it's bent when it exits the lens.

Q. Let's go to slide 32.

Does Mandaluniz, in your opinion, reveal a front sector centered on the preferential side?

A. Well, as we spoke before, this is a free-form lens; however, if one was going to define a front sector, I could use Dr. Lebby's interpretation, if I wanted, and make the LED emitter axis the dividing line in this case.

But more specifically, in this case, for this lens, there is an optical discontinuity. You see that curved surface 6 that has a step in it, that's in line with the LED axis, that could be a demarcation for a front sector to back sector.

Q. Okay. Let's turn to slide 34 -- 33. Excuse me.

Do you see in the Mandaluniz reference a -- something satisfying Claim 1 of the patent, a back sector centered on the non-preferential side radially opposite the preferential side, and having a surface configuration differing from the surface configuration of the front sector?

A. Yes.

So as I just spoke to the front sector, the same definition for the dividing point would be applied here to the back sector, which I have colored in in red, and that the surface lens elements on the inside surface of the back sector, denoted in red or whatever color you see, is different from the front sector, which is denoted in color blue.

Those elements are different.

Q. Okay. Let's go to the next slide, 34, which should be a comparison of the RAB product and the Mandaluniz reference.

Do you recognize the RAB lens on the left, and Mandaluniz on the right?

A. I do.

Q. Would you agree that if you were to use the emitter axis to define the front and back sector, as Dr. Lebby does, that Mandaluniz would also show the same -- the same feature or limitation?

A. Yes. Yes.

Q. As one would want -- would one of ordinary skill in the art, in your opinion, recognize in Mandaluniz the elements necessary to be integrated into a free-form lens, as shown in the '570 Patent?

A. Yes.

Q. Okay. As a person of -- would one such as yourself, a person of ordinary skill in the art, could you take the optical elements -- well, I'll just strike that question.

That's fine. Let's move on.

Let's go on to slide 36.

Oh, excuse me. First, let's bring up RX-758. And can you identify what's shown here?

A. Yes. So it's a US patent. Inventor is Parkyn and Pelka.

Q. Okay.

A. It's prior art.

Q. Okay. We'll come to that.

Let's turn to slide 37, and the '570 Patent recites in the preamble, "A lens for distribution of light predominantly toward a preferential side from a light emitter having an emitter axis and defining emitter plane."

Do you see those -- that feature or limitation present in the Parkyn reference?

A. Yes, I do.

Q. Where is that?

A. We have a lens 90, refractive lens 90, and the lens has two sectors. I would call them sectors.

They have been denoted in the patent, 90R for right, and 90L for left. There's an optical discontinuity

between them. That's that vertical structure. And that the 90R sector of this lens is convex in shape on the outside surface, and it's a tighter, smaller radius of curvature surface, which would have a bigger effect on bending the incident rays from the LED up to it, through the lens, to the preferential side as compared to the other sector, 90L.

So you would effectively get preferential radiation, in this case, to the right of what we're looking at.

Q. Okay. Let's go to the next slide, 38. And the '570 Patent also has a further limitation naming an outer surface configured for refracting emitter light predominantly toward the preferential side.

Is this feature present or limitation present in Parkyn, as best you can tell?

A. Yes, it is.

Q. Where is that?

A. I have marked the outer surface and annotated it, outer surface.

Q. Let's go on to slide 39.

The patent also recites a refracting inner surface configured for refracting light from the emitter.

Is that feature or limitation present, as best you can tell, in the Parkyn reference?

A. Yes, it is, and I've annotated it inner surface.

Q. Okay. Thank you.

Let's go to slide 40. Claim 1 of the '570 Patent recites front sector, centered on the preferential side, and as you understand the term is being used by -- at least by Dr. Lebby, do you believe that Parkyn discloses this feature?

A. Yes.

As in the previous example, emitter axis lines up with optical discontinuity that you can see from the ray trace shown. There's an optical discontinuity right along the emitter axis that conveniently allows the separation from the right sector to the left sector, according to Dr. Lebby's interpretation, which I think applies here, and defines the right sector and the left sector.

Q. Let's go to slide 41.

In Claim 1, recites a back -- of the '570 recites a back sector centered on the non-preferential side radially opposite the preferential siding and having a surface configuration differing from the surface configuration of the front sector, and at least applying Dr. Lebby's interpretation, do you believe that feature is present in Parkyn?

A. Yes, it is.

Q. You have indicated so here on the slide?

A. The front sector, as I say, is to the right, 90R, and the back sector is 90L. And the demarcation between them can be Dr. Lebby's interpretation, the emitter axis.

Q. So you see those sectors have a different surface configuration from one another?

A. Yes. Yes, they do. I mentioned that the radius of curvature is quite different for both the left and the right.

Q. Okay. In your opinion, would a person of ordinary skill be able to take optical elements, such as those shown by the Parkyn reference, which they call it two dissimilar halves, and incorporate them into an asymmetric lens?

A. I believe they could.

Q. Let's go to slide 42 -- excuse me. Before we do that, let's pull up Exhibit RX-733, and can you identify this?

A. Yes. It's a US patent, Minano, et al., 7,377,671. I'm familiar with it.

Q. I also want to call your attention to the -- one, two, three, four -- fifth listed inventor, William Parkyn.

Do you recognize that name from the patent we were just looking at?

A. Yes, he was the inventor in the two-back previous example that we were looking at.

Q. Okay. Let's go to a slide, I think -- figure 28. That's right. Thank you.

Can you give a brief description of what is shown in the Minano reference?

A. Yes. Well, we have what I would call a first lens. I know Dr. Lebby referred to the first lens as being the one right on -- attached to the LED, but I'm calling the first lens here the lens 95.

The lens -- the lens 95 is shown as having what looks like a semi-oval over the LED base, 98, and that you have two segments to that oval, one denoted 96, and one denoted 97.

Right to the left of it and above it is what I call the second lens. That --

Q. Okay.

A. -- is -- okay.

Q. Go ahead.

A. I was going to say that's designed to redirect light in connection with lens 95 to where the inventor wanted it to go.

Q. Are the primary and secondary lenses shown in Figure 28 in the Minano reference all part of the single embodiment?

A. They are.

Q. As a lens designer, do you have an understanding of whether they are designed to work together in a lens system?

A. That's correct.

Q. Let's go to slide 43.

The preamble of the '570, again, recites a lens for distribution of light predominantly toward a preferential side from a light emitter having an emitter axis and defining an emitter plane, and do you believe that feature is present in the single embodiment of the Minano reference?

A. It is.

Q. Where is that?

A. So I showed rays exiting the lens side on the left, annotated 97. The whole lens includes a segment 96.

So 97 and 96 work together to produce redistribution of the emitter light, which would be most intense where that green line is, which would be off the emitter axis, the LED emitter axis, and redistributes that LED radiation to the preferential side, which in this case is lens 97 side.

Q. All right. Let's go to the next slide, 44.

The next feature in Claim 1 of the '570 Patent is an outer surface configured for refracting emitter light

predominantly toward the preferential side.

Do you believe Minano teaches this limitation?

A. Yes, and that's the surface of element 97.

Q. All right. Let's go to the next slide, which is 45.

Claim 1 of the '570 also recites a refracting inner surface configured for refracting light from the emitter.

And do you believe that Minano teaches this limitation?

A. Yes, he does.

Q. Where is that?

A. That would be -- actually, it would be both 97 and 96, but 96 is a refractor that has a metallized coating on it.

So the emitted light from the LED would radiate into that side, 96, refract through the lens onto the outer surface side, which would then reflect the light rays back towards 97, and 97 would then refract the light out of the structure to the preferential side.

I should also note that the lens sector, 97, is described as a tailored free-form lens, clearly designed by computer-aided design. So there are a lot of -- I would expect that there would be a lot of lens elements and complications on the inside of that surface to affect what

we're seeing.

Q. How does the -- does the light that is refracted out of the inner lens, does that then get directed through the larger secondary lens you were describing before?

A. The light from the LED is directed up and to the left of the side 97, and then is incident on this other lens that's above it. And the other lens further manipulates, bends the light, so that the light then has a further optimization to the side and space that the inventor wanted.

Q. All right. Let's go to the next slide, 46.

And, again, Claim 1 of the '570 Patent recites a front sector centered on the preferential side.

And do you believe that feature can be found in the Minano reference?

A. Yes. Again, if I use Dr. Lebby's interpretation, which could be applied here, it also, like the previous cases that we spoke about, even though, as I've annotated, the 97 lens is referred to as a tailored free-form lens, the semi-sphere that's shown by a combination of 96 and 97, splits the difference of that semi-sphere, and is along -- that difference, that demarcation between the two is along the LED axis.

Q. All right.

A. So we have the opportunity to denote lens

element 97, front sector.

Q. Let's go to slide 48.

Claim 3 of the '570 Patent recites the lens of Claim 1 in which the inner refracting surface defines an emitter-surrounding cavity with an emitter-receiving opening in an emitter-adjacent base end of the lens.

Do you think that's shown in the Minano reference?

A. Yes. That's precisely what that lens does.

Q. The base 98?

A. Yes.

Q. Okay. Let's move to slide 49.

And Claim 4 of the '570 Patent recites a reflecting primary back surface positioned to receive light from at least a portion of the refracting-inner-surface back sector and configured for total internal reflection thereof toward the lens outer surface.

Do you believe that Minano discloses this --

A. Yes, Minano --

Q. -- feature?

A. -- Minano teaches this and discloses it.

Q. Where is that shown in -- Figure 28?

A. The surfaces, 93, on those facets, are defined in the patent as total internal reflection surfaces.

Q. Okay. Let's turn to slide 50.

And Claim 5 of the '570 Patent recites an emitter-adjacent base end forming a back opening to a back cavity substantially centered on the non-preferential side and partially bounded by the primary back surface.

Applying Dr. Lebby's interpretation of the '570 Patent, are you able to locate such a feature in the Minano reference?

A. Well, in the secondary -- second lens that I referred to as the lens 90, the back sector of that lens would be shown by the arrow to have -- could be interpreted as having cavities, is kind of a general term for an opening.

Q. Okay. If we can pull up the Minano reference itself, RX-733, and I direct you to column 9, lines 9 to 14.

Does this recite that the luminaire includes an immersed -- chip-on-board LED source surface that utilizes a folded optical path and tailored surfaces that produced the desired outward pattern?

A. Yes.

Q. Let's go up to -- I apologize. I may have -- why don't you just read what is this -- the highlighted passage that I've shown here.

A. "Only a few times bigger than the LED source. Further, the redirecting device and/or optics can include a

precisely defined shape or have precise positioning relative to the source. Some embodiments utilize in-mold-chip-on-board features to implement the redirection device and/or positioning relative to the source." [As read.]

Q. Can I also direct your attention to -- in the patent to column 22, lines 14 to 18?

A. So, "The present invention additionally employs compact folded-optic configurations utilizing tailored free-form surfaces to meet particular output prescriptions, particularly low-beam and high-beam automotive forward lighting."

Q. So does the lighting output prescription, does that mean an illumination output distribution?

A. Yes.

Q. Would a person of ordinary skill in making a lens with free-form surfaces be able to include features like the aggressively tailored surfaces such as we saw earlier in Mandaluniz or the different halves from Parkyn in order to help make a particular output distribution?

A. They could.

Q. Okay. Let's go to -- if we can pull up RX-735. I'll ask you if you recognize this document.

A. I do.

Q. What is it?

A. It's prior art.
Q. Well --
A. It's -- it's -- go ahead.
Q. Well, if I refer to this international publication WO 2009/149558 as the Laporte reference, will you understand what I mean?
A. Yes.
Q. Okay.
Let's go to slide 6 -- 51, rather, which summarizes just the front. Let's go to slide 52.
The preamble of Claim 1 of the '570 Patent, as we mentioned several times now, recites a lens distribution of light predominantly toward a preferential side from a light emitter having an emitter axis and defining an emitter plane.
And is this feature found in Laporte?
A. It is.
Q. Where is that?
A. So we can see from the ray trace, it is shown that this lens redistributes the light from the LED emitter towards the left, clearly, and that it does it off-axis to the LED axis from the emitter plane.
Q. All right. Let's go to slide 5.
And does Laporte reveal a back sector centered on the non-preferential side radially opposite the

preferential side, and having a surface configuration differing from the surface configuration of the front sector?

A. Yes --

Q. Again, applying Dr. Lebby's interpretation.

A. Yes, if I use Dr. Lebby's interpretation, that delineation from front sector to back sector would be the emitter axis.

So the back sector is annotated and shown by the rectangle that surrounds it. And the front sector, likewise, is shown by a rectangle, and marked front sector.

Q. Okay. Let's go to slide 58.

A. And also I --

Q. Did you --

A. They're different optical configurations, the front and back sectors.

Q. Okay. Claim 4 of the '570 Patent recites a reflecting primary back surface positioned to receive light from at least a portion of the refracting inner surface back sector and configured for total internal reflection thereof toward the lens outer surface.

Are you able to find this limitation in the Laporte reference?

A. Yes, I can find it.

Q. Where is that?

A. That would be labeled 32. That segment of 32 is the back sector, and it's clearly, according to these ray traces, that's total internal reflection.

Q. Now, on the left-hand side of this page, there's a figure which is taken from Dr. Lebby's presentation the other day.

Do you recognize that figure from Dr. Lebby's demonstration, Dr. Josefowicz?

A. I do.

Q. Responding to Dr. Lebby, is what is being shown in the image on the left a TIR surface that looks to be --

A. We have --

Q. Go ahead -- let me finish the question.

That looks to be on the non-preferential side, is that also shown in Figure 5a of Laporte?

A. It is.

Q. Where is that?

A. The line he highlighted in purple, with the green arrow trace reflecting from it.

Q. Okay. Let's pull up RX-0060, which is US Patent 7,674,018, and I'll ask if you can identify this.

A. Yes.

Q. What is it?

A. It's a patent referred to as "LED lamp heat sink," filed November 26, 2003. Inventor, Martin and Wall.

Q. Let's go to slide 60.

What is shown -- what is shown here?

A. This is a US patent.

Q. This is the -- this is just a cover sheet of the same patent we were looking at; correct?

A. Yep.

Q. And so let's go to slide 61.

And what is -- are you aware that there's a reference in this patent to a Holder patent?

A. Yes.

Q. What does that disclose?

A. Well, Holder's patent discloses the -- amongst other things, it discloses the computer-aided design and ray trace methodology, working together to design free-form lenses for various applications, including street lighting. And he calls out specifically the mathematical ray trace software, computer-aided design software such -- he calls out Photopia by name as one of the various softwares that does this.

He also teaches the use of total internal reflection as a lens element, amongst various lens elements that he teaches, including prisms and facets and curved -- various types of curved surfaces that are typically found on free-form lenses.

Q. All right. I'm sorry. I didn't mean to cut

off.

A. Yeah, and I'm just listing what he -- the things that I highlighted here.

And the invention also discusses in detail how to maximize the efficiency by minimizing extraneous light, which is referred to here as full cut-off beam.

Designs that would produce IES types of distributions for roadway lights but minimize the amount of backlight or trespass light.

Q. Let's pull up slide 62. Okay. Sorry. Let's strike that.

We'll just take down the slide, and I just would like you -- if there's anything else that you consider relevant from the Holder disclosure, in considering your opinions in this case regarding the validity of the '570 Patent claims?

A. I think, in general, Holder's patent teaches most of what is in the claims in the '570 Patent. Perhaps with the exception of the specific definition of front sector/back sector, which as we went through my presentation is different from Dr. Lebby's definition, and the way that Dr. Lebby defines and identifies the front sector/back sector.

If you imposed Dr. Lebby's definition on Holder, you could apply it to Holder as well, Dr. Lebby's

definition, but it wouldn't apply to the '570 Patent.

Q. All right. Dr. Lebby, you may recall, testified the other day that the -- he believed that the '570 Patent reflects a -- or met a long-felt need in the industry, that he believes renders the claims non-obvious.

Do you agree?

A. No, I don't.

Q. Why is it -- well, Dr. Lebby cited two press releases and a product guide.

What is your opinion about the relevance of the evidence Dr. Lebby cited as reflecting or not reflecting long-felt need?

A. My experience in the industry is that no responsible person who is in a position to issue or request for quotes on luminaires would look at a press release, or look at sales brochures or any material like that.

They would depend on certified lab results, such as an LM-79 test report, that would show analytically the distributions, whether it's -- you know, if it as a streetlight, Type 2.

In the reports, they would also, you know, depend on the LM-79 report for the efficiency of the fixture, because one of the tests that is in an LM-79 report, which is essentially required as part of the package of specifications for a luminaire, is also the

efficiency of the luminaire.

By that I mean -- I mentioned it before -- the number of lumens per plug watt that characterizes that luminaire, and that is performed in an integrating sphere, which is part of the test procedures.

So to answer your question, press releases and sales brochures are not something that procurement managers look at.

Q. Do the materials cited by labor and capital show, in your opinion, any greater teaching as to the improvement -- any improvements in the '570 Patent as against the teachings dating all the way back to the 1983 IES standards?

A. No, because there's no data to show me efficiency versus the industry, or efficiency versus other competitive products, or data that I could -- objective data that I could interpret to mean what the sales brochures purport they do.

Q. All right. I have just a few more questions for you, Dr. Josefowicz, and if we could pull up slide 64 from your materials.

Have you expressed any concerns or any opinions whether the claims -- any of the claims of the -- or terms or limitations of the '570 Patent are unclear or indefinite?

A. Yes, I -- I called out the term "centered on" in my reports, and I call them out because whenever the front sector/back sector are discussed in Patent '570, they're discussed in reference to the direction.

What I mean by that is we're talking about going from front to back, right, and the text says a front sector centered on a preferential side. So I am looking for something to center this front sector on, or the back sector on.

I'm looking for a reference point. I'm looking for a coordinate -- coordinates or some feature of the front sector that I would identify as the centered-on feature, or likewise for the back sector.

But in Dr. Lebby's reports, and his testimony that I heard, he keeps referring to centered on being associated with biaxially symmetric as being one of the characteristics of the front sector.

Now, that might be -- it could be that biaxially symmetric is one way to describe centered on, but nowhere in the Patent '570 does it link front sector centered on with biaxially symmetric as opposed to what I'm looking for, which is what is the front sector centered on in the direction from front to back.

Now, there's only one place in Patent '570 that biaxial symmetry is mentioned, one place, and that is, with

reference to the top view figure that we previously looked at, and the demarcation line through the center of the top view so that, you know, it suggests a mirror image between the top and bottom sectors looking from the top.

That's the only place that it mentions biaxially symmetric.

Now, from my perspective, if the authors of Patent '570 wanted to make it clear what centered on means, they would have been more explicit. It's left -- it's left to the imagination, basically.

Q. So does the term "centered on" have any meaning in the trade or in the profession, or among lens designers, experts or persons of ordinary skill in lens design?

A. Not as it's referred to here. When we're talking about, in the industry, a free-form lens, we understand it to be a continuously varying surface, with continuously varying surface features, and to suggest that some part of the lens is centered on something also suggests that you identify what that center point is, or what you're talking about with regards to centered on.

I wouldn't normally think as biaxial symmetry, unless it was called out, but it's not called out. It's just refers to front sector centered on.

Q. Thank you.

A. It's open to interpretation. Let's put it this

way.

MR. MOSKIN: Thank you, Dr. Josefowicz.

I have no further questions.

JUDGE CHENEY: Is there any cross-examination for Dr. Josefowicz?

MR. HAMSTRA: Yes, Your Honor. Nathan Hamstra on behalf of Cree Lighting.

JUDGE CHENEY: Please proceed when you are ready, Mr. Hamstra.

CROSS-EXAMINATION

BY MR. HAMSTRA:

Q. Dr. Josefowicz, nice to see you again.

A. Nice seeing you again.

Q. So I'm going to start with some questions about your -- the claim interpretations you applied.

So you include on a number of slides, the name of a reference, then you say teaches Claim 1 under Dr. Lebby's interpretation.

Do you recall that?

A. Yes.

Q. From a claim interpretation standpoint -- well, let me rephrase.

A. Could you -- could I ask a question?

Q. I'm the one asking questions here, Dr. Josefowicz.

A. Okay. But I needed you to clarify. You mentioned Claim 1, so I want to know exactly what are you referring to.

Q. I'll ask my question, and then if you can't answer it, you can can't answer it. Okay, Dr. Josefowicz?

A. Okay.

Q. There is a conflict between Cree Lighting's interpretation of Claim 1 and your understanding of Claim 1, isn't there?

A. A conflict of interpretation. Are you talking about front sector and back sector?

Q. Mr. Jay, could you call up page 111, lines 19 through 24 -- actually, give me a moment.

Dr. Josefowicz, you were deposed under oath in this matter?

A. Yes.

Q. You offered truthful testimony during your deposition?

A. Yes.

Q. All right. Mr. Jay, could you call up page 111, lines 19 through 24, of Dr. Josefowicz's deposition transcript.

I asked you, "How am I to know whether you are applying Cree Lighting's apparent theory of infringement or your interpretation of Claim 1?"

You responded, "Because it's similar. It's not -- there isn't a conflict between what Cree is suggesting, and what I understand they are suggesting, and what I disagree with."

I asked that question. You gave that answer under oath, Dr. Josefowicz?

A. Yes.

Q. Setting aside Cree Lighting's and Dr. Lebby's apparent theory of infringement, your anticipation and obviousness opinions would not change at all; correct?

A. Not true.

Q. Mr. Jay, could you call up page 118 of Dr. Josefowicz's deposition transcript, lines 2 through 21.

Dr. Josefowicz, at your deposition, I asked you, "Let me try to ask this question another way.

"Setting aside entirely Cree Lighting's apparent theory of infringement, if you set that aside, would your anticipation or obviousness opinions change at all?"

You answered, "No. If I had just the Patent '570 -- when I started to work on this case, I was given Patent '570 only and I read it, and based on what I read and what I knew, I understood that '570 had significant invalidity. If I didn't think that, I wouldn't have taken this case because I have to feel honestly about what I am arguing, and only that is what is significant to my

opinion.

"If I don't believe something is true, I don't follow it or I don't commit to it.

"So to answer -- I don't know if this answers your question, but if I had nothing but '570 to read, which I did" --

(Clarification requested by the Court Reporter.)

Q. "And I had the knowledge that I had when it read it, it was my opinion that the claims that we have been discussing are invalid because they don't teach anything new, and they don't provide any new invention."

JUDGE CHENEY: Take a big breath there, Mr. Hamstra.

Now ask your question.

Q. Dr. Josefowicz, during your deposition, I asked that question, and you gave that answer under oath; correct?

A. Yes.

Q. You offered some indefiniteness opinions as well, at the end of your testimony today, Dr. Josefowicz; correct?

A. Yes.

Q. You also offered some opinions mapping the claims to Minano, Parkyn, Mandaluniz, and Laporte today; is that right?

A. Correct.

Q. And Claim 1, for instance, recites a refracting inner surface comprising a front sector centered on the preferential side and a back sector centered on the non-preferential side; correct?

A. Yes.

Q. And, Dr. Josefowicz, you understood those terms well enough to be able to opine that Minano discloses the claimed front and back sectors; correct?

A. I was applying -- just now, I was applying Dr. Lebby's definition of front sector and back sector.

I would not -- as I explained at the end of my presentation, I would not normally apply a division between front sector and back sector.

Further, the opinions that I have were based -- that you discussed just now from my deposition, my opinions were based on my knowledge of the state-of-the-art relative to the filing date -- the principal date that we're talking about, which is May 23, 2008.

What was known to me as an expert in the field who is involved with optics design, who knows about ray trace analysis, computer-aided design for LED emitter applications in luminaires, I was referring to those things that I knew relative to what I read in Patent '570, which were all to me known.

Q. Mr. Jay, could you call up page 96 of Dr. Josefowicz's deposition transcript, beginning at line 19?

Okay. Dr. Josefowicz, during your deposition, I asked you, "But for invalidity over, for example, Minano or Benitez, you have to show that Minano and Benitez disclose, for instance, 'A refracting inner surface comprising a front sector centered on the preferential side and a back sector centered on the non-preferential side'; correct?"

You answered, "Yes."

I asked you, "So, Dr. Josefowicz, you understood those terms enough to be able to opine that Minano and Benitez discloses those front and back sectors; correct?"

Your answer, "Yes."

You gave that testimony under oath, Dr. Josefowicz?

A. Yes.

I would add to this that I'm using those terms in that reference as general terms. If you want to call a part of a lens a front sector or front part of the lens, it's a free-form lens, you can call it that. Just like Dr. Lebby called a free-form lens that RAB -- that RAB produces in his cross-sections front sectors and back sectors. You have -- you have the ability to do that. You can do that if you want to do that.

So -- but the point about it is that it's not necessary. You can call it front sector and back sector, but it's not necessary, as it is in the definition that's explicit in the '570 Patent, where there is a juncture, and two lens elements that are clearly identified and committed to being and defined to being front and back sector.

That typically is not the case in a free-form lens, and that's why I answered the way I did. It's not a necessary -- what optical benefit is there for calling a free-form lens, dividing it into sectors, except that, in Patent '570, there is, because those two optical elements have different optical performance characteristics, and they wanted to call that out for reasons that the authors only know.

So that's different from what we're talking about here.

Q. Dr. Josefowicz, I want you to listen very carefully to my questions, and if they call for a yes or no answer, can you give me a yes or no answer?

A. I can't commit to that. Depends what you're asking me to say yes or no to.

Q. I qualify my question. If you can give me a yes or no answer, I would like a yes or no answer.

Do you understand, Dr. Josefowicz?

A. If I can, I will.

Q. Thank you.

Mr. Jay, could you pull up RDX-6, slide 17.

Dr. Josefowicz, you created this demonstrative for today?

A. Yes. Yes, I did.

Q. There's something called numeral 33 that you left white in this annotated Figure 6; is that right?

A. I see -- I see number 33, yes.

Q. The number 33 is colored neither red nor blue; correct?

A. Yes.

Q. Item 33 in the '570 Patent is also part of the front sector; correct?

A. Item 33 is not part of the front sector.

Q. Mr. Jay, can you call up column 6 of the '570 Patent, JX-005, beginning at line 54? Good point. Could you put that down, Mr. Jay?

Dr. Josefowicz, element 33 is part of the back sector; correct?

A. Show that to me again. It's blank on the...

Q. Oh, I'm sorry.

Could you pull up slide 17 again, Mr. Jay?

Element 33 in slide 17 is also part of the back sector; correct?

A. Yes, I think -- I think it is.

Q. Okay. So the back sector in this Figure 6 continues all the way up to the emitter axis at numeral 2 there; correct?

A. Mm-hmm. Yes.

Q. Mr. Jay, could you call up -- actually, just the next slide, Mr. Jay, slide 18.

This is an annotated version of Figure 5 you prepared, Dr. Josefowicz?

A. Yes.

Q. And the emitter axis in the center, the green dot, that's actually a line coming out of the screen at us; correct?

A. In this case, it's in the plane. I say plane.

Q. But --

A. It's in the plane.

Q. I see.

A. This is a top view, and that's a line that's in the plane. And I clearly mark it in the plane. It's not coming out at us. I had another figure that I showed, and I explained that it came out of the plane because I couldn't draw three dimensional. If I'm looking at a plane, I explicitly said it comes out of the plane.

But in this case, this line is through the plane.

Q. If I -- in this Figure 5, if I were to start at

the emitter axis, that green dot, and move towards preferential side, 5, I would enter the front sector; correct?

A. Yes.

Q. If I start at the emitter axis and go to the non-preferential side, 6, I would enter the back sector; correct?

A. Yes.

Q. I believe you spoke about this earlier, line 4 on Figure 5, that represents a plane of bilateral symmetry; correct?

A. Right.

Q. So Figure 5 shows that the front sector is symmetrical about that plane of symmetry numeral 4; right?

A. Yes, I said that before.

Q. Figure 5 also shows that the back sector is symmetrical about that same symmetry plane, 4; right?

A. Yeah. Yes.

Q. Thank you, Dr. Josefowicz.

I'm going to ask you a few questions about Minano.

First of all, in this case, Minano is the only reference where you went limitation by limitation, and provided an anticipation analysis; correct?

A. Yes.

Q. Now, could we turn to slide 43 of his demonstratives, Mr. Jay? I'm sorry, my numbering may be off. Mr. Jay, do you have the updated demonstratives that were served later?

JUDGE CHENEY: Go off the record for a minute.

MR. HAMSTRA: Thank you.

(Off the record.)

JUDGE CHENEY: We are back on the public record after taking a short break to deal with some technical issues.

Please continue with your cross-examination, Mr. Hamstra.

BY MR. HAMSTRA:

Q. All right. So, Dr. Josefowicz, I have presented slide 49 of RDX-006. This is about Minano, and Claims 4 and 10.

Do you recall testifying about this today?

A. Yes.

Q. In this -- well, let's just talk about Claim 4. Claim 4 requires, "The lens of Claim 3 further comprising a reflecting primary back surface positioned to receive light from at least a portion of the refracting inner surface back sector and configure for total internal reflection (TIR) thereof towards the lens outer surface."

Did I read that correctly?

A. Yes, you did.

Q. For Claim 4, the outer surface you refer to is top face, 94.

Do you see that?

A. Yes.

Q. And top face, 94, is the upper surface of the lens, 90, shown in Figure 28; is that right?

A. Yes.

Q. Dr. Josefowicz, you understand when a term in a claim is phrased as -- is prefaced with the word "the," that it's referring to a prior recitation of that element earlier in the claim; right?

A. Yes.

Q. So "the lens outer surface" in Claim 4 refers to a lens outer surface recited earlier in this claim set; is that right?

A. Yes, it is.

Q. So I'm going to call up RDX-6.044.

Do you see this, Dr. Josefowicz?

A. Yes.

Q. In Claim 1, as the outer surface, you identified the combination of exit face, 97, and the surface of reimaging reflector, 96; is that right?

A. Correct.

Q. So part of the outer surface is exit face, 97;

right?

A. That's right.

Q. The claims of the '570 Patent recite both an outer surface and an inner surface; right?

A. Correct.

Q. And the inner surface has front and back sectors; right?

A. Yes. As defined in '570.

In regards to this, I was using Dr. Lebby's interpretation.

Q. Sure.

I've called up RDX-6.046.

And in Claim 1, with respect to Minano, you map the front sector of the inner refracting surface to exit face, 97; right?

A. Correct.

Q. And exit face, 97, is also part of the outer surface, according to your analysis of Minano under Claim 1; right?

A. Yes. And I explicitly defined that as the principle lens or the first lens, and the other lens as the secondary lens.

And I didn't suggest that they're performing the same function, but that the second lens was augmenting the redirection of light from the principle lens.

And the teaching that I was referring to of the second lens was explicit to the total internal reflection surfaces that's taught by Minano in the secondary lens.

So I wasn't claiming that Minano has everything that we need for the limitations of Claim 1, but that it taught TIR, and that all of the other claims, all of the other limitations in present in Minano's principle lens.

That's all I was trying to claim. That's all I was trying to say.

Q. All right. Dr. Josefowicz, let's turn to slide 48 of your demonstratives.

Oh, you have it, the right one. Okay.

So, Dr. Josefowicz, what you're referring to as the base 98, that's the emitter-adjacent base end of Minano?

A. Yes. That's the base for the LED.

Q. Okay. There's an opening in the base 98 to receive the emitter; is that your testimony?

A. I'm not following you. I think what you're asking me is inside that dome there is an LED emitter. The LED emitter is in the center of that base.

It's radiating up with a Lorentzian illuminating output distribution towards the inside surface of 97, and 96, where the light is redirected by refraction and reflection to the -- through the lens segment 97, and that

light is directed at the secondary lens that we looked at earlier.

Q. Just to be clear, the chip-on-board LED you mentioned, that's going to be mounted on the base 98; right?

A. That's right.

Q. Can we turn to slide 53 of Dr. Josefowicz's demonstratives.

So, Dr. Josefowicz, you refer to an outer surface -- outer surface of reflecting prism 30 of Laporte; correct?

A. Yes.

Q. Is at least part of that outer surface the portion of lens 34 from which the rays heading in a leftward direction exit the lens 34?

A. Repeat that question, please.

Q. Yeah. Let me -- so, Dr. Josefowicz, you see some rays exiting what you have annotated in yellow, and heading in a left and upwards direction; right?

A. That's right.

Q. The outer surface you identify, at least includes the portion of that yellow object from which those rays are exiting; right?

A. The yellow object is the entire lens, so, yeah, I -- it's both -- I mean, if you're asking me where do the

rays exit, they exit out of surface marked 34. At least those rays, I think, the ones you're talking about.

Q. All right. Now, let's move forward a handful of slides to slide 55. So -- actually, I don't think you covered this, so I'm going to withdraw that question and move on.

So, Dr. Josefowicz, in performing your invalidity analysis, you understood that just because all elements of a claim are present in the prior art does not mean that the claim is necessarily obvious; correct?

A. I'm not sure about that. It depends on what you're talking about. I mean, it's -- as a general rule, I wouldn't -- I wouldn't know until I saw what you're talking about.

Q. Mr. Jay, could you turn to page 62 of Dr. Josefowicz's deposition transcript, beginning at line 5 through 9.

Dr. Josefowicz, during your deposition, I asked you, "In performing your invalidity analysis, you understood that just because all elements of a claim are present in the prior art does not mean that the claim is not necessarily obvious, correct?"

You answered, "No, the claim is obvious based on..."

Dr. Josefowicz, you gave that answer during

deposition?

A. I did, but I think I misunderstood you when you said that.

Q. Okay.

A. So in performing my invalidity analysis, of course, I'm going to include prior art knowledge, prior art that I'm -- I understood, prior art that I am aware of, my own knowledge about the topic, and how it relates to the claims.

And that's the way I treated invalidity in Patent '570, as I discussed in my testimony today.

Q. So you agree that it's not enough to merely show that all elements of a claim are in different pieces of art; correct?

A. I think that -- I'm not following the legal argument. My understanding is that if something is known, has been disclosed prior to a patent being published, that that is publicly known knowledge, and that -- I'm not quite understanding what you're saying.

MR. HAMSTRA: Your Honor, I'm mindful of the clock, and this is a good stopping point.

JUDGE CHENEY: Okay. So this cross is going to continue tomorrow?

MR. HAMSTRA: Yes. I believe I have about 15 minutes or so, Your Honor.

JUDGE CHENEY: Okay.

Well, thank you, Dr. Josefowicz, for being with us today. Please do return tomorrow morning, and in the meantime, please don't discuss your testimony with anyone.

You may step down while I speak with the lawyers about some housekeeping matters.

Thank you.

Okay. How are we doing with time? Let me hear from someone on Cree's side. Mr. Erwine, you're muted.

MR. ERWINE: Can you hear me now?

JUDGE CHENEY: I can.

MR. ERWINE: Sorry about that. I had my microphone turned away.

As I understand from Mr. Hamstra, he's got about 15 minutes left of cross with Dr. Josefowicz, and then I believe that is RAB's last witness for their case-in-chief.

Then we will have our three experts coming back for rebuttal testimony. I believe the time for each is in the range of about 30 to 45 minutes on direct.

So I think it's going to take us to about the middle of the afternoon, if my numbers are correct.

JUDGE CHENEY: Mr. Roush, your perspective?

MR. ROUSH: I think that's about right. That's -- I think our cross-examination should be around the same time, if not lower than what Mr. Erwine suggested

for Cree Lighting's direct.

So I think early afternoon is a good estimate.

JUDGE CHENEY: Okay. Great.

Are there any other housekeeping matters that we should talk about before we break for the day?

MR. ERWINE: Not for Cree Lighting, Your Honor.

MR. ROUSH: Not for RAB Lighting either.

JUDGE CHENEY: Okay. Well, you are in -- you're turning the final bend; doing a great job. Everyone's holding up nicely.

I hope you can get some rest, and we'll see you in the morning.

We're off the record.

(Whereupon, the proceedings were recessed at 4:35 p.m.)

I N D E X

Confidential Sessions:

850-878; 882-887; 892-897; 903-906

E X H I B I T S

EXHIBIT NO:	RECEIVED
LISTS PROVIDED BY COUNSEL TO BE RECEIVED IN EVIDENCE	
Shackle Examination	
RX-0855	
RX-0112	
RX-0113	
RX-0114	
RX-0117	
RX-0732	
RX-0721	

CX-0487C
CX-0834C
CX-0823
CX-1261
CX-1268
RDX-0004
Katona Examination
RX-0721
CDX-0003C
CX-0445
CPX-0002
CPX-0003
CPX-0008
CPX-0029
CPX-0137
CPX-0138
CPX-0139
CPX-0140
CPX-0141
CPX-0142
CPX-0477C
CPX-0478C
CPX-0484C
CPX-0487C
CPX-0693C

CPX-0834C
CX-0342C
CX-0345C
CX-0458
CX-0465C
CX-0473C
CX-0485C
CX-0488
CX-0489
CX-0596
CX-0823
CX-0835
CX-0836
CX-0837
CX-0838
CX-0843
CX-0844
CX-1899
JPX-0143C
JX-0003
JX-0004
JX-0122C
JX-0077C
CX-0598
CPX-0143

CERTIFICATE OF REPORTER

TITLE: Certain Light-Emitting Diode Products, Fixtures, and Components Thereof

INVESTIGATION NO: 337-TA-1213

HEARING DATE: May 6, 2021

LOCATION: Washington, D.C. - Remote

NATURE OF HEARING: Evidentiary Hearing

I hereby certify that the foregoing/attached transcript is a true, correct and complete record of the above-referenced proceedings of the U.S. International Trade Commission.

Date: May 6, 2021

SIGNED: _____

Signature of the Contractor of the Authorized Contractor's Representative
1220 L Street, N.W., Suite 206
Washington, D.C. 20005

I hereby certify that I am not the Court Reporter and that I have proofread the above-referenced transcript of the proceedings of the U.S. International Trade Commission, against the aforementioned Court Reporter's notes and recordings, for accuracy in transcription in the spelling, hyphenation, punctuation and speaker identification and did not make any changes of a substantive nature. The foregoing/attached transcript is a true, correct and complete transcription of the proceedings.

SIGNED: Raymond G. Bryntesson

Signature of Proofreader

I hereby certify that I reported the above-referenced proceedings of the U.S. International Trade Commission and caused to be prepared from my tapes and notes of the proceedings a true, correct and complete verbatim recording of the proceedings.

SIGNED: Marjorie Peters

Signature of the Court Reporter