

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

BOE TECHNOLOGY GROUP CO.,	)	
LTD.,	)	
	)	
Petitioner,	)	
	)	
vs.	)	No. IPR2024-01130
	)	
OPTRONIC SCIENCES LLC,	)	
	)	
Patent Owner.	)	
_____	)	

VIDEOTAPED DEPOSITION OF
RUSSEL JACOB BAKER, PH.D.
THURSDAY, APRIL 3, 2025, 11:34 A.M. PT/1:34 P.M. CT
VIA ZOOM VIDEOCONFERENCE

JOB NO.: 110990
STENOGRAPHICALLY REPORTED BY:
CHERYL HAAB SCOTT, RDR, CRR, CCRR
CA CSR No. 13600
WA CCR No. 3499
NV CCR No. 1003

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4 LTD.,)
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6 vs.) No. IPR2024-01130
7 OPTRONIC SCIENCES LLC,)
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VIDEOTAPED DEPOSITION OF RUSSEL JACOB BAKER,
PH.D., taken via Zoom Videoconference, on Thursday,
April 3, 2025, at 11:34 a.m. PT/1:34 p.m. CT, before
Cheryl Haab Scott, RDR, CRR, CCRR, Certified Shorthand
Reporter No. 13600 in and for the State of California,
Certified Court Reporter No. 3499 in and for the State
of Washington, and Certified Court Reporter No. 1003 in
and for the State of Nevada.

1 A P P E A R A N C E S
2 --oOo--

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25 Also Present:

JONATHAN BARKER, VIDEOGRAPHER

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I N D E X
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WITNESS: Russel Jacob Baker, Ph.D.

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1 THURSDAY, APRIL 3, 2025, 11:33 A.M.

2 VIA ZOOM VIDEOCONFERENCE

3 --000--

4 THE VIDEOGRAPHER: We're on the record.
5 This is the beginning of Media No. 1 in the
6 deposition of Dr. R. Jacob Baker in the matter of
7 BOE Technology Group Co., Ltd., versus Optronics
8 Sciences LLC, Case Number IPR2024-01130, being held
9 virtually via Zoom. This deposition is being taken
10 on behalf of the Defendant on April 3rd, 2025. The
11 time is 11:34 a.m.

12 The court reporter is Cheryl Scott. I am
13 Jonathan Barker, the videographer, on behalf of
14 First Legal Depositions, located in Los Angeles,
15 California.

16 This decision is being videotaped at all
17 times unless specified to go off the video record.

18 Would all present please identify
19 themselves, beginning with the noticing attorney.

20 MR. KROEGER: This is Paul Kroeger from Russ
21 August & Kabat for Patent Owner.

22 MR. SAULNIER: Michael Saulnier with
23 DLA Piper for BOE Technology.

24 THE VIDEOGRAPHER: All right. Will the
25 court reporter please introduce herself and swear in

1 the witness.

2 THE COURT REPORTER: Good afternoon. My
3 name is Cheryl Scott. I am a California and Nevada
4 Certified Shorthand Reporter and the deposition
5 officer for today's proceeding. My CSR license
6 number is CA 13600; and Nevada, 1003.

7 --oOo--

8 Whereupon,

9 RUSSEL JACOB BAKER, PH.D.,

10 having been called as a witness,
11 was duly sworn by the court reporter
12 and testified as follows:

13 --oOo--

14 EXAMINATION

15 BY MR. KROEGER:

16 Q Good morning, Dr. Baker.

17 A Good afternoon.

18 Q You and I have met before, but I'll state my
19 name for the record. I'm Paul Kroeger, and I
20 represent the Patent Owner in this matter. Thank
21 you for your time.

22 A Thank you.

23 Q Am I correct that you know exactly the
24 number of times you've been deposed before?

25 A Yes.

1 Q And what number of deposition is this?

2 A **113.**

3 Q So is -- so it's fair to state that you're
4 familiar with the deposition process; correct?

5 A **Yes.**

6 Q Is it okay if I skip the admonitions or
7 ground rules for the proceeding?

8 A **Yes.**

9 Q You understand that you're under oath;
10 correct?

11 A **Yes.**

12 Q And are you taking any medications that
13 would impair your ability to testify today?

14 A **No.**

15 Q Any other reason you can't give your best
16 testimony today?

17 A **Not that I can think of.**

18 Q Is there anyone else in the room with you
19 today?

20 A **No.**

21 Q Do you have any paper documents opened?

22 A **No.**

23 Q Do you have any other windows open on your
24 computer other than the Zoom window?

25 A **I have a file explorer open to the IPR**

1 exhibits in this matter.

2 Q Okay. Anything else, or is that it?

3 A That's it.

4 Q Okay. As we started this deposition, I put
5 Exhibit 1002 in the chat. Can you let me know when
6 you have that open.

7 A I have it open.

8 (Patent Owner's Exhibit 1002 was marked.)

9 BY MR. KROEGER:

10 Q Do you recognize Exhibit 1002 as the
11 declaration you have authored in this matter?

12 A Yes.

13 Q And you were retained in this matter by BOE
14 Technology Group; correct?

15 A Yes.

16 Q And you're being compensated at your current
17 hourly rate of \$765 an hour; is that correct?

18 A Yes.

19 Q Do you know when you were first retained in
20 this matter?

21 A I don't remember exactly. If I had to
22 guess, I would say it was early in 2024.

23 Q Do you know how long you spent working on
24 this declaration, Exhibit 1002?

25 A I don't know. If I had to guess, I would

1 say around 50 hours.

2 Q And I know you've provided declarations in
3 other IPRs. Do you think that that 50 hours is the
4 work solely done on this Exhibit 1002?

5 A And reviewing prior art, the patent. But
6 yes.

7 Q And did you personally draft Exhibit 1002?

8 A I worked on the draft with BOE's attorneys
9 at DLA.

10 MR. KROEGER: And I'm going to put
11 Exhibit 1001 in the chat; but if you have your own
12 copy, you can look at that.

13 (Patent Owner's Exhibit 1001 was marked.)

14 BY MR. KROEGER:

15 Q Let me know when you have it open.

16 A I have it.

17 Q Do you recognize Exhibit 1001 as the
18 '842 patent?

19 A Yes.

20 Q And is this the patent that is the subject
21 of your declaration, Exhibit 1002?

22 A Yes.

23 Q And in your declaration, you are offering
24 opinions that the '842 patent is invalid over prior
25 art; is that correct?

1 A Yes.

2 Q Did you review the '842 patent before you
3 looked at the prior art references?

4 A Yes.

5 Q And did you find the prior art that you
6 opined as invalidating, or was it provided to you?

7 MR. SAULNIER: Objection. To the extent
8 that this gets into attorney-client communications
9 or information, then I'm instructing the witness not
10 to respond; but to the extent that's not the case,
11 then go ahead.

12 THE WITNESS: I don't recall. I may have
13 looked for prior art or may have used a search firm.
14 I don't remember.

15 BY MR. KROEGER:

16 Q Have you reviewed the IPR petition that was
17 filed with the PTO that accompanied your
18 declaration?

19 A No.

20 Q And are you aware that the U.S. PTO has
21 issued an institution decision in this IPR?

22 A Yes.

23 Q Have you reviewed the institution's
24 decision?

25 A Yes.

1 Q Do you agree that the '842 patent generally
2 relates to the design of an LED package?

3 A I agree, the '84 [sic] patent relates to the
4 design of an LED backlighting package for
5 backlighting and display, yes.

6 Q So paragraph 45 of your declaration --

7 A I'm there.

8 Q You state that:

9 "After reviewing the '842 patent, the
10 relevant portions of the prosecution history of the
11 '842 patent, and its reexamination and cited
12 references, it is my opinion that the relevant art
13 of the '842 patent is the field of electronic and
14 optoelectronic system design."

15 Do you see that?

16 A Yes, the relevant art of the '842 patent is
17 in the field of electronic and optoelectronic system
18 design.

19 Q Is there any other relevant technology
20 fields that a person of skill in the art would need
21 to have knowledge concerning to analyze the
22 '842 patent?

23 A I don't think so. I think in those fields,
24 one would understand things like needing to
25 dissipate heat by electronics or needing to focus

1 light in optoelectronics. So I think those fields
2 cover the scope of the '842 patent.

3 Q And what do you mean by "optoelectronic
4 system design"?

5 A Taking optoelectronic components like LEDs
6 and light-guiding plates and using them to design an
7 optoelectronic system.

8 Q And in terms of the next paragraph of your
9 declaration, you provide an opinion on the level
10 of -- on the level of skill needed by a person of
11 skill in the art as of the time of the '842 patent.

12 Do you see that?

13 MR. SAULNIER: Objection. Form.

14 THE WITNESS: Are you talking about
15 paragraph 46?

16 BY MR. KROEGER:

17 Q That's what I meant to ask about, yes.

18 A Yes, I see paragraph 46 and my opinions in
19 that paragraph.

20 Q And it's your opinion that a person of
21 skill -- ordinary skill in the art would have had a
22 bachelor's degree in electrical engineering or a
23 comparable field of study plus approximately one or
24 more years of professional experience with
25 electronic and optoelectronic system design; is that

1 right?

2 A Yes.

3 Q How did you decide on this definition of a
4 person of ordinary skill in the art?

5 A I reviewed the '842 patent.

6 Q Anything else?

7 A Specifically, I looked at the claims of the
8 '842 patent and thought about what level of skill a
9 person would need to implement the claims as they're
10 talked about in the specification of the
11 '842 patent.

12 Q And is it your opinion that that same level
13 of skill is needed to implement each of the claims
14 upon which you're opining?

15 A Yes, that's the POSITA that I think is
16 appropriate for the claims of the '842 patent.

17 Q And you're rendering opinions on Claims 3
18 through 9 of the '842 patent; is that correct?

19 A Yes.

20 Q And so, for example, it's the same level of
21 skill would be needed to implement Claim 6 as
22 Claim 3, in your opinion; is that right?

23 A Yes.

24 Q What are the engineering disciplines that
25 are encompassed within optoelectronic system design?

1 A For example, electrical engineering, optical
2 engineering, or physics engineering.

3 Q Do you qualify as a person of skill in the
4 art under the definition you provided in paragraph
5 46?

6 A Yes, as I discussed in paragraph 47.

7 Q What optoelectronic system design
8 experience -- can you describe your optoelectronic
9 system design experience?

10 A I've worked on designs of displays. I've
11 worked on sensors for optical sensing systems. I've
12 worked on communication systems that employ
13 optoelectronics. I've worked on bench-level optical
14 system design. I've designed circuits for driving
15 components of optical systems. I've got pretty
16 extensive experience in both electronics and
17 optoelectronic design.

18 Q Have you ever designed an LED package?

19 A Yes.

20 Q When -- can you describe your LED package
21 experience?

22 A Yes. I currently -- or more recently worked
23 on the design of detectors. So I would design light
24 sources for characterizing the detectors. For
25 example, on Monday, I had a student defend his

1 master's thesis and it was in the area of
2 silicon-germanium SPADs, which are a type of
3 detector used in a system using a scintillator and a
4 radiation source. But yeah, I've designed all kinds
5 of various optoelectronic things.

6 Q Have you worked on any LE- -- strike that.
7 Do you have any experience designing LED
8 packages in or around the 2004 time frame?

9 A Yes.

10 Q And what was that experience?

11 A Back in the '80s, I worked on the design of
12 a touch screen, for example, which packaged infrared
13 LEDs and infrared photodetectors in a grid around a
14 CRT display. So when a user touched the display,
15 the simple electronics would determine where their
16 finger touched the display so it was external to the
17 CRD and went around the perimeter of the display of
18 the CRT, as one example.

19 Q Was that an LED display panel?

20 A There were infrared LEDs and then infrared
21 photodetectors. So an infrared LED would emit
22 infrared light; it would shine or be focused across
23 the front of the display in a beam to a photo
24 detector on the other side, and then they're
25 arranged in a grid. There'd be photodetectors on --

1 say the top and the right side and then LEDs on the
2 left and the bottom, for example.

3 Q And for the optoelectronic products that you
4 have experience with, which one would you say is
5 closest to the type of LED packaging described in
6 the '842 patent?

7 MR. SAULNIER: Objection. Form.

8 THE WITNESS: I don't know. I really
9 haven't thought about it, I mean, I guess using a --
10 a Frenzel lens. So Frenzel is F-r-e-n-z-e-l.

11 And then some sort of optical source might
12 be the closest for some sort of sensing
13 characterization.

14 BY MR. KROEGER:

15 Q And when did you do the work with the
16 Frenzel lens?

17 A I've been doing it for the last -- I don't
18 know how many years. Quite a while. Because work
19 comes and goes depending on the funding.

20 Q So turning to paragraph 12 of your
21 declaration.

22 A Okay.

23 Q You mention at the bottom of page 5, going
24 to page 6, work at Micron Display and Micron
25 Technology.

1 Do you see that?

2 A Yes.

3 Q Were those flat panel displays?

4 A Yes.

5 Q And were they CRT displays?

6 A No.

7 Q What types of displays were they?

8 A The ultimate technology that that company
9 decided to pursue and that I worked on was
10 technology called field emitting displays, which
11 were, like, little miniature electron emitters
12 striking a phosphor to generate the red, green, and
13 blue colors of the flat panel display.

14 Q And you mentioned that that work resulted in
15 five patents; is that correct?

16 A Yes.

17 Q And those were filed in the 1994 to '96
18 timeframe?

19 A That sounds right.

20 Q And what types of technology were these
21 patents directed to?

22 A Mainly to pixel design and the video
23 processing, the video signals to drive the rows and
24 columns of the flat panel display.

25 Q And when you say, "pixel design," was that

1 for electroluminescent displays?

2 A Yes.

3 Q Was any of the technology described in these
4 patents directed to LED displays?

5 A Yes. The video processing signal, the
6 circuitry would be applicable to any flat panel
7 display organized in rows and columns.

8 Q And other than the video processing signal,
9 was any of the technology described in these patents
10 directed to LED displays?

11 A I don't remember.

12 Q And then after you mentioned your patents,
13 you say you were also involved with the evaluation
14 of display technologies, including liquid crystal
15 displays, light emitting diodes, plasma displays,
16 and organic light emitting diode displays.

17 Do you see that?

18 A Yes.

19 Q What do you mean by you were involved with
20 the evaluation of?

21 A So at the time, all the displays -- the
22 majority of the consumer displays were made with
23 cathode ray tubes, and people were looking to enter
24 the market with flat panel displays. And so those
25 technologies were the ones that were thought to be

1 the best contenders for CRT replacement that is a
2 flat panel display. So I would look at the
3 materials, the brightness, the colors, and what we
4 could do with the different types of displays; and
5 ultimately, we pursued and it was in part because we
6 were funded by the DoD. Pursued the field emitting
7 displays because they could get the brightness and
8 the colors and using the phosphors, which was
9 already used in color TVs in -- cathode ray tubes
10 for color TVs was a mature technology.

11 And as I testified yesterday, we got working
12 displays and we tried to ramp up production and we
13 just couldn't get the yield of what it needed to be
14 to make the display practical. The eye is really
15 perceptive in -- there's even one dead pixel, the
16 eye picks that up. And so by the time we got
17 through working on the production issues, the LCD
18 displays had really -- in the market we were going
19 for, which are the smaller flat panel displays had
20 really matured and ended up taking over and becoming
21 the dominant display technology.

22 Q And what characteristics of the LEDs did
23 you -- did you evaluate?

24 A For example, color.

25 Q Did you evaluate response time?

1 A I think we had this question yesterday too.
2 I'm not exactly sure what you mean by that
3 because it's dependent on not just the LED, but the
4 application. So, for example, if you're using an
5 LED and a -- you know, a display with a 30 hertz
6 refresh rate, interleaved, the response time is
7 pretty slow. But in other applications it could be
8 faster, but that really didn't get that far because
9 the colors weren't there. The material system
10 wasn't there at the time.

11 Q Did you evaluate heat generated?

12 A Yes.

13 Q How did you evaluate heat generated -- heat
14 generation?

15 A If you look at how many current you need for
16 a specific pixel and you estimate given the size of
17 the display, how much in the power -- the voltage
18 applied for the pixel and you estimate how much
19 power the display was going to -- to need, so the
20 benefit of the field emitting displays were they
21 required or they used nano amps of current in normal
22 operation. The emitters were just emitting, you
23 know, electrons at a very low rate. So it was low
24 power.

25 Q And I think you may have mentioned this, but

1 did you ultimately determine that LEDs were a viable
2 solution to replace cathode ray tube displays at the
3 time?

4 A No, they weren't. For the general video
5 display market, that's why we went with the field
6 emitting displays.

7 Q And why were LEDs not a viable solution to
8 replace CRT at the time?

9 A As I've testified a moment ago, the material
10 system wasn't mature, the fabrication, and the
11 colors.

12 Q And then in the next sentence in paragraph
13 12, you state that you were involved in the
14 packaging of the displays including the vacuum
15 ceiling and the deposition of phosphors for light --
16 white -- light wavelength conversion.

17 Do you see that?

18 A Yes.

19 Q Are those the phosphors used in CRTs?

20 A Similar, yes.

21 Q And the last sentence here says you also
22 "taught display design as a topic in my courses and
23 did display design consulting again in industry for
24 Cirque in 2013."

25 Do you see that?

1 A Yes.

2 Q What do you mean by you "taught display
3 design" in your courses?

4 A So in memory or displays or sensors for that
5 matter that are arrays of things, when you do design
6 with arrays, there's lots of common commonalities to
7 the design where you need to do a row decode, a
8 column decode, put information on the columns,
9 access row, generate a pixel clock -- those kind of
10 things. So they have -- when you teach one, you can
11 apply it to other things in other types of arrays.

12 So a CMOS imager, which is the camera in
13 your phone, will have -- as far as the control goes,
14 similar behavior. Not exactly the same, but similar
15 as a display does with LEDs for the peripheral
16 circuitry.

17 Q Have you ever taught LED package design for
18 a display in your courses?

19 A No. All of my packaging work is in -- or at
20 least lately -- I mean, the last 15 years is in -- I
21 do in my lab. So I have a wire bonder and packages
22 for packaging up LEDs or photodetectors. So I have
23 a web page that I use to teach my students how to
24 use things, what packages to buy and what
25 consumables and where you can buy them and what you

1 need and those kind of things.

2 Q And you say -- what kind of display design
3 consulting did you do for Cirque in 2013?

4 A I worked on the interface that was a
5 capacitive touch display. They had a -- in the
6 display in the pixel, there was a sensor where, when
7 you put your finger over the sensor, it would change
8 the capacitance. And I helped them with some
9 analog-to-digital interfaces to sense the change in
10 the capacitor with your finger, and there was a
11 pixel-level design which used Sigma-Delta
12 modulation. And there were global designs that used
13 the row and column access to get access to the
14 individual pixels, and they would scan to see or to
15 sense the change in the capacitance with the
16 movement of your finger over each pixel.

17 Q So did your work for Cirque involve the
18 design of LED packages?

19 A Well, to the extent LEDs were packaged in
20 the display. But I didn't work on the actual
21 mechanical design of the LED package. It was more
22 making sure that my solutions didn't interfere with
23 the package, that it could be fit in the package.

24 Q And in paragraph 13, you mentioned your
25 current research related to LiDAR, L-i-D-A-R.

1 Do you see that?

2 A Yes.

3 Q And is LiDAR a form of a detector?

4 A There's a detection, and there needs to be a
5 light source as well. So you send a light pulse out
6 at a particular wavelength, range of wavelengths,
7 either a pulse or some sort of shape, and then you
8 look at what's returned to the detector.

9 Q And did you also work on the design of
10 emitters as part of that process?

11 A I was -- yes, but I was more involved with
12 detection, the design of the light sources. Because
13 you have -- you have significant -- you can have
14 significant power to drive the light source, is less
15 challenging than the design of the detector, which
16 has to be able to be sensitive and detect small
17 levels of return signals. So my work is more on the
18 detector side.

19 Q Do you know what the primary challenges were
20 for LED package design in the 2004 time frame?

21 A Yes.

22 Q And what were the primary challenges for LED
23 package design in the 2004 time frame?

24 A For Micron, I was asked to go visit a
25 start-up company that was working on LED packaging

1 for light sources and evaluate their technology back
2 in that time frame, maybe even a little earlier,
3 around 2000. Maybe it's 2002, I think.

4 The biggest problem at that time was heat
5 removal. The power supplies and the materials
6 weren't as efficient as needed, certainly, as they
7 are now. And so you would have failures and -- and
8 you'd have failures and not very efficient
9 lightbulbs or light sources because the heat
10 couldn't be removed accurately or couldn't be
11 removed efficiently. And so the biggest problem, at
12 least from what I remember in that time frame, was
13 removing the heat.

14 Q And were you able to come up with any
15 solutions to remove heat from the LED packaging at
16 that time?

17 A A simple solution was a heat sink. The
18 issue with using a heat sink is it increases cost,
19 and when you're designing lightbulbs for consumers,
20 cost needs to be as low as possible. So the fact
21 that you could find a solution didn't mean that it
22 would make the product viable.

23 Q And have you ever designed a heat sink for
24 an LED package?

25 A I don't know. Maybe if I did, it was crude.

1 Just to -- I needed a bright light source. It's
2 become less of an issue nowadays with efficient
3 power supplies and better materials.

4 Q So have you ever designed any sort of
5 thermal management system or an LED system?

6 A I don't remember. Maybe.

7 Q And do electrical engineers typically design
8 heat sinks, or is that usually the subject of
9 another discipline?

10 A Well, when I have something that's
11 dissipating a lot of power I just buy the heat sink
12 and then attach it with some thermally conducted
13 grease to what I'm trying to cool off.

14 But I think if you're talking about the
15 actual design of a specific heat sink, I would guess
16 that's more of a mechanical engineer -- more a
17 mechanical engineer design, like what's the
18 thickness of the fins or the height of the fins or
19 whatever. The scope of the '842 would be in my
20 experience. You buy the heat sink to -- because
21 they're needed in the system.

22 Q In terms of the placement of the heat sink
23 in the system for maximal heat dissipating effects,
24 is that something electrical engineers would
25 typically be trained to do or would that be some

1 other discipline?

2 A I don't know if you need training. It's
3 just common sense. You put the heat sink on the hot
4 thing and try to get air to blow across it; but, I
5 mean, an electrical engineer would have no problem
6 doing that, I would think.

7 Q Does the design of thermal management
8 systems or LED packages involve thermodynamic
9 principles?

10 A When you buy electrical components and you
11 look at the data sheet, there's information on how
12 to heat sink a component. So I don't think it
13 requires an in-depth knowledge of thermodynamics.

14 And let me pause there.

15 When I think of thermodynamics, I think of
16 the underlying physical equations in differential
17 form that one would use to analyze specific
18 structures. You don't have to get that deep to
19 heat-sink something. You just need a heat sink, and
20 the size of the heat sink and the position of the
21 heat sink is often dictated or told to you right
22 there in the data sheet.

23 Q And is thermodynamics a required course for
24 electrical engineering, as far as you're aware?

25 MR. SAULNIER: Objection. Form.

1 (Reporter clarification.)

2 THE WITNESS: Depends on the curriculum. It
3 was when I went to school. I took a course in -- it
4 was called "heat transfer." It was slightly
5 different than thermodynamics, but the contents
6 was similar. Heat transfers more with solids, and
7 the thermodynamics can be with gases and other
8 things.

9 BY MR. KROEGER:

10 Q So you said earlier that on placement of the
11 heat sink, you'd put the heat sink on the hot thing
12 and tried to get air to blow across it. Blowing air
13 takes energy; is that correct?

14 A I didn't say you had to. I said you tried
15 to. If you don't have a fan or a source, then you
16 don't.

17 Q But if you -- if you have a -- but if you
18 had access to a fan, that's where you would try to
19 place the heat sink; is that correct?

20 A I need -- I mean, in general, you want air
21 to blow across the heat sink. It doesn't -- I mean,
22 if it's not possible, it's not possible. For
23 example, if you had a laptop and it had a processor
24 in it and you weren't able to get a fan to the heat
25 sink in the processor, then you would need a heat

1 sink that's big enough and spread out enough to
2 remove the necessary power. It's just design
3 choices and tradeoffs.

4 Q And heat sinks only handle heat after
5 they're out of the LED package; is that correct?

6 MR. SAULNIER: Objection. Form.

7 BY MR. KROEGER:

8 Q Let me ask this way. Do you need to
9 dissipate the heat from the LED to the heat sink?

10 A The LED's what's getting hot. The heat sink
11 provides a sink to pull the heat from the LED. I'm
12 not sure I answered your question or I even
13 understand it.

14 Q I guess, are you familiar with ways to
15 modify LED packages to improve heat dissipation from
16 the LED to the heat sink?

17 A I could guess some ways of doing it. I
18 don't know specifically what you're talking about;
19 but if you throw enough money at things, you can
20 generally find ways to solve problems.

21 Q Are you familiar with the JEDEC or JEDEC
22 reliability test for LEDs?

23 A Not right off the top of my head.

24 Q Let's turn to paragraphs 72 to 73 of your
25 declaration.

1 A **Okay.**

2 Q So actually starting with paragraph 70.

3 Here, you're offering a construction for the
4 heat dissipating means term that appears in Claims 6
5 and 9; is that correct?

6 A **Yes.**

7 Q And I believe that you conclude that it's a
8 means plus function term, and that the function we
9 see in paragraph 71 is conducting heat generated on
10 the circuit board; is that correct?

11 A **Would you mind repeating the question?**

12 Q Sure. It's your -- is your opinion that the
13 heat dissipating means term is a means plus function
14 term, and the associated function is conducting heat
15 generated on the circuit board; correct?

16 A **I don't know if I agree with the first part**
17 **of the question that it's a means plus function**
18 **claim, simply because my understanding is means plus**
19 **function requires a specific structure be disclosed**
20 **in the specification. But I did apply that the**
21 **function of that element was, as I mentioned in**
22 **paragraph 71, mean-conducting heat generated on a**
23 **circuit board.**

24 Q And then you go on to say that "any such
25 conduction also constitutes heat dissipation."

1 Do you see that?

2 A Yes.

3 Q What do you mean by that?

4 A So conducting heat is removing heat or
5 dissipating heat.

6 Q And then in paragraph 72, you offer the
7 opinion that one structure disclosed in the heat
8 dissipating means is plural heat dissipating plates.

9 Do you see that?

10 A In paragraph 72, I say that the only
11 structure in the specification that performs the
12 function of heat dissipation is the heat dissipating
13 plates, 46, yes.

14 Q And then in paragraph 73, you consider an
15 alternative where the structure is at least one heat
16 dissipating plate; is that correct?

17 A Yes.

18 Q But am I correct that it's your opinion that
19 plural heat dissipating plates is the correct
20 construction for the structure of this term?

21 MR. SAULNIER: Objection. Form.

22 THE WITNESS: What's taught in the patent is
23 of plurality of heat dissipating plates, 46. But
24 the -- as I mentioned in 73, based on paragraph 73,
25 based on Claim 1, which talks about a singular

1 plate, I used an alternate construction where the
2 term could be construed as only having one heat
3 dissipating plate.

4 BY MR. KROEGER:

5 Q You state in paragraph 73, towards the end:
6 "Thus, a POSITA would not have drawn any
7 inferences from unsupported Claim 1."

8 Do you see that?

9 A Yes, I see that:

10 "Claim 1, the last element requires at least
11 one heat dissipating plate perpendicularly disposed
12 on the other face of the horizontal member. But the
13 embodiment in the figures -- say, figure 4, shows
14 more than one heat dissipating plate, 46."

15 Q So is it your opinion that the alternative
16 construction, the -- I think what you called the
17 "broad construction" of the structure, is likely not
18 how one of skill in the art would understand the
19 term in light of the specification?

20 A I think I agree with that. A person of
21 ordinary skill in the art looking at the
22 specification would only see examples of more than
23 one heat dissipating plate; however, Claim 1 claims
24 at least one heat dissipating plate.

25 Q And so then moving back to paragraph 71, we

1 say -- you say that the function should be
2 conducting heat generated on the circuit board.

3 What is heat conduction?

4 A Movement of heat or the removal of heat from
5 one place to another. So, for example, if I have a
6 furnace in my house and I have an air handler that
7 blows air across a heating element, I would have
8 heat conduction. Because once the air moves across
9 the heating element and goes out the vents, I've
10 conducted the heat away from the heating element.

11 Q Are there other different modes of heat
12 transfer besides conduction?

13 A Yes.

14 Q What are those modes?

15 A There's radiative heat conduction.

16 Q And how does radiative heat transfer
17 different from conduction?

18 A Heat conduction is through a physical --
19 physical medium, like a heat sink; and radiative
20 conduction is through -- through -- I want to say an
21 electromagnetic wave. So it would be like
22 transferring heat from the sun to a person on the
23 earth but having minimal heat absorption in between.

24 (Simultaneous colloquy.)

25 THE WITNESS: Heat removal isn't of interest

1 in this patent or matter.

2 BY MR. KROEGER:

3 Q And are you familiar with convective heat
4 transfer?

5 A Yeah, that's kind of what I mean by
6 radiative, is convection, yeah.

7 Q How would a POSITA calculate conductive heat
8 transfer?

9 MR. SAULNIER: Objection. Form.

10 THE WITNESS: The way you do it is just like
11 an electrical circuit. You have various resistances
12 of components like the heat sink, and you just write
13 an equation that tells you how much heat or voltage
14 source you can remove from point A to point B. This
15 is all information in -- for example, data sheets
16 are associated with heat sinks.

17 BY MR. KROEGER:

18 Q Is there a symbol that's commonly used to
19 represent heat in equations?

20 A That's subjective. Any answer I give,
21 unless I can think of every one, would be -- you'd
22 find an example or a textbook where it's not used.
23 It's like saying voltage is always represented by V,
24 but sometimes authors use electromotive force, and
25 so they don't represent a voltage with V.

1 Q Is Q a common symbol, a common symbol used
2 to represent heat equations?

3 MR. SAULNIER: Objection. Form.

4 THE WITNESS: I didn't give an opinion on
5 that in my declaration. It could be.

6 BY MR. KROEGER:

7 Q Are you familiar with Fourier's law for
8 calculating thermal conductivity?

9 A Not right off the top of my head.

10 Q Are you familiar with how you calculate
11 convective heat transfer?

12 (Reporter clarification.)

13 MR. SAULNIER: Objection to form.

14 THE WITNESS: Yeah, I don't know what
15 specifically you're talking about.

16 MR. KROEGER: Okay.

17 THE WITNESS: When we get to a good breaking
18 point, can we take a break?

19 MR. KROEGER: Let's take a ten-minute break.

20 THE VIDEOGRAPHER: The time is 12:37 p.m.,
21 and we're off the record.

22 (Recess.)

23 THE VIDEOGRAPHER: The time is 12:49, and
24 we're back on the record.

25 ///

1 BY MR. KROEGER:

2 Q Dr. Baker, turning to your report -- I
3 forgot to ask this earlier: Are you aware of any
4 substantive errors in your declaration,
5 Exhibit 1002?

6 A No.

7 Q And does Exhibit 1002 represent all the
8 opinions you have concerning the '842 patent as of
9 today's date?

10 A Yes.

11 Q So going back to the claim construction
12 section of your report, which starts at
13 paragraph 65, you did not offer any construction of
14 the term "fastener"; is that right?

15 A I don't know if I totally agree with that.
16 I offered opinions on what the fastener -- the
17 portions of the fastener. So, for example, second
18 portion was the first part of the first term that I
19 talked about construing or -- in paragraph 65.

20 Q Okay. But did you offer any opinions on the
21 meaning -- on any special meaning for the term
22 "fastener" other than plain, ordinary meaning in
23 your declaration?

24 MR. SAULNIER: Objection. Form.

25 ///

1 BY MR. KROEGER:

2 Q Let me just restate that.

3 Did you offer any claim construction for the
4 term "fastener" in and of itself in your
5 declaration?

6 A Not the word "fastener" alone. The claim
7 teaches what the fastener is. Claim 3, for example.

8 MR. KROEGER: So I'm going to mark, as
9 Exhibit 1, the institution decision, and put that up
10 in the chat and let me know when you have that.

11 (Patent Owner's Exhibit 1 was marked.)

12 THE WITNESS: I've opened it.

13 BY MR. KROEGER:

14 Q So if you turn to page 22 of the institution
15 decision.

16 A Okay.

17 Q And in the middle of the last paragraph,
18 there's a sentence that says:

19 "The fasteners described in the '842 patent
20 appear to simply provide surfaces onto which other
21 components, e.g., an LED, may be attached."

22 Do you see that?

23 A I see that sentence, yes.

24 Q Do you agree with that sentence?

25 MR. SAULNIER: Objection. Form.

1 **THE WITNESS:** I haven't really thought about
2 it. But I think I might.

3 BY MR. KROEGER:

4 Q And so do you agree, then, that one of skill
5 in the art would understand the claim fasteners in
6 the '842 patent to provide surfaces onto which other
7 components, e.g., an LED, may be attached?

8 MR. SAULNIER: Objection. Form.

9 **THE WITNESS:** I mean, I think I might have
10 written LED backlight package be attached, but I
11 don't have any -- sitting here right now, not having
12 written about this institution decision in my
13 declaration, I don't have any reason to disagree
14 with it, but I really haven't considered it.

15 BY MR. KROEGER:

16 Q All right. Moving back to Exhibit 1002,
17 your declaration. Going back up to paragraph 22.

18 And paragraph 22 summarizes the grounds for
19 your opinions that the '842 patent is invalid; is
20 that right?

21 MR. SAULNIER: Objection. Form.

22 **THE WITNESS:** I mean, I'm not offering any
23 legal opinions, but I did my analysis of the grounds
24 of the IPR proceedings and determined based on my
25 understanding that the claims listed there are

1 **invalid, yes.**

2 BY MR. KROEGER:

3 Q And so your Ground 1 is that Claims 3 and 9
4 are anticipated by -- is it Uekusa?

5 A **Yes.**

6 Q And your Ground 2 is that the Claims 3 to 9
7 are rendered obvious by the combination of Uekusa
8 and Isoda; is that correct?

9 A **Yes. And Uekusa is spelled U-e-k-u-s-a.**
10 **And Isoda is I-s-o-d-a.**

11 Q What did you decide to include in validity
12 arguments based on modifying Uekusa in light of
13 Isoda if you thought that Uekusa alone invalidated
14 the claims?

15 A **I wanted to just demonstrate how it was**
16 **known to increase the heat dissipation by using the**
17 **plurality of fins as taught in Isoda, and that's why**
18 **I used that in Ground 2.**

19 Q And is that -- and likewise, your Grounds 4
20 and 6 -- in Ground 4, you assert the Claims 3 and 9
21 are anticipated by Kurokawa, K-u-r-o-k-a-w-a;
22 correct?

23 A **I think what you said is correct. Ground 4**
24 **and 5 are anticipated or obvious respectively by**
25 **Kurokawa; and Ground 6 is obvious in view of**

1 **Kurokawa and Isoda.**

2 Q And why did you feel the need to make the
3 obviousness combination of Kurokawa and Isoda if you
4 thought that Kurokawa invalidated the claims by
5 itself?

6 A Because if the heat dissipating means was
7 required to have a plurality of heat dissipating
8 plates instead of just one heat dissipating plate, I
9 wanted to show that that was well known. And so I
10 used the Isoda reference with Kurokawa to
11 demonstrate the person of ordinary skill in the art
12 would have -- it would have been obvious to increase
13 the number of heat dissipating plates in Kurokawa as
14 taught by Isoda.

15 Q And also, why do you have both Grounds 4 and
16 5? Why do you assert that Kurokawa anticipates
17 Claims 3 and 9 but also renders 4 and 7 to 9
18 obvious?

19 A Because all of these have to do with the
20 claim construction and interpretation of the terms.

21 Q So let's jump down to paragraph 56, which is
22 part of your patent overview section.

23 A Where did you say?

24 Q Paragraph 56. On page -- starts on page 22,
25 goes to 23.

1 A Oh. Okay. That's in the middle of the
2 overview of the '842, yes.

3 Q Did you prepare -- and in looking at the
4 annotated version of figure 4 on page 23, did you
5 prepare these annotations?

6 A I don't think so, but I don't recall
7 clearly.

8 Q And if you didn't prepare them, would they
9 have been prepared by BOE's counsel?

10 A Yes. When I formed my opinions, I spoke
11 with BOE's counsel; and they acted as my scribe,
12 helping me compile the report.

13 Q What is element No. 41 shown in figure 4?

14 A 41 is a lens.

15 Q And is there a reason why 41 is not colored
16 in?

17 A It's the shape on the end of the light
18 plate -- light guiding plate to focus the light into
19 the light guiding plate.

20 Q So why did you decide not to color 41 in?

21 A It's generally a transparent material like
22 glass or clear plastic. So, I mean, since it's
23 clear, I left it, and I think it's better. If it's
24 clear, it makes the image a little bit easier to
25 look at.

1 Q All right. Going down to paragraph 83 to
2 84 -- actually, just start with 83.

3 A Okay.

4 Q You start at 83:

5 "A POSITA would have known in the context of
6 Uekusa, quote, optical wave guide, end quote; and,
7 quote, light guide plate, end quote, are synonymous
8 and refer to the same thing."

9 Do you see that?

10 A Yes.

11 Q Are there any distinctions between the two
12 terms, or do they refer to exactly the same thing?

13 MR. SAULNIER: Objection. Form.

14 THE WITNESS: In general, they refer to the
15 same thing. But if you're trying to introduce the
16 word "exact," that will depend on, for example, the
17 size of the display. So in one case, if the size of
18 the display is different than the other case, then
19 they're not exact.

20 BY MR. KROEGER:

21 Q But are there any differences between a
22 light guide plate and an optical wave guide in
23 general that you're aware of?

24 A Not in the context of the '842 patent and
25 Uekusa.

1 Q If you turn down to paragraph 87.

2 A Okay.

3 Q And we see here what's, I believe, referred
4 to as upright -- you refer to upright portion 32 of
5 Uekusa; is that right?

6 A Yes. 32, upright portion is labeled there
7 as well as the corresponding first portion, 1VP, in
8 the figure of paragraph 87.

9 Q And Uekusa's upright portion, 32, has a
10 T-shape; is that correct?

11 MR. SAULNIER: Objection. Form.

12 THE WITNESS: May I have a copy of Uekusa?

13 MR. KROEGER: Sure. Putting Exhibit 1008,
14 Uekusa, into the chat.

15 (Patent Owner's Exhibit 1008 was marked.)

16 THE WITNESS: 32 is described as an upright
17 portion in Uekusa. I don't -- if you want to call
18 it a T-shape, I understand.

19 BY MR. KROEGER:

20 Q Let me ask it this way: In terms of your
21 opinion, upright portion 32 only gains the L shape
22 required by the claims when it's combined with resin
23 form in section 37; correct?

24 MR. SAULNIER: Objection. Form.

25 THE WITNESS: Well, if you combine 32 with

1 the base portions 31A and 31B, it forms the T
2 character. I think what you were mentioning -- I
3 mean, that's disclosed in column 5, line -- around
4 line 50. And if you look at the one side of the
5 T-shape, it's L shaped without the -- without
6 anything else.

7 BY MR. KROEGER:

8 Q But going back up to paragraph 85 of your
9 report and the picture we see on page 34, would you
10 have opined as the L shape is a combination of 1VP
11 of 32 and 2HP from 37; correct?

12 A Yes, as indicated as the image in text in
13 paragraph 85.

14 Q So going back to the annotated figure 5 in
15 paragraph 87 of your report, what does the orange
16 coloring denote?

17 A The vertical portion, which I labeled 1VP,
18 of the structure.

19 Q And substrate electrodes 38A and 33B are
20 colored orange along with upright portion 32 in this
21 annotated figure; is that correct?

22 A Upright portion 32 is -- and substrate
23 electrode 33B are -- yes, they're colored orange.

24 Q And you consider upright portion 32,
25 substrate electrode 33A, and substrate electrode

1 33B, to be all the claimed first portion in this
2 first alternative; is that right?

3 A Yes, as discussed in paragraph 88.

4 Q What is upright portion 32 made of?

5 A If I read Uekusa correctly, they're formed
6 of a resin.

7 Q And what are substrate electrodes 33A and
8 33B made of?

9 A I don't see a disclosure of the material in
10 Uekusa, but I think it's reasonable to assume some
11 conductor such as copper or maybe tin coated copper,
12 something like that.

13 Q And you also offer a second alternative for
14 the first portion in paragraph 89; is that right?

15 A Yes.

16 Q And in the second alternative, it's your
17 opinion that upright portion 32 is the first portion
18 only; is that right?

19 A Yes.

20 Q And so substrate electrodes 33A and 33B are
21 not part of the first portion in the second
22 alternative; correct?

23 A If I understood what you're saying
24 correctly, the electrodes of the LED 34 -- 33A and
25 33B -- are not part of the upright portion 32; and

1 **yes, that's discussed in paragraph 89.**

2 Q And in this alternative, you consider both
3 substrate electrodes 33A and 33B to be part of LED
4 34; is that right?

5 **A Yes.**

6 Q And so in this alternative, LED 34 is
7 disposed on the substrate electrode, which is
8 disposed on the upright portion; correct?

9 MR. SAULNIER: Objection. Form.

10 **THE WITNESS: And in element 3C, yes. The**
11 **element is disposed of in the first portion of**
12 **the -- of the fastener as indicated in figure -- the**
13 **annotated figure that I put in paragraph 90.**

14 BY MR. KROEGER:

15 Q And you state in paragraph 89:
16 "In the second alternative, the first
17 portion is still only upright portion 32."

18 What did you mean by "still only"?

19 **A In the previous embodiment, it was 32 plus**
20 **the 33A and 33B, as seen in the image in paragraph**
21 **87.**

22 Q So jumping down to paragraph 99 of your
23 report. And then looking at the annotated figure on
24 page 41, you have colored the substrate electrodes
25 purple; correct?

1 A Yeah, we're talking about Claim 5?

2 Q Correct.

3 A And in Claim 5, in paragraph 99, the
4 conducting wire that I'm pointing to in the
5 annotated image which is -- I'm pointing to front
6 wire 35, substrate electrodes 33A and 33B and
7 circuit electrodes 52A and 52B as being the
8 conducting wire.

9 Q So you claim that circuit electrodes 33A and
10 33B, along with wire 35, are collectively the
11 claimed conducting wire?

12 A Claim 5, yes, the conducting wires 33A, 33B,
13 52A, and 52B. And 35, if I didn't mention 35.

14 Q And in terms of the first portion for your
15 analysis here. But we're using the second
16 alternative we just discussed, where 33A and 33B are
17 not part of upright portion 32; correct?

18 MR. SAULNIER: Objection. Form.

19 THE WITNESS: I don't know if I totally
20 agree with this. Because in this analysis, Claim 5,
21 it's dependent on Claim 3, and I did two analyses
22 for Claim 3. So this is focused on assuming that
23 Claim 3 is -- is taught by the combination. Sorry.
24 Is taught by Uekusa.

25 So the Claim 5 analysis assumes the Claim 3

1 analysis as previously discussed.

2 BY MR. KROEGER:

3 Q And I guess can you specify, then, for
4 Claim 5, which of the two alternatives for the first
5 portion you're using or not?

6 MR. KROEGER: Objection. Form.

7 THE WITNESS: I think it's got to be the
8 second alternative; because in the first
9 alternative, the 33A and 33B are parts of the first
10 portion.

11 BY MR. KROEGER:

12 Q And then in paragraph 100, you state that:

13 "A POSITA would have understood that a
14 motherboard is a circuit board because it is a board
15 on which circuits are printed, e.g. electrodes 52A
16 and 52B."

17 Do you see that?

18 A Yes.

19 Q So does that mean that electrodes 52A and
20 52B are printed on motherboard 50?

21 A Yes. As seen in the figure, the annotated
22 figure in paragraph 99, the circuit motherboard is
23 highlighted in light blue, and that's 50. And then
24 on top of that motherboard is a darker or a purple
25 conducting wire on the right. That's labeled 52A.

1 **Conducting wire circuit electrode in 52B.**

2 Q And then 52B is not shown in the annotated
3 figure in paragraph 99; correct?

4 A **It's not labeled. Correct.**

5 Q And then in figure 1 in paragraph 100,
6 neither 52A or 52B are shown; correct?

7 MR. SAULNIER: Objection. Form.

8 **THE WITNESS: Labeling in figure 1 doesn't**
9 **show 52A or 52B, but I've annotated the figure to be**
10 **consistent with my analysis and what's disclosed to**
11 **indicate the -- that they're inside there on the**
12 **motherboard, the print circuit board.**

13 BY MR. KROEGER:

14 Q So moving back up to the annotated figure in
15 paragraph 99.

16 Uekusa's resin-forming section 37 is made of
17 resin; correct?

18 A **Resin-forming Section 37 is made of the**
19 **U-shaped frame 40 formed on the front of the surface**
20 **of the upright Section 32.**

21 Q And is U-shape frame 40 filled with resin?

22 A **It's made of resin. I don't know if it's**
23 **filled with what's -- the circuit board and the**
24 **other stuff in the image.**

25 Q You agreed that U-shaped frame 40 is made of

1 resin?

2 A I believe that's what Uekusa's teaching, is
3 that the resin-forming Section 37 includes a
4 nontranslucent frame 40, yes. And sorry for the
5 delay. I actually hit a wrong button in my report
6 and went to a different section and it took me a
7 minute to get back to where it was.

8 Q Makes you long for the days of paper; right?

9 A I don't know about that.

10 Q So did looking at your annotated figure in
11 paragraph 99 -- what you've annotated in either pink
12 or lighter purple at the top, which consists of 37,
13 43, and 41, that structure is made of resin; is that
14 right?

15 MR. SAULNIER: Objection. Form.

16 THE WITNESS: In the abstract, it says the
17 resin -- in the abstract of the Uekusa, it says:

18 "The resin-forming Section 37 includes a
19 nontranslucent frame 40 extending from a front
20 surface of the upright portion 32 and an extension
21 41 further projecting forwardly larger than the
22 frame."

23 BY MR. KROEGER:

24 Q So does that mean that resin-forming Section
25 37 is made of resin?

1 **A Yes, of course. But the cover over the LED,**
2 **the light has to be able to get out. So that**
3 **obviously is not made of a nontranslucent material.**
4 **Light has to pass through it.**

5 **Q And a solder is not effective on resin;**
6 **correct?**

7 **A You can't solder to resin. I haven't been**
8 **able to, anyway.**

9 **Q It would make the resin melt; right?**

10 **A Soldering iron might, yes.**

11 **Q So looking at paragraph 101 of your report**
12 **and your annotation on page 43.**

13 **Do you see that?**

14 **A Yes.**

15 **Q That shows solder 53 connecting substrate**
16 **electrodes 33A and 33B; correct?**

17 **A On the top of page 43?**

18 **Q Yes.**

19 **A Yes.**

20 **Q And I'm going back to the annotated figure**
21 **in paragraph 99. That does not show solder**
22 **connecting the second portion, 2HP, to the**
23 **motherboard; correct?**

24 **A I believe that's correct. The details are**
25 **not -- everything is not shown in all these figures**

1 because they're assembled in different stages or
2 they're trying to illustrate different things in the
3 figures.

4 Q Does Uekusa disclose using solder on second
5 portion 2HP?

6 MR. SAULNIER: Objection. Form.

7 **THE WITNESS:** Uekusa discloses using solder
8 to connect the circuit motherboard 50 to the -- to
9 the upright 41. I don't recall if it talks about
10 using solder to also connect the second portion,
11 2HP, but I'm not sure it does.

12 BY MR. KROEGER:

13 Q But given that 2HP is made of resin, you
14 would not expect Uekusa to disclose using solder to
15 connect 2HP to the motherboard; correct?

16 MR. SAULNIER: Objection. Form.

17 **THE WITNESS:** Well, I mean, not directly
18 connected.

19 BY MR. KROEGER:

20 Q Are you aware of anywhere in Uekusa where it
21 teaches how what you refer to as "2HP" is attached
22 to the circuit board?

23 A I think it's placed. Circuit board's placed
24 inside. I don't recall it says specifically it
25 snapped -- the parts snapping together or the

1 circuit board snapping in; but I think a person of
2 ordinary skill in the art would understand how to
3 place the motherboard inside what I've called the
4 second portion, 2HP.

5 Q So going down to paragraphs 103 and 104,
6 under your first alternative, where the substrate
7 electrodes are part of the first portion, this would
8 mean the body of Uekusa's structure is making
9 electrical contact between the motherboard and the
10 LED; correct?

11 A If I understand what you're asking, in the
12 annotated figure 2, in paragraph 103, which is the
13 top of page 45 of my declaration, the LED 34 is
14 touching the body -- the translucent frame 40. The
15 first portion, 1VP, yes.

16 Q And then in paragraph 105 -- I'm sorry, and
17 then -- in picture right above paragraph 105, the
18 annotated figure 2, the structure in green includes
19 the LED and the substrate electrodes 38A and 33B;
20 correct?

21 A Well, in that topography, the green includes
22 the 33A, 33B, and the LED 34.

23 Q So in paragraphs 106 and 107, you discuss
24 the heat dissipating means of Uekusa; and turning to
25 the picture -- the annotated picture on the top of

1 page 48, the -- it's your opinion that the heat
2 dissipating means is a part of substrate electrodes
3 33A and 33B; correct?

4 A Yes.

5 Q And is this shown under the first or second
6 alternative regarding the first portion?

7 MR. SAULNIER: Objection. Form.

8 THE WITNESS: I think it's under either
9 construction. This claim, claim six, is related to
10 the heat dissipating means, and that's what my
11 analysis focused on.

12 BY MR. KROEGER:

13 Q Is there any reason a person of skill in the
14 art would not want to use the same structure, both
15 to conduct electricity and also for thermal
16 management?

17 A I think that there may be reasons -- for
18 example, the heat conductor got really hot or the
19 potential was on the -- the heating -- the heat
20 sink. But, I mean, if those aren't issues, then it
21 would be preferable to use the same material or
22 structure for both electrical connection and heat
23 removal.

24 Q And components with an electrical charge
25 attract dust; correct?

1 **A They can, yes. But everything attracts**
2 **dust. So...**

3 Q Does dust accumulation on a component reduce
4 its capability to dissipate heat?

5 **A In general, yes.**

6 MR. KROEGER: Why don't we go ahead and take
7 a ten-minute break.

8 **THE WITNESS: Okay.**

9 THE VIDEOGRAPHER: The time is 1:51 p.m.,
10 and we're off the record.

11 (Recess.)

12 THE VIDEOGRAPHER: The time is 2:02, and
13 we're back on the record.

14 BY MR. KROEGER:

15 Q So let's turn to your combination in Ground
16 2 of Uekusa and Isoda, which starts in paragraph
17 118.

18 **A I'm there.**

19 Q In paragraph 120, you state:

20 "Isoda recognized that many printed
21 substrate materials that LEDs are attached to are
22 poor heat conductors. So when high currents are
23 applied to LEDs to produce high" --

24 (Reporter clarification.)

25 ///

1 BY MR. KROEGER:

2 Q "So when high currents are applied to LEDs
3 to produce high brightness, the emitted heat
4 degrades the LED device and its connections."

5 Do you see that?

6 A Yes.

7 Q And I'll go ahead and put Isoda into the
8 chat in case you need to reference it. That's
9 Exhibit 1005.

10 (Patent Owner's Exhibit 1005 was marked.)

11 BY MR. KROEGER:

12 Q And then the next sentence, you cite to
13 column 1:25-36, and 55 to 67 of Isoda.

14 Do you see that?

15 A Yes.

16 Q And you state that one solution Isoda
17 provided was to use substrate material with high
18 heat conductivity, citing back to the same portion.

19 Is that correct?

20 A Yes.

21 Q Okay. And looking at Isoda at 1:25-36, is
22 it your opinion that 1:25-36 is talking about the
23 invention of Isoda or the improvement over the prior
24 art?

25 A 1:25-36 is talking about the problem Isoda

1 is going to solve.

2 Q And what about 55 to 67? Is that also
3 talking about the problem Isoda is going to solve?

4 A It's talking about a solution that Isoda
5 gives for removing heat from the LEDs.

6 Q Looking at figure 4 of Isoda, at least one
7 of Isoda's solutions is a structure that includes a
8 heat conductive material that protrudes through a
9 circuit board and attaches to a heat stick.

10 Is that right?

11 A In figure 4, the -- the structure 21C is a
12 high conductive member that will conduct heat from
13 the printed circuit board to the heat sink, yes.

14 Q And the heat sink is 41A; correct?

15 A Yes.

16 Q And the circuit board here is 40A and -- is
17 40; correct?

18 A Is --

19 (Reporter clarification.)

20 THE WITNESS: Is 40, yes.

21 BY MR. KROEGER:

22 Q At least as shown in figure 4, the heat sink
23 is placed directly behind the LED; correct?

24 MR. SAULNIER: Objection. Form.

25 THE WITNESS: The LED, which is labeled 33,

1 is mounted on the exposed portion of the heat
2 conducted member, 21C, which is then connected to
3 the heat sink 41.

4 BY MR. KROEGER:

5 Q You said going back to your report in
6 paragraph 120, you have provided an annotated
7 version of figure 3, showing where you believe one
8 of skill in the art would use Isoda's heat -- heat
9 sinks with Uekusa; correct?

10 A Yes.

11 Q Why is the heat sink located up on --
12 exposed circuit motherboard 50 as opposed to
13 directly behind the LED or at the bottom of the
14 structure?

15 A Part of the heat sink is directly below the
16 LED, but what I was trying to illustrate there is
17 just removing heat from the circuit motherboard, and
18 that heat could be coming from the LED or coming
19 from the LED or any electronics that are used to
20 drive the LED, but the takeaway here was that it was
21 trying to show that you could use Isoda's heat sinks
22 or heat dissipating means to place them where you
23 needed them to remove heat.

24 Q And placing the heat sinks as illustrated
25 takes up additional space in lateral directions;

1 correct?

2 A I don't think so. I think the heat sink
3 extend out or you can make them extend out the same
4 length as the motherboard if you wanted.

5 Q Would placing the heat sink directly behind
6 the LED take up less space?

7 MR. SAULNIER: Objection. Form.

8 THE WITNESS: I don't think volume would
9 change.

10 BY MR. KROEGER:

11 Q If the heat sink were placed behind the LED,
12 it would have -- the heat would have to travel
13 through less material; correct?

14 MR. SAULNIER: Objection. Form.

15 THE WITNESS: The issue is that the actual
16 thickness of the material is less important than the
17 thermal conductivity of the material. So resin, for
18 example, would not conduct heat very well, but wire
19 or silver paste that's used to hold the LED in
20 place, that would conduct heat very well, as would a
21 trace on a printed circuit board.

22 BY MR. KROEGER:

23 Q So in your opinion, the printed circuit
24 board would have better thermal conductivity than --
25 than the resin behind the LED?

1 MR. SAULNIER: Objection. Form.

2 THE WITNESS: I mean, the printed circuit
3 board material itself may be slightly better at
4 thermally conducting than an epoxy resin, but
5 general printed circuit board materials are glass
6 epoxy. That's not where you're going to get much
7 conductivity. You're going to get the conductivity
8 from the LED to the heat sinks through the wires and
9 the interconnect on the printed circuit board.

10 BY MR. KROEGER:

11 Q Keep looking at the teaching of Isoda from
12 figure 4, why wouldn't one of skill in the art be
13 motivated to put a high heat conductive material
14 through the resin directly behind the LED and then
15 put the heat sink on the other side down there?

16 A That's another way of doing it. I was not
17 looking at punching a hole in the Uekusa structure,
18 and -- but still removing the heat and the point of
19 using Isoda was that a person of ordinary skill in
20 the art would understand that you could use heat
21 sinks at various places to remove heat from an
22 electronic device like an LED.

23 Q Looking at your paragraph 133, your proposed
24 modifications here, there's a portion of Uekusa's
25 fastener replaced with a thermally conductive

1 material colored orange; correct?

2 A Yes.

3 Q Why is the heat sink being placed on the
4 substrate rather than directly on Uekusa's modified
5 structure?

6 A I don't understand. Are you still talking
7 about the -- the -- what's seen in paragraph 133?

8 Q Sorry. Looking at -- let's look at 145,
9 sorry.

10 A Okay.

11 Q And then figure 8.

12 So here's you're showing that -- and figure
13 8 is an annotated figure from Isoda; is that
14 correct?

15 Actually, no. It's --

16 A Yes.

17 Q And here, the heat sink is located directly
18 beneath -- is located -- again, as here, there's a
19 conductive member through the substrate taken out of
20 the heat sink; is that correct?

21 A There's a conductive member between the LED
22 module or package 50 and the heat conductive member,
23 41A, yes.

24 Q So up to paragraph 123 -- and this is part
25 of your Ground 3 about Uekusa with the AAPA -- the

1 figures you show here depict heat dissipating plates
2 on a substrate directly behind the LED; correct?

3 **A In figures 2 and 3, yes. On the top of**
4 **page 55.**

5 Q Would it affect thermal management if the
6 heat dissipating plates were moved from directly
7 behind the LED to some other place in the package?

8 **A Maybe. I mean, it's more dependent on the**
9 **material, the conductive material between the heat**
10 **source and the heat dissipating plates.**

11 Q Let's go to Kurokawa. It's at paragraph
12 163, and I'll put that in the chat.

13 (Patent Owner's Exhibit 1004 was marked.)

14 BY MR. KROEGER:

15 Q So -- and look to me when you have Kurosawa
16 [sic] open. Sorry. Kurokawa.

17 **A K-u-r-o-w-a-k-a [sic].**

18 **Sorry. I said that wrong. K-u-r-o-k-a-w-a.**
19 **And I have it open.**

20 Q Kurokawa teaches a lighting device that
21 functions as a backlight; correct?

22 **A Yes.**

23 Q Kurokawa does not teach an LED package;
24 correct?

25 MR. SAULNIER: Objection. Form.

1 **THE WITNESS:** I don't know if I'd agree with
2 it. Kurokawa discloses a backlight, and I think
3 that's an LED package.

4 BY MR. KROEGER:

5 Q If we look at the figure, each of the little
6 square boxes 8 is an LED; correct?

7 A Yes.

8 Q And Kurokawa doesn't teach any design of the
9 packages for any of those individual LEDs; correct?

10 MR. SAULNIER: Objection. Form.

11 A Well, they're packaged in the Kurokawa --
12 what's assembled in Kurokawa. I mean, the
13 backlight, it's the -- it's the same as the '842,
14 the LEDs are packaged in a backlight package.

15 Q An LED package has to be attached to a
16 circuit board before it's functional; correct?

17 MR. SAULNIER: Objection. Form.

18 **THE WITNESS:** So in Claim 3, the backlight
19 package comprises -- and one of the things listed --
20 is a light-emitting device disposed on the first
21 portion of the first fastener for emitting light
22 towards the light-guiding plate.

23 That's what I see in Kurokawa annotated
24 figure 2 on page 77 of my declaration. That is a
25 light-emitting device that's emitting light towards

1 a light-guiding plate.

2 BY MR. KROEGER:

3 Q And Kurokawa teaches bending a metallic
4 printed wiring board into an L shape; correct?

5 MR. SAULNIER: Objection to form.

6 BY MR. KROEGER:

7 Q You can look at paragraph 11 of Kurokawa, if
8 you'd like.

9 A Kurokawa teaches bending the wiring board,
10 7, yes.

11 Q And in your opinion, it's bent into an L
12 shape; is that correct?

13 A Yes, as indicated by the shape of the
14 printed circuit board in figure 2 on page 77 or --
15 I'm sorry, in paragraph 171 on page 81 of my
16 declaration.

17 Q And in paragraph 168 of your report, you
18 opined that the printed wiring board, 7, is the
19 first fastener; correct?

20 A Paragraph -- I may not have heard you
21 correctly, but paragraph 161 --

22 Q 168, sorry.

23 A Oh, sorry.

24 Yes. And then there's a second alternative
25 in paragraph 169.

1 Q In that alternative, the cover 1 is the
2 first fastener; correct?

3 A Yes.

4 Q And in that second alternative, the wiring
5 board is still bent into an L shape; correct?

6 A Yes.

7 Q In paragraph 173, you agree that the LEDs
8 are disposed on the wiring board, which is held in
9 place by cover 1; correct?

10 A Which paragraph did you say?

11 Q Sorry. Paragraph 173, you acknowledge that
12 the LEDs are disposed directly on the wiring board;
13 correct?

14 A Yes.

15 MR. SAULNIER: Objection. Form.

16 THE WITNESS: And indirectly disposed on
17 metal plate 71.

18 BY MR. KROEGER:

19 Q And ideally, these were also held in place
20 by cover 1 in Kurokawa; correct?

21 A Yes. As seen in figure 1 of Kurokawa.

22 Q In paragraph 192, do you see that the ribs
23 6A in pink are the heat disputing means; correct?

24 A Ribs 6A may also act as a heat dissipating
25 means, yes.

1 Q Doesn't -- wouldn't that use of 6A as the
2 dissipating means sink heat into the device and
3 closer to the LEDs?

4 A It does have heat inside the enclosure, but
5 that's what's going to happen unless you put the
6 heat sinks on the exterior of the -- of the
7 disclosure. For dissipating heat, volume is
8 important. So the fact that you're increasing the
9 volume of where the heat conducts to will reduce
10 the -- will reduce concentration of heat in specific
11 locations within the enclosure.

12 Q And likewise, for paragraph 218 moving to a
13 different ground, here you put Isoda's heat sinks
14 inside of Kurokawa's device; correct?

15 A Yes.

16 Q And again, in this combination, heat is
17 being directed inside the device and close to the
18 LEDs; correct?

19 A I mean, the heat from the LEDs, which is
20 concentrated, is removed and dispersed; and the fact
21 that it's got a larger volume, I don't think it's
22 technically correct to say that it's moved towards
23 the LEDs because the LED is the source. The goal is
24 the heat gets dissipated that comes from the LEDs.

25 Q But the heat is still being directed inside

1 the -- the enclosure of the device; is that correct?

2 A It's correct to say the heat is not directed
3 inside because it's always inside till it
4 leaves the -- it's dissipated exteriorly. It's
5 just -- it's more correct to say the heat from the
6 LEDs is dispersed over a larger volume when the heat
7 sinks are inside.

8 Q But the heat is being dispersed internal to
9 the device; correct?

10 A It's being spread out within the device, but
11 ultimately, the heat is removed by the exterior
12 environment.

13 Q And turning to paragraph 235, this is the
14 same combination as we saw in 218; is that correct?

15 A The image in paragraph 235 is the same as
16 the image in paragraph 218, yes.

17 MR. KROEGER: Let's go ahead and go off the
18 record for about five minutes.

19 THE VIDEOGRAPHER: The time is 2:36 p.m.,
20 and we're off the record.

21 (Recess.)

22 THE VIDEOGRAPHER: The time is 3:00 p.m.,
23 and we're back on the record.

24 MR. KROEGER: No further questions at this
25 time. Pass the witness.

1 --oOo--

2 EXAMINATION

3 BY MR. SAULNIER:

4 Q And I have a very short redirect.

5 So Dr. Baker, earlier in this deposition --

6 there was a question and answer. The question was:

7 "And I guess, can you specify, then, for

8 Claim 5, which of the two alternatives for the first

9 portion you were using or not in relation to

10 Claim 3B."

11 You said there's two alternative mappings in

12 relation to Claim 3B.

13 Is that in addition to a primary mapping?

14 A Yes. As detailed in paragraphs 166 to 170
15 of my declaration.

16 Q Sorry, Dr. Baker. I think we got a little
17 tied up. I'm referring specifically to Uekusa.

18 A Oh, sorry.

19 Q Yes.

20 A Ground 1 of Uekusa?

21 Q So for Claim 3B, when you refer to two
22 alternative mappings, that's in addition to a
23 primary mapping; correct?

24 A The answer is yes, but I mean, want to make
25 sure we're talking about the same ground. We're

1 talking about Ground 1, Uekusa?

2 Q Yes.

3 A Yes.

4 Q And why don't we do this:

5 So Dr. Baker, in paragraph 85 of your expert
6 report, what do you point to as the first and second
7 portions?

8 A The first portion, I point to upright
9 portion 32 1VP; and the second portion I point to is
10 extension, part 41 and mounted portion 42, 2HP, and
11 that's -- that's what's seen in the first paragraph,
12 the first sentence of paragraph 85.

13 Q Thank you, Dr. Baker.

14 And then in paragraph 87, what do you
15 describe there?

16 A A narrow construction of "disposed on."

17 Q And what are those two alternatives? What
18 are you pointing to as the upright portion?

19 A You're talking about the first two
20 alternatives I discuss in paragraphs 88 and 89?

21 Q Yes, Dr. Baker.

22 A So in paragraph 88, the first alternative
23 is -- the first portion is a combination of upright
24 portion 32 and electrodes 33A and 33B. And in the
25 second alternative, the first portion is upright

1 portion 32, and the LED is the combination of the
2 LED 34 and the electrodes 33A and 33B.

3 Q Thank you, Dr. Baker.

4 So in claim -- in paragraph 99, could
5 you just -- what -- strike that.

6 In paragraph 99, which of three reads that
7 you just discussed does this apply to?

8 A For example, the second portion is the
9 horizontal portion of 2HP, mounted portion 42, and
10 extension part 41.

11 Q What is pointed to as the LED?

12 A Just LED 34.

13 Q So under this disclosure, this is not one of
14 the alternatives or is it -- sorry. Strike that.
15 Let me rephrase.

16 Is this either of the alternatives -- is
17 this a mapping under either of the alternatives that
18 you described, that you discuss?

19 A No.

20 Q Thank you, Dr. Baker.

21 Now, turning to Kurokawa: Do you recall
22 discussing how heat was dissipated in Kurokawa?

23 A I don't remember a specific discussion.

24 Q So -- and Dr. Baker, one of your earlier
25 answers, you stated that heat is removed to the

1 exterior environment in Kurokawa.

2 Can you describe how that's done?

3 MR. KROEGER: Object to form.

4 You can answer.

5 THE WITNESS: I may not be understanding the
6 question. Heat is always removed to the exterior
7 environment. If it's not, then things will -- you
8 continue putting energy into a box, it will continue
9 to heat up until it melts. So heat is always
10 removed externally to an electronic device one way
11 or another.

12 BY MR. SAULNIER:

13 Q Could you turn to paragraph 241 of your
14 expert report?

15 A Okay.

16 Q In the combination of Kurokawa and Isoda,
17 how would heat be able to move away from the
18 interior of the device?

19 A Are you asking about the ventilation
20 holes or the --

21 Q Yes. How would -- what would an option have
22 been for heat to be dissipated in the combination?

23 A Air to flow through the ventilation holes.

24 Q Thank you.

25 MR. SAULNIER: I have no further questions.

1 MR. KROEGER: I have just one quick
2 follow-up just so I understand.

3 --000--

4 FURTHER EXAMINATION

5 BY MR. KROEGER:

6 Q So for Uekusa in section 3B, you actually
7 have three alternatives for the identification of
8 the first fastener; is that correct?

9 A Yes. There's the main disclosure and then a
10 first alternative disclosure, which is discussed in
11 paragraph 88; and a second alternative disclosure
12 discussed in paragraph 89.

13 Q And so -- and the first, I guess primary one
14 is in paragraph 86, where upright portion 32 by
15 itself is the first vertical portion; is that right?

16 A Yes.

17 Q And so this first, I guess, primary
18 alternative does not include the substrates as part
19 of the first portion; is that right?

20 A The substrate electrodes 32A and 32 --
21 sorry, 33A and 33B, are not included in the first
22 upright portion position.

23 Q Okay. And if we turn to 3B of Kurokawa, it
24 looks like you're also offering three potential
25 alternatives for the structure of the first portion

1 there as well; correct? That's starting in
2 paragraph 166?

3 **A Yes.**

4 Q And I guess the first or primary one is at
5 metal plate 71 by itself, is both the first portion
6 and second portion; is that right?

7 **A Yes, as I discuss in paragraphs 166 and 167.**

8 Q And then paragraph 241, you mentioned with
9 your counsel some discussion about, I guess, heat
10 ventilation holes 7C in Kurokawa. We see that in --
11 yup -- paragraph 241.

12 **A Yes, I discuss the plurality of ventilation**
13 **holes 7C.**

14 Q And for the combination of Kurokawa and
15 Isoda, the -- I saw these heat plates 41 and 41A are
16 placed above the hole 7C; is that right?

17 **A The heat plates are inside the package, yes.**

18 Q Okay. And they're physically above the
19 ventilation hole 7C; correct?

20 **A Well, they're not closing up the hole, but**
21 **yes.**

22 Q Is there any space between the fins and the
23 hole?

24 **A I would assume it's just a simple design**
25 **choice to ensure that air can actually flow in.**

1 **Otherwise, there's no reason to have a hole.**

2 MR. KROEGER: All right. Thank you. Pass
3 the witness.

4 MR. SAULNIER: No further questions.

5 MR. KROEGER: All right. Thank you for your
6 time.

7 THE COURT REPORTER: Okay. Before we go
8 off, same as last time, do you both need a rough
9 draft?

10 MR. KROEGER: Yes.

11 THE COURT REPORTER: Okay.

12 MR. SAULNIER: Yeah, we'll take one as well.

13 THE COURT REPORTER: Okay.

14 THE VIDEOGRAPHER: And video orders?

15 MR. KROEGER: I think we have a standing
16 order; but if not, yeah, I think we'll take the
17 video.

18 THE VIDEOGRAPHER: Sure.

19 MR. SAULNIER: And Alan, I don't know about
20 us, but I assume we want the video as well.

21 MR. LIMBACH: I believe we're not going to
22 order a video at this time, but we might in the
23 future, if that's okay.

24 THE VIDEOGRAPHER: Yeah. No worries.

25 All right. The time is 3:16, and we're off

1 the record.

2 (Time noted: 3:16 p.m. PT/5:16 p.m. CT)

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1 CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

2 The undersigned Certified Shorthand Reporter and
3 Deposition Notary Public of the States of California,
4 Washington and Nevada does hereby certify:

5 That the foregoing deposition was taken before me
6 remotely at the time therein set forth, at which time the
7 witness was duly sworn by me;

8 That the testimony of the witness and all
9 objections made at the time of the deposition were
10 recorded stenographically by me and were thereafter
11 transcribed, said transcript being a true and correct copy
12 of the proceedings thereof.

13 I further certify that I am neither counsel for
14 nor related to any party to said action, nor in any way
15 interested in the outcome thereof.

16 Further, that if the foregoing pertains to the
17 original transcript of a deposition in a federal case,
18 before completion of the proceedings, review of the
19 transcript was not requested/offered on the record.

20 In witness whereof, I have subscribed my name,
21 this date: April 9, 2025

22
23 

24 Cheryl Haab Scott, RDR, CRR, CCRR
25 CSR No. 13600/WA CSR No. 3499/NV CCR No. 1003

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