

In the Matter Of:
Quasar Science vs Colt International Clothing

IPR2023-00613 and IPR2023-00614

GARY ALLEN, PH.D.

April 19, 2024



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

3 -----

4 QUASAR SCIENCE LLC,

5 Petitioner,

6 v.

7 COLT INTERNATIONAL CLOTHING, INC. d/b/a COLT LED,

8 Patent Owner.

9 Case: IPR2023-00613

10 U.S. Patent No. 10,411,582

11 Case: IPR2023-00614

12 U.S. Patent No. 10,566,895

13 -----

14

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16 DEPOSITION OF
17 GARY ALLEN, Ph.D.

18

19

20 APRIL 19, 2024

21 9:00 a.m.

22

23 1144 15th Street, Suite 3300

24 Denver, Colorado

25 Michele Koss, RMR, RPR



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DEPOSITION OF GARY ALLEN, Ph.D.

April 19, 2024

GARY ALLEN, Ph.D.,
having been first duly sworn, testified as follows:

CROSS-EXAMINATION

BY MR. BRIGGS:

Q Good morning, Dr. Allen. How are you today?

A Good.

Q So my name is Heath Briggs. I am a patent
attorney with the law firm of GreenbergTraurig. We
represent the Petitioner, Quasar Science, in this
matter.

Do you understand that you are here for a
deposition in connection with two Inter Partes review
proceedings before the U.S. Patent and Trademark Office?

A Yes.

Q And those are called Inter Partes reviews or
IPRs.

Do you understand that term?

A Yes.

Q If I use the term IPR, you know that I am
referring to Inter Partes reviews?

A Yes.

Q For the record, those matters are
IPR2023-00613 and IPR2023-00614.



1 So I was going through your CV, and it looks
2 you have been deposed before; is that correct?

3 A Yes.

4 Q About how many times?

5 A Four times.

6 Q Have those all been in connection with
7 patent proceedings?

8 A Yes.

9 Q Were any of those patent proceedings related
10 to --

11 A I should correct that. One was a
12 class-action suit.

13 Q So one class-action suit deposition?

14 A Yes. I believe the other three were patent
15 related, as I recall, yes.

16 Q Okay. And any of those recently?

17 A About a year ago, a year and a half maybe.

18 Q Any of those related to LED lighting?

19 A All.

20 Q All of them related to LED lighting?

21 A Yes.

22 Q Were any of them related to lighting in
23 connection with film or movie production?

24 A No.

25 Q Okay. Since you have been deposed before,



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1 you probably understand how this works, but I am going
2 to go over the ground rules again.

3 A Okay.

4 Q So I am going to ask you a bunch of
5 questions today about your declarations that you have
6 submitted in these proceedings. I will do my best to
7 ask a clear question and I do ask that you do your best
8 to provide a clear answer.

9 We have our court reporter sitting here, so
10 it is really important that we don't talk over each
11 other. So I am also going to try to not interrupt you
12 while you are providing an answer. And I would ask that
13 you please also do your best to not interrupt me while I
14 am asking a question.

15 Is that okay?

16 A Understood.

17 Q I see that you are shaking your head right
18 now.

19 A Do not do that.

20 Q Yes. Please answer with a verbal yes or no
21 or however you want to answer. Head shakes yes or no
22 are not captured by the transcript.

23 A Okay. Okay.

24 Q So Mr. Hoffman has probably already
25 explained this to you. He is allowed to object on the



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1 record but, unless he instructs you not to answer, you
2 are required to answer my question. Understood?

3 A Okay.

4 Q So I don't know what you have done in prior
5 depositions, but I typically take a break every sixty
6 minutes.

7 Does that work for you?

8 A That is good.

9 Q All I ask is, if there is a pending
10 question, that you answer the question before we go on
11 break.

12 Is that okay?

13 A Yes. Yes.

14 Q Okay. And I think Mr. Hoffman has probably
15 also explained this to you, that you are not allowed to
16 talk about the substance of your testimony today during
17 my cross-examination and during any breaks, okay?

18 A Understood.

19 Q That means until I have concluded my
20 cross-examination, you and Mr. Hoffman cannot talk about
21 the substance of the case, okay?

22 A Yes. Understood.

23 Q And the court reporter just swore you in as
24 we just heard. So you are required to testify
25 truthfully today.



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1 Do you understand that?

2 A Yes.

3 Q Is there any reason that you cannot testify

4 truthfully here today?

5 A No, not at all.

6 Q You are not on any medications or anything

7 like that that would prevent you from testifying

8 truthfully?

9 A No.

10 Q You are not on any medication?

11 A No, I am not on any medication that would

12 prevent me from testifying truthfully.

13 Q Okay. Dr. Allen, I am going to give you

14 copies of your declarations. So the first one is from

15 IPR2023-00613. The second one is from IPR2023-00614.

16 A Okay. Thanks.

17 MR. BRIGGS: Do you want copies?

18 MR. HOFFMAN: Yes, please.

19 Q So can you please look at Exhibit 2080 from

20 IPR2023-00613.

21 A Exhibit 2080 is this?

22 Q So if you look at the bottom of the page, do

23 you see how there are exhibit numbers listed there? You

24 have Exhibit 2080.

25 And the other document, if you can look at



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1 the other document real quick, that is also 2080. So we
2 are going have to be clear on which IPR we are talking
3 about. If you look at the middle of the front page, you
4 can see an IPR number.

5 Do you see that?

6 A Yes, 613.

7 Q And that one is?

8 A 614 so.

9 Q You have two different declarations and that
10 is because we have two different IPR proceedings?

11 A Yes.

12 Q I looked at both of these declarations and
13 they seem nearly identical to me except for some changes
14 obviously due to changes in the wording of the claims
15 and patent numbers but, other than that, the majority of
16 the substance of the testimony appears to be basically
17 the same between the two.

18 Is that your understanding as well?

19 A Yes.

20 Q Okay. So let's just work off the '613,
21 Exhibit 2080, for the majority of the proceedings. If
22 you want to put that other one aside so we don't
23 accidentally grab it for now.

24 A Okay.

25 Q Thank you. So can you please go to page 73



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1 of your declaration.

2 For the record, when I say "your
3 declaration," or "Mr. Allen's declaration," I am
4 referring to Exhibit 2080.

5 A Yes.

6 Q So at the bottom of that we see a signature?

7 A Yes.

8 Q For Gary R. Allen, right?

9 A Yes.

10 Q Is that your signature?

11 A It is.

12 Q Okay. Thank you.

13 I guess we should do that also for the '614.
14 If you can go to page 74 of that document, please.

15 A Okay. Yes, that is my signature.

16 Q Same signature, right?

17 A Yes.

18 Q So, again, these are your declarations then,
19 correct?

20 A Correct.

21 Q Okay. Thank you.

22 So did you prepare for the deposition today?

23 A Yes.

24 Q How so?

25 A Reviewing my declaration and all of the



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1 prior art and any other documents that are cited in my
2 declaration.

3 Q So when you say "all of the prior art," do
4 you mean documents like, if I said Hasnain, would you
5 know what document I am referring to?

6 A Yes.

7 Q Did you prepare with anybody else for the
8 deposition?

9 A Of course some discussions with David
10 Hoffman, the usual, reviewing the content of the
11 declaration, the issues in the patents and the prior
12 art, just sort of review.

13 Q Okay. Did you review the patent owner's
14 response as part of your preparation?

15 A I don't recall reviewing that.

16 Q Okay. Did you review Mr. Holmes'
17 declaration as part of --

18 A Yes.

19 Q -- your preparation?

20 A Yes. Yes.

21 Q Okay. Let us try to, I will ask a question
22 and then if you can just hold on a second, because she
23 is trying to catch your answers but you are answering in
24 the middle of my question.

25 A I am sorry.



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1 Q Did you prepare with anybody besides
2 Mr. Hoffman for the deposition?

3 A No.

4 Q You didn't speak to any colleagues or
5 anything about the case?

6 A No.

7 Q Okay. So let's look at the front page of
8 Exhibit 2080, please.

9 A Okay.

10 Q On the front page there are two parties
11 listed, correct, the first is -- excuse me. I will
12 start that question again.

13 I will also go to the front page. So if we
14 are looking at the front page of Exhibit 2080, in the
15 middle of the page we see a company called Quasar
16 Science, LLC, Petitioner, correct?

17 A Yes.

18 Q And below that we see Colt International
19 Clothing, Inc. d/b/a Colt LED, Patent Owner, correct?

20 A Yes.

21 Q Are you familiar with either of these
22 companies?

23 A I am familiar with Colt, and only
24 peripherally familiar with Quasar.

25 Q How are you familiar with Colt?



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1 A I have done prior declarations with Mr.
2 Hoffman, reexams for other IP for Colt. So I am
3 familiar with their technology at that level.

4 Q So you put in a declaration in a
5 reexamination proceeding for Colt?

6 A Yes.

7 Q Do you happen to know which proceeding that
8 is or if it is listed in your CV?

9 A Is it listed in my CV?

10 Q Let us go back to the back of Exhibit 2080,
11 page 80.

12 Here we see expert witness experience at the
13 top of the page, correct?

14 A Yes. I have not updated this to include
15 that Colt reexam.

16 Q Okay. I was going to ask this anyway.
17 When was the last time this was updated?

18 A It would have been roughly 2022. Looking
19 down through here, that is the only expert witness
20 experience that is not included.

21 Q So I should understand page 80 of Exhibit
22 2080 to have all of your experience as an expert witness
23 except for the Colt reexamination; is that correct?

24 A That is the way it appears. I believe that
25 is true.



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1 Q Okay.

2 A I can provide the details of that reexam
3 during the break, if that is acceptable.

4 Q We will ask for a copy of that declaration
5 since it was not provided to us in advance.

6 A Okay.

7 Q And it directly relates to this proceeding?

8 A Sure.

9 Q Do you recall what your testimony was, in
10 general, in that reexamination?

11 A It was regarding technical aspects of the
12 suitability for commercial image recording, especially
13 as regards to color quality.

14 So the requirements for high CRI, for low
15 green, what sorts of lumen penalties those requirements
16 have on an LED, topics similar to what is in this IP.

17 Q Do you recall if there is any
18 inconsistencies in that reexamination testimony versus
19 what is in your testimony in this Exhibit 2080?

20 A I didn't review that declaration in
21 preparation for this, but I don't suppose there would
22 be any inconsistency.

23 MR. BRIGGS: I would like to get a copy of
24 that reexamination, at a minimum over the break, so I
25 can review it during the break, please, Mr. Hoffman.



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1 MR. HOFFMAN: Sure.

2 MR. BRIGGS: Thank you.

3 Q Let us move on. You said you are familiar
4 with Colt, and that is because you also had put in an
5 expert declaration in one of the reexamination
6 proceedings; is that correct?

7 A Yes.

8 Q Any other ways that you are familiar with
9 Colt?

10 A No.

11 Q Okay. And you see there is two companies
12 here, Colt International Clothing, Inc. and Colt LED?
13 Do you see that?

14 A Yes.

15 Q If I say Colt today, you will understand
16 that I am referring collectively to those two companies?

17 A Yes.

18 Q You said that you are peripherally aware of
19 Quasar Science, LLC?

20 A Yes.

21 Q What do you mean by that?

22 A Only that they are providing products
23 similar to Colt's products for commercial image
24 recording.

25 Q So you are aware of Quasar Science, LLC



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1 because they provide products similar to the products
2 that Colt provides?

3 A Yes.

4 Q What similar products?

5 A For what I would call stage lighting or
6 commercial image recording applications.

7 Q Any specific products in mind?

8 A No.

9 Q Okay. Do you know what the term bicolor
10 means in relation to those products?

11 A Yes.

12 Q Were the products bicolor products by
13 chance?

14 A Are you asking about Quasar products?

15 Q The products that you are familiar from
16 Quasar, were those products bicolor products?

17 A I am not familiar with the specifics, only
18 that they are similar to Colt's products.

19 Q Fair enough.

20 Do you know any employees or officers of
21 Quasar Science, LLC?

22 A No.

23 Q Do you know any employees or officers of
24 Colt?

25 A No.



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1 Q So let's go back to your declaration,
2 Exhibit 2080, and if you can please go to page 75.
3 Are you there?
4 A Yes.
5 Q Great. So it looks at the top we have Gary
6 R. Allen, Ph.D.
7 That is you, correct?
8 A Yes.
9 Q Would you prefer if I call you Dr. Allen
10 today or something else?
11 A Dr. Allen is fine.
12 Q Great. This looks to be your CV or resume,
13 is that correct, starting on page 75?
14 A Yes.
15 Q Do you prefer it to be referred to as a CV
16 or resume or does it matter?
17 A It does not matter.
18 Q I am going to call it a CV.
19 In your CV you have your education listed
20 first, correct?
21 A Yes.
22 Q It looks like you have a Ph.D in
23 astrophysical sciences in 1980 and corresponding
24 master's of astrophysical sciences in 1977 from
25 Princeton, correct?



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1 A Yes.

2 Q Then you went to Penn State, it looks like,
3 and graduated with a bachelor's degree in nuclear
4 engineering and engineering science in 1974, correct?

5 A Yes.

6 Q And then later in 1975 you graduated from
7 Penn State with a master's in nuclear engineering?

8 A Correct.

9 Q And then below your education you have
10 experience listed; is that right?

11 A Yes.

12 Q And let's turn the page and go to page 76 of
13 Exhibit 2080.

14 A Yes.

15 Q And it looks like the majority of your
16 career was spent in or at GE Lighting, from 1987 to
17 2016; is that right?

18 A Yes.

19 Q Okay. But before that you were a research
20 physicist for Sylvania Lighting?

21 A Yes.

22 Q It looks like you have a listing of patents
23 that follows your experience; is that right?

24 A Correct.

25 Q Here it says 92 count, correct?



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1 A Yes.

2 Q So is this list up-to-date?

3 A Yes.

4 Q Okay. It looks like several of these
5 patents are in relation to LEDs; is that right?

6 A Yes.

7 Q Do you know how many, approximately, are
8 related to LEDs as opposed to fluorescent or other types
9 of lighting devices?

10 A 46.

11 Q Wow, right off the top. Good job. You
12 pass.

13 Are any of those 46 patents related to, I
14 think you have been using the term commercial image
15 recording quality LEDs or lighting systems for those?

16 A Yes.

17 Q Do you know which ones?

18 A The titles sometimes are not descriptive
19 enough for me to be certain.

20 Q Okay.

21 A There were several patents related to a PAR
22 38 lamp that I invented and we commercialized at GE
23 Lighting and is used for commercial image recording, as
24 well as other commercial applications.

25 I believe that the patents related to that



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1 PAR, meaning parabolic aluminized reflector, I believe
2 the patents related to the PAR are 8,608,347, 8,613,530,
3 and that may be it for that particular lamp.

4 Q So you call that a PAR 38?

5 A PAR 38 and 30. Those are the diameter
6 sizes.

7 Q In inches?

8 A They are an eighth of an inch.

9 Q And PAR stands for parabolic aluminized --

10 A Parabolic aluminized reflector. That is a
11 standard term in the lighting industry.

12 Q Okay. How do those two patents relate to
13 commercial image recording?

14 A Again, I want to emphasize the caveat that
15 I am not certain that those two are the right patents
16 based on the titles. The way that they are related to
17 commercial image recording is that they have the same
18 requirements for color quality, uniform distribution,
19 uniform color, long-life hybrid liability, high
20 efficacy and, in fact, they are used in stage settings.

21 The most challenging aspects of developing
22 that first ever lamp of that type when LEDs were still
23 inefficient as they were at the time of this invention
24 was doing thermal management. So in those ways both the
25 color quality and the thermal management and the



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1 application space require reliability, stability of the
2 output matches the demands of commercial image
3 recording.

4 Q Aside from those two, and with the caveat
5 that those may not be the exact works, are there any
6 other patents that I should know about that relate to
7 commercial image recordings specifically?

8 A Half of the patents are related to LED. It
9 depends on how specific we want to ask the question,
10 are they related?

11 Q I will reask it then.
12 Designed specifically for use in TV or film
13 production?

14 A Only the PAR lamps.

15 Q Okay. Thank you.

16 So you do have quite a few patents, and
17 congratulations on that.

18 A Thank you.

19 Q Were you ever a member of a patent committee
20 or similar when you were employed at GE?

21 A Yes.

22 Q Okay. You do understand what patent law is
23 then?

24 A I am not an attorney. I try to understand
25 the parts that I need.



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1 Q Okay. Because you have an opinion in here
2 about what is patentable versus not patentable. I don't
3 see any section in here about your understanding of
4 patent law.

5 A Can you tell me where it is that I have
6 opined on what is patentable?

7 Q You have said a lot of things would not have
8 had a reasonable expectation of success, which is a
9 phrase commonly used in the context of whether something
10 would be patentable or not.

11 A Okay.

12 Q That is one of many things. You say novel
13 and obviousness, but I don't see a section in here on
14 patent law standards.

15 Did I miss it or is there a section on
16 patent law standards?

17 A We did not include what is meant by
18 obviousness and so on.

19 Q What is your understanding of anticipation
20 in the context of U.S. patent law?

21 MR. HOFFMAN: Objection. Calls for a legal
22 conclusion.

23 Q You can answer.

24 A Must I answer?

25 Q Yes.



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1 A Okay. Anticipation, and I am not going to
2 use the proper language, but it is a situation where a
3 single piece of prior art provides all of the elements
4 in a claim without relying on other prior art in
5 combination.

6 Q Okay. What is the standard for obviousness?

7 A The standard for obviousness, again, I
8 don't have the legal language, but it is such that a
9 POSITA would be able to put together in effect the
10 invention based on what is taught in the patent.

11 Q By POSITA, for the record, we mean a person
12 of ordinary skill in the art, correct?

13 A Yes.

14 Q And we are going to call that P-O-S-I-T-A
15 for the court reporter.

16 In your review of the prior art provided in
17 the 2023-00613 IPR, did you study any standards for
18 obviousness before you provided your opinion?

19 A The way that you have asked it, no, I did
20 not study any standards.

21 Q Did you rely on your past experience on
22 obviousness in applying your opinions then?

23 A Yes.

24 Q What type of past experience?

25 A Having been deposed on, as I recall, three



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1 patent related or patent infringement related cases, I
2 have been coached and provided the legal language
3 around obviousness.

4 Q Okay. Do you know what enablement means in
5 the context of patent law?

6 MR. HOFFMAN: Objection. Relevance and
7 legal conclusion.

8 A I have not been asked to opine on
9 enablement in this case.

10 Q My question is, do you know what it means?

11 A I can paraphrase, again without the legal
12 language, that enablement has to do with the contents
13 of the patent, as the word says, enabling a POSITA to
14 build and reproduce the results of the patent.

15 Q Okay. Have you ever been asked to arrange
16 lighting for a TV or movie studio?

17 A No.

18 Q Have you ever planned a lighting arrangement
19 for a commercial image recording?

20 A No.

21 Q Have you ever designed any set lighting?

22 A Would you specify or clarify what that
23 means?

24 Q TV set or movie set lighting. Have you ever
25 designed the layout of any TV or movie set lighting?



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1 A The layout, no.

2 Q Okay. Have you ever worked as a gaffer?

3 A No.

4 Q All right. Let's go back into your
5 declaration and go to paragraph 1, which is at page 2 of
6 Exhibit 2080.

7 A Okay.

8 Q So the top of this says, Declaration of Gary
9 R. Allen Ph.D in support of patent owner's response,
10 correct?

11 A Yes.

12 Q How did you prepare this declaration?

13 A It was prepared iteratively. Mr. Hoffman
14 described to me which issues he wanted me to opine on.

15 I read thoroughly both patents, all of the
16 prior art, the related documents and started to form my
17 opinions which I wrote down as a draft declaration.

18 Iteratively after that Mr. Hoffman, of
19 course, applied layers of legal structure to it and then
20 there was editing after that to get to the fine points.

21 Q Did you work with anybody else in preparing
22 your declaration?

23 A No.

24 Q Okay. So let look at paragraph 2 of your
25 declaration, please. Read that and let me know when you



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1 are ready.

2 A My compensation --

3 Q I am sorry. Read it to yourself. I
4 apologize. If I say please read it today, you can
5 assume I mean read it to yourself.

6 A Okay. Yes, I have done that.

7 Q You say, My compensation is in no way
8 contingent on the nature of my findings, the
9 presentation of my findings in testimony, or the outcome
10 of this or any other proceeding. I have no other
11 interest in this proceeding. Correct?

12 A Correct.

13 Q So you have no financial interest in Colt?

14 A Correct.

15 Q You don't own any stock in Colt?

16 A No.

17 Q You don't have any family members who work
18 for Colt?

19 A No.

20 Q Okay. If you can look at paragraph 4 of
21 your declaration then, please.

22 A Okay.

23 Q Just read that and let me know when you are
24 ready.

25 A Okay.



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1 Q So it looks like you have a lot of
2 experience with LED lamps, but I don't, what I don't see
3 here is experience with commercial recording imaging,
4 correct?

5 A The LED lamps and luminaires includes those
6 PAR lamps which are used in stage and studio
7 applications, commercial imaging recording applications
8 and have the same very demanding requirements on color,
9 reliability and thermals as the products in this case.
10 So that term encompasses what you are asking.

11 Q Okay. Let us go to paragraph 8 of your
12 declaration, please. Why don't you go ahead and read
13 that whole paragraph and then I will ask you some
14 questions.

15 A Okay.

16 Q So about three lines it says that the patent
17 was issued to Guillermo Macias.

18 Do you see that?

19 A Yes.

20 Q Do you know Mr. Macias?

21 A No.

22 Q So you have never met him?

23 A No.

24 Q You never spoke to him on the phone?

25 A No.



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1 Q You never exchanged any emails with him?
2 A No.
3 Q Text messages?
4 A No.
5 Q No communications whatsoever?
6 A No communications whatsoever.
7 Q Okay. So read paragraph 9 of your
8 declaration on page 6 and let me know when you are
9 ready.
10 A Okay.
11 Q Here is one of the reasons that I asked what
12 your experience was, because you have been retained to
13 opine on certain questions related to ground one which
14 it starts, and there is a bunch of claims, and would
15 have been obvious based on some prior art references;
16 and then you also say would have been obvious based on
17 Kit in view of Iamiro, Ducharme and Katzir, correct?
18 A Yes.
19 Q So what was your standard for obviousness
20 when you did this analysis?
21 MR. HOFFMAN: Objection to the extent it
22 calls for a legal conclusion.
23 Q You can answer.
24 A Would you repeat it again, please?
25 MR. BRIGGS: Would you read it back, please?



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1 (The question was read.)
2 MR. HOFFMAN: And mischaracterizes.
3 Q It says, I have been retained to opine on
4 certain questions related to Ground I which asserts that
5 Claims 1 through 3, 6 through 18, 21 through 24 and 27
6 to 31 would have been obvious.
7 Do you see that?
8 A Yes.
9 Q What is your standard for obviousness?
10 MR. HOFFMAN: Same objections. Calls for a
11 legal conclusion, and it is a mischaracterization.
12 MR. BRIGGS: David, as you know, you can do
13 objections to form but not the really long objections.
14 MR. HOFFMAN: If I say objection to form,
15 will that cover a mischaracterization?
16 MR. BRIGGS: Yes. Can we go off the record
17 for a minute?
18 (Recess was taken.)
19 Q Back on the record. So I was just asking
20 you, Dr. Allen, what your standard for obviousness was
21 as specified in paragraph 9 of your declaration?
22 A So I have already answered that question.
23 MR. HOFFMAN: Same objection. Form.
24 A I have already answered that.
25 Q Yes, and your answer was?



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1 A Can we pull it back up in the record? Do
2 you recall that I answered?

3 Q I recall that you said that you used prior
4 experience with obviousness.

5 Is that your answer again? I cannot testify
6 for you. I am asking you what your answer is on what
7 your standard of obviousness is, because it is not in
8 your declaration.

9 So if you don't know what standard you used
10 for obviousness --

11 A I am saying that I answered the question
12 already. I don't know what your process is for this.

13 MR. BRIGGS: If you want us to go off the
14 record and stop, she can go back and find it, because I
15 am not going to delay my time here with him going back
16 and getting his answer read all of the time.

17 MR. HOFFMAN: Okay. We will go off the
18 record.

19 (Recess was taken.)

20 MR. BRIGGS: Back on the record. So thank
21 you, court reporter, for finding his answer.

22 Can you please read his answer on
23 obviousness back for the record so I can ask questions
24 about it?

25 (The record was read as follows:



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1 "Question. Okay. What is the standard for
2 obviousness?

3 "Answer. The standard for obviousness,
4 again, I don't have the legal language, but it is such
5 that a POSITA would be able to put together in effect
6 the invention based on what is taught in the patent.

7 Q Is that the standard that you applied in
8 paragraph 9 of your declaration?

9 A Yes.

10 Q Okay. When you are assessing obviousness,
11 do you look at the claims of the patent at issue?

12 A Yes.

13 Q And did you do so here?

14 A Yes.

15 Q Did you read the prior art?

16 A Yes.

17 Q Did you read each prior art reference in its
18 entirety?

19 A Yes. No. One of those is 305 pages long.
20 No, I did not read all 305 pages. I skimmed through
21 much of that.

22 Q Okay.

23 A I know the content.

24 Q Okay. Let's look at Claim 1. If you can go
25 to page 7 of your declaration. At the top there is a



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1 paragraph 11.

2 Do you see that?

3 A Yes.

4 Q I am going to read it. It says, Claim 1 of
5 the '582 patent recites an LED light system configured
6 for providing broad-spectrum white light suitable for a
7 commercial image recording, in a form factor of a
8 fluorescent light lamp, correct?

9 A A fluorescent light tube lamp, yes.

10 Q Thank you.

11 That is the preamble of Claim 1, correct?

12 A Yes.

13 Q Then it says, the LED light system includes.
14 Do you see that?

15 A Yes.

16 Q Why did you replace the word includes
17 instead of using the original language of comprising?

18 MR. HOFFMAN: Objection. Form.

19 A I don't have an answer for that.

20 Q Let's get Exhibit 1001 so we are working off
21 the same thing. I am providing you a copy of 1001,
22 which is a copy of the '582 patent.

23 You now have that, correct?

24 A I do, yes.

25 Q If you want to turn to Claim 1, it starts



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1 with column 12, line 4, approximately.

2 Are you there?

3 A Yes.

4 Q So we just agreed that the first part of
5 your paragraph 11 is the preamble, correct?

6 A Yes.

7 Q And then if we look at the '582 patent,
8 line 7, it says, the LED light system comprising.

9 Do you see that?

10 A Yes.

11 Q But instead of saying comprising in your
12 declaration, you say includes?

13 MR. HOFFMAN: Objection. Form.

14 Q Do you understand the question?

15 A It was not a question.

16 Q I said the light system -- in paragraph 11
17 you say the light system includes.

18 That is what your paragraph says, correct?

19 A Yes.

20 Q So you have replaced the word includes --
21 excuse me. You replaced the word comprising with
22 includes in your declaration, correct?

23 MR. HOFFMAN: Objection. Form.
24 Characterization.

25 A Correct, without quotes.



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1 Q What do you mean correct, without quotes?
2 A Those words do not have quotes around them.
3 Q Right. I am asking, why did you replace the
4 word comprising with includes?
5 MR. HOFFMAN: Objection. Asked and
6 answered. Form.
7 MR. BRIGGS: He did not answer this
8 question.
9 A Yes, I have. She can look it up again.
10 Yes, I have.
11 Q You said why you replaced the word
12 comprising with includes?
13 A You asked that question and I have answered
14 it.
15 Q I have not asked it.
16 A You can look it up.
17 Q Why did you replace the word includes -- why
18 did you use the word includes instead of comprising? I
19 never asked that question.
20 MR. HOFFMAN: Objection. Form.
21 Characterization. Harassing.
22 A You did ask that question and I answered it
23 and I will repeat the answer now.
24 My answer to that question that you asked
25 explicitly was, I don't have an answer for that. That



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1 is in the record probably verbatim.

2 Q So you don't know why you replaced the word
3 comprising with includes?

4 MR. HOFFMAN: Objection. Characterization.
5 Form.

6 A It is not in quotes.

7 Q Okay. The claim says that the LED light
8 system comprising, right?

9 A Yes.

10 Q Do you know what the word comprising means
11 in the context of patent law?

12 A Not exactly, but I can give an
13 interpretation.

14 Q Go ahead.

15 A It means that it includes the following; it
16 may also include some other things.

17 Q Right. So it is open-ended, correct?

18 A Yes.

19 Q Do you know what the word consisting of then
20 means in patent law?

21 MR. HOFFMAN: Objection. Legal conclusion.
22 Not relevant.

23 A Consisting of, I am guessing because I
24 don't know that aspect of patent law, but I would
25 interpret that to mean that it is all inclusive,



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1 consisting.

2 Q Closed as opposed to open, correct?

3 A I believe so.

4 Q Okay. So let's go down right below the
5 language, the light system includes: and it starts 1B,
6 correct?

7 A Yes.

8 Q Why is there no 1A?

9 A We were focusing on the claim elements that
10 I have listed here.

11 Q So I just asked you though a few minutes ago
12 when you did your obviousness analysis did you consider
13 the claim as a whole. I don't see 1A here.

14 MR. HOFFMAN: Objection. Argumentative.
15 Form.

16 Q Did you consider 1A in your analysis?

17 MR. HOFFMAN: Objection. Argumentative
18 form.

19 Q Yes. Show me in your declaration where you
20 considered 1A.

21 A This will take a while unless you would
22 like me to use my digital copy and do a scan.

23 MR. BRIGGS: You can use your digital copy.
24 Why don't we go off the record. You don't have to do
25 this during the break. I just need to use the restroom



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1 real quick. Let us go off the record.

2 (Recess was taken.)

3 Q So, Dr. Allen, thank you for letting me take
4 a break.

5 If you want to use your electronic version
6 to search for limitation 1A, that would be great.

7 A I can short circuit that. What I am
8 looking for is my use of the word housing in regards to
9 the thermal management and complete system. I don't
10 recall without looking if I used that term. That is
11 what I would be searching for, if that is sufficient to
12 your question.

13 Q I will read what limitation 1A says. It
14 says, A housing having ends and including a support
15 structure in the form of an elongated and narrow surface
16 having a top side and a bottom side. So it is just more
17 than housing. It has to have the support structure and
18 not really dimensions but at least a narrow surface and
19 a top side and bottom side.

20 So I am a little confused. Are you going to
21 search for that or you are not going to search for that?

22 A I don't believe that I have included those
23 other aspects in my declaration, no.

24 Q Okay. That is fine.

25 All right. So going back to the word



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1 includes, am I to understand that you have the same
2 definition of includes that you apply for comprising?
3 They are both open?

4 A Yes.

5 Q So if they are both open, that means, as you
6 said, other things other than what are listed in the
7 claim can be included, correct?

8 A Yes.

9 Q Okay. So, for instance, if we look at
10 Limitation 1B and 1C on page 7, there is a plurality of
11 first LEDs in limitation 1B and there is a plurality of
12 second LEDs in limitation 1C, correct?

13 A Yes.

14 Q So conceivably a device that has a plurality
15 of third LEDs would still be within the scope of Claim
16 1, correct?

17 A Agreed.

18 Q Okay. So in your analysis of Claim 1 did
19 you consider the preamble to be limiting?

20 A Yes, it is somewhat limiting.

21 Q So I don't think somewhat counts. It is
22 either limiting or not in patent law.

23 A I do not understand that aspect of the
24 patent law. If you can explain it to me, please.

25 Q No. It is either limiting or not limiting.



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1 It is pregnant or not pregnant.

2 MR. HOFFMAN: Objection. Form.

3 Argumentative.

4 MR. BRIGGS: I am not done asking my
5 question. You can object when I am done asking my
6 question.

7 MR. HOFFMAN: I thought you were done. I am
8 sorry.

9 Q So it is either pregnant or not pregnant.
10 Is your answer that the preamble is limiting
11 or not limiting?

12 MR. HOFFMAN: Objection. Form.

13 A As a non-attorney I know what pregnant and
14 nonpregnant means. As a non-attorney, I don't know
15 what limiting and nonlimiting means.

16 Q Okay. Let us continue on. So please go to
17 page 9 of your declaration.

18 A Okay.

19 Q On page 9 there is paragraph 12, correct?

20 A Yes.

21 Q That says, Claims 6-7 both recite that the
22 first and second LEDs are phosphor-based emitters,
23 correct?

24 A Yes.

25 Q Do you know what the Doctrine of Claim



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1 Differentiation means?

2 A No.

3 Q So Claims 6 and 7 require first and second
4 LEDs are phosphor-based light emitters, correct?

5 MR. HOFFMAN: Objection. Form.

6 A That is what my --

7 MR. HOFFMAN: Objection. Form.

8 A That is what my declaration says.

9 Q Which means Claim 1 does not require first
10 and second LEDs or phosphor-based light emitters,
11 correct?

12 MR. HOFFMAN: Objection. Form.

13 A Let me review Claim 1, please.

14 Q Sure.

15 A Correct.

16 Q Just to be clear on the record, Claim 1 does
17 not require first and second LEDs are phosphor-based
18 light emitters, right?

19 MR. HOFFMAN: Objection. Form. Legal
20 conclusion.

21 Q I am trying to make sure the record is
22 clear. All you said was correct. I want to make sure
23 that we are saying correct to the right thing. I am not
24 trying to do anything here.

25 Should I say the question again?



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1 A Yes, please.

2 Q So because Claims 6 and 7 require the first
3 and second LEDs are phosphor-based light emitters, that
4 means, and those same limitations are not recited in
5 Claim 1, that means Claim 1 does not require first and
6 second LEDs are phosphor-based light emitters, correct?

7 MR. HOFFMAN: Objection. Form. Legal
8 conclusion. Scope.

9 Q You can answer.

10 A Correct.

11 Q Okay. So please look at paragraph 15 of
12 your declaration.

13 A Okay.

14 Q Why don't you go ahead and read that and let
15 me know when you are ready.

16 A Okay.

17 Q So the first sentence of paragraph 15 of
18 your declaration, I have been asked to assume a date of
19 invention of May 17, 2013, right?

20 A Yes.

21 Q Do you know why you were asked to assume
22 that date?

23 A I do not.

24 Q Okay. Can you look at the front page of
25 Exhibit 1001, please, which is the '582 patent.



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1 A Okay.

2 Q If we look under related U.S. Application
3 Data; do you see that?

4 A Yes.

5 Q There is in front of me I can see, because
6 you are already going to page 2 which lists a bunch of
7 applications, the earliest of which is filed May 17,
8 2013, correct?

9 A Yes.

10 Q Below that there is a provisional
11 application number 61/648,554 filed May 17, 2012,
12 correct?

13 A Yes.

14 Q Did you analyze the provisional application
15 for your report?

16 MR. HOFFMAN: Objection. Form.

17 A I have and I read it. I don't know what
18 you mean by analyze.

19 Q Review it. Look at it.

20 A Okay. Yes.

21 Q Okay. And did you come to a conclusion as
22 to whether the provisional application provided support
23 for the claim of the '582 patent?

24 MR. HOFFMAN: Objection. Form. Scope.

25 A I believe the provisional provides support



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1 for the claims, yes.

2 Q So if the provisional provides support for
3 the claims, why did you use a date of invention of
4 May 17, 2013 instead of the provisional application
5 filing date of May 17, 2012?

6 MR. HOFFMAN: Objection. Form. Scope.
7 Asked and answered.

8 A It is exactly what my declaration says; I
9 was asked to use that as the time of invention.

10 Q Okay. So after the first sentence there is
11 a second sentence that talks about, I have further been
12 asked to consider Petitioner's proposed definition for a
13 person of ordinary skill in the art, POSITA, namely,
14 that a POSITA would have had at least a Bachelor of
15 Science degree in electrical engineering, or a closely
16 related field.

17 Do you see that?

18 A Yes.

19 Q You do not have a Bachelor of Science degree
20 in electrical engineering, do you?

21 A Yes.

22 Q You do?

23 A Yes.

24 Q It is not in your CV.

25 A It is.



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1 Q Under what?

2 A The degree was in engineering science which
3 includes as many courses in electrical engineering as
4 an EE degree but it was an honors course so I had about
5 five additional courses beyond an EE.

6 Q Or closely related field; that is good
7 enough, correct?

8 A Yes, but specifically the answer to the EE
9 is I have the equivalent of an EE even though it is
10 named something else.

11 Q The next requirement is, along with at least
12 two years of experience in the design of entertaining,
13 entertainment, lighting systems.

14 Do you have two years of experience in
15 designing entertainment lighting systems?

16 A Yes, in regards to the PAR lamps that have
17 all the requirements of the entertainment lighting
18 systems and, in fact, is used in entertainment
19 lighting.

20 Q The design and use of LED lights?

21 A Yes.

22 Q Okay. So the next part of your paragraph 15
23 is patent owner's definition. It says, I have been
24 asked whether my conclusion would change if a POSITA
25 would have had two to four years' experience in



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1 electrical engineering/design of film and television
2 lighting systems.

3 Do you have two to four years' experience in
4 design of film and television lighting systems?

5 A Yes, that is what I just answered, those
6 PAR lamps are that experience in the design.

7 Q So just the lamps themselves but not the
8 systems?

9 A Electrical engineering/design, that PAR
10 lamp has a electrical circuit in it that I was
11 responsible for as the overall system engineer.

12 Q Okay. So another requirement by patent
13 owner is combined with two to three years of work
14 experience as a set lighting technician in television
15 and/or motion picture industry.

16 Do you have that experience?

17 A No.

18 Q Okay. Let us go to Section 1 of your
19 declaration which starts on page 11. Here you have a
20 header called Hasnain and Holmes failure to determine
21 the lumen output of a lighting device as in Claim 1.

22 Wait a minute. I forgot to do this. Can
23 you please go back to page 6 of your declaration?

24 A Okay.

25 Q So in paragraph 10 you have a listing of



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1 documents received and reviewed for this IPR proceeding,
2 correct?

3 A Yes.

4 Q And there is a list that looks like 8
5 letters long, A through H, correct?

6 A Year.

7 Q And A is the petition for the 5 -- excuse
8 me. Scratch that.

9 Letter A is the petition for Inter Partes
10 review of U.S. Patent No. 10,411,582, correct?

11 A Yes.

12 Q If I say the petition for the '582 patent,
13 you know that I am referring to that document?

14 A Yes.

15 Q And then Exhibit 1001, which you already
16 have a copy of, is the '582 patent, correct?

17 A Yes.

18 Q And then Exhibit 1003 is the Fred Holmes
19 declaration, correct?

20 A Yes.

21 Q And when I say the Holmes declaration, you
22 know that I am referring to Exhibit 1003?

23 A Yes.

24 Q And the next one is Kit, which is Exhibit
25 1004, U.S. Patent No. 7,507,001 right?



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1 A Yes.

2 Q So if I say Kit, you know that I am
3 referring to that document?

4 A Yes.

5 Q The same thing, Exhibit 1005, Ducharme, if I
6 say Ducharme, you know that I am referring to Exhibit
7 1001, correct?

8 A Yes.

9 Q The next one is Katzir. If I say Katzir,
10 you will know that I am referring to Exhibit 1006,
11 correct?

12 A Yes.

13 Q Next one, Iamiro, Exhibit 1007, if I say
14 Iamiro, you know that I am referring to Exhibit 1007,
15 correct?

16 A Yes.

17 Q Last but not least, Hasnain, Exhibit 1008,
18 if I say Hasnain, you know that I am referring to
19 Exhibit 1008, correct?

20 A Yes.

21 Q All right. Now that we have that laid out,
22 if you can please go to page 19 of your declaration.

23 Why don't you read that and let me know when
24 you are ready.

25 A That is paragraph 30?



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1 Q I am sorry. Page 12, paragraph 19. My bad.

2 A Okay.

3 Q So you say, Due to Petitioner's Declarant
4 Holmes' and reference Hasnain's failure to consider
5 lumen reducing penalties resulting form, without
6 limitation the claimed luminaire elements, right?

7 I am going to go through the rest, but at
8 least I got that first part right, correct?

9 A Yes.

10 Q Including, without limitation, the diffusion
11 cover, the LED driver, the G/M 5 point limit and CRI of
12 greater than 90, the Petitioner has failed to address
13 the lumen output of the luminaire as a combined lighting
14 system, right?

15 A Yes.

16 Q So there is five things there, the diffusion
17 cover, the LED driver -- well, there is four things
18 here.

19 A Yes.

20 Q G/M 5 point limit and the CRI greater than
21 ninety.

22 So those are four requirements that are
23 claimed, correct?

24 A Yes.

25 Q Okay. Those all have to be achieved at once



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1 in your mind?

2 A Yes.

3 Q So if you can read paragraph 20.

4 A Okay.

5 Q So am I to understand paragraph 20 to say
6 that Hasnain's 70 to 100 LPW per LED results are all
7 inappropriate because they are for an uncovered LED tube
8 light under ideal test bench conditions?

9 A I would not say inappropriate.

10 Q What would you say?

11 A I would say that they are incomplete.

12 Q So if you can look at paragraph 21, please,
13 of your declaration.

14 A Okay. I have read it.

15 Q So it looks like we have the same four --
16 give me a second. I am sorry.

17 A Okay.

18 Q So in paragraph 21 you are saying all of the
19 following elements recited in Claim 1 of the '582 patent
20 have inherent lumen losses including at least, the
21 diffusion cover, the less than 5-step MacAdam ellipses,
22 the G/M 5 point limit. That is one and the same.
23 Sorry. The CRI of greater than 90 and the circuitry.

24 So we have the same four limits or same four
25 items from Claim 1 that you recited in paragraph 19; is



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1 that right?

2 A Yes, but there is a fifth added here.

3 Q There is a fifth. What is the fifth?

4 A The last sentence, In addition, there is
5 inherently a lower efficacy of the LEDs when operating
6 at an elevated temperature. We refer to that later in
7 the declaration as thermal droop.

8 Q Okay. So in paragraph 22, this is going
9 after diffusion cover, I guess, it says, For example,
10 there is a first substantial lumen loss due to optical
11 loss from the diffuser covering the tube in order to
12 blend the individual LEDs into suitable light output.

13 Did I read that right?

14 A Yes.

15 Q Okay. Do you want to explain to me what you
16 mean by substantial lumen loss from a diffusion cover?

17 A Yes. I was developing a market leading LED
18 light circuitry at the same time as this. I had the
19 first energy certified LED lighted bulb in the world.
20 It was highly acclaimed by GE.

21 At the time we were working with material
22 and manufacturers like Behr in Germany to provide
23 diffusion covers that had reduced absorption losses. We
24 had to have a diffusion cover because the LEDs are tiny
25 bright spots of light and they are annoying to the eye.



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1 Even from an A line light bulb in commercial imaging
2 recording application absolutely can see the bright dots
3 behind it. It is very annoying.

4 So typically these diffusing plastics were
5 30 and 40 percent absorbing output. In 100 lumens, you
6 get out 70 or 60. We pushed that technology to be 20
7 percent absorbing. That is the best that these guys
8 could have done at this time.

9 So when we say we have 70 to 100 LPW from
10 the LEDs, we are going to lose 20 percent of that just
11 in going through the diffuser.

12 Q Does that matter whether the diffuser is
13 clear, translucent or transparent?

14 A Yes, it matters. So clear you would not
15 have those losses. You would have only surface losses,
16 which are about 8 to 10 ten percent.

17 If it is translucent, it would not do the
18 job. You would still see the bright points behind the
19 translucent. It needs to be diffusing. We refer to it
20 as a lambertian diffuser.

21 Q You do not consider a clear cover to be a
22 diffused cover?

23 A A clear cover would not be suitable for
24 commercial image recording application.

25 Q Okay. Can you please go to the Exhibit 1001



1 and look at column 6, line 31?

2 A Okay.

3 Q So the '582 patent allows for a clear
4 diffuser shade tube, correct?

5 MR. HOFFMAN: Objection. Form. Legal
6 conclusion.

7 Q Do you understand my question?

8 A Would you repeat it, please?

9 Q The '528 patent expressly says a clear or
10 semi-translucent or translucent diffuser shade tube,
11 correct?

12 MR. HOFFMAN: Objection. Form. Legal
13 conclusion.

14 A Correct.

15 Q That is the same thing as a diffusion cover,
16 correct?

17 MR. HOFFMAN: Objection. Form.

18 A This sentence, which you have taken out of
19 context, continues to go on to say, is also visible
20 which acts to diffuse the light.

21 Q I don't think I took it out of context. I
22 read what it says.

23 A You did not read it all the way.

24 Q Sure.

25 A What I am saying is that we are teaching in



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1 this patent spec that that diffuser shade needs to
2 diffuse the light.

3 Q So if I just don't use the word
4 semi-transparent or translucent, I say a clear diffuser
5 shade tube is also visible which acts to diffuse the
6 light, that is wrong?

7 MR. HOFFMAN: Objection. Form.

8 A I believe that the inventor may have had a
9 broader use of the term clear. I can imagine it was
10 that a clear cover could be diffusing.

11 Q Do you want to give me one?

12 A A diffraction grating.

13 Q So clear covers are possible?

14 A Not preferred but possible.

15 Q I understand.

16 If it is a clear cover -- excuse me. Going
17 back to your paragraph 22, if it is a clear cover, there
18 would not be as a substantial lumen loss, correct?

19 A If it was a clear cover that is by some
20 mechanism diffusing the light, then it would have a
21 loss to the cover.

22 Q I am looking at your words there, there is a
23 first substantial lumen loss.

24 Would it still be a substantial lumen loss?

25 A Yes, nothing better than 20 percent at the



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1 time of the invention.

2 Q Even for clear?

3 A I personally examined and understood every
4 material available to the lighting industry at the time
5 of the invention. Nothing better than 20 percent could
6 provide diffusion.

7 Q Okay. Let's look at paragraph 23. Why
8 don't you read that and let me know when you are ready.

9 A Okay.

10 Q So I am on page 15, in the middle of the
11 page, and just tell me when you are ready.

12 A Yes.

13 Q It says, The LEDs would have to be driven at
14 at much higher current than the rated current of the
15 LEDs to achieve the things that you talked about
16 previously. Is that right?

17 MR. HOFFMAN: Objection.

18 Q I can read the whole thing out loud, if you
19 want.

20 MR. HOFFMAN: Form.

21 A I agree with what you said.

22 Q Why do they have to be driven at a much
23 higher current rate?

24 A We are not getting the output that Hasnain
25 taught we would get. So that 70 to 100 LPW would have



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1 been the best available efficacy at that time. Best
2 available efficacy means that you are not overdriving
3 it.

4 In order to cover some of these losses,
5 which we have only just begun to quantify in the
6 declaration, there are huge losses to come. We have to
7 drive the LEDs harder, harder than what Hasnain would
8 have measured in his lab, and 70 to 100 LPW is going to
9 drop considerably. The point is Hasnain and Holmes
10 neither have considered those realities that a POSITA
11 must take into consideration in designing this for
12 commercial imaging recording.

13 Q When you say "drive it harder," do you mean
14 apply more current?

15 A Yes.

16 Q Does applying more current increase the
17 output of the LEDs?

18 A Yes, to an extent and then it saturates.

19 Q So I am going to give you a copy of Exhibit
20 2081 that you relied on.

21 A Thank you.

22 Q Can you tell me what Exhibit 2081 is?

23 A It is titled "Cree XLamp MK-R LEDs." It is
24 a product family data sheet.

25 Q And I think that you assert that this is



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1 from 2012?

2 A The copyright states 2012 at the bottom.

3 Q Did you locate this document yourself?

4 A Yes.

5 Q Okay. How did you locate it?

6 A I am familiar with all of these documents
7 having worked first-hand with Cree and other
8 manufacturers. I knew that it existed. I went and
9 found it.

10 Q Okay. So I will ask some questions about it
11 in a minute. If you can just turn to page 2.

12 A Yes.

13 Q It says, Flux characteristics, standard
14 orders cords and bins.

15 Do you see that?

16 A Yes.

17 Q It has a bunch -- it has a table below that.
18 Can you explain this table to me?

19 A So this table has several headings. On the
20 left one-third of the table we are identifying the LED.
21 On the middle far-right thirds of the table we are
22 identifying order codes. The 20-digit long number
23 thing is how you would order the LED. We are also
24 identifying the chromaticity region which is referred
25 to as the chromaticity color binning diagram.



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1 In the left one-third we also have output or
2 flux, so-called binning. And so the group, which is
3 called H2 or G4, for example, are higher lumens or lower
4 lumens. And so a buyer of these LEDs has to come in and
5 specify exactly per the order code number which output
6 bin, intensity bin and color bin they want to purchase.

7 Q Okay. Can you tell me what the difference
8 is between a two-step order code and a four-step order
9 code?

10 A Yes. These steps refer to MacAdam ellipses
11 which is in the chromaticity diagram. We call that
12 CCx, CCy or CCE chromaticity space. We have a target
13 color point that we want and then these LEDs are
14 specified to be within some elliptical range around
15 that target color point. A two-step ellipse would be
16 roughly half the size of a four-step ellipse.

17 Q When you buy these LEDs from Cree, are the
18 power supply requirements already built into the
19 standards?

20 MR. HOFFMAN: Objection. Form.

21 A That question is vague to me. If you can
22 clarify what you are asking.

23 Q I see in the note it says, Cree maintains a
24 tolerance of plus-minus 7 percent on flux and power
25 measurements.



1 A Okay.

2 Q So what do they mean by that?

3 A Well, the plus-minus 7 percent on the flux
4 would refer to what we see as columns four and five,
5 flux at 85 C, flux at 25 C. And so what they are
6 saying is we specified the top row 1,044 lumens and we
7 are saying that you can expect it to be within
8 plus-minus 7 percent of that.

9 Power measurements may be referring to some
10 other aspect. For example, I am searching here, I don't
11 see power in the above table. There may be power in
12 watts cited somewhere else in this document that they
13 are referring to as a percentage on power.

14 Q Okay. If you can read paragraph 24 of your
15 declaration and let me know when you are ready.

16 A Okay.

17 Q So this section is titled "Losses from G/M 5
18 Point Limit," correct?

19 A Yes.

20 Q Can you tell me what that means?

21 A Well, the G and the M are referring to
22 green and magenta and that refers to -- without a
23 diagram, I am just going to be hand waving. But there
24 is a black body curve which we refer to as white light
25 that can have different color temperatures, blue or



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1 red, magenta. But that black body curve is the target
2 color point for these specifications. If we go above
3 that black body curve, it means we have an excess of
4 green in the otherwise white light. If we go below the
5 black body, it means we have and excess of magenta or
6 red relative to a pure white.

7 Q Okay. This was well-known before the '582
8 patent, correct?

9 A Sure. Yes.

10 Q Was it possible to order LEDs with less than
11 a 5 G/M in 2013?

12 A Yes.

13 Q Okay. Would those LEDs also have a CRI of
14 not greater than 90?

15 A That would be very difficult to find the
16 combination.

17 Q Okay. If you --

18 MR. HOFFMAN: I -- go ahead. I am sorry.

19 Q So if you can look at paragraph 26 of your
20 declaration, please. Just review it and let me know
21 when you are ready.

22 A Okay.

23 Q So this part I am not following. There is a
24 table on the right-hand side of your paragraph 26,
25 correct?



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1 A Yes.

2 Q And it refers to Exhibit 2081, and I have
3 gone through 2081 and I cannot find this table.

4 Can you help me find this table in paragraph
5 26?

6 A This is confusing to me because I just
7 reviewed my declaration and looked at that table from
8 which I derived this simplified table, and I don't see
9 that table now in this paper copy.

10 Q Exhibit 2081 is also in front of you.

11 A Oh, it is in the exhibit. That is where I
12 found it. Sorry for the confusion.

13 Q The reason that I am confused is because
14 your declaration says page 2 inserted from table at page
15 2, which I think that is a typo.

16 A Yes, I agree. I wonder if we even cited
17 the wrong Cree document here.

18 Q That is fine.

19 Do you want to say that you believe this
20 table is correct based on your knowledge?

21 A Yes. And I can, if you would like, I can
22 find the proper document on my laptop.

23 Q Sure.

24 A From within the document that was provided.

25 Q Not right now. On a break. Right now I am



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1 fine with you --

2 A I am sorry.

3 Q -- that you understand this table to be
4 accurate based on your knowledge?

5 A Yes.

6 Q Okay. And so my understanding of this table
7 is that you have got various filters being applied; is
8 that correct?

9 A Yes.

10 Q Those result in lumen penalties?

11 A Yes.

12 Q If an LED is capable of getting less than 5
13 G/M, you do not need a filter, correct?

14 MR. HOFFMAN: Objection. Form.

15 A You may still need a filter if it is less
16 than 5G, but if it is 4.9G and you don't want to be
17 marginal, you would use a filter.

18 Q I understand. Okay. Moving on, so here is
19 where I think we need to get on the same page about a
20 numbering issue.

21 If you can go to page 18 of your
22 declaration. I am going to walk through the paragraph
23 numbers. So paragraph 18 at the bottom starts -- I
24 mean, on page 18, the last paragraph is 29, correct?

25 A Yes.



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1 Q The next page, page 30, the next page there
2 is a table and then we are at 28 again, right?

3 A Yes.

4 Q Is it okay with you if I refer to the
5 paragraphs on page 21 as 28A, 29A and 30A so the record
6 is clear?

7 A Yes. I am sorry for that.

8 Q That is no problem. It happens in Word all
9 of the time.

10 Referring you to normal 29 on page 18.

11 A Yes.

12 Q Can you look at that and let me know when
13 you are ready?

14 A Okay.

15 Q So here you say, Losses from CRI greater
16 than 90 is the header for this paragraph, correct?

17 A Yes.

18 Q I think that you have already answered this,
19 but did LEDs exist that had a CRI greater than 90 in
20 2012?

21 A Yes, but they were not typical.

22 Q Okay. So paragraph 30 on page 19, please.
23 I only have a question about the sentence in middle. It
24 says, In the time frame of 2009 to 2013, before the
25 advent of narrow-band LED phosphors, right?



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1 A Yes.

2 Q What is a narrow-band LED phosphor?

3 A Well, in fact, it is a breakthrough
4 technology that we developed at GE Lighting that I was
5 part of and without certain graphics it is difficult to
6 describe. The graphics can be found in the documents.

7 But before narrow red phosphors, we achieved
8 high CRI by having broad red phosphors; meaning that the
9 extent of the phosphor along the visible spectrum was
10 almost 100 nanometers wide. The visible spectrum is
11 only 300. Just providing it in red required a very
12 broad-band phosphor and most of that light spilled out
13 beyond 700 nanometers in the infrared. So it is wasted.
14 It is an efficacy loss.

15 So the only way, when we came up with the
16 narrow red phosphor, we had the wavelength exactly where
17 we needed it, less than 700 nanometers, nothing spilling
18 into the infrared. So what we had before, we had
19 narrow-band red phosphors. If you wanted to achieve 90
20 LPW, that broad-band had to be so far into the infrared
21 that it would cost you typically 24 percent in your
22 lumens relative to an 80 CRI. I would have used
23 narrower but not narrowless broad phosphor.

24 Q Okay. So if I am understanding you
25 correctly, a phosphor is a narrow-band phosphor if its



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1 emission wavelengths are narrower than what was done
2 before?

3 A No. That is part of it, yes.

4 Q Okay.

5 A The broad-band red phosphors were extremely
6 broad, as I mentioned, on the order of 100 nanometers
7 and there is no reason for that other than that is all
8 the technology can do. In order to provide red, we
9 need to fill only maybe a 30 to 50 nanometer wide band.
10 The narrow red phosphor would be 50 or less nanometers.

11 Q Now I get it. So it is around 50
12 nanometers?

13 A We were narrower than that, but that is
14 where I would put the continuum --

15 Q And those did not exist in 2013?

16 A No.

17 Q Okay. If you can then please look at page
18 21 and what I am going to call paragraph 30A.

19 A I am sorry.

20 Q Are you ready?

21 A Yes.

22 Q It says, But Hasnain does not specify the
23 CRI of the 70 to 100 LPW LEDs, right?

24 A Yes.

25 Q Doesn't a POSITA want to achieve a high CRI



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1 for commercial image recording?

2 A Yes.

3 Q So if Hasnain knew that his device is going
4 to be used for commercial image recording, he would
5 specify a high CRI, correct?

6 A No.

7 Q Why not?

8 A He does not say that he did.

9 Q Okay. At the time of Hasnain -- actually,
10 in the time of 2012 a POSITA looking at Hasnain's
11 disclosure, would a POSITA be able to purchase the LEDs,
12 for instance, from Cree and make those in Hasnain's
13 device?

14 MR. HOFFMAN: Objection. Form.

15 Q Sorry. I probably butchered that.

16 A If you can just repeat, please.

17 Q Sure. So in 2012, the time of the Cree data
18 sheet --

19 A Yes.

20 Q -- if a person looking at Hasnain, a POSITA
21 wanted to purchase LEDs for his devices, that person
22 could purchase the Cree LEDs, correct?

23 A Yes.

24 Q All right. Are you good for a while?

25 A Yes.



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1 Q Let us go another 15 or 20 minutes. So
2 let's go now to thermal. So if you could go to page 23
3 and Section II is in the middle of the page.

4 It says, Due to thermal issues, a POSITA
5 would not have a reasonable expectation of success in
6 trying to create the device of Claim 1.

7 Do you see that?

8 A Yes.

9 Q Okay. So let's stay in that section and if
10 you can look at paragraph 38.

11 A Okay.

12 Q It looks like you relied on a declaration of
13 Mr. Csernecky.

14 Do you see that?

15 A Yes.

16 Q I am not quite sure I get from your
17 paragraph why you did that.

18 Can you explain why you relied on his
19 declaration?

20 A Yes. His declaration explained the
21 relatively high thermal challenge of commercial image
22 recording applications where linear tubes may be
23 stacked vertically in a ladder formation. And what
24 that does is each tube is creating heat. Heat rises
25 and so the very top-most tubes are going to be much,



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1 much hotter than the ambient air temperature.

2 The point being that a product like this
3 where the reliability and quality is so demanding, we
4 have to design for the worse case.

5 Q Okay. Do you recall a statement by Mr.
6 Csernecky in his declaration that bicolor lights were
7 around at the time of the '528 patent?

8 MR. HOFFMAN: Objection. Characterization.

9 A I don't recall that. I was not looking for
10 that.

11 Q Let us look at it.

12 A If it is okay, I would like to take
13 something for this throat, cough I have going on here.

14 Q It sounds like we have the same thing.

15 A It is annoying, and I apologize for it.

16 Q I got mine last Saturday.

17 If you would not mind grabbing your copy of
18 Mr. Csernecky's declaration there, Exhibit 2041. And
19 then going to page -- I don't have the page. Go to
20 paragraph 12. Just read that and let me know when you
21 are ready.

22 A Okay.

23 Q So the last sentence of Mr. Csernecky's
24 declaration says, It was not bicolor, even though
25 bicolor had existed for years in a light panel, correct?



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1 A In a panel light, yes.

2 Q Yes. I apologize.

3 Do you agree with that?

4 A The term panel light, if he has not defined
5 it elsewhere, can be somewhat vague. Do I agree with
6 it? I don't know. I rely on Mr. Csernecky's
7 declaration for expertise in that regard.

8 Q Do you agree that an LED lighting system had
9 bicolor for years before the '582 patent, some type of
10 lighting system, whether it is panel light or otherwise?

11 A Bicolor for some type of lighting system
12 prior to the time of the invention, yes.

13 Q Okay. That is it.

14 Are you aware of a company named Light
15 Panel?

16 A No.

17 Q Okay.

18 A No.

19 Q No?

20 A I am conflating it with a different one.

21 Q So if you can look at paragraph 42 of your
22 declaration and let me know when you are ready.

23 A Okay.

24 Q So your heading for paragraph 42 is Holmes
25 omits substantial thermal management design



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1 considerations, correct?

2 A Correct.

3 Q When you are doing your analysis in
4 paragraph 42 and elsewhere in this section, are you
5 having a requirement that a device is fully enclosed?

6 MR. HOFFMAN: Objection. Form.

7 A In order to meet the limitations of Claim 1
8 in the '582 it has both a housing at the back and a
9 cover at the front or the bottom and the top.

10 Q Okay. Why don't we look at Claim 1 then.
11 Let us walk through it. Please go to Claim 1 of the
12 '582 patent.

13 A Okay.

14 Q Let us look at Limitation 1A. It says, A
15 housing having ends and including a support structure,
16 correct?

17 A Yes.

18 Q There is nothing else about the housing
19 there, correct?

20 A Yes. Correct.

21 Q And then if we go down to Limitation 1E, it
22 says, An elongated cover extending substantially a
23 length of the support structure and covering the top
24 side of the support structure, correct?

25 A Correct.



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1 Q So now we have got a cover that covers the
2 support structure and we have a housing with ends?

3 A Yes.

4 Q There is no back recited anywhere in
5 Claim 1?

6 MR. HOFFMAN: Objection. Form.

7 A Go to Limitation F. So we have the housing
8 and the cover together have a linear form factor of a
9 fluorescent light tube lab. That is the circular tube,
10 circumference all around. Having a diameter, which
11 infers a circle, a cylindrical tube having a top and
12 bottom and enclosed all around of no greater than
13 approximately 41 millimeters.

14 Q So you are reading, which is fine, you are
15 reading a linear form factor to require a backing?

16 A No. It is a linear form factor of a
17 florescent tube.

18 Q Okay.

19 A And the fluorescent tubes are cylinders.

20 Q It says linear?

21 A Linear means it is straight.

22 Q Right. Form factor?

23 A The form factor generally means a right
24 circular cylinder is what I interpret that to mean.

25 Q Okay. That is what I am asking. So as part



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1 of your analysis Limitation 1F informed you that you
2 should have an enclosed lighting system?

3 A Yes.

4 Q Okay. If you can go to paragraph 43. Why
5 don't you go ahead and read that, and especially the
6 part about Exhibit 2083, and let me know when you are
7 ready.

8 A Which Exhibit is 2083?

9 Q I am about to give it to you. I did not
10 want to bother you yet.

11 A Okay.

12 Q I figured if I give you enough exhibits, you
13 will just tell me what I want to hear.

14 A Okay.

15 Q Okay. So I am going to hand you Exhibit
16 2083 now. Why don't you go ahead and turn to page 13,
17 which is what you cited.

18 A Did I cite that here?

19 Q Yes.

20 A In paragraph 42?

21 Q 43. Yes, it is about seven lines up from
22 the top.

23 A I got it. Thank you. Which page? 13 did
24 you say?

25 Q That's right.



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1 A Okay.

2 Q Are you ready?

3 A Yes.

4 Q So you pointed out this table on page 13. I
5 don't know if I should call it a table or box. It is a
6 light blue color.

7 A Yes.

8 Q Below that it has got some additional
9 language that is not related to the table. It says, a
10 maximum ambient temperature.

11 Do you see that?

12 A Yes.

13 Q So it says, A maximum ambient temperature of
14 62 C for the example luminaire is acceptable for this
15 indoor application.

16 For an operating environment needing higher
17 maximum ambient temperature, either the maximum junction
18 temperature should be raised, which may impact lifetime,
19 or the thermal system R improved, e.g., better heat
20 sink.

21 Do you see that?

22 A Yes.

23 Q Were these well-known tradeoffs in 2012?

24 A Yes.

25 Q So if you wanted the higher maximum ambient



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1 temperature, then that may impact the lifetime of the
2 device?

3 A If the LED operates at a higher temperature
4 than its specification, it would impact the life of the
5 device.

6 Q Okay. Fair point.

7 So was it possible to specify higher maximum
8 junction temperatures --

9 MR. HOFFMAN: Objection. Form.

10 Q -- in 2012?

11 MR. HOFFMAN: Objection. Form.

12 A I will answer generally not.

13 Q But even though they say either the maximum
14 junction temperature should be raised, that is not an
15 indication that Cree has an ability to raise maximum
16 junction temperatures?

17 A They do.

18 Q Okay.

19 A And the point, the reason that I cited Cree
20 references is that Cree LEDs had the highest available
21 maximum temperatures available.

22 So if a POSITA wants to design the system
23 thermally, he is not going to do any better than what
24 Cree tells us.

25 Q Understood. It also says, or the thermal



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1 system improved, e.g, a better heat sink.

2 So was it known to add heat sinks to LED
3 lighting systems in 2012?

4 A Yes.

5 Q Okay. Continuing on. So if it was known to
6 consider heat sinks in the thermal analysis in 2012, did
7 you do so in analyzing the combination of the prior art?

8 MR. HOFFMAN: Objection. Form.

9 A The prior art provided no heat sinks.

10 Q So let's go to paragraph 44. Why don't you
11 read that, mostly in the middle of the page where it
12 says the copyright date.

13 Do you see that on page 31?

14 A Yes.

15 Q It says, Furthermore, the copyright of the
16 Cree document is 2007 to 2016, from which it is clear
17 that the data is from 2016, right?

18 A Yes.

19 Q Therefore, the LEDs in 2010 to 2013 would
20 have higher thermal limits.

21 I don't follow how something from 2016 can
22 be used to opine on 2010 to 2013?

23 MR. HOFFMAN: Objection. Form.
24 Characterization.

25 A I think that you may have misread it. It



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1 says, In 2010 to 2013 at the time of the invention
2 would have thermal limits no higher than those quoted
3 in the Cree Luminaire Design Guide.

4 Q Explain it to me. I do not understand why
5 we are using a 2016 document that go after things that
6 happened three years prior.

7 A It is in your favor. I am showing how far
8 LEDs thermal capabilities have developed by 2016, and
9 the answer was that we want the junction temperature no
10 higher than 80 degrees C. In 2010 to 2013 the
11 allowable junction temperature would have been no
12 higher than that, probably significantly lower than
13 that, which makes the Hasnain and other attempts at
14 providing thermal solutions even more insufficient.

15 Q Okay. You raise a point that I wanted to
16 ask about. At the bottom of the page 31 it says, p-n
17 junction 80 degrees C limit.

18 That is what it says, correct?

19 A Yes.

20 Q If we go back to 2081 though, Exhibit 2081,
21 I am sorry, and we go to your table that you cited, if I
22 look at the -- actually, above that, it says, in
23 characteristics, it is talking about LED junction
24 temperatures as high as 150 degrees.

25 Do you see that?



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1 A Yes, as a maximum.

2 Q As a maximum, okay.

3 A That means it will not burn up in less than
4 a minute on your benchtop. It is not an operating
5 spec. I am being facetious on that one minute by the
6 way. I mean, it is not a design spec.

7 Q Since you are under oath, let us try to keep
8 the facetiousness to a minimum.

9 A I am sorry.

10 Q That is okay. If you can go down to table 2
11 or the table right below it. It says, Flux LM at 85 C,
12 right?

13 A Yes.

14 Q Aren't those specs for 85 C?

15 A It is telling you what your performance
16 will be when you run hotter than the spec. When you
17 run hotter than the spec, you are going get shorter
18 life, worse color on every performance specification
19 related to LED and there are charts in here to show
20 that degradation. Every performance attributes degrade
21 above the spec temperature.

22 So what they are telling you is if you
23 operate higher than the spec temperature, and only by 5
24 degrees C by the way, this is how your lumen output will
25 suffer.



1 Q How do you know that the spec temperature is
2 80 degrees C? To me it looks like 85 degree C spec
3 temperature.

4 A I go back to the Luminaire Design Guide.

5 Q That is four years afterwards though,
6 correct?

7 A Again, in your favor. So anything -- if
8 Cree had a design guide in 2010 to 2013,
9 80 degree C spec would have been the most that they
10 could offer; probably significantly less than that.

11 Q I am confused. Why do they have 85 C in
12 this Exhibit 2081 in this table then?

13 MR. HOFFMAN: Objection. Asked and
14 answered.

15 A I don't mind answering it again. I
16 understand that you are confused, so I will go further.

17 The specification -- let us see what the
18 date is on this, 2012. I am not see seeing a
19 specification. In other words, under typical for LED
20 junction temperature there is no spec there, right? So
21 we don't have a specification in this data sheet for
22 junction temperature.

23 Q Okay.

24 A The best guidance that I can get on
25 junction temperature is from Cree's Design Guide from



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1 2016.

2 Q So in other words, if you would not mind my
3 interrupting for a second, this characteristics chart
4 that is it at the top of page 2, if this chart would
5 fast forward three years or four years to 2016, it would
6 have a value of 80 degree C at the LED junction
7 temperature?

8 A I would expect that. I don't know that.

9 Q Okay. Now I understand what you are saying.

10 A Okay.

11 Q So just staying in paragraph 44 of your
12 declaration, Exhibit 2080, on page 31, right above that,
13 above the G/M junction limit you say, And on film or TV
14 set conditions such as wrapping a luminaire in black
15 wrap or gel.

16 Do you see that?

17 A Yes.

18 Q So can you please look at Claim 2 of the
19 '582 patent?

20 A Claim 2?

21 Q Yes. Just read it out loud.

22 A The LED light system of Claim 1 wherein the
23 LED light system is provided without a gel or filter.

24 Q So Claim 1 of the '582 does not require a
25 gel or filter?



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1 A It does not require it. It could be there.

2 Q So then if we go to page 33 of your Exhibit
3 2080, on paragraph 48 there is a heading called,
4 Junction temperature versus solder point temperature
5 deduction, right?

6 A Yes.

7 Q And you are saying Hasnain and Holmes failed
8 to consider this, correct?

9 A Yes.

10 Q And then if we go to the next page, page 34,
11 the heading of paragraph 49 is Holmes use of Hasnain
12 fails to account for a diffusion cover, correct?

13 A Yes.

14 Q So your opinion is that Holmes' calculations
15 or opinions did not account for a diffusion cover when
16 he examined the prior art, correct?

17 MR. HOFFMAN: Objection. Characterization.
18 Form.

19 Q Sorry. Do you want me to replace --

20 A I will mention that Holmes make no mention
21 of a diffusion cover or the thermal penalty made by
22 that.

23 Q Okay. If you go to page 38, paragraph 53 of
24 your declaration, you say, Hasnain and Holmes failed to
25 account for nearby equipment heat and studio set



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1 ambient, and location conditions, right?

2 A Correct.

3 Q And this is another defective analysis of
4 Holmes, correct, in your opinion?

5 A It is an incomplete analysis, yes.

6 Q Incomplete, okay.

7 And then page 39, paragraph 54, the heading
8 is, Thermal effect of increased operation power to
9 overcome lumen penalties, correct?

10 A Yes.

11 Q You say, Furthermore, Hasnain and Holmes
12 omit another key factor. This is the increased
13 operation power?

14 A Yes.

15 Q And then if you can go to page 42, paragraph
16 59, your Conclusion.

17 I am assuming there is nothing that you want
18 to change in your Conclusion today?

19 A Correct.

20 Q Why don't we take a break.

21 How much time do you guys need?

22 A Whatever you prefer. This is not the lunch
23 break, right?

24 MR. HOFFMAN: That's correct.

25 MR. BRIGGS: We will do lunch in about an



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1 hour. Let us do five-ish minutes.

2 (Recess was taken.)

3 Q Back on the record.

4 Dr. Allen, if you can please grab your copy
5 of the '582 patent. If you can please go to column 10
6 and read example one and let me know when you are
7 finished.

8 A Okay.

9 Q So the first sentence says, A four foot long
10 T12 1.5 diameter LED lamp was constructed with four rows
11 of alternating LEDs of a daylight time and tungsten
12 (warm light) type using the pattern of Figure 1A,
13 correct?

14 A Yes.

15 Q Do you want to look at 1A to familiarize
16 yourself with that?

17 A Just briefly. I recall it. Okay.

18 Q And then below that there is a table.
19 Do you see the table?

20 A Yes.

21 Q And can you just go through the table and
22 let me know if you have any issues with any of the units
23 of the table?

24 A Yes, I do.

25 Q Would you please explain those to me?



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1 A Luminosity is listed in the sixth row for
2 daylight and then tungsten is below that. These are
3 lux for foot-candle levels and that is what may
4 normally be used in application but, as cited in the
5 claims, we need to have lumen units for the luminosity,
6 which the later tables do provide.

7 Q And is it possible, is there like a
8 conversion factor that you can use to get exactly
9 foot-candles to lumens or is that not possible?

10 A It is with some -- I am sorry. Were you
11 going to say something?

12 MR. HOFFMAN: No.

13 A It is possible with some bold assumptions.

14 Q So then below that it says, Spacing of LEDs
15 may, e.g., be one quarter inch apart or about one inch,
16 one quarter inch apart from the middle of one LED to the
17 middle of the next one, correct?

18 A Yes.

19 Q Anything special about that spacing?

20 A Well, that spacing is determining how many
21 LEDs can fit in a 44-inch or 48-inch long tube.

22 Q We see below he gets a total of 576,
23 correct?

24 A Yes.

25 Q Each of the LEDs is roughly about an eighth



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1 of an inch square, correct?

2 A Yes, he is quoting there 3.5 by 2.8
3 millimeters. So about an eighth of an inch or
4 something less than that.

5 Q I see. Are those typical LED sizes for that
6 time?

7 A It is one of the typical sizes, yes.

8 Q There is no mention of a cover anywhere in
9 example one, is there?

10 A Well, he is telling us that it is an LED
11 lamp as opposed to a strip of -- as opposed to what
12 Hasnain has.

13 I would interpret that, when he says LED
14 lamp, to mean that he has the LED replacement for a
15 florescent tube. I think that is what a POSITA would
16 interpret that as.

17 Q So you think this testing was done with a
18 cover on it?

19 A My interpretation, and I think the
20 interpretation of a POSITA is that the inventor had
21 what we would consider to be an LED lamp which would
22 include a cover, yes.

23 Q If you can then read example two.

24 A Okay.

25 Q So we have another four foot long T12 one



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1 and a half inch diameter LED lamp, correct?

2 A Yes.

3 Q Again looking at the table, the table in
4 example two, are there any units that seem out of place?

5 A Well, there is a unit missing but easily
6 assumed that is on the luminosity where we have 1107
7 and 1010, those are clearly, in the interpretation of a
8 POSITA and myself, those are clearly lumen values.

9 Q Anything else?

10 A If you want to get really detailed, there
11 is an inconsistency in the temperature ranges, row one
12 says two and row two has a dash.

13 Q I am sorry. Just strictly on the right
14 units used for scientific purposes in the table, not
15 typos or anything like that.

16 A I see. I believe so.

17 Q And then right below that table it says, At
18 one foot the output can be over 1,000 lumens.

19 Is that a correct statement in terms of how
20 you are able to measure luminosity?

21 A No, that is not a correct statement.

22 Q Okay. Is there a way that we can interpret
23 that statement then?

24 A Yes, I interpret it to mean that in the way
25 that lumens are normally measured, the output can be



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1 over 1,000 lumens per foot is what he is saying. I am
2 sorry. I may have misstated.

3 He is saying at one foot, which I interpret
4 to mean at one foot away from the LED lamp, he is saying
5 the output can be over 1,000 lumens. And to answer your
6 question, that is a technically incorrect statement.

7 Q Okay. Let us look at example three then,
8 please.

9 A Okay.

10 Q We have another four foot long T12 LED lamp
11 and then we have a table below it.

12 Can you please examine the table and let me
13 know if there are any scientific units that are
14 incorrect?

15 A No, I believe he has gotten them all
16 correct.

17 Q Below that it says, life span and examples
18 one, two and three estimated at 40,000 hours?

19 A Yes.

20 Q Is that long?

21 MR. HOFFMAN: Objection. Form.

22 Q What do you think of 40,000 hours lifetime?

23 A It tells me that the thermal design is very
24 good.

25 Q Let's look at the next sentence.



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1 A Okay.

2 Q To create the LED lamps in each of the above
3 examples, LEDs and desired color ranges are selected
4 which provide at least 1,000 lumens.

5 So instead of the lamps themselves providing
6 the luminosity, it is the LEDs, correct?

7 A Yes, this is improperly stated. A POSITA
8 will understand what the inventor is saying here is
9 that I am taking LEDs and measuring them for their
10 lumen output, understanding that I am going to put a
11 certain number of LEDs into the luminaire and, when I
12 add them all up, for example, 576 LEDs, I will exceed
13 1,000 lumens. That is not how it is said, but that is
14 how I and a POSITA would interpret it, I think.

15 Q Right. But we have at least 1,000 lumens
16 based on the LEDs alone, no cover, right?

17 MR. HOFFMAN: Objection. Vague.
18 Characterization.

19 A I would not interpret it that way at all.
20 The inventor knows and has explained in all of the
21 elements in Claim 1 all of the limitations that go into
22 this lamp and for which he has to choose the individual
23 LEDs in order to get 1,000 lumens out of the
24 limitations, as stated in the claim.

25 Q You understand the claims are based on



1 written description supported in the specification,
2 right, not the other way around?

3 MR. HOFFMAN: Objection. Argumentative.
4 Form.

5 Q I will ask it a different way.

6 You understand that the specification has to
7 provide a written description in support of the claims
8 of the patent, right?

9 A Yes.

10 Q Which means that the claims are interpreted
11 in light of the specification, correct?

12 MR. HOFFMAN: Objection. Legal conclusion.
13 Form.

14 A That is a legal guideline that I don't know
15 verbatim, but I would assume that that sounds correct.

16 Q Okay. Your statement earlier was, well, he
17 has these values in the claims so he must have meant
18 those values with a cover on it. That is a backwards
19 analysis.

20 A No, I don't believe that is what I said.

21 Q Okay.

22 A I am not taking 1,000 lumens from the
23 claims and saying okay, I understand why he put 1,000
24 lumens in here, no.

25 He is saying that my target is 1,000 lumens



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1 and I am going to select my LEDs and measure every one
2 of them so that in the aggregate and with the
3 limitations of my invention I will achieve 1,000 lumens.
4 That is my target. Having achieved that target in the
5 spec, now he can claim it.

6 Q Okay. So I believe a few minutes ago you
7 were discussing the 40,000 hour life span that is
8 recited in lines 11, column 11, line 37 and 38.

9 Do you see that?

10 A Yes.

11 Q And you mentioned something about heat. I
12 am not trying to get another answer. I am trying to
13 remember what you said. I can go back.

14 A I understand.

15 Q That is fine.

16 A My remark was that that tells me that the
17 thermal management design is very good.

18 Q Okay. Can you point to me in the '582
19 patent where you see good thermal management design?

20 A There is possibly, as I recall, one
21 instance that is in the claims where we have a
22 limitation of an aluminum housing and an aluminum
23 housing would enable, I should not use the word enable,
24 would be required for very good thermal management.

25 Q So Mr. Macias overcame all of these thermal



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1 penalties by using an aluminum housing?

2 MR. HOFFMAN: Objection. Form.

3 A Well, he does not tell us the dimensions,
4 shape, functionality of that heat sink. He does tell
5 us that it is an aluminum housing, and I, as an expert
6 who have done this, a POSITA who understands, the
7 POSITA would know that that aluminum housing enables me
8 to dissipate heat by means of lots of different
9 techniques which Mr. Macias does not specify.

10 Q So aside from an aluminum housing, is there
11 anything else in the '582 patent that teaches a POSITA
12 how to overcome all the thermal management issues
13 described in your declaration?

14 MR. HOFFMAN: Objection. Form. Scope.

15 A Should I answer?

16 Q You should.

17 A Most significantly the results of
18 especially example two in my opinion and the statement
19 of 40,000 hour life and the guidance of an aluminum
20 housing give a POSITA high confidence that without
21 undue experimentation these results can be reproduced.

22 Q There is no designs described in example
23 two, correct?

24 MR. HOFFMAN: Objection.

25 Q Thermal dissipation designs, correct?



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1 MR. HOFFMAN: Objection.

2 A I provided two guidelines. The question is
3 already answered regarding thermals. The one is the
4 indication of 40,000-hour life by which the inventor is
5 telling me that I have solved the thermal problems.

6 Mr. POSITA, the thermal problems are solvable. I
7 solved them. He is in possession of that solution.

8 Secondly, the claims indicate to us that
9 part of that solution was an aluminum housing.

10 Q So sitting here today, other than the 40,000
11 hours and the aluminum housing, there is nothing that
12 you can point to that talks about how heat dissipation
13 results?

14 MR. HOFFMAN: Objection. Characterization.
15 Vague. Scope.

16 A I am confident that a POSITA would
17 understand that since this inventor has achieved it and
18 has told us that the method that he used to achieve it
19 was selecting high performance LEDs, providing an
20 aluminum housing and solving the thermal issues, as a
21 POSITA I would have high confidence that I could
22 reproduce that result. I don't need all the detail
23 guidance.

24 Q Can you go to paragraph 22 of your
25 declaration, please?



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1 A Okay.

2 Q So in paragraph 22 you talk about a
3 diffusion cover?

4 A Yes.

5 Q Does Mr. Macias explain how he overcame the
6 issues with the diffusion cover and thermal housing in
7 the '582 patent?

8 MR. HOFFMAN: Objection. Scope.

9 A I believe I answered this from all
10 perspectives.

11 Q Is the answer the same, the 40,000 hours and
12 the aluminum housing?

13 MR. HOFFMAN: Objection. Characterization.

14 A Yes.

15 MR. HOFFMAN: Scope.

16 A I am sorry. I should wait.

17 Q Can I assume that answer is going to apply
18 for current loss or current droop?

19 MR. HOFFMAN: Objection. Vague. Form.

20 A No, current droop is a separate topic, one
21 aspect of overheating that must be resolved through the
22 thermal management. Remember there were at least five
23 other contributions to overheating that we have
24 discussed and more coming.

25 Q In paragraph 24 of your declaration, The



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1 losses from G/M 5 point limit, does Mr. Macias in the
2 '582 patent explain how he overcame those issues?

3 MR. HOFFMAN: Objection. Scope.

4 A So it is the same answer, and I will repeat
5 it. He overcame the challenges of providing less than
6 5 G/M by testing probably a high number of LEDs,
7 selecting those which meet his criteria, 576 of them,
8 and those are the ones that went into the luminaire.

9 Q Okay. Let's go to -- did I give you a copy
10 of Hasnain yet?

11 A No, I don't believe so.

12 Q So if we look at Hasnain, which is Exhibit
13 1008, you studied Hasnain for your report, correct?

14 A Correct.

15 Q And why don't you go ahead and read column
16 4, lines 23 to 41 and let me know when you are finished.

17 A Okay.

18 Q So it looks like Hasnain got a bunch of LEDs
19 mounted on a heat dissipating structure 36, correct?

20 A Yes.

21 Q And that is shown in Figure 2, for instance,
22 which is on sheet 2 of Hasnain, if you want to go check
23 that out.

24 A Yes, I see it.

25 Q And then in that section of Hasnain that you



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1 just read, it says, at line 37, It has been determined
2 experimentally that if LEDs are spaced apart, and it
3 goes on, okay?

4 A I am sorry. I am not following you. I am
5 in the wrong column. Yes, I am good.

6 Q That is okay. Column 4, line 37, It has
7 been determined experimentally that if the LEDs are
8 spaced apart, and it goes on, right?

9 A Yes. Yes.

10 Q Is that language the reason that you use
11 benchtop experiment in your declaration?

12 A I am referring to what I see in the figure.
13 I would label that, in my experience, the way that I do
14 inventions and development as a first step benchtop
15 experiment where I have part of the system and I am
16 starting to characterize it and it is an insignificant
17 part of the system.

18 Q Okay. Why don't you read the next paragraph
19 which starts at column 41 and let me know when you are
20 finished.

21 MR. HOFFMAN: Did you mean line 41?

22 Q Did I say column 41? There is no column 41
23 in this patent. Column 4, line 41. Sorry.

24 A Okay.

25 Q So here Hasnain teaches that if additional



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1 heat dissipation is required, you can use an additional
2 heat dissipating surface, 47, correct?

3 A Yes.

4 Q Did you consider that aspect in your
5 analysis?

6 A Yes, certainly.

7 Q Can you point me to that, please?

8 A In my declaration?

9 Q In your declaration.

10 A I am not sure that I will find it in my
11 declaration. That is not the question that you asked.
12 You asked if I considered it.

13 Q I am asking if you considered that specific
14 disclosure.

15 A Yes. I do need to find it in my
16 declaration.

17 Q Why don't you look at page 34, for instance.

18 A Okay.

19 Q On page 34 I see that you have Figure 3 here
20 but you stop at line 32 and then I went through the rest
21 and I can never see you discussing this additional
22 aspect.

23 A Where do you mean that I stop at line 32?

24 Q In the middle of 34 you say, The entire
25 assembly of 30 and 34 emerge. You have cited Exhibit



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1 1008, column 4, lines 23 to 42.

2 A I see what you mean. Okay. That is a good
3 point. Let me review that.

4 I am simply asserting in my declaration at
5 that point that Hasnain does not have a cover. I am not
6 further going down into Hasnain to discuss heat sink.

7 Q Okay. But would you agree that Hasnain
8 says, If additional heat dissipation is required, an
9 additional heat dissipating surface can be used?

10 A It could be. He did not do it. He did not
11 do it correctly. He did it insufficiently, far
12 insufficiently.

13 Q Okay. I am asking if you considered this
14 additional heat dissipating surface in your analysis of
15 the prior art?

16 A Yes.

17 Q Where?

18 A That is why I asked you, does it have to
19 be, do I have to have numerical calculations in my
20 declaration? No. I have an explanation in my
21 declaration of why it is insufficient.

22 Q If you just want to point me to where you
23 say this additional heat dissipation required an
24 additional heat dissipation surface is inadequate, I am
25 happy to look at it?



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1 A Okay.

2 Q I will give you, if you go to page 47 of
3 your declaration, you talk about Figure 4.

4 Is this something Hasnain discloses as a
5 whole which you are required to do in term of
6 obviousness? I don't see this.

7 A Repeat that.

8 Q I think earlier we talked about the rules on
9 obviousness and one of them is every reference must be
10 considered as a whole.

11 So I am just asking if you considered this
12 additional teaching of Hasnain when you were considering
13 your analysis of the thermal impact of the combined
14 prior art?

15 MR. HOFFMAN: Objection. Form. Asked and
16 answered.

17 A Yes, I did.

18 Q And you were about to go find it for me,
19 correct?

20 A Yes.

21 Q Okay. I will wait.

22 A The first aspect of this inadequacy of
23 Hasnain's benchtop experiment is that he does not have
24 the cover. So what he has in 36 is what we consider to
25 be a spreader. It is the printed circuit board in



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1 which the LEDs are mounted. Part of its function is to
2 take the heat from right below each LED and spread it
3 laterally.

4 Then he adds, what is it, 47, referring to,
5 in thermal contact with 36. What he is doing is adding
6 a bigger spreader, okay. It looks thicker. It looks
7 wider. And so he is getting more surface area which he
8 claims is wonderful. It is not. He is transferring
9 heat from the LEDs to a spreader, to a bigger spreader
10 and it is still on a benchtop. That hot air that comes
11 out from the spreader is allowed to freely circulate
12 into the air of his laboratory.

13 In a tube LED lamp, both of those spreaders
14 will be enclosed in the cover and housing. So we are
15 just making the air inside the tube hotter with the
16 spreaders. We are not getting the heat out of the tube.

17 So it does not matter how much spreading;
18 spreading is not heat dissipation. It is thermal
19 smoothing. He is doing a smoothing operation.

20 Holmes should know what Hasnain is doing and
21 should know that that is not what is stated in Claim 1.
22 Hasnain is not solving the problems of Claim 1. Hasnain
23 is doing no thermal management other than spreading.

24 There is another aspect of Hasnain that we
25 can discuss later. He is not solving the thermal



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1 management problem with a cover.

2 Q Are you done?

3 A I am sorry. I went too long.

4 Q No, you never go too long. You can answer
5 as long as you want. I do not want to interrupt you.

6 So is your interpretation of Claim 1 that
7 the housing cannot have a thermal management system on
8 the back of it?

9 MR. HOFFMAN: Objection. Characterization.
10 Form.

11 A Claim 1 does not tell us anything about
12 that.

13 Q But we went over to Claim 1 and you agree
14 that it has a housing?

15 A Yes.

16 Q And LED linear form factor?

17 A Yes.

18 Q Which you told me is enclosed, correct?

19 A Yes.

20 Q Okay. And it has a cover that creates the
21 full enclosure?

22 A Yes.

23 Q That cover is on the top part, correct? I
24 can read the claim, if you want.

25 A Yes, it is what we call the top part. You



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1 don't need to look it up. That is okay.

2 Q Okay. The claim is silent on the back of
3 the housing, correct?

4 MR. HOFFMAN: Objection. Form.

5 Q I will rephrase. Claim 1 is silent as to
6 what materials could be used as the back of the housing,
7 correct?

8 A Claim 1 is silent, yes.

9 Q Claim 1 is also silent as to whether
10 multiple different layers of materials can be used on
11 the back of the housing, correct?

12 A Yes, it is silent in that regard.

13 Q Okay. You mentioned that Hasnain's
14 experiment is open to the ambient, correct?

15 A Yes.

16 Q Can we read, please, column 6, line 54? So
17 column 6, line 54 starts, Such an arrangement is shown
18 in Figure 5, which is a cross-sectional view of another
19 embodiment of a light source according to the present
20 invention.

21 In light source 60 the cylindrical lens is
22 mounted above the LEDs, right?

23 A Yes.

24 Q That is acting as a cover?

25 A Not necessarily. It is acting as a lens.



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1 We are not being told that it encloses.

2 Q So moving down a few lines, it says,
3 Alternatively, the diffuser 26 shown in Figure 1B could
4 be replaced by a diffuser having a cylindrical lens
5 stamped on the diffuser?

6 A Yes.

7 Q Are you saying, so does that -- sorry.
8 Strike that.

9 Let's review Figures 1A and 1B, please. If
10 you can please go to column 2, line 45. Read lines 45
11 through 56.

12 A Okay.

13 Q So about line 53 it says, Light source 20
14 also includes a diffuser plate 26 that is not shown in
15 Figure 1A, right?

16 A Yes.

17 Q Did you consider a diffuser plate to be
18 equivalent to a diffuser cover?

19 A No.

20 Q Why not?

21 A First of all, these are prior art. These
22 are fluorescent light tubes. And 26 is shown to be
23 something bigger than the fluorescent light tube and
24 therefore necessarily external to the fluorescent light
25 tube and therefore not trapping the heat of the



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1 florescent light tube.

2 Q Okay. If we go to Figure 5, we were having
3 a discussion about column 6, and starting at line 54 all
4 the way through line 68 it is talking about using a
5 cylindrical lens?

6 A Yes.

7 Q And then below that it says, Alternatively,
8 the diffuser 26 show in Figure 1B could be replaced by a
9 diffuser having a cylindrical lens stamped on the
10 diffuser.

11 Isn't Hasnain teaching that you can have a
12 cover in his device?

13 A In Figure 5, yes. Let me be very specific.
14 Holmes is basing his assertion of prior art on
15 Hasnain's measurement of 30 degree C temperature rise,
16 which is not Figure 5. It is Figures 2 and 3, which
17 are clearly open air. They have no diffusion cover or
18 no enclosure of any kind. Hasnain is not making any
19 thermal claims relative to Figure 5.

20 Q Okay. But after Figure 3, even starting
21 with Figure 3, Hasnain provides an additional heat
22 dissipation surface, correct, 47?

23 A Yes, that is the one that we already
24 discussed.

25 Q That is one way he is talking about



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1 dissipating?

2 A That is not heat dissipation. It is a
3 spreader. In the sense that I explained it, it is not
4 dissipating heat to the ambient outside of the LED
5 lamp. Dissipation means we are getting rid of the
6 heat. Moving the heat through a spreader is not
7 dissipation.

8 Q So let's look at column 4, line 52.

9 A Okay. The first sentence, It should be
10 noted that heat dissipation structure 47 can transfer
11 heat to the air.

12 Q That is conduction, correct?

13 A Yes, but he has no cover. His air is his
14 laboratory air.

15 Q I understand that. But if you look at
16 Figure 3, 47 is on the bottom of the device, correct?

17 A That is the spreader that is inside the
18 cover.

19 Q The air is on the back contacting --

20 A Inside the cover, inside the LED tube.

21 Q Okay. I understand your position. So if we
22 go down to column 4, line 58, we have a different type
23 of heat dissipating structure anticipated by Hasnain,
24 correct?

25 A Yes.



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1 Q But I understand from your report that you
2 believe that this is ineffective?

3 A It would never work. I stated several
4 reasons.

5 Q Column 5, line 21, Light source 50 could
6 also be applied with a heat-conducting adhesive that is
7 applied prior to making the attachment of light source
8 50 to 25?

9 A Yes.

10 Q This is another manner of trying to manage
11 heat disclosed by Hasnain, correct?

12 A It is aspirational.

13 Q Column 5, line 52, In one aspect of the
14 present invention, the replacement LED light source has
15 a plurality of LEDs mounted on a heat-dissipating
16 substrate that has width that is less than or equal to
17 the diameter of the fluorescent tube.

18 It goes on, Substrates are metal clad
19 printed circuit boards in which the metal cladding
20 provides the heat-radiating surface.

21 A He is misusing the term heat dissipating.
22 He is describing a spreader. I understand that those
23 terms might be interchanged, but strictly speaking he
24 is not dissipating the heat as per the limitations of
25 Claim 1 which requires a housing and a cover.



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1 Q The last line of that paragraph starting at
2 line 69 says, The goal of the LED placement is to
3 provide sufficient heat dissipation to limit the
4 temperature of the LEDs to less than 5 degrees C above
5 ambient, correct?

6 A Yes.

7 Q So a POSITA would have a goal of getting to
8 a temperature of not greater than 75 degrees C above
9 ambient for Hasnain's devices, right?

10 A No, a POSITA would disregard that statement
11 as being incorrect. There is a lot of incorrect stuff
12 in Hasnain that a POSITA has to be very careful about.

13 Q Line 6, excuse me. Column 6, line 27, The
14 above-described embodiment of the present invention have
15 utilized a design requirement that the temperature rise
16 of the LEDs is held to less than 75 degree C over
17 ambient. Also incorrect?

18 A Yes. We just discussed this an hour ago.

19 Q Let us go on. For example, the replacement
20 light sources could be constructed such that the maximum
21 increase in temperature over ambient is 20, 30, 40, 50
22 60 or 70 degrees C, correct?

23 A Very misleading. Incrementally with each
24 increment of ten degrees. He is already suggesting
25 that we are 47 degrees C too hot.



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1 Q Okay. Let us talk Ducharme for a few
2 minutes.

3 A Okay.

4 Q I am giving you Exhibit 1005 which is the
5 Ducharme reference.

6 A Okay.

7 Q Can you go to Figure 5A of Ducharme?

8 A Okay.

9 Q So if you want to read about Figure 5A, that
10 is fine.

11 Figure 5A is a picture of the lighting
12 device disclosed by Ducharme?

13 A Yes.

14 Q 5000. It has an upper portion 5003. Let me
15 get you cites for this so you don't have to believe me.
16 Read column 12, line 49 through column 13, line 12. Let
17 me know when you are ready.

18 A Okay.

19 Q So Figure 5A appears to have a fixture 5000
20 and upper body 5003, LEDs 5007, platform 5005 and lower
21 body 5001, correct?

22 A Yes.

23 Q Did you consider this embodiment in your
24 analysis?

25 A Yes.



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1 Q Can you show me?

2 A I didn't discuss it in my declaration. I
3 don't know what you mean by -- you asked me, did I read
4 all of the prior art? Yes, all of it. So I considered
5 it.

6 Q Sorry. I am probably confusing you. I
7 apologize.

8 Did you, in conducting your analysis and
9 preparing your report, consider this disclosure of
10 Ducharme?

11 A You mean this figure?

12 Q That's correct.

13 A No.

14 Q Okay.

15 A If you are going to leave it at that I will
16 qualify my answer. Ducharme was not cited for thermal
17 management. It was cited for more than that and --

18 Q We will move on. If you can go to Claim 1
19 of --

20 A Let me clarify.

21 Q No, let us move on.

22 A No --

23 Q He can ask you questions --

24 A I am not finished with my answer.

25 Q -- when it is his turn. You already did



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1 finish your answer.

2 A No, I didn't. Before you start asking
3 another question, let me further clarify.

4 What is shown in here is air slots. I know
5 it to be ineffective. They provide some cooling, an
6 order of magnitude factor of less than 10, less than
7 good thermal management heat. I do not want to leave
8 you with the impression that is a thermal management
9 solution. It is not.

10 Q Okay. What are effective thermal management
11 solutions in the context of that figure?

12 A Surface area.

13 Q Corrugation?

14 A That is one way, relatively ineffective way
15 to get surface area.

16 Q Okay.

17 A Again, a corrugation, I don't know what
18 kind of a corrugation will provide up to 50 percent
19 increase in surface area. We need a factor of 10
20 increase of surface area. That is what heat vents
21 provide.

22 Q So Claim 1, this is going to extend a while.
23 Do you want to do lunch?

24 A Your call.

25 Q It is noon. That is why I am asking.



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1 Unless David is hungry, we can keep going.

2 MR. HOFFMAN: We can keep going.

3 Q So if you can please go to Claim 1 of the
4 '582 patent, which is in column 12.

5 There are no power supply requirements
6 recited in Claim 1, correct?

7 A I believe there are.

8 Q Okay. Can you point them to me?

9 A Can you specify what you mean by power
10 supply requirements?

11 Q Why don't we look at Claim 10. It says, the
12 LED light system of Claim 1, further comprising a power
13 supply configured to provide at least 20 watts.

14 A There is no corresponding power supply
15 requirement. It is saying further comprising 20. That
16 is the additional limitation by Claim 10.

17 Q But there is no minimum power supply recited
18 in Claim 1, correct?

19 A We have in Section D circuitry mounted to
20 the support structure including an LED driver circuit.
21 That is the power supply.

22 Q But no minimum wattage specified?

23 A Not in Claim 1.

24 Q What I want to ask now is whether there is a
25 minimum wattage requirement specified in Claim 1?



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1 A No.

2 Q There is also not a maximum wattage supply
3 specified in Claim 1?

4 A No.

5 Q There is also no minimum device lifetime
6 that I see in Claim 1.

7 Do you see one?

8 A By inference.

9 Q Okay.

10 MR. HOFFMAN: Objection. Scope.

11 A By inference, that is my answer.

12 Q So what do you mean "by inference"?

13 A Well, in claim element J of Claim 1 we are
14 claiming that it is suitable for the commercial image
15 recording.

16 Q Okay.

17 A And that is what infers to me long-life
18 stable operation.

19 Q Like the 40,000 hours Mr. Macias put right
20 below example three?

21 A What is your question?

22 Q I am asking if you think the commercial
23 image recording lifetime includes the 40,000 hours
24 specified in the spec below example three?

25 MR. HOFFMAN: Objection. Scope.



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1 A I would say that that is overly specific.
2 I don't think 40,000 or any other number is required.
3 What the 40,000 assertion in the specification of
4 Macias is telling a POSITA is, I have solved it. You
5 can solve it.

6 Q Can you go to paragraph 44 of your
7 declaration, please? All right. On page 31, in the
8 middle of the page, there is a quote from Cree.

9 A Yes.

10 Q It says, x-Lamps X-RE LEDs are rated to
11 provide an average of 70 percent lumen maintenance after
12 50,000 hours.

13 Do you see that?

14 A Yes.

15 Q Did you use a 50,000 hour requirement when
16 you were figuring out whether the prior art was
17 sufficient?

18 A The prior art is so insufficient by an
19 amount exceeding 50 degrees C. To argue whether we
20 have 40,000 hour life or 50,000 hour life is
21 insignificant on that scale.

22 Q So no, you didn't apply 50,000 hours? I do
23 not understand the answer.

24 Did you apply 50,000?

25 A I do not understand the question.



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1 Q My question is, did you apply a 50,000 hour
2 lifetime requirement in evaluating whether the prior art
3 was sufficient?

4 A Not specifically but indirectly. So I need
5 some long lifetime, not necessarily 50,000, not
6 necessarily 40,000, but to be suitable for the
7 commercial imaging recording application it requires
8 some long life.

9 Q Do you have a minimum number in mind?

10 A It is a continuum. What does the customer
11 need? It varies from customer to customer.

12 Q Would 5,000 hours be sufficient in some
13 cases?

14 A If my customer only needed 5,000 hours,
15 that is what I would design to.

16 Q Okay. So sticking in Claim 1, if you want
17 to go back there and make sure that is in front of you.

18 Earlier we discussed the meaning of
19 comprising and you agreed that it is open-ended, right?

20 A Yes.

21 Q So it does not preclude the use of a fan,
22 correct?

23 A Correct.

24 Q It does not preclude the use of, for
25 instance, heat dissipating structures like fins?



1 A Correct.

2 Q Let's look at the background of the '582
3 patent which begins in column 1 at line 15.

4 A Is there a section that I should read?

5 Q I think if you started reading around column
6 1, line 58 through column 2, line 8, that would be a
7 good start.

8 A Okay.

9 Q So starting in column 2, line 2, it says,
10 The two most frequently used and desired color
11 temperature ranges in the lighting industry for stage
12 and set lighting have been found to be 3050 to 3300 K
13 for tungsten (warm white) and 5400 to 5600 K for
14 daylight white, correct?

15 A Correct.

16 Q Do you agree?

17 A Yes.

18 Q Okay. So then if you go down to column 2,
19 line 36.

20 A I agree with a caveat, if you don't mind.

21 Q Be my guest.

22 A We later say that refers to, I believe we
23 say later, and I just want to make sure that we are not
24 overly restricting, that more pertains to anything
25 below 3500 K.



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1 Q Sure. I understood. So if you could please
2 read column 2, line 36 to 42.

3 A Okay.

4 Q There are two primary types of LED lighting
5 used to create white light. One is to use individual
6 LEDs that emit three primary colors, red, green, and
7 blue and mix the colors to form white light.

8 Right?

9 A Yes.

10 Q And you agree with that?

11 A Yes.

12 Q And that was well-known before the '582
13 patent?

14 A Yes.

15 Q Okay. The other then, the patent goes on,
16 start on column 2, line 39, The other is to use a
17 phosphor material to convert monochromatic light from a
18 blue or ultraviolet LED to broad-spectrum white light,
19 also referred to as phosphor based LEDs.

20 That is what it says, correct?

21 A Yes.

22 Q Do you agree with that?

23 A Yes.

24 Q And well-known before the '582 patent?

25 A Yes.



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1 Q The words broad-spectrum white light occur
2 in the claims as well.

3 Do you remember that?

4 A I think it said broad-band.

5 Q I don't think so. If you want to read Claim
6 1 and just confirm.

7 A Okay. I was about to say that they are
8 equivalent in my mind.

9 You are right. I am sorry. Okay.

10 Q What do you understand broad-spectrum white
11 light to mean in the context of Claim 1?

12 MR. HOFFMAN: Objection. Form.

13 A Broad spectrum in the context of Claim 1 is
14 as regards to the application of commercial image
15 recording. And so broad spectrum in that regard means
16 that we have to have all colors represented throughout
17 the visible spectrum, which is nominally 400 nanometers
18 to 700 nanometers from violet to red. So broad
19 spectrum means that we are providing light at all
20 colors or wavelength in the white light spectrum.

21 Q Okay. Are you good?

22 A Yes.

23 Q Next paragraph, column 2, line 43. I am
24 going to read it out loud. In order to match the
25 tubular form of a fluorescent bulb, arrays of LEDs may



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1 be placed within a tube having the same form factor as a
2 fluorescent lamp, such as T8 or T12 size fluorescent
3 bulb. One such bulb is made by Dialight and is called
4 DuroSite.

5 Do you see that?

6 A Yes.

7 Q Were you familiar with Dialight or the
8 company, excuse me, the company Dialight or the bulb
9 DuroSite?

10 A I was at the time. I was aware of most new
11 things that came out, and these names do ring a bell.

12 Q Again, since this is in the background of
13 the patent application, this is before the '582 patent,
14 correct?

15 A Yes, I believe so.

16 Q For example, in size T8 the bulb in one form
17 using SMD LEDs in a four foot long tube and provides
18 1500 lumens of natural white light, using 17 watts, 300
19 LEDs, with 90 volts to 277 volts, and is ETL/ UL
20 approved.

21 What I just read from column 2, line 46
22 through 50 is correct?

23 A Yes.

24 Q So they are already getting 1,500 lumens of
25 natural white light, correct?



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1 A Well, not suitable for commercial image
2 recording application.

3 Q Because of the CRI and magenta and green
4 requirements or something else?

5 A Very likely. If they are not saying that
6 they have greater than 90 CRI, less than five points
7 green, a POSITA would understand that most likely they
8 did not at this time.

9 Q Okay.

10 A In fact, the problem that we state that we
11 are solving is that LEDs at the time of the invention
12 were typically green, and typically provided very poor
13 color of skin. Here is an example of a product that
14 was put out not for commercial recording image
15 recording and rather is more typical of the products at
16 the time.

17 Q I understand. Line 55 to 56, it says,
18 Sufficient intensity of the light is preferably at least
19 1,000 lux for such an application.

20 Do you see that?

21 A Yes.

22 Q What is the difference between 1,000 lux or
23 in lumens, not lux. What is -- strike that. I will
24 start over.

25 What is the difference between lux and



1 lumens, if anything?

2 A This gets technical. They are very
3 different. I believe that this is used properly.

4 Q Okay.

5 A In this instance, lux is simply lumens per
6 square meter. So if I am illuminating a 10-square
7 meter section of the stage, each of my lights puts out
8 1,000 lumens onto that 10 meters, and I am going to
9 need ten of those lights. So one is brightness and the
10 other is total flux.

11 Q Okay.

12 A Brightness not being the right technical
13 term. It is illuminates is what lux refers to.

14 Q Okay. So if we go back to example one of
15 the '582 patent and we recall that Mr. Macias at line 39
16 of column 10 said he used a total of 560 LEDs; do you
17 see that?

18 A I see a total of 576 LEDs.

19 Q Yes. A total of 576?

20 A Yes.

21 Q So that is nearly double the amount of LEDs
22 that was in the 300 we just saw in the prior art,
23 correct?

24 A Which prior art?

25 Q The Dialight device. The Dialight device



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1 had 300 LEDs, was 90 volts to 277 volts, column 2, line
2 49.

3 A Okay.

4 Q So in recognition of bicolor it appears that
5 Mr. Macias grabbed white, grabbed tungsten and doubled
6 the number.

7 Isn't that mere optimization?

8 A I don't know what you mean by grabbed
9 white.

10 Q White light was already known, correct?

11 A Yes.

12 Q Bicolor was already known, correct?

13 A Yes.

14 Q So now we have a prior art device with 300
15 LEDs in it that does white?

16 A Yes.

17 Q And now we have 576 LEDs that does white and
18 tungsten?

19 A That is misrepresenting. The 300 LEDs did
20 a very poor color quality of white, not suitable for
21 commercial image recording.

22 Q I am not saying that it is. I am saying
23 that the number is basically doubled.

24 A You are inferring that they are equivalent
25 and they are not.



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1 Q I am inferring what is equivalent?

2 A You are inferring the white light from
3 Dialight is equivalent from the white light of the
4 example two.

5 Q I didn't mean to infer that.

6 A I just wanted to clarify that.

7 Q Sure. All right.

8 Was it typical in, let us say, 2010 to be
9 able to buy residential lighting in a T8 or T12 format
10 and achieve over 1,000 lumens?

11 A No, not in 2010.

12 Q I am going to give you about five exhibits
13 then. These are new exhibits.

14 A Okay.

15 Q The first is 1033. They are marked at the
16 bottom. These are new exhibits. This is from a thing
17 called the Wayback Machine which Mr. Hoffman is well
18 aware of.

19 If you look at the URL at the top, do you
20 see it says 2010/02?

21 A Okay.

22 Q That is February 2010 according to the
23 Wayback Machine standard.

24 A Understood.

25 Q I have got down here right below the green



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1 bar, it says T12, T8 LED tube light four foot, 15 watt?

2 A Yes.

3 Q And then right below that there is a whole
4 bunch of boxes, but there is a text that describes that
5 product and it says, LED T12, T8 Tube light, 300 LEDs
6 1500 lumens. This is 2010?

7 A Yes.

8 Q So, again, I think things on the internet
9 can be bought for residential purposes?

10 A No.

11 Q No?

12 A No. There was so much junk being -- this
13 does not tell us who the manufacturer is, right? It
14 most likely is not a reliable manufacturer and so the
15 Environmental Protection Agency and the Department of
16 Energy started coming in in the 2010s to get these, get
17 this junk out of the market. So they can say 1500
18 lumens. They can say a certain CRI. It's likely and I
19 cannot -- I haven't worked with this lamp, but it is
20 very likely they are not getting what they are
21 claiming. You may also be getting a CRI even less than
22 70.

23 Q All I was asking about is lumens. So 1500
24 lumens 2010, but you say this is unreliable?

25 A I would expect that to be -- you asked for



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1 residential applications. This would be unsuitable for
2 residential applications. The color quality, I am
3 speculating, but I am an expert, I have been there, I
4 experienced all of this real time and hands on, the
5 color quality would have been horrible. You would not
6 use it in a residential application.

7 Can somebody put out an LED type with 1500
8 lumens, yes. With 10,000 lumens? Yes, but it is going
9 to be overheated and have a very short life or it is
10 going to be very poor color quality or all of the above
11 and very likely all of the above.

12 I would dismiss this -- we ran across this
13 stuff as employees of GE Lighting. Here is what we have
14 to compete against. The specs are wrong. When we spec
15 something, when I say 1,000 lumens in 2010, I mean 1,000
16 lumens that you can trace back to the NIST. It is true
17 1,000 lumens. I don't believe this would be.

18 Q I am going to continue reading.

19 A I thought I had dismissed it.

20 Q Great for business lighting, home lighting,
21 accent lighting and office lighting.

22 You don't agree with that?

23 A They can say whatever they want. These
24 claims were shown by institutions within the industry
25 to be problematic, poor quality.



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1 And let me just add one layer since you keep
2 pressing this. The LED industry was following on to the
3 compact florescent light industry, CFL industry, which
4 consumers rejected outright. Very poor quality,
5 flickering, humming, very short life.

6 Because of products like this that were put
7 out there, not because of GE or Phillips or Sylvania who
8 were testing to make sure that they had the performance
9 they were claiming, but these other companies out there
10 that does not meet the performance claims. The
11 Department of Energy and EPA started putting out very
12 strict regulations that this kind of stuff is not going
13 to be allowed. You are going to require labeling that
14 says you met EPA and DOE specifications. I am certain
15 that this would not have.

16 Q Okay. Were you familiar with the company
17 LEDLight.com?

18 A No.

19 Q We will just stick with the one then.

20 A There are so many low-quality lighting
21 companies, and they are still not cleared out of the
22 system yet.

23 MR. BRIGGS: So I think this is a good place
24 for a break because I want to review your reexam
25 declaration before you go today because I need to be



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1 able to ask questions about it.

2 So did you send that to me?

3 MR. HOFFMAN: I have links to it that I can
4 forward to you, but I just want to make sure that there
5 is nothing attorney-client privileged in what I have or
6 work product. Let me see here.

7 MR. BRIGGS: Should we go off the record,
8 David?

9 MR. HOFFMAN: Yes, let us go off the record.
10 (Lunch recess was taken.)

11 Q (BY MR. BRIGGS) Welcome back from lunch,
12 Dr. Allen.

13 Did you guys discuss -- did you discuss the
14 substance of your testimony at all over lunch?

15 A Not my testimony, no.

16 Q Okay. I went through your, a couple of your
17 reexamination declarations that Mr. Hoffman sent me and
18 I am not going to have any questions on those at this
19 time.

20 A Okay.

21 Q I only have a few more questions. There
22 were several declarants besides yourself in these two
23 IPRs.

24 Do you know that?

25 A Others submitting declarations on behalf of



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1 Colt?

2 Q That's correct.

3 A I believe I know that.

4 Q For instance, Mr. Csernecky submitted a
5 declaration?

6 A Well, I read that one.

7 Q That is one instance. Do you know
8 Mr. Csernecky by any chance?

9 A No.

10 Q So another person who submitted a
11 declaration is Kevin Baxter.

12 Do you know Kevin Baxter?

13 A No.

14 Q Another person who submitted a declaration
15 is a Fernando Silva.

16 Do you know Fernando Silva?

17 A No.

18 Q Another person who submitted a declaration
19 is a gentleman named Bruce Wunderlich.

20 Do you know Mr. Wunderlich?

21 A No.

22 Q The last person who submitted a declaration
23 who I have not already mentioned is a person named Ken
24 Fischer.

25 Do you know Mr. Fischer?



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1 A No.

2 MR. BRIGGS: I have no further questions.

3 MR. HOFFMAN: Okay. I would like to take
4 about a ten-minute break and then I will have some
5 redirect.

6 (Recess was taken.)

7 REDIRECT EXAMINATION

8 BY MR. HOFFMAN:

9 Q Dr. Allen, is there anything in your past
10 declarations, to the best of your knowledge,
11 inconsistent with the current declarations that you have
12 done of Exhibit 2080?

13 MR. BRIGGS: Objection. Form.

14 A Can you repeat it then, please?

15 Q Sure. Is there anything in the past
16 declarations you have done for Colt in reexaminations
17 and/or patent prosecution for Colt that is inconsistent
18 with anything in your current declarations of Exhibit
19 2080, in the two IPR proceedings we have been talking
20 about?

21 A No, no inconsistencies.

22 Q In your time and experience at GE with the
23 patent review group you mentioned earlier, did you
24 consider obviousness of patents over the prior art?

25 A Yes.



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1 Q In the analysis that you have done in
2 providing your declarations of Exhibit 2080, did you
3 consider obviousness of the prior art?

4 A Yes.

5 Q Did you consider it from the point of view
6 of a POSITA?

7 A Yes.

8 Q Did you consider it at the time of the
9 invention?

10 A May 17, 2013, yes.

11 Q In your work in the GE patent review
12 committee, did you review any LED lighting devices in
13 patents that were for commercial image recording?

14 A I don't recall any specific, but I am
15 fairly sure that I did because I was responsible for a
16 very broad range, the entire broad range of IP that we
17 were considering.

18 Q In considering and setting forth your
19 opinions in your declarations of Exhibit 2080 in these
20 IPR proceedings, did you read and consider all of Claim
21 1, including all of its elements of the ''582 patent?

22 A Yes.

23 Q And then I am going to ask you the same
24 question with respect to the '895 patent. So your
25 review in these -- in your consideration of your



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1 opinions and setting them forth in your declarations of
2 Exhibit 2080 for both IPR proceedings, did you read and
3 consider all of Claim 1 and all of its elements of the
4 '895 patent?

5 A Yes.

6 Q Okay. I want to direct your attention, Dr.
7 Allen, to Exhibit 1001 which you should have a copy of
8 in front of you. You should have one over there.

9 A Okay. I have it.

10 Q I want to direct your attention specifically
11 to column 6 and line 31 through 33. Just take a moment
12 to read that.

13 A Okay.

14 Q Now, what is your understanding with respect
15 to whether or not the mention of clear in that sentence
16 is diffusing or not?

17 A Well, the way the sentence is constructed
18 it clearly says that a clear which acts to diffuse the
19 light. So even though it is clear, it is diffusing the
20 light.

21 Q Would a POSITA reach the same conclusion or
22 a different conclusion?

23 A One has to reach that conclusion saying it
24 acts to diffuse the light.

25 Q Is there anything in your testimony today or



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1 any document that you have seen today that changes your
2 opinions in your declarations of Exhibit 2080 in either
3 IPR?

4 A No, nothing.

5 Q Now I want to direct your attention, Dr.
6 Allen, back to Exhibit 1001 which is a copy of the '582
7 patent and specifically example one which is in column
8 10. And in that example or, actually, below that
9 example, lines 38-39, I just want to read that real
10 quick. It says, By diameter of 41 millimeters, there
11 would be four LEDs over the width and 144 LEDs long, for
12 a total of 576 LEDs.

13 Do you see that?

14 A Yes.

15 Q Does anything about using 576 LEDs tell you
16 anything about thermal management?

17 A Yes. If I were a POSITA reading this, I
18 would understand that the inventor was probably using
19 as many LEDs as possible. When you use a high number
20 of LEDs, then each LED has to carry less current. And
21 so it is not challenging, it is specified current and
22 therefore has longer life and it has higher
23 performance, and it has better color and it has better
24 efficacy.

25 Q Okay. Dr. Allen, in reviewing the Hasnain



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1 patent -- I just want to get you the exhibit number for
2 that. I believe it is 1008.

3 So in reviewing the Hasnain patent, 1008,
4 did you review the embodiment of Figure 3 and Hasnain's
5 discussion in column 4, lines 41-51 in considering your
6 opinions?

7 A The lines again, please?

8 Q Column 4, lines 41 through 51.

9 A Yes.

10 Q Had you expressly mentioned that Figure 3
11 and/or column 4, lines 41 through 51 of Hasnain in your
12 opinion, would it have changed your opinions at all?

13 MR. BRIGGS: Objection. Form.

14 A No, it would not change my opinion. And,
15 by the way, I did scrutinize every line of Hasnain. I
16 assimilated all of Hasnain into my analysis.

17 Q Okay. Now, I want to direct your attention
18 to the patent of Ducharme, which is Exhibit 1005.

19 Did you consider the embodiment of Figure 5A
20 in reviewing Ducharme for purposes of your declaration?

21 A Yes.

22 Q If you had expressly mentioned the
23 embodiment of paragraph 5A of Ducharme in your
24 declaration of Exhibit 2080, would it have changed any
25 of your conclusions at all?



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1 A No. The reason is because the thermal
2 management opportunity expressed in Figure 5A is
3 inconsequential.

4 Q Would the embodiment of Figure 5A have
5 changed any of the opinions in your declaration of
6 Exhibit 2080?

7 A No, none.

8 Q Would the embodiment of Figure 3 in column
9 4, lines 41 through 51 of Hasnain, Exhibit 1008, have
10 changed any of the opinions in your declaration of
11 Exhibit 2080?

12 A Repeat it again, please.

13 MR. HOFFMAN: Can the reporter read that
14 back, please.

15 (The question was read.)

16 Q Let me reask that question.

17 Does the embodiment of column 4, lines 41
18 through 51 in Figure 3 of Hasnain change any of the
19 opinions you have expressed in your declaration of
20 Exhibit 2080 in either IPR?

21 A Not at all. I have scrutinized those
22 lines. I understood them.

23 Q Now, you were talking earlier in your
24 testimony, Dr. Allen, about whether or not Claim 1
25 precludes the use of fans or fins.



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1 I want to direct your attention to Claim 1,
2 Element F as in Frank.

3 A Okay.

4 Q Do you see where that element mentions a
5 fluorescent form factor?

6 A Yes, a linear form factor of a fluorescent
7 light tube lamp.

8 Q Is it your understanding that if one were to
9 add fans or fins to the elements of Claim 1 that one
10 would still have to come within a fluorescent form
11 factor?

12 A Yes, that is exactly what it says.

13 Q Does a fluorescent form factor have to be
14 exactly round?

15 A No.

16 Q Okay. I want to direct your attention to
17 the '582 patent, column 1, lines 47 through 50. That
18 is Exhibit 1001.

19 A Okay.

20 Q So I am directing your attention to column
21 1, lines 47-50 of Exhibit 1001, which is the '582
22 patent and would you just take a moment to read those
23 lines to yourself.

24 A I have done that.

25 Q Okay. What is your understanding of cool



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1 color temperatures from that portion of the patent?

2 A It says explicitly color temperatures over
3 5000k are considered cool colors. I agree with that.

4 MR. HOFFMAN: Okay. I have nothing further.

5 MR. BRIGGS: No recross.

6 (The deposition concluded at 2:14 p.m.)
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C E R T I F I C A T E

I, MICHELE KOSS, a Shorthand Reporter and
notary public, within and for the State of Colorado, do
hereby certify:

That GARY ALLEN, Ph.D., the witness whose
examination is hereinbefore set forth, was first duly
sworn by me and that this transcript of said testimony
is a true record of the testimony given by said witness.

I further certify that I am not related to any
of the parties to this action by blood or marriage, and
that I am in no way interested in the outcome of this
matter.

IN WITNESS WHEREOF, I have hereunto set
my hand this 23rd day of April, 2024.

Michele Koss
Michele Koss, RMR, RPR



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ESQUIRE ERRATA SHEET

Esquire Job ID: J11077930

Case Caption: Quasar Science vs. Colt International
Clothing

DECLARATION UNDER PENALTY OF PERJURY

I declare under penalty of perjury that I have
read the entire transcript of my Deposition taken
in the above-captioned matter or the same
has been read to me and the same is true and
accurate, save and except for changes and/or
corrections, if any, as indicated by me on the
DEPOSITION ESQUIRE ERRATA SHEET hereof, with the
understanding that I offer these changes as if still
under oath. Signed on the _____ day of
_____, 2024.

GARY ALLEN, Ph.D.



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