



Transcript of Michael A. Hickner, Ph.D.

Date: August 21, 2025

Case: Shenzhen Tuozhu Technology Co., Ltd. -v- Stratasys, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Transcript of Michael A. Hickner, Ph.D.
Conducted on August 21, 2025

1 (1 to 4)

1	2	3
1 UNITED STATES PATENT AND TRADEMARK OFFICE	1 A P P E A R A N C E S	
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD	2 ON BEHALF OF PETITIONER:	
3 - - - - - x	3 KENNETH W. DARBY, ESQUIRE	
4 SHENZHEN TUOZHU :	4 FISH & RICHARDSON, P.C.	
5 TECHNOLOGY CO., LTD., :	5 111 Congress Avenue	
6 Petitioner, : Case No. IPR2025-00257	6 Suite 2000	
7 v. : U.S. Patent No.	7 Austin, Texas 78701	
8 STRATASYS, INC., : 9,592,660	8 (512) 226-8126	
9 Patent Owner. :	9	
10 - - - - - X	10 ON BEHALF OF PATENT OWNER:	
11	11 AASHISH KAPADIA, ESQUIRE	
12 Deposition of MICHAEL A. HICKNER, Ph.D.	12 CHRISTIAN TATUM, ESQUIRE	
13 Conducted Virtually	13 McDERMOTT WILL & SCHULTE LLP	
14 Thursday, August 21, 2025	14 300 Colorado Street	
15 10:58 a.m. EDT	15 Suite 2200	
16	16 Austin, Texas 78701	
17	17 (512) 298-6488	
18	18	
19	19	
20 Job No.: 595151	20	
21 Pages 1 - 79	21	
22 Reported by: Debra A. Whitehead	22	
2	4	
1 Deposition of MICHAEL A. HICKNER, Ph.D.,	1 C O N T E N T S	
2 conducted virtually.	2 EXAMINATION OF MICHAEL A. HICKNER, Ph.D. PAGE	
3	3 By Mr. Kapadia 5	
4	4	
5 Pursuant to notice, before Debra Ann Whitehead,	5 EXHIBITS MARKED IN TODAY'S SESSION	
6 E-Notary Public in and for the Commonwealth of	6 (None marked)	
7 Virginia.	7	
8	8 EXHIBITS MARKED IN PRIOR SESSIONS	
9	9 (Not attached)	
10	10 DEPOSITION EXHIBIT PAGE	
11	11 Exhibit 1001 13	
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5 1 PROCEEDINGS 2 MICHAEL A. HICKNER, Ph.D., 3 having been duly sworn, testified as follows: 4 EXAMINATION BY COUNSEL FOR PATENT OWNER 5 BY MR. KAPADIA: 6 Q Dr. Hickner, could you please state your 7 full name. 8 A Michael A. Hickner. 9 Q Thank you. We're conducting a remote 10 deposition today, and since you and I are not in 11 the same room I am going to ask you a few 12 questions about your environment. 13 Do you have any materials, whether it's 14 written or electronic, with you today? 15 A I just have the Zoom on my computer, and 16 I have a clean paper copy of my declaration next 17 to me. 18 Q If you want to open anything, like the 19 paper copy of your declaration, just let us know 20 so that we can, you know, mark it if need be and 21 keep a clean record for the depo. 22 Does that sound okay?	7 1 A I will let you know if someone enters the 2 room. 3 Q Thank you. Dr. Hickner, have you been 4 deposed before? 5 A I have been deposed approximately 15 6 times previously. 7 Q Well, then as a brief reminder, I'm just 8 going to ask you questions. You're under oath to 9 give an answer. Your counsel may object, but you 10 still have to answer. 11 Is that understandable? 12 A I understand the instructions. 13 Q After I ask you a question, please just 14 answer the question that I've asked you and not 15 anything else. 16 Does that make sense? 17 A I understand the instructions. 18 Q At some point if we need to take a break, 19 just let us know, we can certainly take a break. 20 But I'd just ask that you finish responding to any 21 pending questions before we take that break. 22 Does that make sense?
6 1 A I understand the instructions. 2 Q Do you have any access to another chat or 3 messaging application besides the Zoom application 4 that we are using today? 5 A No; I just have Zoom open on my computer. 6 Q Will you let us know if you receive any 7 chats or messages during the deposition besides 8 the messages that end up in the chat window for 9 this particular Zoom meeting? 10 A I will let you know. And I see the chat 11 at the bottom of the Zoom, so I'm assuming things 12 will just alert there as needed. 13 Q Okay. Do you have any access to email 14 applications? 15 A My email is closed. 16 Q And is there anyone else in the room with 17 you today? 18 A There is no one else in the room with me 19 today; it's just me. 20 Q During the course of our deposition today 21 if someone enters the room, will you please let us 22 know?	8 1 A Okay, I will -- I will let you know if I 2 need a break. 3 Q And is there any reason that you can't 4 testify truthfully today to the best of your 5 ability? 6 A I can testify truthfully today. 7 Q All right. Dr. Hickner, you're here 8 today because you offered a declaration in support 9 of a petition for inter partes review in 10 IPR2025-00257. 11 Is that correct? 12 A That is correct. 13 Q And in that inter parties review the 14 petitioner is Shenzhen Tuozhu Technology Company 15 Limited. 16 Is that right? 17 A As I understand it, that is correct. 18 MR. KAPADIA: I am going to upload 19 Exhibit 1003 to the chat. 20 (Exhibit 1003, previously marked, not 21 attached.) 22 Q It is in the process of uploading. Let

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1 me know when you receive it. 2 A Yes, I have the PDF open from the chat. 3 Q Excellent. So on your screen now is 4 Exhibit Number 1003 that's filed in the IPR. 5 Is Exhibit 1003 a copy of your 6 declaration in this IPR? 7 A Exhibit Number 1003.PDF is in reference 8 of patent Riley Reese, U.S. Patent Number 9 9,592,660, and at the bottom of the header it 10 says, "Declaration of Dr. Michael Hickner." 11 So this -- this is my declaration. 12 Q Okay. Thank you. Doctor, was anyone 13 else involved in creating this declaration? 14 A I wrote this declaration, and I 15 collaborated with Attorney Darby on its writing. 16 Q And potentially other lawyers at his law 17 firm as well? 18 A I -- so I wrote the declaration and 19 collaborated with Attorney Darby, to the best of 20 my knowledge. 21 Q Besides Attorney Darby, did anyone else 22 contribute to your work or analysis in relation to	1 spent in preparing this declaration? 2 A I spent approximately 40 to 50 hours 3 preparing this declaration over the course of four 4 or five weeks. 5 Q Are you working for petitioner on other 6 matters? 7 A I've written declarations in regards to 8 other patents in -- for the petitioner, yes. 9 Q And do you know which declarations or 10 matters those are? 11 A I don't have the patent numbers off the 12 top of my head. There are three or four other 13 matters that I'm working on, but I don't have 14 those numbers off the top of my head. 15 Q Are you working for Bambu Lab Limited on 16 other matters? 17 MR. DARBY: Objection. Form. 18 A No other matters than these IPRs. 19 Q Are you working for Shanghai Lunkuo 20 Technology Company Limited on other matters? 21 MR. DARBY: Objection to form. 22 A I am not working for them on other
1 your opinions in this declaration? 2 A Not to my knowledge, no. 3 Q Let's stay on Page 1 of your declaration. 4 Do you see the page number at the bottom 5 of the page in the center? 6 A Yes. It appears that Page 1 is Page 1 of 7 the PDF in the copy I have it open in front of me, 8 Exhibit 1003. 9 Q And referring -- when I refer to page 10 numbers today, I'm going to refer to the page 11 number at the bottom of the page. I understand 12 that the page number at the bottom might match the 13 PDF viewer page number, but I'll refer to page 14 number at the bottom of the page. 15 Is that okay? 16 A I understand. And I will ask for 17 clarification as needed. 18 Q Thank you. 19 With respect to this declaration, 20 Dr. Hickner, how much were you paid? 21 A My rate is \$450 per hour. 22 Q And approximately how many hours were	1 matters aside from these IPRs. 2 Q Are you working for Tuozhu Technology 3 Limited on other matters? 4 MR. DARBY: Same objection. 5 A I am not working for Tuozhu Technology on 6 any other matters aside from these IPRs. 7 Q Are you working for Bambu Lab USA, 8 Incorporated, on other matters? 9 MR. DARBY: Same objection. 10 A I am not working for them on other 11 matters aside from these IPRs that we spoke about 12 previously. 13 Q Are you working for any companies related 14 to petitioner on other matters? 15 A I'm not working for any related 16 companies, to my knowledge, on other matters, 17 aside from these IPRs. 18 Q Besides the IPRs that you've mentioned, 19 do you plan to do any work for petitioner or any 20 companies related to petitioner in the future? 21 MR. DARBY: I'm going to direct the 22 witness not to answer that. It would divulge

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1 confidential information. 2 Q Okay. Do you currently have any 3 discussions to do any work for petitioner? 4 MR. DARBY: I'm going to direct the 5 witness not to answer that. It would divulge 6 confidential and privileged information. 7 Q Dr. Hickner, in your declaration you 8 expressed opinions regarding U.S. Patent Number 9 9,592,660. 10 Is that correct? 11 A That's in the header to my declaration on 12 Page 1. It states U.S. Patent Number 9,592,660, 13 and that is the subject of the analysis that I 14 performed in my declaration. 15 MR. KAPADIA: I'm going to put into the 16 chat Exhibit Number 1001. 17 (Exhibit 1001, previously marked, not 18 attached.) 19 Q Let me know when you first receive it and 20 pull it up. 21 A I have Exhibit Number 1001.PDF open on my 22 computer.	13 1 the present invention. 2 Q So Figure 2 does show a build platform 3 with holes. Correct? 4 A In Column 2 of the patent, Lines 47 to 5 49, the patent reads, "Figure 2 shows a build 6 platform with holes for heater cartridges and 7 thermocouples, in accordance with an embodiment of 8 the present invention." 9 Q In your opinion, does Figure 2 of the 10 '660 patent show the platform with holes? 11 A As the patent states in plain language, 12 in the reference that I stated previously to the 13 patent, "Figure 2 shows a build platform with 14 holes for heater cartridges and thermocouples, in 15 accordance with an embodiment of the present 16 invention." 17 So the plain -- the patent speaks for 18 itself in this plain language. 19 Q So some of the holes are for 20 thermocouples. 21 Is that right? 22 A In Column 3 of this '660 patent, Line 26,
14 1 Q Thank you, Dr. Hickner. 2 Do you recognize Exhibit 1001 as U.S. 3 Patent Number 9,592,660? 4 A Yes. Exhibit Number 1001, U.S. patent 5 Reese, et al., U.S. 9,592,660, dated March 14, 6 2017. 7 Q Throughout today you'll understand if I 8 refer to the '660 patent that I'm talking about 9 the patent shown in front of you as Exhibit 1001. 10 Does that make sense? 11 A I understand that, yes. 12 Q Go ahead and turn to Figure 2 of the '660 13 patent. 14 A I'm looking at Page Number 4 in the PDF 15 and at the bottom of the page Figure 2. I have it 16 in front of me. 17 Q Does Figure 2 of the '660 patent show a 18 build platform with holes? 19 A As it says in the patent, '660 patent, 20 Column 2, Line 47, Fig. 2 shows a build platform 21 with holes for heater cartridges and 22 thermocouples, in accordance with an embodiment of	16 1 the patent -- starting on Line 25 it states, "With 2 thermal control from PID controllers connected to 3 thermocouples (204), spaced evenly in the build 4 platform 102." 5 And if we look at Figure 2, both 204 and 6 102 are identified in the language of the patent. 7 Q So are some of the holes in the build 8 platform for the thermocouples? 9 A In Column 3, Line 38 of the '660 patent, 10 it states, "One or more thermocouples can be 11 situated at one or several locations (204) on the 12 block 102 to provide feedback to a controller." 13 And both 102 as we look at Figure 2, both 14 102 and 204 are defined in that figure. 15 Q In your opinion, are some of the holes in 16 the build platform shown in Figure 2 of the '660 17 patent for thermocouples? 18 A In the language of the patent in Column 19 3, Lines 39, the patent states itself "One or more 20 thermocouples can be situated at one or several 21 locations (204) on the block 102." 22 So the patent's plain language is there,

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17 1 and both 102 and 204 are identified in Figure 2. 2 MR. KAPADIA: Objection. Nonresponsive. 3 Q Dr. Hickner, please just answer the 4 question that I've asked you. 5 In your opinion, are some of the holes in 6 the build platform shown in Figure 2 of the '660 7 patent for thermocouples? 8 A So my response is, in Column 3, in the 9 two places I've identified, Column 3, Line 26, or 10 starting at 25, and Line 3, starting at 38, the 11 patent in its plain language describes – Line 26, 12 "Controllers connected to thermocouples (204) 13 spaced evenly," and going to Column 3, Line 38, 14 "One or more thermocouples can be situated at one 15 or several locations 204," both of which are 16 identified in Figure 2. 17 So in plain language the patent states 18 locations of thermocouples, hyphen, 204, and 19 identifies location 204 in Figure 2. And so the 20 patent speaks for itself on this issue. 21 MR. KAPADIA: Objection. Nonresponsive. 22 Q Dr. Hickner, what is your opinion about	19 1 A Again, my – my best response is that the 2 patent speaks for itself in terms of the Figure 2, 3 which you directed me to, and the plain language 4 of the patent and the references that I pointed 5 out in Column 3. I -- I can't -- I can't say 6 anything more than the plain language given right 7 in the '660 patent. 8 Q Earlier you mentioned that locations for 9 the thermocouples in Figure 2 of the '660 patent 10 are denoted by the number 204. 11 Is that right? 12 A So in Column 3, at Lines 26, the patent 13 states, "Controllers connected to thermocouples 14 (204), spaced evenly in the build platform 102." 15 Q And do you have an opinion about whether 16 some of the holes in the build platform shown in 17 Figure 2 of the '660 patent are for heater 18 cartridges? 19 A In Column 3 of the '660 patent, it states 20 on Line 25, "Using heater cartridges (202)." And 21 that bold 202 if we look at Figure 2, 202 is 22 identified with arrows in that figure.
18 1 whether the build platform in Figure 2 of the '660 2 patent shows some of the holes for thermocouples? 3 A I don't understand your question more 4 than I've responded. 5 The patent speaks for itself on this. 6 Q Dr. Hickner, do you have an opinion about 7 whether the build platform in Figure 2 of the '660 8 patent shows that some of the holes are for 9 thermocouples? 10 A So the analysis that I performed is from 11 the perspective of a person of ordinary skill in 12 the art. And they would interpret this patent, 13 given the plain language used in the patent, 14 wherein both of these references in Column 3 to 15 thermocouples and locations, parenthetical, 204, 16 the patent speaks for itself on this issue. 17 I -- that's my testimony. 18 MR. KAPADIA: Objection. Nonresponsive. 19 Q Yes or no, Dr. Hickner. Do you have an 20 opinion about whether the build platform in Figure 21 2 of the '660 patent shows that some of the holes 22 are for thermocouples?	20 1 Q Do the number of holes in the build 2 platform shown in Figure 2 of the '660 patent 3 depend on the number of thermocouples in heater 4 cartridges? 5 A So in Column 3 of the '660 patent, Lines 6 44, 45, and 46 read, "The number of holes depends 7 on the number of heating cartridges and/or 8 thermocouples, as stated in the '660 patent." 9 Q Dr. Hickner, in your declaration you 10 express opinions involving U.S. Patent Publication 11 Number 2016/0096326 to Naware. 12 Is that right? 13 A So Exhibit 1007 on Page 15 of my 14 declaration identifies U.S. 2016/0096326, 15 15 parentheses, quotes, Naware, in my declaration. 16 MR. KAPADIA: Okay. I am going to drop 17 into the chat Exhibit 1007. 18 (Exhibit 1007, previously marked, not 19 attached.) 20 Q Let me know when you receive it and have 21 opened the file. 22 A Okay, I have Exhibit 1007 opened on my

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21 1 computer. 2 Q Thank you, Dr. Hickner. Let's stay on 3 the first page of Exhibit 1007. 4 Do you recognize Exhibit Number 1007 as 5 U.S. Patent Publication Number 2016/0096326 to 6 Naware? 7 A Yes, Exhibit Number 1007 open on my 8 computer is the U.S. Patent Application 9 Publication to Naware, publication date April 7, 10 2016. 11 Q And you'll understand if I refer to 12 "Naware" today, that I'm talking about the 13 document that is shown in Exhibit 1007. 14 Is that okay? 15 A I understand that. 16 Q Let's turn to Page 3 of Naware. 17 A Apologies. It's sideways. I'm just 18 going to -- ah, there we go. So Page 3 of the 19 PDF -- oh, and shown stamped Page 3 is Fig. 2. 20 Q Okay. In Figure 2 Naware shows multiple 21 modular elements denoted by the number 30. 22 Is that right?	23 1 modules," bold 34, "is in communication with and 2 controlled by a microcontroller processor 52, 3 (Figure 5)." 4 Q Does each module in Figure 5 of Naware 5 have a heating and cooling mechanism denoted by 6 the number 38? 7 A In Paragraph 32 of the Naware reference a 8 few lines down from the top it states, Include 9 heating/cooling -- "Include heating/cooling 10 mechanism 38 and temperature sensors 40." 11 And then further down near the bottom of 12 Paragraph 32 in the Naware reference it states, 13 "In the illustrative embodiment shown, each 14 heating/cooling mechanism 38 and each temperature 15 sensor 40 are housed inside respective temperature 16 control modules 34 which are housed in the build 17 plate 10." 18 Q Okay. Let's go back to Page 3 of Naware, 19 that's Figure 2. Let me know when you're there. 20 A Yes, I have Figure 2 in front of me. 21 Q Do you have any opinion as to whether 22 there are any holes in the build plate for
22 1 A In Paragraph 31 of Naware, the reference 2 says, "Referring to Figs. 2 through 5, the build 3 plate 10 includes multiple numbers of zones or 4 modular elements 30 from 1 to N. Each modular 5 element 30 consists of contact plate 32, 6 temperature control module 34, and then insulating 7 plate 36." 8 Q And do you see each of those elements 9 identified in Figure 2? 10 A Figure 2 identifies 10, 20, 32, 34, and 11 36. 12 Q Let's turn to Page 2 of Naware. 13 Do you see Figure 5 of Naware? 14 A Yes, I see Fig. 5 on the bottom of marked 15 Page 2. 16 Q Figure 5 of Naware shows one temperature 17 control module denoted by the number 34. Right? 18 A So in Paragraph 31 of this Naware 19 reference, it says a few lines down from the top 20 of Paragraph 31, "Temperature control module 34." 21 And in Paragraph 34 of this reference it starts, 22 "Alternatively, each of the temperature control	24 1 Naware's temperature control modules? 2 A On Page 3 of the Naware reference, 3 Paragraph 31, the reference states, "Referring to 4 Figs. 2 through 5 the build plate 10 includes 5 multiple numbers of zones or modular elements 30 6 from 1 to N. Each modular element 30 consists of 7 contact plate 32, temperature control module 34, 8 and an insulating plate 36. The plurality of 9 contact plates 32 of the multiple modular elements 10 30 form the upper surface 20 or at least a portion 11 of the upper surface 20. The number of modular 12 elements 30 may vary based on many factors or 13 parameters, including but not limited to the size 14 of the build plate 10, the size and complexity of 15 the part or article 14 being manufactured, the 16 type of material used to fabricate the part or 17 article 14 and/or the environment in which the 18 build plate 10 is provided." 19 MR. KAPADIA: Objection. Nonresponsive. 20 Q Dr. Hickner, do you have an opinion as to 21 whether there are any holes in the build plate in 22 Naware's Figure 2 for temperature control modules?

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25 1 A So in plain language in Column 3, 2 Paragraph 31, the patent itself describes Figure 2 3 in that -- in that Paragraph 31 that I just read. 4 I -- I don't have any more analysis than what is 5 written in plain language in Exhibit 1007. 6 Q So you have not performed any analysis of 7 Naware outside of the language that's in Exhibit 8 1007? 9 MR. DARBY: Objection. Misstates 10 testimony. 11 A So Exhibit 1007 is cited in my 12 declaration and throughout my declaration and 13 formed part of my basis for my testimony in the 14 declaration. And so I considered Exhibit 1007 in 15 whole and used it in my declaration and in my 16 analysis as cited throughout. 17 Q Did you perform any analysis on Paragraph 18 31 of Exhibit 1007? 19 A In Paragraph 74 of my declaration I 20 state, "Additionally, the Cable-Naware combination 21 incorporates Naware's more specific teachings 22 regarding a build plate (platform) containing an	27 1 Q Dr. Hickner, did you just read from 2 Paragraph 74 of your declaration? 3 A Yes, that's what Paragraph 4 -- that's 4 what Paragraph 74 says in my declaration. 5 Q Besides the words that actually appear in 6 Paragraph 74 of your declaration, do you have any 7 opinions with respect to Naware and whether it has 8 holes in its build plate for temperature control 9 modules? 10 A So Paragraph 74 contains my testimony. I 11 believe we are speaking about Exhibit 1007, 12 Paragraph 31. This paragraph in my declaration 13 contains my testimony and analysis, including a 14 citation to that reference. 15 Q So nowhere else in your declaration do 16 you have an opinion with respect to Naware and 17 whether it has holes in its build plate for 18 temperature control modules? 19 A So in Paragraph 77 of my declaration I 20 state on the -- on the next page from the heading 21 of that paragraph, "Hereto Naware disclosed 22 temperature control module in the preferred
26 1 array of modular elements, each including a 2 contact plate 32, temperature control module 34, 3 and an insulating plate 36," and I cite Exhibit 4 1007, Paragraph 31, from Paragraph 74 of my 5 declaration. 6 Q In Paragraph 74 of your declaration you 7 don't have any opinion as to whether there are 8 holes in the build plate of Naware's -- of 9 Naware's build plate for temperature control 10 modules. 11 Is that right? 12 A Paragraph 74 in my declaration reads, 13 "Additionally, the Cable-Naware combination 14 incorporates Naware's more specific teachings 15 regarding a build plate (platform) containing an 16 array of modular elements, each including a 17 contact plate 32, temperature control module 34, 18 and an insulating plate 36," citing to Exhibit 19 1007, Paragraph 31. And that's the whole 20 paragraph and below that paragraph 74 in my 21 declaration I show a copy of an annotated Figure 2 22 from Exhibit 1007 right below Paragraph 74.	28 1 embodiment of the '660 patent's temperature 2 control unit. Both contain a heating element 3 controller and temperature sensor." 4 MR. KAPADIA: Objection. Nonresponsive. 5 Q Dr. Hickner, is there anywhere in your 6 declaration where you have an opinion with respect 7 to Naware and whether it has holes in its build 8 plate for temperature control modules? 9 A So in Paragraph 77 of my declaration it 10 states, "To a POSITA in this context, there is no 11 meaningful difference between a module and a unit, 12 both of which connote a cohesive package or 13 assembly of components." 14 MR. KAPADIA: Objection. Nonresponsive. 15 Q Dr. Hickner, I'm going to ask you another 16 time. Is there anywhere in your declaration where 17 you have an opinion with respect to Naware and 18 whether it has holes in its build plate for 19 temperature control modules? 20 A Can you ask the question again, please? 21 Q Sure. I'll repeat it back. 22 Is there anywhere in your declaration

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29 1 where you have an opinion with respect to Naware 2 and whether it has holes in its build plate for 3 temperature control modules? 4 A So in Paragraph 51 of my declaration it 5 starts, "As shown below," which is the annotated 6 Figure 2, "Naware creates his disclosed 7 heating/cooling zones by providing an array of 8 temperature control modules 34 located throughout 9 the build plate 10, each of which includes 10 heating/cooling mechanisms 38 and temperature 11 sensors 40." That's Exhibit 1007, Paragraph 32. 12 "The heating/cooling mechanisms may be, but are 13 not limited to, micro/nano heaters, coils, heat 14 pipes, micro/nano channels, thermoelectric 15 coolers, electromagnetic induction heating or a 16 combination of them." 17 MR. KAPADIA: Objection. Nonresponsive. 18 Q Dr. Hickner, do you have any opinions in 19 your declaration beyond the words that are found 20 in Naware as to whether Figure 2 discloses holes 21 for temperature control modules? 22 A So I can't be any more clear than	31 1 of Naware. 2 MR. KAPADIA: Objection. Nonresponsive. 3 Q Dr. Hickner, in Paragraphs 50, 51, and 52 4 of your declaration do you ever use the word 5 "hole"? 6 A Section B, which is titled Naware Exhibit 7 1007, in my declaration with those paragraphs 8 speaks for itself. And this is my analysis and 9 testimony. 10 MR. KAPADIA: Objection. Nonresponsive. 11 Q Dr. Hickner, in Paragraphs 50, 51, and 52 12 of your declaration, do you ever use the word 13 "hole"? 14 A I think this Section B, this -- my 15 analysis of Naware, Exhibit 1007, speaks for 16 itself in my declaration. 17 MR. KAPADIA: Objection. Nonresponsive. 18 Q Yes or no, Dr. Hickner. In Paragraphs 19 50, 51, and 52 of your declaration, do you ever 20 use the word "hole"? 21 A I don't understand the question. I told 22 you that Section B is -- is my analysis of Naware,
30 1 Paragraph 51 of my declaration. That's my 2 testimony. And that paragraph 51 is about Figure 3 2 in Naware with the annotated figure. And so my 4 declaration, Paragraph 51, contains my testimony 5 on Figure 2. 6 Q So sitting here today, you don't have any 7 opinions beyond the words that are found in 8 Paragraph 51 as to whether Figure 2 of Naware 9 discloses holes for temperature control modules? 10 A Paragraph 51 and the annotated Figure 2 11 are my -- are my testimony on Figure 2 of Naware, 12 including the Section B of my declaration that 13 discusses Exhibit 1007, which is Naware, in 14 general. That's Paragraphs 50, 51, 52. And so in 15 my declaration I have my analysis of the Naware 16 Exhibit 1007. 17 Q In Paragraphs 50, 51, and 52 of your 18 declaration, do you ever use the word "hole"? 19 A So my analysis of Naware, Exhibit 1007, 20 is given in Section B, which is the Paragraphs 50, 21 51, and 52, along with my annotated Figure 2. 22 That's my analysis that I used in my declaration	32 1 including an annotated Figure 2. I don't have any 2 further analysis of Naware as an exhibit beyond 3 what I put into my declaration here in these 4 paragraphs. 5 MR. KAPADIA: Objection. Nonresponsive. 6 Q Dr. Hickner, sitting here today, are you 7 able to answer whether Paragraphs 50, 51, and 52 8 of your declaration use the word "hole"? 9 A So Section B contains my analysis of 10 Naware, Exhibit 1007. I don't have any further 11 testimony. This is -- this is my complete 12 analysis of Naware in this section. 13 Q Are there any other sections of your 14 declaration where you have analysis of Naware as 15 to whether Naware discloses a build platform with 16 holes for thermally conducted modules? 17 A Sorry, can you -- can you ask me that 18 question again, Counsel? 19 Q Sure. Are there any other sections of 20 your declaration where you have analysis of 21 Naware, Exhibit 1007, as to whether the reference 22 discloses a build platform with holes for

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33 1 temperature control modules? 2 A So you'll have to point me to some place 3 specific in my declaration if you want to talk 4 about a specific analysis. Otherwise we've 5 discussed Section B, which is my analysis of 6 Naware, Exhibit 1007. 7 Q So sitting here today, you can't tell me, 8 without me identifying a specific section of your 9 declaration, whether you have an analysis of 10 Naware as to whether the reference discloses a 11 build platform with holes for temperature control 12 modules? 13 A So my analysis of Naware is contained in 14 Section B of my declaration, which is Paragraphs 15 50, 51, and 52, including annotated Figure 2. If 16 you want to discuss other pieces of my 17 declaration, I'd be happy to do so if you point me 18 to a specific reference in my declaration. 19 Q Does Paragraph 75 of your declaration, 20 which you had discussed earlier, does Paragraph 75 21 of your declaration mention anything with regards 22 to holes in the build platform?	35 1 A Paragraph 75 in my declaration is -- is 2 my testimony beginning with, "Naware teaches 3 that," and I have read that Paragraph 75 4 previously. That's my testimony in Paragraph 75 5 of my declaration. 6 Q For any of the paragraphs in your 7 declaration with respect to Naware, do you have 8 any testimony, sitting here today, beyond the 9 words that appear in your declaration? 10 A So my -- my declaration is my complete 11 testimony and analysis of this case, including the 12 references and references to the subject '660 13 patent. I don't have testimony beyond what's 14 written in my declaration. This is -- this is my 15 complete testimony in regards to the '660 patent. 16 Q Dr. Hickner, in your declaration you 17 express opinions regarding a combination involving 18 U.S. Patent Publication Number 2016/0075091 to 19 Cable, and the reference we just discussed, 20 Naware. 21 Is that correct? 22 A In Section C of my declaration titled The
34 1 A So Paragraph 75 in my declaration states, 2 "Naware teaches that each of the temperature 3 control modules 34 is a device which has the 4 ability to control the temperature thereof, and 5 consequently control the temperature of its 6 respective modular element 30." And it cited 7 Exhibit 1007, Paragraph 30 -- 0032. 8 MR. KAPADIA: Objection. Nonresponsive. 9 Q Does Paragraph 75 of your declaration 10 mention anything with regards to holes in the 11 build platform? 12 A Paragraph 75 again states, "Naware 13 teaches that each of the temperature control 14 modules 34 in a device which has the ability to 15 control the temperature thereof, and consequently 16 control the temperature of its respective modular 17 element 30," that's cited Exhibit 1007, Paragraph 18 0032, that's -- that's my testimony in Paragraph 19 75 of my declaration. 20 Q So you don't have any testimony, sitting 21 here today, beyond what is actually repeated in 22 Paragraph 75?	36 1 Cable-Naware Combination, Paragraph 53 starts, "A 2 POSITA would have been motivated to combine, one, 3 Cable's 3D printing apparatus and, two, Naware's 4 disclosure of an array of temperature control 5 modules within the build platform as an integral 6 heat source. The result of this Cable-Naware 7 combination would yield an additive manufacturing 8 3D printer system with a heated build plate that 9 incorporates temperature control modules to 10 control the temperature of the plate and, thus, 11 mitigates printing issues such as deformation of 12 the 3D object." 13 And I continue with the reason to combine 14 in following paragraphs in my declaration. 15 Q If you turn to Page 15 of your 16 declaration, do you identify Cable as Exhibit 17 1006? 18 A Yes, in Page 15 of my declaration, in the 19 table at the bottom of Page 15, Exhibit 1006 is 20 U.S. 2016/0075091 that I labeled as Cable in 21 parentheses. 22 MR. KAPADIA: I am going to drop in

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37 1 Exhibit 1006 into the chat. 2 (Exhibit 1006, previously marked, not 3 attached.) 4 Q Let me know when you've received it and 5 pulled it up. 6 A Yes, I have Exhibit 1006 pulled up. 7 United States patent application publication, 8 Cable. And U.S. 2016/0075091, dated March 17, 9 2016. 10 Q You understand that if I refer to "Cable" 11 today, that I'm talking about this document shown 12 in Exhibit 1006. 13 Does that make sense? 14 A I understand that. 15 Q Let's go ahead and turn to Page 2 of 16 Cable. 17 Do you see Figure 1 of Cable on Page 2? 18 A Yes, Page 2 numbered at the bottom, Fig. 19 1 looks like the only -- only thing on this page. 20 Q And in Figure 1 do you see a build 21 platform? 22 A In Paragraph 0034 of Exhibit 1006, it	39 1 104, yet removable after the object 104 is 2 formed." 3 Q Dr. Hickner, do you have any opinions as 4 to whether the substrate in Cable sits adjacent to 5 the platform 114? 6 A So as it -- as it says in my declaration 7 in Paragraph 47, "Cable's substrate is used as a 8 working surface for building the object and can be 9 positioned on a heated platform configured to 10 support the substrate." Exhibit 1006, Paragraphs 11 34, 44, and 45. "The substrate has a top layer 12 made of a first material such as a thermoplastic 13 polymer, which is selected to promote good 14 adhesion and can be manufactured by coating the 15 substrate." 16 And that's in Exhibit 1006, Paragraph 61 17 and 36. 18 Q Speaking of Paragraph 61 of Exhibit 1006, 19 I believe you had cited to that very same 20 paragraph in Paragraph 80 of your declaration on 21 Pages 53 and 54 of your declaration. 22 If you navigate to those pages, do you
38 1 states, "The substrate 110 can be positioned on a 2 platform 114 that is configured to support the 3 substrate 110." And I -- 110, if we look at 4 Figure 2 -- apologies. If we look at Figure 1, 5 110 and 114 are identified in Figure 1. 6 Q Does the substrate in Cable sit adjacent 7 to Platform 114? 8 A So in Paragraph 34 of Exhibit 1006, it 9 states, "The substrate 110 can be positioned on a 10 platform 114 that is configured to support the 11 substrate 110. In this manner the substrate 110 12 can be provided on the platform 114 as a working 13 surface for building the object 104 on the 14 substrate 110. The substrate 110 can be removably 15 mounted, attached, or fastened to the platform 114 16 by any suitable attachment mechanism, including, 17 without limitation, one or more bolts, clamps, 18 hooks, latches, locks, nails, nuts, pins, screws, 19 slots, retainers, adhesive, Velcro, tape, or any 20 other suitable attachment mechanism that allows 21 for the substrate 110 to be secured to the 22 platform 114 during the formation of the object	40 1 have any opinions as to whether the substrate in 2 Cable sits adjacent to platform 114? 3 A Counsel, you referred me to which 4 paragraph in Exhibit 1006? 5 Q I referred you to Paragraph 80 of your 6 declaration. That's on Pages 53 and 54. 7 A Okay, I have Paragraph 80 of my 8 declaration in front of me. 9 Q My question was, do you have any opinions 10 as to whether the substrate in Cable sits adjacent 11 to platform 114? 12 A Below Paragraph 80 in my declaration is 13 an annotated Figure 1 of Cable from Exhibit 1006. 14 And I state in Paragraph 80 of my declaration, "As 15 seen in Cable's Figure 1 below, the substrate 110, 16 (thermally conducted plate), sits adjacent to the 17 build platform 114." And both elements -- or both 18 110 and 114 are shown in the annotated Figure 1 in 19 my declaration. 20 Q Dr. Hickner, why does the substrate 110 21 sit adjacent to the build platform 114 in Cable? 22 MR. DARBY: Objection to form.

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41 1 A In Paragraph 81 of my declaration I state 2 right below the annotated Figure 1 from Exhibit 3 1006, I mentioned above that Cable's flexible 4 substrate is plate-like. "As shown above, the 5 substrate is illustrated as a thin, flat sheet of 6 material - like a plate. Additionally, Cable's 7 substrate functions as a plate at least in the 8 sense that it supports the object being printed 9 during the build. More, as shown above (and in 10 Cable's other figures), the substrate sits on top 11 of the build platform and is removably mounted, 12 attached, or fashioned to the platform, just as 13 the build plate of a typical 3D printer." 14 And that -- the reference is Exhibit 15 1006, Figure 1, Paragraph 57. 16 Q Dr. Hickner, in Paragraph 80 of your 17 declaration you state that the substrate 110, and 18 then parentheses, thermally conductive plate, sits 19 adjacent to the build platform 114. 20 Why is the substrate 110 in Cable a 21 thermally conductive plate? 22 A In Paragraph 79 of my declaration I	43 1 kelvin, while concrete has a much lower thermal 2 conductivity of approximately 0.9 watts per meter 3 kelvin." 4 And that's -- the reference to those 5 numbers are Exhibit 1025, Page 31. 6 MR. KAPADIA: Okay. Why don't we take a 7 break, and then we'll reconvene. 8 (A recess was taken.) 9 BY MR. KAPADIA: 10 Q Welcome back, Dr. Hickner. We just 11 completed a break. 12 Did you speak to anyone during that 13 break? 14 A I did not speak to anyone during the 15 break. 16 Q Did you receive any chats or messages 17 during the break? 18 A I did not receive any messages during the 19 break. 20 Q And did you open any materials during 21 your break? 22 A I did not open any materials during the
42 1 state, The substrate plate, parenthetical, can be 2 made of any suitable material, including metal, 3 which a POSITA would have understood to be 4 thermally conductive. Exhibit 1006, Paragraph 77. 5 In fact, the POSITA would have recognized 6 that all or virtually all materials are thermally 7 conductive to some degree. 8 MR. DARBY: Counsel, we've been going for 9 a little bit over an hour now, if you could work 10 in a break soon, that would be great. 11 MR. KAPADIA: Yeah, let's do one more 12 question and then we'll do a break. 13 Q Dr. Hickner, would a POSITA understand 14 that a metal plate satisfies the thermally 15 conductive plate claim limitation? 16 A In Paragraph 79 of my declaration I 17 state, "The POSITA would have recognized that all 18 materials are thermally conductive to some degree. 19 Many kinds of metals, as disclosed by Cable, are 20 known to have relatively high levels of thermal 21 conductivity. For example, steel has a thermal 22 conductivity of approximately 52 watts per meter	44 1 break. 2 Q Before we went on break we were 3 discussing the thermally conductive plate claim 4 limitation. 5 Can you explain in your own words what 6 the term "thermally conductive plate" means? 7 MR. DARBY: Objection to form. 8 A In Paragraph 79 of my declaration, I 9 state, "The substrate (plate), can be made of any 10 suitable material, including metal, which a POSITA 11 would have understood to be thermally conductive," 12 referenced Exhibit 1006, Paragraph 77. "In fact, 13 the POSITA would have recognized that all or 14 virtually all materials are thermally conductive 15 to some degree. Many kinds of metals, as 16 disclosed by Cable, are known to have relatively 17 high levels of thermal conductivity." 18 Q Besides the words in Paragraph 79 of your 19 declaration, do you have any opinions as to what 20 the term "thermally conductive plate" means? 21 A As I say in my declaration in Paragraph 22 22 79, a POSITA would have understood in plain

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45 1 language the term "thermally conductive." 2 Q What's your understanding of the term 3 "build platform" in additive manufacturing? 4 A So in Paragraph 31 of my declaration I 5 state, "In 3D printing, the term 'print bed' is 6 used when referencing the surface on which a 7 printer deposits build material to construct an 8 object layer by layer during additive 9 manufacturing process." And I cite to Exhibit 10 1011, Page 10. The print bed is the surface that 11 your 3D prints are built on. I reproduce a figure 12 that's annotated from Exhibit 1011, Page 8, right 13 below Paragraph 31. And in 32, Paragraph 32 of my 14 declaration I state, "Depending on the 15 configuration of the 3D printer, the print bed can 16 be the top surface of a static platform structure, 17 often called a build platform or a removable 18 plate, often called a build plate. The build 19 plate is secured to the build platform during the 20 additive manufacturing process and taken off the 21 build platform to facilitate removal of the 22 printed object. The terms 'print bed' can be used	47 1 Q Are you not familiar with the term 2 "reasonable certainty" in the context of claim 3 limitations? 4 A As I state in Paragraph 17 of my 5 declaration, I understand that an obviousness 6 determination also requires that a POSITA would 7 have had a reasonable expectation of success. And 8 this concept has been explained to me as relating 9 to the relative likelihood or predictability from 10 the perspective of a POSITA of successfully 11 modifying the prior art in a manner that would 12 meet the claim – claimed limitations of the 13 patent being challenged. Here '660 is the topic 14 of my declaration and analysis. 15 I understand that the expectation of 16 success need only be reasonable and thus does not 17 require the absolute certainty gleaned from 18 physically creating the proposed prior art 19 modification. 20 Q Do you have any understanding of claim 21 interpretation? 22 A In Part C of my declaration, well,
46 1 interchangeably with 'build platform' or 'build 2 plate.'" 3 Q Dr. Hickner, can you explain in your own 4 words whether you believe a person of ordinary 5 skill in the art would understand a thermally 6 conductive plate disposed adjacent to the build 7 platform to have reasonable certainty? 8 MR. DARBY: Objection to form. 9 Q I'll repeat the question. 10 Doctor, can you explain in your own words 11 whether you believe a person of ordinary skill in 12 the art would understand the term "a thermally 13 conductive plate disposed adjacent to the build 14 platform" to have reasonable certainty? 15 MR. DARBY: Same objection. 16 A Can you define "reasonable certainty" for 17 me? I don't understand exactly what you're 18 asking. 19 Q Are you not familiar with the term 20 "reasonable certainty"? 21 A Can you define that term for me, please, 22 in this context?	48 1 Section C, titled Claim Interpretation, I state in 2 Paragraph 18, "I understand that for the purpose 3 of my analysis in this inter partes review 4 proceeding, the terms appearing in the patent 5 claims should be interpreted according to their 6 ordinary and customary meaning." In determining 7 the ordinary and customary meaning, I understand 8 that the words of the claim are first given in 9 their plain meaning that those words would have to 10 a person of ordinary skill in the art at the time 11 of the alleged invention. 12 Q Dr. Hickner, in comparing the claims of 13 the '660 patent to the art in your declaration, 14 did you interpret the claims of the '660 patent? 15 A In Page 5 of my declaration – excuse me, 16 Page 6 of my declaration I have a heading, Listing 17 of Challenged Claims. And I list Claim 1 and its 18 elements, Claim 2, Claim 3, and I go on to list 19 the claims of the '660 patent. 20 Q In comparing the claims of the '660 21 patent and each of their elements to the art in 22 your declaration, did you interpret the claims or

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49 1 any of their elements? 2 A So I used the ordinary and customary 3 meaning of the words in the claims themselves. I 4 didn't need to interpret. I used the ordinary and 5 customary meaning as stated in my declaration in 6 Paragraph 18. 7 Q Do you believe that a person of ordinary 8 skill in the art would understand the terms 9 appearing in the '660 patent's claims to be 10 interpreted according to an ordinary and customary 11 meaning? 12 A In Paragraph 28 of my declaration where I 13 discuss a person of ordinary skill in the art, I 14 say midway through Paragraph 28, "For example, 15 pertinent to the '660 patent, the design and 16 development of a build platform and a build plate 17 onto which a 3D part is printed would have been 18 well within the capabilities of a junior engineer, 19 and such a person would have understood the 20 purpose of the platform and plate and would have 21 been able to apply basic product design 22 principles."	51 1 customary meaning, end quote? 2 MR. DARBY: Same objection. 3 A As I state in Paragraph 30 of my 4 declaration, my analysis and conclusions expressed 5 in this declaration are based on the perspective 6 of a POSITA having this level of knowledge and 7 skill. 8 Q Dr. Hickner, today -- sitting here today, 9 do you have an opinion as to the interpretation of 10 the '660's patent claims? 11 A So I -- I list the claims in my 12 declaration and in the section of Claim 13 Interpretation, Paragraph 18 I used their -- I say 14 that the terms appearing in the patent claims 15 should be interpreted according to their ordinary 16 and customary meaning. The language in the claims 17 speaks for themselves in terms of their ordinary 18 and customary meaning. 19 Q Okay. Why don't we turn to Page 7 of 20 Cable. I believe you may have to rotate the page. 21 A This is Exhibit 1006? 22 Q That's right.
50 1 I go on to say that, in Paragraph 29, "I 2 also believe that a POSITA could reach the same 3 level of ordinary skill, without formal degree or 4 training. For example, as with the junior 5 engineer I mentioned above, experienced users of 6 3D printers would have understood the purpose of 7 the build platform and build plate, as well as 8 concerns a designer might consider in developing 9 these components." 10 MR. KAPADIA: Objection. Nonresponsive. 11 Q Dr. Hickner, do you believe that a person 12 of ordinary skill in the art would understand the 13 terms appearing in the '660 patent's claims to be 14 interpreted according to a, quote, ordinary and 15 customary meaning, end quote? 16 MR. DARBY: Objection to form. 17 A Can you -- can you ask that question 18 again, please? Can you repeat the question? 19 Q Yes. Do you believe that a person of 20 ordinary skill in the art would understand that 21 the terms appearing in the '660 patent's claims to 22 be interpreted according to a, quote, ordinary and	52 1 A On Page 7 of 1006 I see Fig. 7 and Fig. 2 8. 3 Q Let's talk about Figure 8 to start with. 4 Does Figure 8 of Cable show an object 5 denoted by the number 700? 6 A In Paragraph 0085 of Exhibit 1006, the 7 exhibit says, Fig. 7 -- oh, excuse me. Were you 8 asking about Fig. 8? 9 Q Yes, Figure 8. 10 A Yeah, in Paragraph 0085, down the 11 paragraph a little ways in this Exhibit 1006, it 12 states, "Fig. 8 shows the object 700 after having 13 been removed from the substrate 702. As shown in 14 Fig. 8, the object 700 was not damaged after the 15 removal from the substrate 702, and a minimum 16 amount of residue 800 remained on the substrate 17 702 after the removal of the object 700." 18 Q Looking at Figure 8 of Cable, is the 19 residue 800 shown to the right of object 700? 20 A In Paragraph 85 of Exhibit 1006, it 21 states, "As shown in Fig. 8, the object 700 was 22 not damaged after the removal from the substrate

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53 1 702, and a minimum amount of residue 800 remained 2 on the substrate 702 after the removal of the 3 object 700." 4 And if you look at the figure with 700, 5 800, and 702 labeled, if the page is rotated in 6 Figure 8, 700 and what it's pointing to is on the 7 far left-hand side. 800 is in -- points to the 8 center of the -- of the figure. And 702 points to 9 the right-hand side of the figure. 10 Q Can you explain in your own words what 11 the residue denoted by the number 800 represents? 12 A As stated in Paragraph 85 of Exhibit 13 1006, A minimum amount of residue 800 remained on 14 the substrate 702 after the removal of the object 15 700. 16 Q Can you explain in your own words what 17 material the residue denoted by the number 800 18 would be? 19 A So in -- in the language of the 1006 20 reference, a minimum amount of residue 800 21 remained on the substrate 702 after removal of the 22 object -- object 700. And those -- those denoted	55 1 Q So you have no opinions with respect to 2 Figure 8 beyond what Figure 8 shows and what the 3 patent describes? 4 A I think the patent language is -- is 5 clear in terms of a POSITA being able to 6 understand what the patent describes in regards to 7 this figure. 8 Q And what do you understand with respect 9 to Figure 8 and the residue denoted by the number 10 800? 11 A I think the patent language speaks for 12 itself in Paragraph 85 that discusses Figure 8. 13 And it says at the bottom of Paragraph 0085, 14 "Figure 8 shows the object 700 after having been 15 removed from the substrate 702. As shown in 16 Figure 8, the object 700 was not damaged after the 17 removal from the substrate 702, and a minimum 18 amount of residue 800 remained on the substrate 19 702 after the removal of the object 700." 20 So in plain language, the patent language 21 itself tells a POSITA the -- the components of 22 Figure 8 and what Figure 8 shows.
54 1 elements, or those denoted numbers, are shown in 2 Figure 8 pointing to 700, 800, and 702. 3 MR. KAPADIA: Objection. Nonresponsive. 4 Q Dr. Hickner, do you have an opinion, 5 sitting here today, as to what the material 6 denoted by the number 800 would be? 7 A So in -- in the language of Exhibit 1006, 8 in Paragraph 85, it states, "A minimum amount of 9 residue 800 remained on the substrate 702." And 10 both of those are identified in Figure 8. I don't 11 have any analysis beyond the plain language of the 12 patent. It speaks for itself in terms of denoting 13 700, 800, and 702 denoted in Figure 8. 14 Q In Figure 8 of Cable, is the residue 15 denoted by the number 800 a circular shape? 16 A So Figure 8 in Exhibit 1006 shows 700, 17 800, and 702 with arrows or lines to those 18 referenced in the -- in the words of the patent. 19 And I think the Figure 8 speaks for itself in 20 terms of how 700, 800, and 702 are -- are denoted. 21 I don't have to -- I don't have anything beyond 22 what Figure 8 shows in the patent.	56 1 Q Do you have any understanding with 2 respect to Figure 8 beyond the words that appear 3 in Paragraph 85 of Cable and the particular 4 numbers and lines that they point to in Figure 8 5 of Cable? 6 A So as I said previously, the patent 7 language is clear to a POSITA in terms of what the 8 patent itself describes and how the patent 9 describes Figure 8 in their ordinary and customary 10 meaning. 11 Q All right. Let's turn to Page 8 of 12 Cable. Again, you may have to rotate the page. 13 A All right. I'm on Page 8 of Exhibit 14 1006. And the only thing on this page is Figure 15 9. 16 Q And what numbers appear on Figure 9? 17 A Figure 9 denotes 902 with a line and 900 18 with a line as well. 19 Q Is there a mark to the left of the object 20 that 900 with the line points to? 21 A Can you -- can you repeat the question? 22 Q Yeah. Is there a mark to the left of the

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57 1 object that 900 with that line points to? 2 A So I see Figure 9 on Page 8. And I see 3 Number 902 denoted with a line. And I see 900 4 denoted with a line. And that's -- that's the 5 only things denoted in Figure 9. 6 Q Does Figure 9 show anything besides 7 what's denoted by 900 and 902? 8 A Again, Figure 9 shows 902 denoted with a 9 line and 900 denoted with a line, and that's -- 10 that's what Figure 9 shows. 11 Q So in your opinion, Figure 9 does not 12 show anything except for 902 denoted with a line 13 and 900 denoted with a line? 14 A I don't understand what you're driving 15 at. Figure 9 is shown on Page 8. And 902 is 16 denoted and 900 is denoted in this figure. I 17 don't understand your question. 18 Q I'll repeat it back to you. 19 In your opinion, does Figure 9 show 20 anything except for 902 denoted with a line and 21 900 denoted with a line? 22 A So in Exhibit 1006, Figure 9 on Page 8	59 1 flex the substrate 902 by hands of an individual 2 to a suitable radius of curvature or center point 3 deflexion to cause removal of the object 900 from 4 the substrate 902 without mechanically contacting 5 the object 900." 6 Q Would a person of ordinary skill in the 7 art understand that a blade would have been used 8 to remove the object 900? 9 MR. DARBY: Objection to form. 10 A In Paragraph 86, as stated in -- in plain 11 language itself, Paragraph 86 at the bottom 12 states, "The object 900 was removed from the 13 substrate 902 using a blade, i.e. mechanically 14 contacting the object 900." 15 Q In your opinion, would a blade have been 16 used to remove anything else from substrate 902? 17 MR. DARBY: Objection to form. 18 A So in Paragraph 86 of Exhibit 1006 it 19 states, "Figure 9 shows an object 900 that was 20 formed on a substrate 902 using an Ultimaker 3D 21 printer. The object 900 was formed from an 22 Amphora copolyester, and the substrate 902 was
58 1 denotes 902 with a line and 900 with a line. And 2 I guess if you want to be a little bit more 3 specific, 902 and 900 appear to be resting on a -- 4 a wood-grained desk or something like that, but 5 that's, you know -- I can only interpret Figure 9 6 on Page 8 and what 902 denoted with a line and 900 7 denoted with a line, I can only interpret those 8 denoted marks on Figure 9. 9 Q Does Cable explain what 900 and 902 10 denote? 11 A So in Paragraph 0086 of Exhibit 1006, it 12 states under Example 2, "Figure 9 shows an object 13 900 that was formed on a substrate 902 using an 14 Ultimaker 3D printer. The object 900 was formed 15 from an Amphora copolyester and the substrate 902 16 was formed from Tritan TX1000 copolymer." 17 Q Does Paragraph 86 of Cable explain 18 whether object 900 was removed from substrate 902? 19 A Paragraph 86 of Exhibit 1006 states, "The 20 object 900 was removed from the substrate 902 21 using a blade, i.e. mechanically contacting the 22 object 900. The substrate 902 was too thick to	60 1 formed from Tritan TX1000 copolyester." 2 This is the start of Example 2, which is 3 Paragraph 0086 in the Exhibit 1006 reference. And 4 I think the -- the language -- the plain language 5 of Exhibit 1006 describes this Example 2. 6 Q Do you have any understanding with 7 respect to Figure 9 of Cable beyond the words that 8 appear in Figure 9 in Cable and Paragraph 86 of 9 Cable? 10 A My -- my analysis is that Paragraph 86, 11 which is Example 2 in Cable, or Exhibit 1006, 12 speaks for itself in terms of the plain language 13 of exactly what this reference says. 14 Q Why don't we turn to Page 85 of your 15 declaration. 16 Let me know when you're there. 17 A Is this the pages with full Paragraph 18 130 -- or the page with full paragraph -- full 19 Paragraph 133 on it? 20 Q I apologize. I had the wrong page 21 number. Let's turn to Page 58. And on Page 58 22 you should see Paragraph 88?

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61 1 A Yes, I'm there. I see Paragraph 88 on 2 this page. 3 Q Okay. Can you explain in your own words 4 what the term, quote, "without damaging the 5 polymer coating," means? 6 A So Paragraph 88 in my declaration states, 7 "As I discussed at Elements 1.C to 1.C.I, Cable 8 teaches a flexible substrate with the top layer 9 formed by a polymer coating that promotes adhesion 10 to the 3D object during the printing process." 11 That's Exhibit 1006, Paragraph 36, 61, 12 and 80. "The combination further includes Cable's 13 disclosures regarding removal of the 3D object 14 after printing." Exhibit 1006, Paragraphs 23, 44, 15 52, and 67. 16 Q Dr. Hickner, does Paragraph 88 of your 17 declaration discuss "without damaging the polymer 18 coating"? 19 A So this section of my declaration 20 contains my analysis of the Cable reference. And 21 near the bottom of Paragraph 91 I state, "This 22 approach results in no damage to the object and to	63 1 damage to the substrate 110 and/or the object 104, 2 and the substrate 110 can be reused. Thus, the 3 need for replacement substrates can be minimized 4 or altogether eliminated." And the reference is 5 1006, Paragraph 82. 6 Q Besides the words of Paragraph 92 of your 7 declaration, do you have any opinion as to whether 8 a substrate that can be reused after an initial 9 use does not damage the polymer coating of the 10 substrate? 11 A I don't understand the question. Can 12 you – can you restate it or ask it a different 13 way? 14 Q Sure. You just read from Paragraph 92 of 15 your declaration, did you not? 16 A Paragraph 92 in my declaration contains 17 my full analysis of this part of Cable's 18 illustration, as I state in Paragraph 92. 19 Q And when you made this analysis and 20 statement in your declaration in Paragraph 92, did 21 you believe that you understood what the term 22 "without damaging the polymer coating" meant?
62 1 the substrate such that the polymer coated 2 substrate (parenthetical thermally conductive 3 plate) can be reused." 4 And the reference is Exhibit 1006, 5 Paragraph 52. 6 Q If a substrate can be reused after 7 initial use, does that mean that the initial use 8 did not damage the polymer coating? 9 A So in Paragraph 92 of my declaration I 10 state, "As shown below, Figure 6 provides an 11 illustration of Cable's removal process, Exhibit 12 1006, Paragraph 13. Here the removal of the 13 object 104 at 606 can comprise flexing the 14 substrate." 15 And that's -- the reference is Exhibit 16 1006 -- excuse me, Paragraph 82. "Because removal 17 occurs without physically contacting the object 18 with the device, example a chisel, blade, a 19 person's hand, et cetera, or chemically contacting 20 the object 104, example chemically dissolving 21 material at an interface between the object and 22 the substrate, removal occurs with minimal, if any	64 1 MR. DARBY: Objection to form. 2 A So I state in Paragraph 92 of my 3 declaration, "Because removal occurs without 4 physically contacting the object with the device, 5 example chisel, blade, a person's hand, et cetera, 6 or chemically contacting the object 104, example 7 chemically dissolving material at an interface 8 between the object and the substrate, removal 9 occurs with minimal, if any, damage to the 10 substrate 110 and/or the object 104, and the 11 substrate 110 can be reused. Thus the need for 12 replacement substrates can be minimized or 13 altogether eliminated." And the reference is 14 Exhibit 1006, Paragraph 82. 15 So in the plain-language interpretation, 16 that is my analysis in my declaration in Paragraph 17 82. 18 Q Are you referring to Paragraph 92? 19 A Apologies. Paragraph 92. I apologize. 20 Q Okay. Paragraph 92 appears in a section 21 of your declaration, I believe that section begins 22 on Page 58.

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65 1 Is that right? 2 A Yes. The Page 58, that section is small 3 Roman numeral 6, Element 1.C.2. 4 Q And so the paragraphs under that section 5 of your declaration, are you analyzing why, in 6 your opinion, the reference or references teach 7 those elements of the claim? 8 A As I state in Paragraph 88 of my 9 declaration, "As I discussed at Elements 1.C 10 through 1.C.1, Cable teaches a flexible substrate 11 with a top layer formed by a polymer coating that 12 promotes adhesion to the 3D object during the 13 print process," with reference to Exhibit 1006, 14 Paragraph 36, 61, and 80. "The combination 15 further includes Cable's disclosure regarding 16 removal of the 3D object after printing." 17 Reference to Exhibit 1006, Paragraphs 23, 44, 52, 18 and 67. 19 I go on to say in Paragraph 89 of my 20 declaration, "To start, Cable teaches that the 21 object can be easily removed from the substrate 22 after the object has been produced (formed by	67 1 not be mechanically contacted with a device or 2 chemically contacted." And the reference is 3 Exhibit 1006, Paragraph 67 and also Paragraph 20, 4 "removal of the object from the substrate can be 5 accomplished by flexing or bending the substrate, 6 causing the object to dislodge or pop off the 7 substrate." 8 Q And when you made those statements in 9 Paragraph 91 of your declaration, did you believe 10 that you understood what the term "without 11 chemically or mechanically removing the polymer 12 coating from the 3D object" meant? 13 MR. DARBY: Object to form. 14 A As I state in Paragraph 91 of my 15 declaration, "A POSITA would have understood 16 Cable's teaching that the part is able to simply 17 pop off indicates the object need not be 18 mechanically contacted with a device or chemically 19 contacted." And the reference is Exhibit 1006, 20 Paragraph 67. And see also Paragraph 20. 21 Q Dr. Hickner, in your declaration you 22 express opinions regarding U.S. Patent Publication
66 1 flexing the substrate such that the object can pop 2 off.)" And that's reference to Exhibit 1006, 3 Paragraph 52. 4 Q Okay. You mentioned an object popping 5 off. If a printed object can be removed from the 6 substrate by popping it off, does that mean that 7 the object is removed without chemically or 8 mechanically removing the polymer coating from the 9 object? 10 A In Paragraph 91 of my declaration I 11 state, "Cable makes clear that the object is 12 removed from the polymer coated substrate without 13 chemically or mechanically removing the polymer 14 coating from 3D object. As Cable explains, its 15 substrate enables the object to be removed without 16 mechanically contacting the object with a device 17 or chemically contacting the object." And I refer 18 to Exhibit 1006, Paragraph 52 and also Paragraphs 19 4, 6, 20, and 23. 20 I go on to say, "A POSITA would have 21 understood's Cable's teaching that the part is 22 able to simply pop off indicates the object need	68 1 Number 2013/0310507 to Tummala. 2 Is that right? 3 A In the table on the bottom of Page 15 of 4 my declaration, Exhibit 1005 is U.S. 2013/0310507, 5 parenthetical, Tummala. Yeah, so that's -- that's 6 in my -- that's an exhibit in my declaration. 7 MR. KAPADIA: I am dropping into the chat 8 Exhibit 1005. 9 (Exhibit 1005, previously marked, not 10 attached.) 11 Q Let me know when you receive it. 12 MR. DARBY: Counsel, we're almost at the 13 hour mark and probably need to take lunch soon. I 14 don't know if you want to take that now or before 15 you introduce the new exhibit. 16 MR. KAPADIA: Yeah, why don't we take it 17 now and then -- yeah, why don't we take it now and 18 then we'll continue after. 19 (A recess was taken.) 20 BY MR. KAPADIA: 21 Q All right. Dr. Hickner, before we went 22 on break I believe I had uploaded an Exhibit 1005

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69 1 into the chat. 2 Did you receive that exhibit? 3 A I -- I have one Exhibit 1005 in my chat 4 box. 5 Q Okay. Can you please open that up. 6 A All right. I have Exhibit 1005.PDF open. 7 United States Patent Application Publication 8 Tummala, et al., publication date November 21st, 9 2013. 10 Q And would you understand if I refer to 11 "Tummala" today that I'm talking about the 12 document shown in Exhibit 1005? 13 A Yes, in my declaration I cited this as 14 Exhibit 1005 with the relevant identifying number, 15 parentheses, Tummala. 16 Q All right. Before we move on to Exhibit 17 1005, we just came back from a break. I just 18 wanted to ask you some questions about that. 19 Did you speak to anyone during the break? 20 A I did not speak to anyone during the 21 break. 22 Q Did you receive any chats or messages	71 1 A I'm there. I have Paragraph 161 in my 2 declaration in front of me. 3 Q And it's your opinion that Tummala's 4 coating is a viscous gel at room temperature and 5 is easily applied in a gel form. Right? 6 A As I say in Paragraph 161 of my 7 declaration, "Tummala's coating is a viscous gel 8 at room temperature and is easily applied in a gel 9 form." And I cite to Exhibit 1005, Paragraphs 52 10 and 53. 11 Q And Tummala discusses that his polymeric 12 components can be a polyimide. 13 Is that right? 14 A Excuse me. Are you saying "polymeric 15 components" and "polyimide," is that -- are those 16 the terms you used? 17 Q Yes. 18 A Yes, in Paragraph 161 of my declaration I 19 said, "In either instance, the polymeric 20 components can be polyimide," and I cite to 21 Exhibit 1005, Paragraphs 28, 31, and 34. 22 Q Would a polyimide be a viscous gel at
70 1 during your break? 2 A I did not receive any messages during the 3 break. 4 Q Did you open any materials during your 5 break? 6 A I did not open any materials during the 7 break. 8 Q All right. I want to turn to -- let me 9 see if I can find the reference. I'm going to 10 give you a page number. 11 If you could turn to Page 9 of Tummala. 12 Do you see Paragraph 53? 13 A I'm on Page 9. And I see Paragraph 53 in 14 Exhibit 1005. 15 Q And does Tummala describe that its 16 adhesive is a viscous gel at room temperature? 17 A Paragraph 53 starts, "In some 18 embodiments, an adhesive described herein is a 19 viscous gel at room temperature." 20 Q And if we jump over to your declaration 21 on Page 99. If you look at Paragraph 161. Let me 22 know when you're there.	72 1 room temperature? 2 A As Paragraph 161 in my declaration 3 states, it starts "Tummala's coating is a viscous 4 gel at room temperature and is easily applied in 5 gel form." And I cite to Exhibit 1005, Paragraphs 6 52 and 53. And at the end of Paragraph 161 in my 7 declaration I say, "In either instance, the 8 polymeric components can be polyimide." And I 9 cite to Exhibit 1005, Paragraphs 28, 31, and 34. 10 Q In your opinion, how would a polyimide be 11 a viscous gel at room temperature? 12 MR. DARBY: Objection to form. 13 A In Paragraph 161 of my declaration I 14 state, "Tummala's coating is a viscous gel at room 15 temperature and is easily applied in gel form." 16 And I cite Paragraphs 1005 -- or sorry, I cite 17 Exhibit 1005, Paragraphs 52 and 53. 18 And later in Paragraph 161 of my 19 declaration I state, "In either instance, the 20 polymeric components can be polyimide," and I cite 21 to Exhibit 1005, Paragraphs 28, 31, and 34. 22 So in plain language, that's -- that's in

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73 1 Exhibit 1005, as I state in my declaration in 2 Paragraph 161. 3 Q Do you have any opinions as to why a 4 polyimide would be a viscous gel at room 5 temperature, besides the language of Paragraph 161 6 in your declaration and the citations within that 7 paragraph? 8 A So my testimony is given in Paragraph 9 161, wherein Exhibit 1005, the Tummala reference, 10 it says "Tummala's coating is a viscous gel at 11 room temperature and easily applied in gel form," 12 as I've given these references, Exhibit 1005, 13 Paragraphs 52 and 53. And then I go on to say, 14 "In either instance, the polymeric components can 15 be polyimide." Exhibit 1005, Paragraphs 28, 31, 16 and 34. So that is my testimony in Paragraph 161 17 of my declaration. 18 MR. KAPADIA: Objection. Nonresponsive. 19 Q Dr. Hickner, do you have any opinions as 20 to why polyimide would not -- let me repeat the 21 question. 22 Do you have any opinions as to why	75 1 look at them. But I've -- I've cited my testimony 2 in Paragraphs 161 and 162. If you have something 3 more specific, I'm happy to consider it. 4 Q Well, Dr. Hickner, I'm asking you about 5 your opinions today. And I'm specifically asking 6 you, to your point, a specific question. 7 Do you have any opinions as to why 8 polyimide would be a viscous gel at room 9 temperature? And we've already talked about 10 Paragraphs 161, 162. So I'm asking you that 11 question with respect to any other opinions you 12 have. 13 A My -- my complete analysis in this case 14 is given in my declaration, where I discuss in 15 Paragraphs 161 Tummala's coating is a viscous gel 16 at room temperature. And also in either instance, 17 the polymeric components can be a polyimide, and 18 cite to Exhibit 1005. That -- that is my 19 testimony. 20 Q All right. Doctor, I just have a few 21 additional questions for you. 22 During the course of our deposition today
74 1 polyimide would be a viscous gel at room 2 temperature, besides the language of Paragraph 161 3 in your declaration and the citations within that 4 paragraph? 5 A So in Paragraph 162 of my declaration, in 6 Section B where I discuss the Comb-Tummala 7 combination, I state that "Tummala further 8 discloses applying polymeric materials, including 9 polyimide, in the form of a viscous gel. A 10 POSITA, knowing Tummala's teachings of applying a 11 polymeric material to a build sheet in a form 12 other than as tape, would have sought to apply the 13 various polymer materials described for Comb's 14 polymeric top film in a manner other than tape, 15 e.g., as a coating." 16 Q Do you have any opinions as to why 17 polyimide would be a viscous gel at room 18 temperature, besides the language of Paragraph 161 19 and 162 in your declarations and the citations 20 within those two paragraphs? 21 A If -- if you're asking me about other 22 specific parts of the declaration, I'm happy to	76 1 did you receive any chats or messages? 2 A I did not receive any chats or messages 3 during our deposition today. 4 Q Did you receive any phone calls? 5 A I did not receive any phone calls during 6 our deposition today. 7 Q Did you check your email? 8 A I did not check my email during the 9 deposition today. 10 MR. KAPADIA: I don't have any further 11 questions, so I'll pass the witness. 12 MR. DARBY: Okay. Let's take a 15-minute 13 break. I'll look at the transcript and come back 14 and make a decision on redirect. 15 (A recess was taken.) 16 MR. DARBY: Just to confirm, petitioner 17 doesn't have any redirect, so that concludes 18 today's deposition. 19 Dr. Hickner, thank you for your time 20 today. 21 THE WITNESS: Thank you very much. 22 (Off the record at 2:30 p.m. EDT.)

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77 1 ACKNOWLEDGMENT OF DEPONENT 2 I, MICHAEL A. HICKNER, Ph.D., do hereby 3 acknowledge that I have read and examined the 4 foregoing testimony, and the same is a true, 5 correct and complete transcription of the 6 testimony given by me, and any corrections appear 7 on the attached Errata sheet signed by me. 8 9 _____ 10 (DATE) (SIGNATURE) 11 12 13 14 15 16 17 18 19 20 21 22	79 1 I further certify that I am not related to 2 any of the parties to this action by blood or 3 marriage, I am not employed by or an attorney to any 4 of the parties to this action, and that I am in no 5 way interested, financially or otherwise, in the 6 outcome of this matter. 7 8 IN WITNESS WHEREOF, I have hereunto set my 9 hand this 27th day of August, 2025. 10 11 My commission expires: 12 October 31, 2027 13 14  _____ 15 E-NOTARY PUBLIC IN AND FOR THE 16 COMMONWEALTH OF VIRGINIA 17 18 19 20 21 22
78 1 C E R T I F I C A T E 2 I, Debra Ann Whitehead, E-Notary Public in and for 3 the Commonwealth of Virginia, do hereby certify: 4 5 That MICHAEL A. HICKNER, Ph.D., the 6 witness whose deposition is hereinbefore set forth, 7 was duly sworn by me before the commencement of such 8 deposition and that such deposition was taken 9 virtually and is a true record of the testimony 10 given by such witness. 11 12 I further certify that the adverse party, 13 SHENZHEN TUOZHU TECHNOLOGY CO., LTD., was 14 represented by counsel at the deposition. 15 16 I further certify that the deposition of 17 MICHAEL A. HICKNER, Ph.D., occurred virtually, on 18 Thursday, August 21st, 2025, from 10:58 a.m. to 2:30 19 p.m. EDT. 20 21 22	

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