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

GOOGLE, LLC.; SAMSUNG	)
ELECTRONICS CO., LTD.; AND	)
SAMSUNG ELECTRONICS AMERICA,	)
INC.,	)
	) IPR2023-01374
Petitioner,	)
	) U.S. Patent No.
v.	) RE48,206
	)
NARISTE NETWORKS PTY. LTD.	)
	)
Patent Owner.	)
—	)

REMOTE VIDEO-RECORDED DEPOSITION
OF
SAMUEL PHILLIP PULLEN, PH.D.
FRIDAY, SEPTEMBER 27, 2024

1 APPEARANCES 2 3 FOR THE PETITIONER: 4 O'MELVENY & MYERS LLP 5 By: Ben Haber, Esq. 6 400 South Hope Street, 18th Floor 7 Los Angeles, CA 90071 8 (213) 430-6000 9 bhaber@omm.com 10 11 FOR THE PATENT OWNER: 12 13 ALAVI & ANAIPAKOS PLLC 14 By: Steven T. Jugle, Esq. 15 609 Main Street, Suite 3200 16 Houston, TX 77002 17 (713) 751-2376 18 sjugle@atriallaw.com 19 20 ALSO PRESENT: 21 22 JoAnn Yager, Videographer 23 24 25 Page 2	1 PURSUANT TO WRITTEN NOTICE and the 2 appropriate rules of civil procedure, the Remote 3 Video-Recorded Deposition of SAMUEL PHILLIP PULLEN, 4 PH.D., called for examination by the Petitioner, was 5 taken via Zoom, commencing at 10:02 AM on Friday, 6 September 27, 2024, before Jennifer L. Smith, 7 California CSR No. 10358, Washington CCR No. 3101, 8 RMR, CRR, CRC. 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Page 4
1 INDEX 2 3 EXAMINATIONS: PAGE 4 SAMUEL PHILLIP PULLEN, PH.D. 5 Examination By Mr. Haber 6 6 7 EXHIBITS 8 9 No. Description Identified 10 Exhibit 1001 Patent US RE48,206 10 11 (previously 12 identified) 13 Exhibit 1005 Patent 5,982,324 43 14 (previously 15 identified) 16 Exhibit 1006 Patent US 2002/0151314 66 17 (previously 18 identified) 19 Exhibit 2001 Declaration of Dr. Samuel 75 20 (previously Pullen 21 identified) 22 23 24 25 Page 3	1 PROCEEDINGS 2 3 THE VIDEOGRAPHER: Good morning. We are on 4 the record at 10:02 AM on September 27, 2024. 10:02:44 5 Please note that this deposition is being 10:02:51 6 conducted virtually. Quality of the recording 10:02:53 7 depends on the quality of camera and Internet 10:02:56 8 connection of participants. 10:02:59 9 What is seen from the witness and heard on 10:03:01 10 screen is what will be recorded. Audio and video 10:03:03 11 recording will continue to take place unless all 10:03:06 12 parties agree to go off the record. 10:03:09 13 This is Media Number 1 of the recorded 10:03:12 14 deposition of Dr. Samuel Pullen in the matter of 10:03:14 15 Google LLC, et al., versus Nariste Networks PTY. LTD, 10:03:19 16 filed in the United States Patent and Trademark 10:03:27 17 Office before the Patent Trial and Appeal Board, Case 10:03:31 18 Number IPR2023-01374. 10:03:35 19 This deposition is being conducted remotely, 10:03:42 20 using virtual technology. 10:03:46 21 My name is JoAnn Yager, representing 10:03:48 22 Veritext Legal Solutions, and I am the videographer. 10:03:50 23 The court reporter is Jennifer Smith from the firm 10:03:53 24 Veritext Legal Solutions. 10:03:57 25 I am not related to any party in this 10:03:58 Page 5

1 action, nor am I financially interested in the 10:04:01 2 outcome. 10:04:03 3 If there are any objections to proceeding, 10:04:04 4 please state them at the time of your appearance. 10:04:06 5 Counsel and all present will now state their 10:04:10 6 appearances and affiliations for the record, 10:04:12 7 beginning with the noticing attorney. 10:04:14 8 MR. HABER: Benjamin Haber of O'Melveny & 10:04:16 9 Myers for petitioner Google, and with me on the line 10:04:19 10 is Kyla Butler, also of O'Melveny. 10:04:22 11 MR. JUGLE: Steven Jugle with Alavi & 10:04:27 12 Anaipakos for patent owner, Nariste Networks. 10:04:30 13 THE VIDEOGRAPHER: The witness may be sworn 10:04:48 14 in. 10:04:49 15 THE COURT REPORTER: My name is Jennifer 10:04:50 16 Smith, CSR Number 10358. 17 And, Doctor, if you could please raise your 18 right hand. 19 SAMUEL PHILLIP PULLEN, PH.D., 20 having been first duly sworn, 21 was examined and testified as follows: 22 10:04:54 23 EXAMINATION 10:04:54 24 BY MR. HABER: 10:04:56 25 Q. Good morning, Dr. Pullen. 10:04:56 Page 6	1 out of tolerance, I'll ask for a break at some point. 10:06:04 2 Q. All right. That's fine. 10:06:08 3 If you do refer to anything for purposes of 10:06:08 4 this deposition today, just let me know so that I can 10:06:14 5 follow along. 10:06:17 6 A. Yes. 10:06:18 7 Q. You understand that you have given an oath 10:06:26 8 to testify truthfully and accurately in this 10:06:28 9 deposition; right? 10:06:30 10 A. Yes. 10:06:31 11 Q. Are you taking any medication or under any 10:06:32 12 condition that would prevent you from testifying 10:06:36 13 truthfully and accurately today? 10:06:39 14 A. No. I'm taking insulin and other 10:06:41 15 medications to control my diabetes, but I am in good 10:06:43 16 shape to testify. 10:06:47 17 Q. All right. 10:06:48 18 A. As I said, if that should change, mainly 10:06:49 19 because my blood sugar goes too high or too low, I 10:06:51 20 will let you know. 10:06:54 21 Q. That's fair. Just let me know if anything 10:06:55 22 comes up, and we'll -- we'll take a break. 10:06:57 23 Have you been deposed before? 10:06:59 24 A. Yes. 10:07:04 25 Q. So I'll short circuit some of the 10:07:06 Page 8
1 A. Good morning. 10:04:57 2 Q. Could you please state your full name for 10:04:58 3 the record. 10:05:00 4 A. It's Samuel Phillip Pullen, and I normally 10:05:00 5 go by Sam. 10:05:04 6 Q. All right. Good morning, Sam. 10:05:05 7 Where are you physically located today? 10:05:06 8 A. I am in San Antonio, Texas. The office I 10:05:08 9 use here which is in a family member's law firm, of 10:05:14 10 course, completely unrelated to this case. It's in a 10:05:19 11 personal, enclosed office in San Antonio, Texas. 10:05:29 12 Q. Is there anyone in the -- in the room with 10:05:32 13 you? 10:05:34 14 A. No. 10:05:34 15 Q. Do you have any papers or physical printouts 10:05:36 16 or anything in the room with you that you plan to 10:05:40 17 refer to today? 10:05:41 18 A. No. 10:05:43 19 Q. Other than the computer that you're using 10:05:45 20 for this deposition, do you have any electronic 10:05:47 21 devices that you plan to refer to today? 10:05:49 22 A. My phone, but it's not for this deposition, 10:05:51 23 just if someone contacts me or generally. It also -- 10:05:54 24 I should mention it also monitors my blood sugar. So 10:05:57 25 I will check it periodically. If my blood sugar is 10:06:00 Page 7	1 preliminaries, but I'm going to be asking you a 10:07:07 2 number of questions. If there is a question pending, 10:07:11 3 I'll ask you to answer a question before we move on 10:07:14 4 to the -- to anything else that needs to be taken 10:07:19 5 care of. 10:07:21 6 A. Okay. 10:07:22 7 Q. When I ask you a question, Counsel may 10:07:23 8 object. You still need to answer the question unless 10:07:27 9 specifically instructed not to answer. 10:07:29 10 Do you understand? 10:07:33 11 A. Yes. 10:07:33 12 Q. Can you tell me what you did to prepare for 10:07:34 13 your deposition today? 10:07:36 14 A. Let's see. I reviewed the materials that I 10:07:39 15 reviewed in preparing my declaration. So the 10:07:42 16 declaration itself; the declaration of the other 10:07:45 17 expert, I think Dr. Andrews; the original patent; and 10:07:49 18 the petition, the patent cited in both cases. 10:07:55 19 Q. Did you review any documents other than 10:08:00 20 documents of record in this proceeding? 10:08:04 21 A. No. 10:08:07 22 Q. Did you meet with any individuals to prepare 10:08:13 23 for the deposition today? 10:08:15 24 A. Only Mr. Jugle virtually. 10:08:17 25 Q. And how long did you meet with Mr. Jugle? 10:08:23 Page 9

1 A. A little over an hour maybe. 10:08:27	1 A. Yes, I do. 10:11:47
2 Q. And when was that meeting? 10:08:30	2 Q. Do you understand what a Cramer-Rao bound 10:11:50
3 A. Yesterday. 10:08:31	3 is? 10:11:52
4 Q. Other than Mr. Jugle, did you meet with 10:08:41	4 A. Yes. 10:11:52
5 anyone else to discuss your deposition today? 10:08:43	5 Q. And what is that? 10:11:58
6 A. No. 10:08:45	6 A. It is -- the Cramer-Rao theorem of 10:11:59
7 Q. Other than Mr. Jugle, did you meet with 10:08:48	7 statistics relates to the best possible estimate of a 10:12:01
8 anyone else to prepare your declaration for this 10:08:50	8 random variable under certain assumptions. 10:12:05
9 proceeding? 10:08:54	9 Q. Does the '206 patent describe that a 10:12:29
10 A. Repeat the question, please. 10:08:57	10 position error can be expressed as a Cramer-Rao 10:12:33
11 Q. Other than Mr. Jugle, have you met with 10:08:58	11 bound? 10:12:38
12 anyone else in preparation for your declaration that 10:09:01	12 A. I would have to go back and review it. If 10:12:38
13 was submitted in this proceeding? 10:09:04	13 you'll give me some time, I'll do so. 10:12:41
14 A. No. I may have met with one of his 10:09:06	14 Q. Sure. 10:12:43
15 associates at his law firm, but mostly Mr. Jugle. 10:09:09	15 And feel free to look at the patent wherever 10:12:46
16 Q. Okay. If you can, you should have in front 10:09:16	16 you'd like, but I can refer you to Column 6, Line 63 10:12:48
17 of your documents that were downloaded from Exhibit 10:09:30	17 or so. 10:12:52
18 Share. If you can turn to Exhibit 1001. 10:09:35	18 A. Okay. Let me read this area. 10:13:01
19 (Exhibit 1001 was previously identified.) 10:09:39	19 Yes, I've read the paragraph beginning 10:13:30
20 BY MR. HABER: 10:09:41	20 around Column 6, Line 51. I can address that, or I 10:13:36
21 Q. Let me know when you have that in front of 10:09:42	21 can go -- I'll -- let me search to see if it's 10:13:41
22 you. 10:09:43	22 addressed anywhere else. 10:13:42
23 A. Okay. Yes, I have it in front of me. 10:09:44	23 Q. Sure. 10:13:43
24 Q. All right. So Exhibit 1001 has been 10:09:56	24 Feel free to look wherever you like, and I 10:13:44
25 previously marked in this proceeding, and it is 10:09:59	25 can also direct you, for example, to Claim 36, which 10:13:45
Page 10	Page 12
1 Patent Number US RE48,206, and if I refer to this as 10:10:02	1 is at the end of the patent. 10:13:49
2 the '206 patent, will you understand what I'm 10:10:10	2 A. Okay. Okay. I see it there. I'm going 10:13:51
3 referring to? 10:10:12	3 back to Paragraph 6. 10:14:27
4 A. Yes, I do. 10:10:15	4 Okay. Please proceed. 10:14:33
5 Q. Have you reviewed the '206 patent? 10:10:19	5 Q. So the question that I asked was does the 10:14:35
6 A. Yes. 10:10:23	6 '206 patent describe that a position error can be 10:14:38
7 Q. And the '206 patent is the subject of the 10:10:28	7 expressed as a Cramer-Rao bound? 10:14:41
8 declaration that you submitted in this proceeding; 10:10:30	8 A. It stats around Line 63, the latter 10:14:52
9 correct? 10:10:32	9 information, meaning current radio position and error 10:14:58
10 A. Yes, it's -- yes, it's referenced. The 10:10:33	10 220, may be determined using Cramer-Rao bound. 10:15:02
11 declaration in particular is response, I believe, to 10:10:38	11 That's different -- a little different from 10:15:10
12 the petition and the declaration of Mr. Andrews. 10:10:41	12 "expressed as." 10:15:12
13 Q. You understand that the '206 patent is the 10:10:46	13 Q. What is the difference? 10:15:20
14 patent which is challenged in this IPR proceeding; 10:10:50	14 A. The -- the Cramer-Rao bound essentially 10:15:23
15 right? 10:10:55	15 under -- gives you a lower bound on -- under 10:15:29
16 A. Yes. 10:10:55	16 circumstances, it gives you a lower bound on 10:15:36
17 Q. If you can turn to Figure 2 of the '206 10:11:00	17 estimate -- on estimation error of unknown variable, 10:15:37
18 patent. Let me know when you're there. 10:11:05	18 which, again, would be the position being unknown and 10:15:42
19 A. I am there. This says -- at the bottom it 10:11:23	19 the error being unknown. 10:15:45
20 says Figure 2 Amended, and it's on Page 5 of 18. 10:11:24	20 So the Cramer-Rao bound gives a lower bound, 10:15:46
21 Q. Great. 10:11:30	21 and that informs the estimation, the actual 10:15:51
22 There is a box in the lower left-hand corner 10:11:31	22 estimation. 10:15:54
23 identified 220, which includes "Current radio 10:11:35	23 Q. If you can turn to Line 36, which is at the 10:16:00
24 position and error (Cramer-Rao bound)." 10:11:40	24 top of Column 16. 10:16:05
25 Do you see that? 10:11:45	25 Line 36 states, "The method according to 10:16:06
Page 11	Page 13

1 Claim 34, wherein the position error is the 10:16:11 2 Cramer-Rao bound on the radio position of the mobile 10:16:15 3 device." 10:16:18 4 Do you see this? 10:16:20 5 A. Yes, I do. 10:16:21 6 Q. So the '206 patent states, "The position 10:16:24 7 error is the Cramer-Rao bound on the radio position 10:16:26 8 of the mobile device." Right? 10:16:30 9 MR. JUGLE: Objection. Form. 10:16:32 10 THE WITNESS: I read this as -- first of 10:16:39 11 all, I understand Claim 36 is not the claim -- one of 10:16:40 12 the claims under discussion. It's in brackets and 10:16:44 13 was cancelled or otherwise set aside. 10:16:47 14 To your question, the '206 patent notes that 10:16:51 15 the Cramer-Rao bound is a means to determine or at 10:16:57 16 least aid in the determine -- determination of the 10:17:01 17 position or position error estimate. 10:17:04 18 BY MR. HABER: 10:17:04 19 Q. So is it your opinion that a POSITA reading 10:17:10 20 Claim 36 would not understand at the '206 patent 10:17:13 21 describes that the position error is the Cramer-Rao 10:17:17 22 bound on the radio position of the mobile device? 10:17:19 23 A. The words that you read from the patent are 10:17:22 24 not as -- they're not declarative. They're not 10:17:31 25 unique by itself. A POSITA would have to interpret 10:17:36 Page 14	1 BY MR. HABER: 10:19:02 2 Q. Are any of those several things related to 10:19:10 3 the Cramer-Rao theorem described in the '206 patent? 10:19:16 4 A. Let me check again. 10:19:23 5 All I see is the specific mention of the use 10:19:39 6 of the Cramer-Rao bound. A POSITA would interpret 10:19:43 7 that to mean use -- given an estimation method that 10:19:48 8 fits the assumptions of the Cramer-Rao bound, you can 10:19:58 9 determine offline the lower bound on estimation 10:20:00 10 error, but you cannot determine the estimation error 10:20:03 11 itself. 10:20:07 12 Q. Other than the '206 patent, did you submit 10:20:31 13 any evidence on which you base this opinion regarding 10:20:34 14 the Cramer-Rao bound? 10:20:37 15 A. Please restate the question. 10:20:41 16 Q. Other than the '206 patent, did you submit 10:20:44 17 in this IPR proceeding any evidence on which you base 10:20:46 18 this opinion regarding the Cramer-Rao bound? 10:20:49 19 A. No, I don't think so. 10:20:54 20 Q. You stated that the Cramer-Rao bound is a 10:21:01 21 lower bound on estimation error; is that right? 10:21:04 22 A. Yes. 10:21:08 23 Q. Can you describe in a little bit more detail 10:21:09 24 what you mean by that? What is a lower bound on 10:21:11 25 estimation error? 10:21:13 Page 16
1 them. And a POSITA -- in my opinion, a POSITA would 10:17:40 2 understand that the Cramer-Rao bound is not the same 10:17:43 3 as the position error estimate, but it is a means of 10:17:45 4 determining how to make that estimation and what the 10:17:49 5 best, lowest estimation error would be. 10:17:52 6 Q. On what basis would the -- would a POSITA 10:18:03 7 understand that the position error is the Cramer-Rao 10:18:05 8 bound, as stated in Claim 36, means something other 10:18:12 9 than what is stated there? 10:18:16 10 MR. JUGLE: Objection. Form. 10:18:17 11 THE WITNESS: Again, that's -- that -- let's 10:18:21 12 take Claim 36. It says, "The position error is the 10:18:25 13 Cramer-Rao bound." 10:18:28 14 A POSITA would understand that's shorthand 10:18:31 15 for reality. 10:18:36 16 BY MR. HABER: 10:18:36 17 Q. And on what basis would a POSITA understand 10:18:40 18 that Claim 36 is shorthand for reality? 10:18:42 19 A. There -- 10:18:46 20 MR. JUGLE: Objection. Form. 10:18:46 21 THE WITNESS: It depends how you interpret 10:18:49 22 the words of Cramer-Rao -- the words "Cramer-Rao 10:18:50 23 bound." That's not -- that is a term of art, but it 10:18:55 24 could mean several things related to the Cramer-Rao 10:18:58 25 theorem. 10:19:02 Page 15	1 A. Let me -- let me think how to do so. Let me 10:21:14 2 give -- an example may be easier than a general 10:21:23 3 statement. 10:21:26 4 Let's say I'm trying to estimate the -- 10:21:27 5 let's say I have a dataset of the heights that -- the 10:21:32 6 heights of American men, and let's say it's of size 10:21:38 7 N, capital N. 10:21:43 8 The -- the mean -- just trying to be clear. 10:21:46 9 I'll need to go through several steps. 10:21:54 10 The mean of the sample, N samples, that has 10:21:56 11 a -- we know that we can calculate the sample mean. 10:22:05 12 That's known by definition. 10:22:08 13 The mean of the height of the population is 10:22:09 14 not known. We are estimating it from that -- those N 10:22:12 15 points. 10:22:17 16 So we can calculate the sample mean, and 10:22:18 17 what the Cramer-Rao bound would do is affect, in 10:22:21 18 simple terms, is express if -- if I use the sample 10:22:27 19 mean as the estimate of the true mean of the 10:22:35 20 population, what is the lower bound on estimation 10:22:37 21 error in that estimate? It doesn't tell you what the 10:22:41 22 error is. 10:22:46 23 Q. All right. So in your example, the heights 10:22:50 24 of American men generally would be expressed in feet 10:22:55 25 and inches; right? 10:23:00 Page 17

1 A. That -- those units are fine. 10:23:03 2 Q. And then if you took the mean of those 10:23:06 3 heights, you would get an answer expressed in feet 10:23:10 4 and inches; correct? 10:23:13 5 A. That's correct. 10:23:15 6 Q. And then the Cramer-Rao bound would be an 10:23:17 7 estimate of error inherent in that sample number that 10:23:21 8 is expressed in feet and inches; correct? 10:23:28 9 A. No. 10:23:32 10 Q. How would that Cramer-Rao bound be 10:23:35 11 expressed? 10:23:37 12 A. It would -- as a function of the number of 10:23:39 13 samples and several other assumptions, it would say 10:23:43 14 that, given N samples, the error -- the error -- the 10:23:48 15 different -- the difference between the true unknown 10:23:57 16 mean height and the mean height of the sample is 10:24:02 17 lower bounded by a certain value. 10:24:04 18 That doesn't tell you, at least in my 10:24:07 19 recollection using the Cramer-Rao bound, it doesn't 10:24:10 20 give you an estimate of the actual error. It just 10:24:12 21 says -- it just gives information on the random -- 10:24:15 22 the variation of the error, given that you know the 10:24:20 23 sample mean. 10:24:24 24 Q. And that the Cramer-Rao bound would be the 10:24:26 25 difference between the true unknown mean height and 10:24:28 Page 18	1 typically don't apply perfectly. So even the bound 10:26:27 2 is a -- has an error in it. 10:26:29 3 Q. When you say the bound has error in it, 10:26:37 4 would that be expressed in some way other than units? 10:26:38 5 For example, a percentage or some other way to 10:26:43 6 quantify that error? 10:26:45 7 A. If you normalize the error by some set fact 10:26:53 8 or, say, the sample mean, then you would -- you would 10:26:58 9 be -- you could express it as a percentage. But 10:27:00 10 that's different from the error itself. 10:27:02 11 Q. So the -- just so I understand. The 10:27:10 12 Cramer-Rao bound may be normalized, for example, and 10:27:12 13 expressed in a percentage? 10:27:21 14 A. Yes, but that's different than the bound 10:27:23 15 itself. It's just a different representation, and 10:27:25 16 that would be understood by a POSITA. 10:27:28 17 Q. Staying in Column 6, and you looked up 10:27:47 18 around Line 35, there is a statement there that 10:27:49 19 says, "The embodiments of the invention involve the 10:27:59 20 determination of the error between the predicted 10:28:03 21 position of the mobile device and that of the actual 10:28:06 22 position reported by its GPS." 10:28:09 23 Do you see that? 10:28:13 24 A. What line? I see that paragraph -- that 10:28:16 25 section. What line did you start on? 10:28:19 Page 20
1 the mean height of the sample that is lower bounded 10:24:32 2 by a certain value. 10:24:37 3 Did I state that correct? 10:24:39 4 A. No. The Cramer-Rao bound just gives you 10:24:40 5 a -- a measure of the -- a lower bound on estimation 10:24:44 6 error, in general terms. But it is -- it -- it is 10:24:53 7 not an estimate of the error. You don't know the 10:24:57 8 error. You have information on how the error may be 10:25:00 9 distributed. The error is still a random variable. 10:25:03 10 Q. Okay. The lower bound on estimation error 10:25:07 11 would have a certain value; correct? 10:25:14 12 A. Yes, given the actual data number of points, 10:25:19 13 as I recall. 10:25:22 14 Q. And if the actual data were expressed in 10:25:23 15 feet and inches, for example, the lower bound on 10:25:27 16 estimation error value would also be expressed in 10:25:30 17 feet and inches; correct? 10:25:35 18 A. Yes. 10:25:37 19 Q. So is it fair to say that the Cramer-Rao 10:25:44 20 bound would be expressed in units of whatever it is 10:25:47 21 that is being estimated? 10:25:56 22 A. In the simple -- I believe in the simplest 10:26:08 23 application, yes. There may be variations. 10:26:13 24 Keep in mind the Cramer-Rao bound is -- only 10:26:22 25 applies under its assumptions. The assumptions 10:26:24 Page 19	1 Q. Actually starts on Line 34. 10:28:21 2 A. Yes, I see that sentence. 10:28:28 3 Q. You would agree that that sentence that I 10:28:31 4 just read to you in Column 6, Line 34 through 37, is 10:28:34 5 one way in which the '206 patent describes 10:28:40 6 identifying positioning error; right? 10:28:46 7 A. I would say this is one way the patent 10:28:54 8 describes estimating the error. Again, the error -- 10:28:57 9 as any POSITA would understand, the error is unknown. 10:29:03 10 Q. You would agree, then, that the '206 patent 10:29:18 11 describes at least one way -- for example, what I 10:29:21 12 identified at Column 6, Line 34 through 37 -- of 10:29:26 13 estimating position error; correct? 10:29:30 14 A. Please repeat the question. 10:29:39 15 Q. You would agree that the '206 patent 10:29:41 16 describes at least one way -- for example, what I 10:29:43 17 identified at Column 6, Line 34 through 37 -- of 10:29:46 18 estimating position error; correct? 10:29:51 19 A. It -- it describes a general approach. 10:29:54 20 The -- not -- it's not -- the method is not -- a 10:29:58 21 POSITA would -- would interpret -- would need to 10:30:02 22 interpret this to derive a specific means for 10:30:04 23 estimating the error. 10:30:08 24 Q. Would you agree that using Cramer-Rao bound 10:30:22 25 is another method for estimating position error that 10:30:26 Page 21

1 is described in the '206 patent? 10:30:29 2 A. As I said before, it's a means of deriving 10:30:33 3 information, useful in understanding the error in the 10:30:37 4 estimation. It is, strictly speaking, not a 10:30:44 5 determination of the error -- an estimate or a 10:30:48 6 determination of the error itself. 10:30:50 7 Q. Are there multiple ways to determine 10:30:59 8 positioning error, as that term is used in the '206 10:31:06 9 patent? 10:31:10 10 A. There are multiple ways of estimating the 10:31:11 11 error. 10:31:14 12 Q. Can you describe for me some of the multiple 10:31:16 13 ways of estimating positioning error? 10:31:19 14 A. I did not review this in my -- in detail or 10:31:23 15 consider it -- or report on it in my declaration. I 10:31:26 16 will mention what's given in the text we reviewed 10:31:29 17 earlier. This is Column 6, Line -- around Line -- 10:31:33 18 the paragraph beginning Line 51 refers to a neural 10:31:42 19 network module. 10:31:48 20 Q. I'm reading where you pointed around 10:32:34 21 Line 51, "The system 200 comprises a neural network 10:32:36 22 module 230." 10:32:40 23 I don't see in that paragraph where the 10:32:45 24 neutral network module is determining positioning 10:32:47 25 error. 10:32:50 Page 22	1 Okay. This is described one -- one means of 10:36:03 2 doing this is described in the previous paragraph, 10:36:07 3 starting around Line 40. 10:36:12 4 BY MR. HABER: 10:36:12 5 Q. I'm reading down and a little bit below that 10:37:01 6 around Line 46. It says, "After forming this 10:37:04 7 position error, the values of the position, the 10:37:06 8 position error, and the value of Pu, used at the time 10:37:08 9 of the actual position measurement are stored in the 10:37:12 10 mobile device's memory." 10:37:15 11 Do you see that? 10:37:16 12 A. Yes, I do. 10:37:18 13 Q. And the position error that's referred to 10:37:19 14 there is an estimate of position error; correct? 10:37:23 15 A. Correct. 10:37:27 16 Q. Would you agree that the position error 10:37:49 17 that's referred to there is an estimate of the 10:37:51 18 difference between a predicted position and an actual 10:37:53 19 position reported, for example, by GPS? 10:37:58 20 A. No, that's not accurate. 10:38:09 21 Q. Could you describe that more accurately for 10:38:13 22 me? 10:38:15 23 A. Let me describe it in my words. 10:38:15 24 Q. Go ahead. 10:38:19 25 A. So you have a predicted position and -- this 10:38:21 Page 24
1 Does the neural network module determine 10:32:53 2 positioning error? 10:32:56 3 THE VIDEOGRAPHER: Counsel? 10:33:25 4 MR. HABER: Yes. 10:33:26 5 THE VIDEOGRAPHER: We lost the witness. Can 10:33:27 6 we go off the record? 10:33:28 7 MR. HABER: Oh, yeah. 10:33:30 8 THE VIDEOGRAPHER: Going off the record. 10:33:31 9 The time is 10:32 AM. 10:33:32 10 (Recess taken.) 10:33:38 11 THE VIDEOGRAPHER: Back on the record. The 10:34:42 12 time is 10:33 AM. 10:34:43 13 BY MR. HABER: 10:34:43 14 Q. All right. It appeared we had some 10:34:45 15 technical difficulties there; so I'll repeat my last 10:34:46 16 question. 10:34:48 17 I was reading where you pointed around 10:34:50 18 Line 51, "The system 200 comprises a neural network 10:34:52 19 module 230." 10:34:55 20 I don't see in that paragraph where the 10:34:57 21 neural network is described as determining a position 10:34:59 22 error. 10:35:03 23 Does the neural network module determine 10:35:03 24 positioning error, and if so, where does it do that? 10:35:06 25 A. Let me check. 10:35:11 Page 23	1 one method -- one method using the neural network, 10:38:28 2 and there are other methods to obtain a predicted 10:38:31 3 position. 10:38:33 4 You obtain an actual position, meaning which 10:38:36 5 is the -- in the normal way you would implement this, 10:38:42 6 the predicted position is another form of an -- is 10:38:46 7 another estimate of the actual position. 10:38:50 8 So then independent of the network, you 10:38:53 9 provide an actual measurement of position -- estimate 10:38:57 10 of position at time T, say, with GPS. 10:39:01 11 The difference between them can be used as 10:39:03 12 an estimate, but that's not the only way to make an 10:39:07 13 estimate, and that's -- certainly would have 10:39:12 14 significant -- not significant, some error. 10:39:15 15 Q. You said that that estimate would have some 10:39:42 16 error. 10:39:44 17 Is there a standard way that that error 10:39:45 18 would be expressed? 10:39:47 19 A. There are multiple ways. I don't know if 10:39:56 20 you would say any one is standard. 10:39:59 21 Q. That's fair. 10:40:02 22 Can you describe for me some of the multiple 10:40:02 23 ways in which an error on an estimate would be 10:40:05 24 expressed? 10:40:08 25 A. Let's say, again, you had a predict -- you 10:40:10 Page 25

1 had two independent measures of position. One -- 10:40:13 2 again, this is an oversimplification. One is -- and 10:40:21 3 both give you estimates of position; therefore, the 10:40:25 4 difference is a statistic relevance of the position 10:40:30 5 error. The distribution of that statistic could be 10:40:36 6 expressed as a probability distribution. 10:40:42 7 Q. How else could it be expressed? 10:40:48 8 A. That's the most -- you could -- you could -- 10:40:50 9 it depends how you define the words "probability 10:40:54 10 distribution," but you can express one several ways. 10:40:57 11 Q. And can you describe for me some of the 10:41:00 12 several ways with which -- under which you could 10:41:02 13 express a probability distribution? 10:41:06 14 A. Yeah. One example, not -- certainly not 10:41:09 15 exhaustive, is as a Gaussian random variable. 10:41:11 16 Q. And a Gaussian random variable doesn't have 10:41:21 17 particular units associated with it, does it? 10:41:29 18 A. Depending on how you've expressed the 10:41:32 19 estimate, the Gaussian random variable would have -- 10:41:35 20 typically have same units as the way you have 10:41:40 21 described the estimate. 10:41:44 22 Q. If you described the estimate as a 10:41:50 23 percentage, for example, the Gaussian random variable 10:41:52 24 describing an error distribution would be a 10:41:56 25 percentage; right? 10:41:59 Page 26	1 unitless; right? 10:43:51 2 A. Yes, usually. 10:43:53 3 Q. Is it -- you understand that the claim 10:43:57 4 term -- I'm sorry. Strike that. 10:44:01 5 You understand that the term "positioning 10:44:04 6 error" appears in the challenged claims; right? 10:44:06 7 A. Yes. 10:44:14 8 Q. Is it your opinion that the 10:44:16 9 term "positioning error" does not cover a normalized 10:44:18 10 positioning error? 10:44:24 11 A. No. 10:44:33 12 Q. So a normalized positioning error would 10:44:35 13 satisfy the claim language positioning error; 10:44:39 14 correct? 10:44:42 15 A. Because they are mathematically related -- I 10:44:46 16 mean, they are mathematically related. The position 10:44:50 17 error specifically is in the units of the 10:44:52 18 position (unintelligible). 10:44:58 19 THE COURT REPORTER: I'm sorry. "The 10:45:05 20 position"? 10:45:05 21 THE WITNESS: The position error that -- 10:45:05 22 THE COURT REPORTER: I just missed the very 10:45:05 23 last word you said. I'm sorry. 10:45:08 24 THE WITNESS: I think it was measurement. 10:45:10 25 THE COURT REPORTER: Thank you. 10:45:10 Page 28
1 A. Yes, but it would not -- it would not be a 10:42:07 2 distribution of error in that case. It would be a 10:42:08 3 distribution of a normalized error. 10:42:11 4 Q. What is the difference between error and 10:42:16 5 normalized error, in your opinion? 10:42:19 6 A. Okay. Just in simple terms, the error -- if 10:42:23 7 we're measuring heights of American males, the units 10:42:28 8 would be, as you said, feet and inches or decimal 10:42:34 9 feet or centimeters. All of those are measures of 10:42:38 10 distance. 10:42:40 11 The -- if I express -- I can express a -- I 10:42:43 12 can define a Gaussian distribution of error in that 10:42:51 13 tight measurement and units of distance, or I can -- 10:42:56 14 and this is mainly for the convenience of the 10:43:01 15 analysis -- I can normalize by the sample mean. 10:43:05 16 Let's say the sample mean is five feet, nine inches. 10:43:10 17 If I divide every -- if I divide the height 10:43:14 18 error -- you know, for example, the mean or standard 10:43:22 19 deviation -- standard deviation of the height error 10:43:25 20 by that mean, I -- my new units are distance over 10:43:28 21 distance, and I -- results in a unitless parameter, 10:43:34 22 and I call that normalized, because we're normalizing 10:43:40 23 by a particular known -- known distance, in this 10:43:43 24 case. 10:43:48 25 Q. So a normalized positioning error is 10:43:49 Page 27	1 BY MR. HABER: 10:45:10 2 Q. I'm not sure I understand. The question I 10:45:15 3 asked is the claim term positioning error, would that 10:45:17 4 be satisfied by a normalized positioning error? 10:45:21 5 MR. JUGLE: Objection. Form. 10:45:30 6 THE WITNESS: It -- I don't think that can 10:45:38 7 be answered universally. 10:45:40 8 Basically, if you do use normalization in 10:45:42 9 your calculations, you still have to -- the actual 10:45:45 10 position -- you still have to trace that back to 10:45:49 11 the -- an estimate of the actual position error in 10:45:53 12 the units of position error. 10:45:55 13 Normalization is a technique -- analysis 10:45:58 14 technique for convenience. 10:46:00 15 BY MR. HABER: 10:46:05 16 Q. So if I measure positions in meters, for 10:46:14 17 example, and then I find position errors expressed in 10:46:18 18 meters and then I find a normalized position error 10:46:25 19 that is ultimately unitless, because meters cancel 10:46:31 20 out, would that normalized position error satisfy the 10:46:37 21 claim language position error? 10:46:42 22 MR. JUGLE: Objection to form. 10:46:46 23 THE WITNESS: The way I see it is in order 10:46:52 24 to get the normalized position error, you need to 10:46:53 25 have an estimate of position error itself. So it's 10:46:56 Page 29

1 that position error itself, which satisfies the 10:47:00 2 claims. Normalized position error is a related 10:47:04 3 quantity. 10:47:08 4 BY MR. HABER: 10:47:08 5 Q. So the -- I'm not sure that answered the 10:47:46 6 question that I was asking. The hypothetical that I 10:47:48 7 gave you was that you're measuring a position in 10:47:51 8 meters, and then you find position errors, also 10:47:55 9 expressed in meters, and then you normalize that 10:47:58 10 position error, which is ultimately unitless, because 10:48:02 11 the meters cancel out. 10:48:06 12 And so the question is, in that example that 10:48:07 13 I gave you, is the claim language positioning error 10:48:10 14 satisfied? 10:48:16 15 MR. JUGLE: Objection. Form. 10:48:17 16 THE WITNESS: It's satisfied by the position 10:48:19 17 error estimate itself in the units of position error. 10:48:21 18 The normalization applies after you've done 10:48:29 19 that. You can't estimate -- you can't normalize 10:48:33 20 position error without having the position error 10:48:36 21 estimate to start with. 10:48:39 22 BY MR. HABER: 10:48:43 23 Q. So you would agree that you can't normalize 10:48:43 24 position error without also having a position error; 10:48:45 25 right? 10:48:48 Page 30	1 what counts -- what matters in the claim language is 10:50:27 2 specifically position error, meaning an estimate of 10:50:31 3 position error in the -- in the units of position. 10:50:34 4 Q. The portion at the end of your answer, "in 10:51:15 5 units of position," is there anything in the '206 10:51:20 6 patent that states that an estimate of position error 10:51:26 7 must be in units of position? 10:51:30 8 A. Let me do a quick check. 10:51:40 9 I'll refer to Column 7, near the top, and 10:52:43 10 let me read out part of that. 10:52:51 11 I'll start with one, two, three, four, 10:52:54 12 five -- Line 5. "A number of techniques are known 10:53:00 13 for predicting the next position of a mobile device 10:53:05 14 based on its past history of positions, such as 10:53:08 15 regression, Kalman filter, particle filter. In Step 10:53:12 16 320, at the next power-up time, the predicted 10:53:18 17 position of the GPS-enabled mobile device is compared 10:53:21 18 with the actual position of the mobile device, and 10:53:24 19 the position error, Ep, is determined." 10:53:27 20 Again, a POSITA would understand that 10:53:32 21 that's -- A, that's just an estimate of position 10:53:34 22 error, and that that's in the units of the two 10:53:36 23 variables that were different, such -- predicted 10:53:40 24 position in, say, meters, and actual position in 10:53:44 25 meters. So position error Ep, the estimate of 10:53:48 Page 32
1 A. You have a -- if you have an estimate of 10:48:54 2 position error -- again, that's an estimate of an 10:48:57 3 unknown variable, then you can -- then you can 10:49:01 4 normalize it by any arbitrary devisor that you 10:49:04 5 choose. 10:49:12 6 Q. And, again, I don't think that answered my 10:49:13 7 question. 10:49:15 8 The question that I have is you would agree 10:49:16 9 that you can't normalize position error without also 10:49:20 10 having determined position error that is being 10:49:22 11 normalized; right? 10:49:26 12 A. That's not what I said. You were -- you 10:49:28 13 said you have to determine -- this is what your -- 10:49:33 14 your language was you have to determine position 10:49:35 15 error before you can normalize it. 10:49:38 16 What I'm saying is you have to estimate. 10:49:40 17 You can't determine it specifically. You can 10:49:42 18 estimate it, and then once you have an estimate of 10:49:45 19 position error, you can normalize it. 10:49:48 20 Q. All right. So then would you agree that in 10:49:51 21 order to have a normalized position error, you have 10:49:56 22 to have first estimated position error; correct? 10:49:58 23 A. In -- in one way or another, yes. In 10:50:15 24 principle, you can normalize, then estimate, then 10:50:21 25 unnormalize to get back to the position error. But 10:50:24 Page 31	1 position error Ep is also in meters. 10:53:54 2 Q. You would agree that positions can be 10:53:58 3 expressed in latitudes and longitudes; correct? 10:54:00 4 A. Yes. 10:54:05 5 Q. Latitudes and longitudes are not meters; 10:54:07 6 correct? 10:54:11 7 A. They are mathematically equivalent. 10:54:20 8 Q. Latitudes and longitudes are degrees; right? 10:54:23 9 A. Yes, but they're -- they are degrees in a 10:54:30 10 coordinate system -- a self-consisting coordinate 10:54:33 11 system, such as latitudes and longitudes on earth, 10:54:39 12 such that any position expressed in degrees can also 10:54:44 13 be expressed in meters or other units of distance. 10:54:51 14 In this sense, degrees are a measure of 10:54:55 15 angular distance and can be converted to linear 10:54:56 16 distance. And in that sense, they're mathematically 10:54:59 17 equivalent. 10:55:02 18 Q. But you would agree that latitude and 10:55:03 19 longitude degrees have different units than meters, 10:55:06 20 for example? 10:55:11 21 A. They are different units, but, again, 10:55:14 22 they're both units of distance, whether angular or -- 10:55:18 23 I mean, distance from some origin point, either in 10:55:23 24 angular terms or linear terms. 10:55:27 25 Q. Latitude and longitude degrees are 10:55:48 Page 33

1 mathematically equivalent to meters because you can 10:56:00 2 convert from one to the other; right? 10:55:56 3 A. Yep. They represent -- yes, they represent 10:56:04 4 the same physical concept, just expressed 10:56:06 5 differently. But that concept is distance, distance 10:56:10 6 from an origin point. 10:56:14 7 Q. And a unitless parameter, such as a 10:56:16 8 percentage, can be mathematically equivalent to a 10:56:19 9 distance, assuming that you know the reference point; 10:56:24 10 right? 10:56:30 11 A. The -- there is a -- there is a distinction 10:56:42 12 here. 10:56:48 13 Again, the normalization method we discussed 10:56:49 14 earlier requires a reference point to -- a reference 10:56:51 15 point as the divisor to normalize. 10:57:02 16 The conversion between angular and linear 10:57:06 17 units is somewhat different. But, again, angular 10:57:09 18 units are not unitless. 10:57:18 19 Q. You say that the conversion between angular 10:57:24 20 and linear units is somewhat different. 10:57:27 21 How is it different? 10:57:29 22 A. It depends on exactly how the angular 10:57:33 23 measurements are derived. 10:57:37 24 Q. Also for latitudes and longitudes, they're 10:57:50 25 derived with reference to the earth; right? 10:57:53 Page 34	1 see it. Please ask -- repeat your question. 11:11:09 2 Q. The '206 patent equates the term "error 11:11:18 3 bound" and "accuracy." Right? 11:11:21 4 A. It indicates that an error bound can be 11:11:29 5 expressed in terms of accuracy. 11:11:33 6 Q. Would you agree that accuracy is a way to 11:11:38 7 express error? 11:11:43 8 A. It is a way to express the statistics of the 11:11:47 9 error. It is not -- it is not a direct expression of 11:11:53 10 error which, again, is unknown. 11:11:59 11 Q. Can accuracy be used to express an estimate 11:12:22 12 of error? 11:12:25 13 A. Accuracy is a characterization of the 11:12:37 14 error -- the estimate of error. They're not 11:12:42 15 equivalent. 11:12:44 16 Q. Where I pointed to you in Column 5, the '206 11:12:53 17 patent describes an error bound (accuracy) of 50 11:12:56 18 meters. 11:13:01 19 Do you see that? 11:13:02 20 A. Yes, I do. 11:13:04 21 Q. When the patent describes an accuracy 50 11:13:09 22 meters, how does that relate to an estimate of error? 11:13:14 23 A. This language does not say specifically. 11:13:24 24 One interpretation -- one -- because "accuracy" has 11:13:27 25 several definitions. 11:13:30 Page 36
1 A. What specific -- specific lines on the 10:58:00 2 earth, that's right. A simple example is a triangle, 10:58:05 3 where, as an origin zero, and two lines emanating 10:58:09 4 from that point, one due east and one 40 -- due 10:58:17 5 northeast. So the angle between them is 45 degrees. 10:58:24 6 At any point along either line, you can 10:58:30 7 determine the location in units of meters or 10:58:32 8 distance. So in that sense, they're mathematically 10:58:38 9 equivalent, but neither is unitless. 10:58:42 10 By the way, this is a good time to take a 10:58:54 11 break once your -- find an appropriate stopping 10:58:56 12 point. 10:58:59 13 MR. HABER: Sure. We can take a break. 10:59:00 14 THE WITNESS: Right now? Okay. 10:59:02 15 THE VIDEOGRAPHER: All right. Going off the 10:59:03 16 record. The time is 10:58 AM. 10:59:04 17 (Recess taken.) 10:59:06 18 THE VIDEOGRAPHER: Back on the record. The 11:10:07 19 time is 11:09 AM. 11:10:16 20 BY MR. HABER: 11:10:19 21 Q. Dr. Pullen, I want to direct your attention 11:10:21 22 to Column 5, around Line 57, and the question I have 11:10:23 23 for you is the '206 patent equates the term "error 11:10:34 24 bound" and "accuracy." Right? 11:10:38 25 A. One second. I'm going to that spot. Yes, I 11:10:44 Page 35	1 Let's -- just as an example, let's assume 11:13:32 2 accuracy refers to the standard deviation of the 11:13:34 3 error in the position estimate. 11:13:40 4 Q. Okay. If we assume that accuracy refers to 11:13:48 5 the standard deviation of error in the position 11:13:51 6 estimate, how does the statement that accuracy of 11:13:52 7 50 meters, as described in Column 5 of the '206 11:13:57 8 patent, relate to an estimate of position error? 11:14:03 9 A. Is it -- if we're estimating position error, 11:14:15 10 the accuracy, which typically determines separately, 11:14:21 11 gives us an idea of how good -- how -- how the -- is 11:14:26 12 a characteristics of the distribution of error. So 11:14:35 13 in this case, if 50 meters is one sigma, it 11:14:40 14 represents a standard deviation of the error that 11:14:44 15 characterizes the distribution of actual position 11:14:53 16 error or, I should say, unknown position error. 11:14:56 17 Q. So is it fair to say that accuracy provides 11:15:07 18 information about position error? 11:15:16 19 A. Because it's a characterization of position 11:15:32 20 error, the two terms are related. 11:15:34 21 Q. So accuracy is a characterization of 11:15:38 22 position error that is useful for providing 11:15:40 23 information about underlying position error; correct? 11:15:49 24 MR. JUGLE: Objection. Form. 11:15:54 25 THE WITNESS: It is useful -- as I said, 11:15:57 Page 37

1 it's useful in characterizing the distribution of 11:16:01 2 position error, which is a useful thing for -- which 11:16:04 3 is certainly a -- something a POSITA would find -- 11:16:07 4 would want to know, if it's available. 11:16:10 5 BY MR. HABER: 11:16:10 6 Q. And so as the '206 patent describes 11:16:15 7 accuracy, as given in Column 5, in units of meters; 11:16:19 8 correct? 11:16:27 9 A. Yes. 11:16:28 10 Q. Are there other ways to describe accuracy, 11:16:29 11 other than in units of meters? 11:16:32 12 A. When referring to position error in units of 11:16:50 13 distance, say, meters, then accuracy is provide -- to 11:16:53 14 be self-consistent, accuracy is also provided in the 11:17:02 15 same units. And the distribution, the input to the 11:17:04 16 probability distribution of error is also in units in 11:17:09 17 meters. 11:17:14 18 Q. Can accuracy be described as a percentage? 11:17:17 19 A. In general, yes. But the -- if you're 11:17:29 20 talking about an accuracy as a percentage, it's a 11:17:32 21 description of the distribution of a normalized 11:17:38 22 error. 11:17:44 23 So, again, different from the position error 11:17:45 24 estimate itself. 11:17:48 25 Q. Are there other ways that you can think of 11:18:01 Page 38	1 current and past -- are -- are used as weight to 11:21:34 2 determine a new power-up period. 11:21:38 3 Q. At Column 7, around Line 36, there is 11:21:51 4 described there W as a weighting factor in the range 11:21:57 5 of zero to one. 11:22:00 6 What is a weighting factor? 11:22:06 7 A. One moment. I'm, again, reading the full 11:22:11 8 paragraph. 11:22:13 9 Here, the weighting factor is used to update 11:22:54 10 the power-up period or Pu, as a weight -- as a weight 11:23:09 11 combining, for example, pre -- updating Pu by 11:23:22 12 weighting pre -- other information, including a 11:23:30 13 previous value of Pu and a value of Pu, based on 11:23:38 14 base A, sub c. 11:23:45 15 Q. In the '206 patent, do these weighted values 11:23:51 16 or weighting factors have to do with positioning 11:23:56 17 error? 11:24:00 18 A. Repeat the question, please. 11:24:15 19 Q. In the '206 patent, did these weighted 11:24:16 20 values or weighting factors have to do with 11:24:19 21 positioning error? 11:24:21 22 A. Not really, as I interpret it. 11:24:35 23 Q. Back to Column 3, around Line 33, it 11:24:55 24 says, "A weighted value is dependent upon an 11:24:58 25 acceptable error bound." 11:25:00 Page 40
1 that one of skill in the art might describe accuracy? 11:18:07 2 A. For example, accuracy does not need to be 11:18:15 3 defined as a standard deviation. It could be defined 11:18:17 4 as a 95th percentile or a -- what's known in -- as a 11:18:22 5 circular error probable for a 2D position error. 11:18:28 6 Q. However it is described, including the 11:18:49 7 examples that you just gave, accuracy is used to 11:18:51 8 characterize position error; right? 11:18:55 9 A. Yes. 11:19:03 10 Q. If you can go to Column 3 of the '206 11:19:23 11 patent, around Line 33, the last line of this 11:19:27 12 paragraph. It's a partial sentence, "A weighted 11:19:37 13 value dependent upon an acceptable error bound." 11:19:40 14 Do you see that? 11:19:43 15 A. Yes, I do. 11:19:49 16 Q. Can you describe for me generally what a 11:19:50 17 weighted value is? 11:19:52 18 A. Let me read this paragraph to give you the 11:19:55 19 appropriate context. 11:19:59 20 The weighted value here describes -- refers 11:20:31 21 to the period of the power-up phase. 11:21:03 22 Q. What does it mean that the value is 11:21:09 23 weighted? 11:21:10 24 A. There's several interpretations, but one is 11:21:20 25 that the estimates of position error -- again, the 11:21:28 Page 39	1 Do you understand how a weighted value would 11:25:05 2 be dependent upon an acceptable error bound? 11:25:09 3 A. Yes, it could be. 11:25:18 4 Q. How does the '206 patent describe a weighted 11:25:25 5 value is dependent upon an acceptable error bound? 11:25:27 6 A. The section you referred to -- this is 11:25:36 7 Column 7, around -- starting around Line 30, 11:25:40 8 expresses weight in terms of update -- that are used 11:25:47 9 as a means to update the variable Pu. 11:25:56 10 But as written here, just in this section, 11:25:59 11 the weights are not -- the weights themselves are not 11:26:02 12 dependent on an error bound. They are used with -- 11:26:05 13 they are used as part of the calculation. But the 11:26:13 14 way it's written here, it's simply -- the weight is 11:26:16 15 simply assign a certain per -- a certain amount to -- 11:26:22 16 for example, a previous Pu and another amount to a Pu 11:26:30 17 based on Ac here, which is, again, an acceptable 11:26:37 18 error bound. 11:26:44 19 So the weights themselves are separate from 11:26:44 20 the Pus, which are related to position -- in this -- 11:26:46 21 in this description, the acceptable error bound. 11:26:52 22 Q. Where we're looking in Column 7, the 11:26:57 23 weighting factor that's described there, does it have 11:27:00 24 any particular units? 11:27:02 25 A. It says, again, weighting factor in the 11:27:05 Page 41

1 range zero to one. So typically it would be 11:27:09 2 unitless, meaning -- so a particular -- so it's just 11:27:11 3 a fraction, a fraction that you -- so, yes, it's a 11:27:18 4 fraction that's unitless. Again, it's different from 11:27:26 5 Pu or position error. 11:27:28 6 Q. Where it says at Column 3, "A weighted value 11:27:35 7 dependent upon an acceptable error bound," would that 11:27:38 8 weighted value have the same units as whatever units 11:27:42 9 are used to express the error bound? 11:27:49 10 A. Please repeat the question. 11:27:57 11 Q. Sure. 11:27:59 12 In the weighted value that's referred to at 11:27:59 13 Line 33 of Column 3 is dependent upon an acceptable 11:28:03 14 error bound. And so the question is would that 11:28:10 15 weighted value have the same units that are used to 11:28:13 16 express the error bound that's referred there? 11:28:16 17 A. It could, but, in general, as shown on 11:28:27 18 Paragraph 7, the weights are unitless. Again, 11:28:30 19 they're separate from the -- they're used as part of 11:28:38 20 the calculation, but they're separate from position 11:28:41 21 error estimates. 11:28:43 22 Q. The language used at Column 3 and Column 7 11:28:54 23 is slightly different. Column 7 describes a 11:28:57 24 weighted -- a weighting factor, and Column 3 11:28:59 25 describes a weighted value. 11:29:03 Page 42	1 A. Yes. 11:32:02 2 Q. If you look at Column 5, around Line 24 of 11:32:57 3 Watters, Watters explains that using three different 11:33:05 4 base station provides for an accurate location fix 11:33:14 5 for a mobile terminal. 11:33:16 6 Do you see that? 11:33:17 7 A. Which lines are you referring to? 11:33:22 8 Q. Line 24 to 25 of Column 5. 11:33:24 9 A. Yes, I see that. 11:33:42 10 Q. And you would agree that you can get an 11:33:44 11 accurate location fix using three cellular base 11:33:46 12 stations, as described by Watters; correct? 11:33:50 13 A. You can get a location fix. The accuracy 11:33:53 14 depends on a large number of variables. 11:33:55 15 Q. But using the configuration shown in 11:34:03 16 Figure 3, you can get a location fix with a certain 11:34:06 17 degree of accuracy; correct? 11:34:09 18 A. All right. Going back to Figure 3. 11:34:17 19 In Figure 3 shows how you can obtain a 11:34:29 20 location fix with some idea of what the accuracy and 11:34:32 21 like -- and error distributions are. But you would 11:34:38 22 not know, just based on this, exactly what -- what 11:34:41 23 the accuracy is. 11:34:45 24 Q. Based on configuration in Figure 3, would 11:34:53 25 you be able to estimate what the accuracy is? 11:34:56 Page 44
1 Does the fact that this is a weighted value 11:29:05 2 at Column 3 suggest that it would have particular 11:29:08 3 units? 11:29:12 4 A. The -- the use of weighted -- let me get it 11:29:32 5 exactly right. 11:29:38 6 Weighted value in Column 3 and -- does not 11:29:39 7 imply units any different from weighting factor in 11:29:45 8 Column 7. 11:29:50 9 Q. I want to turn to Exhibit 1005. 11:30:35 10 (Exhibit 1005 was previously identified.) 11:30:42 11 BY MR. HABER: 11:30:43 12 Q. Let me know when you have that up. 11:30:44 13 A. Yes. One moment. 11:30:46 14 Yes, I have it open now. 11:31:02 15 Q. You have in front of you a document that's 11:31:04 16 been previously marked Exhibit 1005, which US Patent 11:31:06 17 NUMBER 5,982,324 to Watters, W-a-t-t-e-r-s. I'll 11:31:09 18 refer to this patent as Watters. 11:31:22 19 Will you understand what I'm referring to? 11:31:25 20 A. Yes. 11:31:26 21 Q. I want to turn to Figure 3 of Watters. 11:31:38 22 A. Yes, I see on Page 3. 11:31:48 23 Q. And what's shown in Figure 3 is an example 11:31:52 24 of using cellular infrastructure to determine a 11:31:54 25 current position; right? 11:31:58 Page 43	1 A. The best way to say is you would be able to 11:35:04 2 characterize the accuracy in this configuration. You 11:35:07 3 wouldn't know it precisely, because it -- but you 11:35:10 4 would have some idea -- you would have effectively an 11:35:14 5 estimate of the accuracy, which is a -- which is a 11:35:17 6 characterization of the estimation -- the position 11:35:20 7 error. 11:35:25 8 Q. So using the configuration of Figure -- 11:35:28 9 strike that. 11:35:32 10 Using the configuration shown in Figure 3, 11:35:32 11 you'd be able to characterize the accuracy, which 11:35:36 12 provides a characterization of the estimation of the 11:35:40 13 position error; right? 11:35:46 14 A. A characterization -- the latter part -- the 11:35:50 15 characterization of accuracy, combined with a 11:35:55 16 probability -- you know, other assumptions, provides 11:35:58 17 a characterization of the distribution of position 11:36:01 18 error. 11:36:05 19 Q. And Watters teaches to give appropriate 11:36:14 20 regard to the accuracy of each signal; right? 11:36:21 21 MR. JUGLE: Objection. Form. 11:36:26 22 THE WITNESS: When you say "accuracy of each 11:36:34 23 signal," please explain what you mean in the context 11:36:36 24 of Figure 3. 11:36:41 25 /// Page 45

1 BY MR. HABER: 11:36:41	1 it's also referring to location determined based on 11:40:51
2 Q. Let me direct you to Column 23, Line 15. 11:36:50	2 cellular infrastructure signals? 11:40:55
3 A. One second. 11:37:05	3 A. As written, yes. 11:41:05
4 Q. Just let me know when you're there. 11:37:09	4 Q. And just up a few lines, the patent 11:41:13
5 A. Yes, I'm there. 11:37:16	5 says, "This may be done by weighting each location 11:41:14
6 Q. So Watters teaches that you can determine a 11:37:18	6 measurement in the average by the confidence or 11:41:18
7 location fix using cellular infrastructure, for 11:37:22	7 expected error in the measurements." 11:41:19
8 example, what was shown in Figure 3; right? 11:37:28	8 Do you see that? 11:41:21
9 A. Yes. 11:37:37	9 A. Yep. Yes. Let me read what you're 11:41:28
10 Q. And Watters also teaches determining 11:37:39	10 referring to from Line 16. 11:41:29
11 location with GPS; right? 11:37:40	11 Yes, I see it. I've read it. 11:41:57
12 A. Here in this paragraph, it refers to GPS 11:37:51	12 Q. Would you agree that the expected error in 11:42:11
13 receiver position, or at least GPS -- use of GPS, and 11:37:57	13 the measurements will be expressed in whatever units 11:42:14
14 calls that another means of determining position. 11:38:08	14 those measurements are expressed in? 11:42:18
15 Q. And so what Watters says in Column 23 is you 11:38:09	15 A. Repeat the question, please. 11:42:39
16 should give appropriate regard to the accuracy of 11:38:13	16 Q. Would you agree that the expected error in 11:42:41
17 each measurement; right? 11:38:15	17 the measurements, as recited at Column 3, Line 11 11:42:43
18 MR. JUGLE: Objection. Form. 11:38:18	18 through 12, would be expressed in whatever units 11:42:49
19 THE WITNESS: It says, "With appropriate 11:38:19	19 those measurements are expressed in? 11:42:52
20 regard to the accuracy of each measurement." 11:38:22	20 A. Yes. 11:42:58
21 Again, the accuracy is something you don't 11:38:27	21 Q. And you would agree that positions measured 11:43:03
22 know perfectly, but you would have -- you would have 11:38:30	22 by cellular infrastructure or GPS would be reported 11:43:20
23 some idea. 11:38:32	23 in either latitudes or longitudes or distances? 11:43:24
24 BY MR. HABER: 11:38:32	24 A. There are other representations, but they're 11:43:42
25 Q. And so when it says, "each measurement," 11:38:33	25 all in -- generally in units of distance, some form 11:43:49
Page 46	Page 48
1 it's saying that you should consider the accuracy of 11:38:36	1 of distance. 11:43:51
2 the GPS measurement; right? 11:38:38	2 Q. When Watters describes giving appropriate 11:43:58
3 A. Hold on one second. 11:38:57	3 regard to the accuracy of each measurement, that 11:44:01
4 In those -- in -- starting Line 13, "This 11:39:13	4 would include giving appropriate regard to expected 11:44:07
5 technique may be used to combine together location 11:39:22	5 error, as described here in Column 23; right? 11:44:14
6 measurements based on available GPS signals with 11:39:24	6 A. Repeat the question, please. 11:44:32
7 measurements based on cellular infrastructure signals 11:39:28	7 Q. When Watters describes giving appropriate 11:44:34
8 with appropriate regard to the accuracy of each 11:39:32	8 regard to the accuracy of each measurement, that 11:44:36
9 measurement." 11:39:35	9 would include giving appropriate regard to the 11:44:40
10 So whether -- it's unclear here if location 11:39:37	10 expected error, as described here in Column 23, at 11:44:42
11 measurements -- the -- there's confusion between the 11:39:41	11 Line 13. 11:44:46
12 measurements made and the location determined, and 11:39:46	12 A. I think you're referring to Lines 10 through 11:44:57
13 then it refers to the accuracy of each measurement. 11:39:51	13 12, weighting each location measurement in the 11:45:01
14 Q. I'm not sure I understand. 11:39:54	14 average by the confidence or expected error in the 11:45:06
15 When it's referring to the accuracy of each 11:39:55	15 measurement. 11:45:10
16 measurement there, is one of the measurements that 11:39:58	16 So Watters is -- is stating on Line 21, he 11:45:12
17 it's referring to a location measurement provided by 11:40:03	17 refers to sigma end are the expected errors or 11:45:19
18 GPS? 11:40:05	18 variances. Actually, that's imprecise, but he 11:45:24
19 A. That's the natural reading, but that's 11:40:10	19 simply -- he's simply describing variance or, more 11:45:31
20 inaccurate in the sense that GPS doesn't measure 11:40:13	20 accurately, standard deviation as an expected error 11:45:34
21 location. It measures ranges, in the range domain. 11:40:17	21 and using -- and using that as a weighting method, as 11:45:38
22 The location is determined based on those range 11:40:22	22 part of a weighting method. 11:45:47
23 measurements. So that's the ambiguity. 11:40:25	23 Q. I think you pointed to the equation at 11:45:56
24 Q. Would you agree that when it's referring to 11:40:30	24 Line 21 in your answer; right? 11:46:00
25 the accuracy of each measurement here at Column 23, 11:40:48	25 A. Yeah, I think it's Line 20, yes. The 11:46:03
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1 equation there, beginning with X on the left-hand 11:46:05	1 error in the measurements; correct? 11:50:56
2 side. 11:46:08	2 A. Uncertainty is a very general term. There 11:51:03
3 Q. And the position coordinate X, is that 11:46:09	3 is a -- the greater the uncertainty, in general, the 11:51:06
4 described in any particular units? 11:46:13	4 great -- you know, the -- large -- the more spread 11:51:14
5 A. Right here it's not described in any 11:46:33	5 out the distribution of error, based on that -- 11:51:20
6 particular units. It's some units of -- the context 11:46:35	6 that's related to that uncertainty. 11:51:23
7 certainly indicates it's some units of distance. 11:46:42	7 Q. And the example provided in Watters at 11:51:26
8 Q. If you look at Column 3, Line 46 -- I'm 11:46:49	8 Column 25 is that uncertainty in this example 11:51:29
9 sorry, Line 44, this is describing DGPS. 11:46:59	9 translates into an uncertainty in distance of about 11:51:38
10 Just let me know when you're there. 11:47:05	10 150 meters. 11:51:41
11 A. I'm there. 11:47:07	11 Do you see that? 11:51:42
12 Q. Watters explains that accuracies can be 11:47:10	12 A. Yes, I see it. Uncertainty is not a -- is 11:51:47
13 expressed here in the order of ten minutes -- ten 11:47:12	13 too general a term. I mean, it's used as, like -- 11:51:53
14 meters. 11:47:17	14 it's -- uncertainty is used in a similar way as 11:51:58
15 Do you see that? 11:47:17	15 accuracy to characterize the error and here in the -- 11:52:03
16 A. Yes, it says that. 11:47:19	16 in the form of distance and the -- and the units of 11:52:09
17 Q. Do you -- 11:47:21	17 distance. 11:52:12
18 A. In the order of, yes. 11:47:23	18 Q. Right. 11:52:13
19 Q. Sorry. 11:47:25	19 And so as -- as described by Watters, when 11:52:13
20 Would you agree that accuracies generally 11:47:25	20 it talks about uncertainty as characterizing 11:52:17
21 can be expressed in distance units such as meters? 11:47:28	21 positioning error, it uses an expression of distance 11:52:20
22 A. Accuracy? To be specific, accuracy 11:47:41	22 expressed in meters; correct? 11:52:26
23 characterizing the distribution of position error or 11:47:44	23 A. Yes. 11:52:29
24 range error that are, yes, generally expressed in the 11:47:49	24 Q. The -- I want to turn you to Figure 12 of 11:52:32
25 same units as the error, and the example he gives 11:47:53	25 Watters. Let me know when you're there. 11:52:40
Page 50	Page 52
1 here is ten meters. 11:47:56	1 A. Yes, I'm there. 11:52:54
2 Q. If you'd turn to Column 25, around Line 5, 11:48:57	2 Q. And so what's shown in Figure 12 is one of 11:52:55
3 there is a discussion of uncertainty. 11:49:11	3 the example positioning approaches taught by Watters; 11:53:00
4 Do you see that? 11:49:15	4 right? 11:53:06
5 A. Yes, I do. 11:49:26	5 A. It's an example of a process of determining 11:53:14
6 Q. Would you agree that uncertainty in 11:49:27	6 position. 11:53:16
7 measurements will correspond to an error in the 11:49:29	7 Q. And that first box there, 1200, says "First 11:53:18
8 measurements? 11:49:35	8 Fix." 11:53:22
9 A. Uncertainty in the measurements corresponds 11:49:46	9 Do you see that? 11:53:23
10 to the measurements being -- the measurements being 11:49:49	10 A. Yes. 11:53:24
11 different from the truth, the unknown truth, which we 11:49:56	11 Q. That is the first fix using GPS; right? 11:53:25
12 described as an error, which is also unknown. 11:50:00	12 A. Going to the description to double-check. 11:53:39
13 Q. Okay. So uncertainty in measurements 11:50:04	13 Looking at Column 22, around Line 47, which 11:54:10
14 corresponds to measurements being different from some 11:50:06	14 states, "At Block 12" -- I'm sorry, "At Block 1200, a 11:54:18
15 unknown truth, which is also described as an error; 11:50:11	15 first fix is calculated." 11:54:23
16 correct? 11:50:17	16 Q. Right. 11:54:28
17 A. Not quite. 11:50:20	17 And so that first fix is calculated with 11:54:28
18 The truth -- well, the truth -- the error 11:50:21	18 GPS; correct? 11:54:34
19 describes -- I think this is what you are saying: 11:50:27	19 A. It certainly could be. I'm looking for the 11:54:44
20 The error describes the difference between the 11:50:33	20 place in Watters where it specifically says that. 11:54:46
21 measurements we made, which we know, and the truth, 11:50:35	21 So in reference to Figure 11, the preceding 11:54:55
22 which we don't know. 11:50:38	22 figure, column -- the bottom of Column 19 says that 11:54:59
23 Q. Right. 11:50:46	23 "At Block 1100, a GPS receiver portion 1010 obtains a 11:55:02
24 And so you would agree that uncertainty in 11:50:47	24 first fix on the location of the mobile terminal, if 11:55:08
25 the measurements that we made will correspond to some 11:50:50	25 necessary." 11:55:11
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1 So in at least one embodiment, the first fix 11:55:13 2 is determined by GPS. 11:55:16 3 Q. And then Figure 12, the next step after 11:55:21 4 first fix is GPS receiver turned off. 11:55:23 5 Do you see that? 11:55:26 6 A. Going back to Figure 12. 11:55:29 7 Yes, I see it. 11:55:37 8 Q. And so at 1200, before the GPS receiver is 11:55:42 9 turned off, assuming that the GPS is providing that 11:55:44 10 first fix, that will be a position; correct? 11:55:48 11 A. Yes, in the most natural interpretation here 11:56:01 12 it could include other things. 11:56:04 13 Q. So the first fix is provided by GPS, 11:56:08 14 position is determined by GPS, GPS receiver is turned 11:56:12 15 off, and then the next step at Block 1220, 11:56:15 16 says, "Calculate position using cellular." Right? 11:56:20 17 A. Yes. 11:56:24 18 Q. And so calculate position using cellular 11:56:25 19 will determine a position using cellular 11:56:30 20 infrastructure, for example, what was shown in 11:56:34 21 Figure 3; right? 11:56:36 22 A. Yes. 11:56:45 23 Q. And if the position using cellular 11:57:03 24 calculated at Block 1220 was taken at a later time 11:57:06 25 than the position using GPS at Block 1200, those two 11:57:14 Page 54	1 meters, then -- then the difference -- the distance 11:59:16 2 between the two would be a -- in units of meters, and 11:59:20 3 similarly, if it's lat-long. 11:59:26 4 THE COURT REPORTER: I'm sorry. "And 5 similarly if it's"? 6 THE WITNESS: If it's in units of lat-long 7 height. 8 THE COURT REPORTER: Thank you. 9 BY MR. HABER: 10 Q. So if it's in units of latitude, longitude, 11:59:34 11 and height, the difference would likely be converted 11:59:38 12 into units of meters; correct? 11:59:41 13 A. It could be, certainly. 11:59:44 14 Q. The patent at Column 22, Line 59, talks 11:59:53 15 about alternative inquiries that can be conducted at 12:00:07 16 Block 1230. 12:00:10 17 Do you see that? 12:00:12 18 A. Hold on one second. 12:00:14 19 Yes, I see, I think, starting on 12:00:21 20 Line 57, "Alternative inquiries at Block 1230." 12:00:23 21 Q. Right. 12:00:27 22 And those alternative inquiries include 12:00:27 23 determining how far in space the mobile terminal has 12:00:29 24 moved since the last GPS update. 12:00:33 25 Do you see that? 12:00:37 Page 56
1 positions could be different; right? 11:57:23 2 A. Yes. 11:57:27 3 Q. And one way to determine the distance 11:57:31 4 between those two positions would be to compare them, 11:57:35 5 whether subtracting or whatever, to determine the 11:57:41 6 distance -- the difference between those two 11:57:44 7 positions? 11:57:47 8 A. Repeat the question, please. 11:57:50 9 Q. Maybe I can ask a clearer question. 11:57:52 10 One way to determine the difference between 11:57:54 11 a position calculated at Block 1220 using cellular 11:57:57 12 and a first fix calculated at Block 1200 using GPS 11:58:04 13 would be simple subtraction; right? 11:58:10 14 A. Subtracting the cellular position at 1220 11:58:17 15 from the cellular -- from the GPS -- in this case, 11:58:23 16 the assumed GPS position at 1210 -- would give you an 11:58:28 17 estimate of the distance between the two fixes, the 11:58:32 18 two positions. 11:58:42 19 Q. And that estimate of distance would be in 11:58:43 20 whatever units was used to calculate -- to express 11:58:46 21 the two positions; correct? 11:58:49 22 A. It would be in some units of distance if -- 11:59:01 23 if the -- that -- if the distances were reported 11:59:06 24 in -- I'm sorry. 11:59:12 25 If the positions were reported in terms of 11:59:13 Page 55	1 A. Yes. 12:00:39 2 Q. And the method we just described of 12:00:41 3 subtracting the GPS location and the location 12:00:44 4 determined by cellular could be used to determine how 12:00:50 5 far in space the mobile terminal has moved since the 12:00:55 6 last GPS update; correct? 12:00:59 7 A. Repeat the question, please. 12:01:02 8 Q. The method we just described of subtracting 12:01:03 9 the GPS location from the location determined by 12:01:06 10 cellular could be used to determine how far in space 12:01:10 11 the mobile terminal has moved since the last GPS 12:01:12 12 update? 12:01:15 13 A. Yes. It would be an estimate of that 12:01:16 14 distance. 12:01:18 15 Q. And in the patent, gives an example, wherein 12:01:30 16 the mobile terminal has moved a predetermined 12:01:58 17 distance such as 100 meters. 12:02:00 18 Do you see that? 12:02:02 19 A. Yes. 12:02:03 20 Q. And the method we just described of 12:02:05 21 subtracting the GPS location fix from the location 12:02:09 22 determined by cellular could be used to determine, 12:02:13 23 for example, that the mobile terminal has moved a 12:02:16 24 predetermined distance such as 100 meters; right? 12:02:22 25 A. Yes, it would estimate -- it -- that 12:02:28 Page 57

1 difference between two different positions at two 12:02:31 2 different times would estimate how far the mobile 12:02:35 3 terminal has moved. But here it refers to a 12:02:38 4 predetermined distance, not the actual distance -- 12:02:44 5 not the actual distance estimate. 12:02:47 6 Q. So if we wanted to figure out, for example, 12:03:01 7 whether or not the mobile terminal has moved 12:03:03 8 100 meters, one way to do that would be to subtract 12:03:06 9 the current location determined by cellular from the 12:03:14 10 previous GPS fix; right? 12:03:18 11 A. Yeah, in doing so -- yes, in doing so, 12:03:24 12 you're deriving an uncertain estimate of how far the 12:03:26 13 device has moved or at least how its positions 12:03:30 14 changed to a predetermined distance. 12:03:35 15 Q. And so it's an uncertain estimate because 12:03:37 16 those measurements contain some error. Fair? 12:03:41 17 A. Yes. 12:03:47 18 Q. And I believe Watters gives some examples of 12:03:51 19 errors that may be included in an underlying position 12:03:56 20 measurement, such as multipath errors; is that right? 12:04:04 21 A. Let me look for that to confirm that. 12:04:13 22 And now repeat the question? 12:04:20 23 Q. Watters gives some example of errors that 12:04:22 24 may be included in an underlying position measurement 12:04:24 25 taken by cellular infrastructure such as multipath 12:04:29 Page 58	1 it's possible to estimate the multipath error -- it 12:06:43 2 suggests a means of estimating multipath error in the 12:07:00 3 cellular signal, and that is a -- I think in that -- 12:07:02 4 that is a, you know, practice would not work well, 12:07:11 5 but it would give some characterization -- it would 12:07:16 6 give some characterization of what the overall error 12:07:19 7 might be. 12:07:22 8 BY MR. HABER: 12:07:22 9 Q. So would you agree that if Watters estimated 12:07:29 10 high multipath errors, the resulting position that 12:07:35 11 was determined using that signal would be of 12:07:42 12 relatively low accuracy? 12:07:46 13 A. More accurately, more -- no. More 12:07:51 14 rigorously, just trying to say -- say it closer to 12:07:56 15 the true situation, if the method in Watters makes an 12:08:03 16 estimate of multipath propagation error, that 12:08:12 17 characterizes the distribution of multipath error, 12:08:15 18 actual multipath error, which was related to the 12:08:19 19 distribution in the error, which is one factor in the 12:08:22 20 error in the distribution of position error, or at 12:08:27 21 least the -- here -- not here in this case, the 12:08:31 22 distance that's been moved in a period of time. 12:08:34 23 However, that doesn't determine what the 12:08:37 24 error in that distance is, only -- it only 12:08:43 25 characterizes it. You don't know the error, and, 12:08:47 Page 60
1 errors; right? 12:04:32 2 A. Yes. And it cites it in at least one place. 12:04:33 3 Q. Where specifically were you looking? 12:04:37 4 A. Right now, looking back on Column 23, 12:04:39 5 Lines 50 to 55. 12:04:52 6 Q. Where you pointed me, it states -- sorry, 12:05:11 7 strike that. 12:05:13 8 Where you pointed me in Watters, Watters 12:05:14 9 explains that an estimate may be made of the 12:05:16 10 multipath propagation errors in the cellular signals; 12:05:19 11 right? 12:05:23 12 A. Yes, it says that. 12:05:24 13 Q. Would you agree that if Watters were to make 12:05:49 14 an estimate of errors -- I'm sorry. Strike that. 12:05:52 15 Would you agree that if Watters were to make 12:05:59 16 an estimate of multipath errors in the cellular 12:06:02 17 signals, that would result -- strike that. Let me 12:06:04 18 try again. 12:06:10 19 Would you agree that if Watters were to make 12:06:10 20 an estimate of the multipath errors in cellular 12:06:12 21 signals that was relatively high, that would result 12:06:14 22 in a low accuracy signal? 12:06:19 23 MR. JUGLE: Objection. Form. 12:06:25 24 THE WITNESS: Let me try to unpack that. 12:06:28 25 So, again, based on the language at Line 53, 12:06:32 Page 59	1 therefore -- or you -- you have -- you know, 12:08:50 2 basically you have a probability distribution that 12:08:53 3 you've revised, and the probability distribution 12:08:55 4 tells you a certain probability of having lower or 12:08:58 5 higher errors, but no guarantee -- no specific 12:09:02 6 guarantee of that, just a -- just a characterization 12:09:05 7 of probability. 12:09:10 8 And in order to explain what I'm referring 12:09:12 9 to, I would refer to the -- just as an example, the 12:09:14 10 distributions of position error in the Specht 12:09:18 11 reference, cited in my declaration. 12:09:22 12 Q. Okay. All right. I think that's fair. I'm 12:09:25 13 asking a little -- maybe a little higher level 12:09:27 14 question. 12:09:31 15 The question that I'm asking is, you know, 12:09:31 16 in general, if there are high levels of multipath 12:09:34 17 propagation errors, that will lead to more error in 12:09:40 18 an estimated position, you know, a less accurate 12:09:48 19 estimate; correct? 12:09:53 20 A. Everything else being equal, if you knew the 12:09:56 21 multipath errors were higher, then, yes, the position 12:09:59 22 errors would be higher. But in practice, you don't 12:10:05 23 know that. You simply have an estimate of what the 12:10:08 24 multipath error might be, and all that does is affect 12:10:10 25 the -- your characterization of the distribution of 12:10:14 Page 61

1 both multipath and position error. 12:10:18 2 In this case, I believe, we're still talking 12:10:21 3 about the distance -- the distance -- the measurement 12:10:24 4 of distance moved. 12:10:26 5 Q. And everything else being equal, if you knew 12:10:35 6 the multipath errors were lower, then the result 12:10:37 7 would be a more accurate position estimate; right? 12:10:45 8 A. If you knew the multipath errors were lower 12:10:52 9 and all else were equal, that would be the case. 12:10:57 10 But, again, Watters is making a crude 12:11:00 11 estimate of it by trying to compare GPS and cellular. 12:11:02 12 So you would not be -- that really -- it does not 12:11:06 13 give you sufficient, you know, knowledge to say 12:11:13 14 definitely the position -- the distance moved, the 12:11:16 15 error in the distance -- in the estimated distance 12:11:22 16 travel is high or low. 12:11:25 17 Q. Right. 12:11:27 18 And so I think it's fair to say that Watters 12:11:28 19 is working in estimates; right? 12:11:31 20 MR. JUGLE: Objection. Form. 12:11:36 21 THE WITNESS: Yes. It says, for example, 12:11:43 22 "An estimate may be made of the multipath propagation 12:11:45 23 error," but what's relevant to your question is that 12:11:49 24 estimate of any -- any usefulness. It's very 12:11:52 25 difficult in practice to estimate multipath error in 12:11:58 Page 62	1 A. Yes, I do. 12:13:41 2 Q. Would you agree that estimating whether 12:13:43 3 cellular network infrastructure signals are of good 12:13:48 4 accuracy could include considerations of estimates of 12:13:52 5 multipath propagation errors? 12:13:58 6 A. I would agree that there is a relationship 12:14:08 7 with the characterization of -- of multipath errors. 12:14:19 8 Estimates are very imprecise. So if you characterize 12:14:26 9 multipath errors in one location versus another, that 12:14:31 10 would influence your characterization of error in the 12:14:35 11 distance traveled. 12:14:39 12 Q. And you would agree that Watters teaches to 12:14:43 13 turn on or off GPS, based on these characterizations 12:14:47 14 of accuracy or errors in the measurements? 12:14:53 15 A. I believe it tries -- it's -- it's, in 12:15:17 16 imprecise terms, relating -- trying to relate them, 12:15:22 17 but there is no precise guidance on connect -- 12:15:26 18 connecting them except, for example, what's given in 12:15:28 19 Figure 12 and its description. 12:15:35 20 Q. I think that's fair. 12:15:38 21 It's your opinion that Watters does not 12:15:39 22 expressly describe a particular method or algorithm 12:15:45 23 for determining position errors; right? 12:15:55 24 A. Yeah, that's correct, nor of estimating 12:16:07 25 them. That's right. 12:16:10 Page 64
1 realtime. 12:12:01 2 BY MR. HABER: 12:12:01 3 Q. Right. 12:12:06 4 And assuming that you could estimate it, 12:12:06 5 that estimate would at least give you a 12:12:09 6 characterization of accuracy of -- of whatever 12:12:13 7 measurement it is that you're trying to estimate; 12:12:18 8 right? 12:12:21 9 A. Yes. It would update your -- your 12:12:22 10 characterization of the accuracy of your distance -- 12:12:24 11 distance traveled measurement -- at your distance 12:12:30 12 traveled estimate. 12:12:34 13 Q. At the top of Column 23 -- 12:12:55 14 A. Okay. 12:13:06 15 Q. -- the sentence starts at the bottom of 12:13:07 16 Column 22. It starts, "Of course, the rate at which 12:13:09 17 GPS updates are needed will depend on the conditions 12:13:16 18 under which the mobile is operating." 12:13:19 19 Do you see that? 12:13:22 20 A. Yes. 12:13:27 21 Q. And Watters states that, "Less frequent 12:13:27 22 updates are needed if the mobile terminal is in an 12:13:31 23 area where the cellular network infrastructure 12:13:34 24 signals are known to be of good accuracy." 12:13:36 25 Do you see that? 12:13:39 Page 63	1 Q. Watters states that you should estimate 12:16:14 2 them. It just doesn't say how to do it; right? Is 12:16:20 3 that your opinion? 12:16:24 4 A. It states that you can try to estimate or 12:16:35 5 characterize errors in multipath that have -- that 12:16:39 6 may be relevant to the calculation -- the estimate of 12:16:44 7 distance traveled or distance between two position 12:16:51 8 fixes in the example in Figure 12. 12:16:59 9 Q. Right. 12:17:14 10 I think we're on the same page. I just want 12:17:15 11 to make sure I have your opinion clearly. 12:17:17 12 It's your opinion that Watters states that 12:17:19 13 an estimate may be made of multipath propagation 12:17:26 14 errors in the cellular signals which might relate to 12:17:29 15 position error, but it does not expressly describe a 12:17:31 16 way to do that. 12:17:36 17 Is that fair? 12:17:40 18 MR. JUGLE: Objection. Form. 12:17:41 19 THE WITNESS: I don't think that's quite 12:17:50 20 right as you said it. Let me think that -- anyway, I 12:17:51 21 don't think that's quite right, as you said it. 12:17:57 22 BY MR. HABER: 12:17:57 23 Q. Can you tell me what I said that's not quite 12:18:01 24 right? 12:18:04 25 A. What I can do is give you a description in 12:18:05 Page 65

1 my words. 12:18:07	1 during the break? 12:33:32
2 Q. Appreciate a description in your words. 12:18:09	2 A. Correct. 12:33:33
3 A. Yeah. 12:18:11	3 Q. If you look back at the title of Nohara, 12:33:35
4 In Figure 12 and its description, the 12:18:12	4 you'll see that it's titled "Positioning Apparatus, 12:33:40
5 Watters patent connects the presence of requisite 12:18:48	5 Positioning Method, and Positioning System." 12:33:43
6 cellular signals and specifically gives the example 12:18:51	6 Do you see that? 12:33:45
7 are there enough signals to determine position as 12:18:54	7 A. Yes, I do. 12:33:46
8 shown in Figure 3, and uses that as a means of 12:18:57	8 Q. Would you agree that as part of its 12:33:49
9 determining whether or not to turn on a GPS -- a GPS 12:19:06	9 positioning apparatus, method, and system, Nohara 12:33:52
10 receiver. 12:19:10	10 considers positioning errors? 12:33:56
11 In the description of Figure 12, it suggests 12:19:12	11 A. It considers variables like -- it considers 12:34:06
12 alternatives, but very imprecisely, and not based on 12:19:15	12 variables like HDOP, which are used to help 12:34:10
13 estimating position error, but instead trying to 12:19:22	13 characterize the distribution of positioning error. 12:34:13
14 characterize -- but instead potentially 12:19:29	14 Q. So flip to Figures 15-A and B on Page 16 of 12:34:30
15 characterizing things that might have some -- that 12:19:32	15 Exhibit 1006. 12:34:37
16 have some relationship to it. 12:19:35	16 Just let me know when you're there. 12:34:39
17 That's as far as it goes. 12:19:38	17 A. I'm going back to them. 12:34:44
18 Q. All right. We can turn to Exhibit 1006. 12:20:06	18 Okay. Yes, I'm there at 15-A. 12:34:55
19 (Exhibit 1006 was previously identified.) 12:20:15	19 Q. And you see in 15-A what appears to be a 12:34:58
20 BY MR. HABER: 12:20:17	20 crude or rudimentary map; right? 12:35:05
21 Q. Let me know when you have that. 12:20:18	21 A. Yes. 12:35:07
22 A. Hold on one second. 12:20:30	22 Q. In the lower left-hand corner, there is a P. 12:35:07
23 Yes, I have it. 12:20:37	23 Do you see that? 12:35:10
24 Q. All right. Exhibit 1006 has been previously 12:20:39	24 A. Yes. 12:35:11
25 marked in this proceeding, and it is publication -- 12:20:42	25 Q. That corresponds to a position; right? 12:35:12
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1 it's US Patent Publication Number 2002/0151314 to 12:20:46	1 A. Let me reference the description of 15-B 12:35:24
2 first named inventor Nohara. 12:20:55	2 and -- 15-A and B. 12:35:28
3 If I refer to this reference as Nohara, will 12:20:59	3 Yes, as the Nohara -- Nohara recites in 12:35:40
4 you understand what I'm referring to? 12:21:03	4 Paragraph 159, the display unit displays -- this 12:35:46
5 A. Yes. 12:21:04	5 is -- it says, "Display of the map information and 12:35:50
6 Q. All right. I'd like you to turn to 12:21:11	6 blinks a signal P, which indicates the present 12:35:53
7 Figures 15-A and 15-B. It's on Page 16 of the 12:21:16	7 position for the sake of convenience of users." 12:35:56
8 exhibit. 12:21:28	8 Q. And underneath 15-A is Figure 15-B, and you 12:36:05
9 A. I'm there. But I request that before we get 12:21:38	9 can see the same rudimentary map with position P 12:36:10
10 into questions in this area, that we take another 12:21:41	10 drawn on it; right? 12:36:14
11 break. 12:21:43	11 A. Yes. 12:36:15
12 MR. HABER: That's fine. 12:21:44	12 Q. And around position P is a circle, 12:36:17
13 THE VIDEOGRAPHER: Going off the record. 12:21:46	13 identified as "Cerr." 12:36:19
14 The time is 12:21 PM. 12:21:47	14 Do you see that? 12:36:22
15 (Recess taken.) 12:21:49	15 A. Yes. 12:36:23
16 THE VIDEOGRAPHER: Back on the record. The 12:33:02	16 Q. And Cerr is a position error around position 12:36:25
17 time is 12:32 PM. 12:33:09	17 P; right? 12:36:28
18 BY MR. HABER: 12:33:13	18 A. Let me see how Nohara describes it. 12:36:32
19 Q. All right. Welcome back. 12:33:14	19 On Paragraph 160, Page 11, bottom left, next 12:36:45
20 Did you speak with anyone during this last 12:33:15	20 to last line, "As illustrated in Figure 15-B, the 12:36:56
21 break? 12:33:17	21 circle Cerr, C-e-r-r, is displayed around the present 12:37:01
22 A. Yes, the people in the breakroom where I 12:33:21	22 position with the range inverted from the positioning 12:37:06
23 went to refill my drink. We complained about the 12:33:24	23 error HDOP as the radius." 12:37:11
24 lack of ice. 12:33:27	24 So that is a -- again, Nohara connects 12:37:16
25 Q. I see. You didn't speak with your attorney 12:33:29	25 positioning error to HDOP, but HDOP is not the 12:37:22
Page 67	Page 69

1 positioning error. 12:37:27 2 Q. Okay. But what's shown in Figure 15-B, 12:37:28 3 Cerr, that is an error range around position P; 12:37:34 4 right? 12:37:38 5 A. It's a -- it's a circle derived for the 12:37:39 6 display that attempts to characterize what the error 12:37:43 7 might be. 12:37:45 8 Q. And is it a range; right? 12:37:47 9 A. Hold on one second. 12:37:53 10 What Paragraph 160 describes a little is -- 12:38:15 11 using the character -- using HDOP to convert -- it 12:38:19 12 says specifically, "The range converted from the 12:38:25 13 positioning error HDOP is the radius." 12:38:28 14 So based on HDOP, it derives a radius so 12:38:31 15 that it can plot the circle on the display? 12:38:35 16 Q. Right. 12:38:42 17 So Nohara says the positioning error HDOP is 12:38:43 18 the radius of the Cerr circle as shown in Figure 12:38:46 19 15-B; right? 12:38:51 20 A. As I interpret it, a range is converted from 12:38:59 21 HDOP, again, which is not positioning error, but a 12:39:02 22 characterization. Given HDOP, the display derives a 12:39:05 23 range, which it describes as the radius of the 12:39:13 24 circle. 12:39:16 25 Q. That range is going to be some distance; 12:39:18 Page 70	1 Q. The long answer for -- I think it's a simple 12:41:45 2 question here. It says, "Range converted from the 12:41:47 3 positioning error HDOP as the radius." 12:41:51 4 The range that it's talking about is the 12:41:57 5 radius of the Cerr circle that's shown in Figure 12:42:00 6 15-B; right? 12:42:05 7 MR. JUGLE: Objection. Form. 12:42:08 8 THE WITNESS: The -- the easiest way to read 12:42:17 9 that is that range is not clearly defined, but a -- a 12:42:18 10 radius is determined from a 1D value derived from the 12:42:22 11 description, the HDOP representing two dimension -- a 12:42:31 12 two-dimensional characterization of error of 12:42:37 13 uncertainty. Its range -- the meaning is pretty 12:42:40 14 clear. The use of the word "range" is a little 12:42:47 15 unclear. 12:42:49 16 BY MR. HABER: 12:42:49 17 Q. Well, it continues, "This provides measures 12:42:50 18 such as making users or others check for the degree 12:42:55 19 of precision the present position has." 12:42:57 20 Do you see that? 12:43:02 21 A. Yes. 12:43:03 22 Q. The degree of precision of the present 12:43:04 23 position, that is a way to characterize error 12:43:07 24 inherent in the position provided; right? 12:43:12 25 A. Repeat the question, please. 12:43:23 Page 72
1 right? 12:39:23 2 A. The radius is the distance from the center 12:39:25 3 of the circle. 12:39:28 4 Q. Right. 12:39:29 5 And the positioning error HDOP is the 12:39:30 6 radius. That's what Nohara says; right? 12:39:39 7 A. It's not -- it's not that simple. 12:39:42 8 Q. Well, let's just start with what Nohara 12:39:49 9 says. "The range is converted from the positioning 12:39:52 10 error HDOP as the radius of the Cerr circle." Right? 12:39:55 11 A. Hold on. I'm going back to that. 12:40:03 12 So, again, this is top of right column, 12:40:19 13 Page 11, I'll read it again because it says, "A 12:40:21 14 circle Cerr is displayed around the present position 12:40:26 15 with the range converted from the positioning error 12:40:30 16 HDOP as the radius." 12:40:37 17 The meaning of "range" is not -- not 12:40:40 18 completely clear, but what -- what we would -- POSITA 12:40:44 19 would interpret this as saying is that I have a HDOP 12:40:50 20 in 2D, and as explained in my declaration, you can 12:40:54 21 convert unitless HDOP to a -- to a 1D distance from a 12:41:04 22 center of a circle, and that's -- that's what's shown 12:41:16 23 here, a circle with that radius. 12:41:19 24 But keep in mind HDOP is representing 2D 12:41:24 25 error, and the range or radius is in 1D. 12:41:27 Page 71	1 Q. The degree of precision present -- I'm 12:43:24 2 sorry. Strike that. 12:43:26 3 The degree of precision of the present 12:43:27 4 position as described by Nohara here is a way to 12:43:31 5 characterize errors inherent in the position XPYP 12:43:35 6 that's provided on the display of Figure 15-B; right? 12:43:42 7 A. It's a -- it's a -- the 1D radius converted 12:43:46 8 from HDOP is a way to convert the characterization of 12:43:52 9 2D error, given by HDOP into a characterization of 1D 12:43:58 10 error from the center of the circle. 12:44:05 11 Q. And that radius around the center of the 12:44:10 12 circle is some particular distance that depends on 12:44:12 13 how big or how small the error is; right? 12:44:17 14 A. It depends on the HDOP -- it depends on the 12:44:20 15 characterization of the error given by HDOP, which is 12:44:23 16 not the same as what the error actually is or even an 12:44:25 17 estimate of it. 12:44:47 18 Q. I'm still having trouble understanding here. 12:44:52 19 So what's shown in Figure 15-B is identified 12:44:54 20 as Cerr; right? 12:44:57 21 A. Yes. 12:45:02 22 Q. And that, by the title that it's given, 12:45:03 23 corresponds in some way to error; right? 12:45:09 24 MR. JUGLE: Objection. Form. 12:45:12 25 THE WITNESS: It -- the radius of the circle 12:45:14 Page 73

1 is a characterization of -- is a characterization of 12:45:22 2 what the error might be. If the circle -- if the 12:45:27 3 radius were twice as big, that would be a different 12:45:33 4 characterization of the error, but not an estimate of 12:45:37 5 the error. 12:45:39 6 BY MR. HABER: 12:45:39 7 Q. So it might not be a particular numerical 12:45:43 8 value that corresponds exactly to what the error is, 12:45:47 9 but it would be some estimate of the error that a 12:45:50 10 user can use to, what Nohara says, check the degree 12:45:53 11 of precision of the present position; right? 12:45:58 12 A. No. It's just a characterization of the 12:46:02 13 distribution of the error, not really even an 12:46:05 14 estimate of the error. 12:46:07 15 Again, the Specht reference I mentioned 12:46:12 16 earlier shows this more clearly. 12:46:17 17 Q. Maybe -- maybe I'm -- I'm struggling with 12:46:19 18 the word characterization of the distribution of the 12:46:21 19 error as opposed to estimate of the error. I'm not 12:46:24 20 sure what the difference is. I mean, if I'm 12:46:27 21 characterizing the error, aren't I estimating it in 12:46:29 22 some at least crude or rudimentary way? 12:46:31 23 MR. JUGLE: Objection. Form. 12:46:34 24 THE WITNESS: Not in the way a POSITA would 12:46:39 25 understand. 12:46:40 Page 74	1 distribution of position error shown by the .pdf -- 12:48:29 2 each of these .pdf curves is a characterization of 12:48:32 3 position error, and that changes with that -- as this 12:48:37 4 shows, the -- it is a -- HDOP is -- is related to 12:48:42 5 that characterization. 12:48:47 6 The different curves are different 12:48:49 7 characterizations of the error corresponding to 12:48:51 8 different HDOPs. 12:48:54 9 BY MR. HABER: 12:48:54 10 Q. This curve that you're pointing to is not in 12:48:56 11 Nohara; right? 12:48:58 12 A. No. It's from -- I don't think there is 12:49:02 13 anything like it in Nohara, to my recollection. 12:49:05 14 Q. Right. 12:49:10 15 The figure from Nohara is Figure 15-B, which 12:49:11 16 shows a circle around a position; right? 12:49:15 17 A. That -- yes, there is a -- among what's in 12:49:26 18 Nohara is this characterization, this display, you 12:49:30 19 know, for the purpose of the user, of a circle around 12:49:33 20 position, which -- which relates to the 12:49:37 21 characterization of a position error, the 12:49:42 22 distribution of a position error. 12:49:48 23 The -- Nohara states, as we just went over, 12:49:50 24 that that -- the radius of the circle is based -- is 12:49:53 25 converted from HDOP. 12:49:56 Page 76
1 BY MR. HABER: 12:46:46 2 Q. Can you expand on that? I'm just not -- I'm 12:46:46 3 having trouble understanding. 12:46:48 4 A. Yeah. 12:46:49 5 The best way is to refer back to my 12:46:50 6 declaration, which has an example from the Specht 12:46:52 7 reference. 12:46:54 8 May I -- may I refer to that and -- 12:46:57 9 Q. Sure. 12:47:00 10 A. -- answer in respect to that? 12:47:00 11 Q. This is Exhibit 2001 that had been 12:47:02 12 previously marked as the Declaration of Samuel 12:47:06 13 Pullen. 12:47:10 14 Feel free to point to whatever you need to 12:47:11 15 point to. 12:47:13 16 A. Okay. 12:47:14 17 (Exhibit 2001 was previously identified.) 12:47:27 18 THE WITNESS: Okay. I'm referring -- if you 12:47:44 19 go to paragraph 57, which is Page -- Page 33 of the 12:47:46 20 .pdf document, Page 33, Figure 5 is on Page 34. 12:47:53 21 And in this figure, the character -- the use 12:48:02 22 of HDOP to characterize position error is shown more 12:48:07 23 precisely because, depending on HDOP -- again, HDOP 12:48:14 24 is something we calculate, the -- the 12:48:20 25 characterization -- the distribution -- let's say the 12:48:26 Page 75	1 Q. Well, Nohara states that it's converted from 12:50:00 2 the positioning error HDOP. 12:50:02 3 A. Right. 12:50:04 4 (Simultaneous cross-talk.) 12:50:04 5 Which as I've explained multiple times here 12:50:04 6 and in my declaration is not positioning error. 12:50:08 7 What the Specht reference shows and what I'm 12:50:11 8 citing in -- going back and forth -- Paragraph 57 of 12:50:13 9 my declaration effectively connects these points. 12:50:21 10 Nohara, as we've discussed, converts HDOP to 12:50:29 11 a radius that it can show on the display. 12:50:37 12 As HDOP changes -- but that doesn't tell you 12:50:41 13 what the error is. It just gives an indication of -- 12:50:44 14 really it's just purely based on HDOP. At most, that 12:50:47 15 is the characterization of the distribution of error. 12:50:52 16 And Figure 5 of the Specht reference, again, that's 12:50:56 17 Exhibit -- well, in my Exhibit 2001, I believe Specht 12:50:58 18 is Exhibit 2003, you can see that for different 12:51:05 19 HDOPs, the actual distribution of position error, 12:51:08 20 determined after the fact, is still very large and 12:51:13 21 doesn't change that much. 12:51:16 22 As a result, that circle is not even 12:51:18 23 attempting to -- it's not -- it's attempting to give 12:51:24 24 a representation of what the error might be, but it 12:51:29 25 is not a real estimate, and it's -- as you can see, 12:51:31 Page 77

1 the -- if the -- the radius of the circle will change 12:51:39 2 with the calculated HDOP, but the actual distribution 12:51:44 3 of position error won't change that much, as shown in 12:51:47 4 Figure 5, Specht Figure 5 in Paragraph 57 of my 12:51:51 5 declaration. 12:51:57 6 Q. I understand that you want to look at 12:51:58 7 something other than Nohara. I'm asking you to look 12:51:59 8 at the reference that's in front of you. It 12:52:01 9 says, "The range is converted from positioning error 12:52:03 10 HDOP." Right? I mean, that's what the reference 12:52:07 11 says. 12:52:10 12 A. Right. 12:52:11 13 And the reference is -- and that's simply 12:52:11 14 incorrect, as a POSITA would understand it. HDOP is 12:52:14 15 not positioning error, as I've stated in the 12:52:18 16 declaration and -- and several times here. 12:52:22 17 Q. So it's your opinion that Nohara is -- is 12:52:25 18 wrong; right? 12:52:28 19 A. This aspect -- my opinion -- again, I don't 12:52:31 20 know exactly how this occurred, but my opinion is 12:52:35 21 that the characterization of -- that the -- defining 12:52:41 22 HDOP as the position error, as though they're 12:52:44 23 equivalent, that's incorrect. 12:52:47 24 Q. And so it's your opinion that where Nohara 12:52:49 25 talks about a Cerr error circle being displayed on 12:52:52 Page 78	1 Figure 15-B to be shown to the user; correct? 12:55:06 2 MR. JUGLE: Objection. Form. 12:55:09 3 THE WITNESS: One second. I'm going back to 12:55:13 4 the section of Nohara we were discussing earlier. 12:55:20 5 Again, this is Paragraph 160 of Nohara, 12:55:23 6 beginning bottom of Page 11 left and continuing on to 12:55:29 7 the top right. 12:55:34 8 So, as we discussed before, a circle is 12:55:35 9 displayed with the range converted from what it calls 12:55:38 10 positioning or HDOP, but just HDOP as the radius. 12:55:46 11 So based on HDOP, a radius is derived -- a 12:55:49 12 circle is derived, and the circle is shown on the -- 12:55:53 13 on the display. 12:55:57 14 BY MR. HABER: 12:55:57 15 Q. When you're reading Paragraph 160, you keep 12:56:00 16 changing what Nohara says. I mean, it says, "The 12:56:02 17 range is converted from the positioning error HDOP as 12:56:07 18 the radius," and you keep just saying "HDOP." 12:56:10 19 I mean, you would agree that Nohara -- 12:56:13 20 MR. JUGLE: Objection. Form. 12:56:14 21 MR. HABER: Please allow me to finish my 12:56:16 22 question. 12:56:17 23 BY MR. HABER: 12:56:17 24 Q. You would agree that Nohara says the range 12:56:18 25 is converted from the positioning error HDOP as the 12:56:22 Page 80
1 the map, based on the positioning error HDOP, that's 12:52:57 2 also wrong; right? 12:53:01 3 MR. JUGLE: Objection. Form. 12:53:03 4 THE WITNESS: That's not what I said. 12:53:06 5 What I said was that the circle is based on 12:53:08 6 the calculation of HDOP; and, therefore, as HDOP 12:53:13 7 increases, the circle -- the radius of the circle 12:53:22 8 will increase. The actual position -- that's -- 12:53:26 9 information shown to the -- provided in the display, 12:53:30 10 but it is not an estimate of position error, because, 12:53:35 11 as I said before, if we change the radius of the 12:53:38 12 circle, the distribution of position error does not 12:53:40 13 change nearly as much as the radius of the circle 12:53:43 14 would. 12:53:46 15 BY MR. HABER: 12:53:46 16 Q. So you would agree that HDOP is a 12:54:28 17 characterization of position error but is not itself 12:54:30 18 a position error. 12:54:34 19 Is that your opinion? 12:54:36 20 A. Specifically HDOP is a characterization of 12:54:39 21 the -- helps characterize the distribution of 12:54:43 22 position error. 12:54:46 23 Q. And you would agree that using HDOP as a 12:54:52 24 characterization of the distribution of position 12:54:56 25 error allows for, for example, this error circle of 12:54:58 Page 79	1 radius, and that corresponds to the range of the 12:56:26 2 circle that is displayed in Figure 15-B? 12:56:29 3 MR. JUGLE: Objection. Form. 12:56:34 4 THE WITNESS: I'm just going back to what 12:56:38 5 Nohara says in Paragraph 160. 12:56:40 6 The range or the radius -- let's leave out 12:56:46 7 the word "range" being confusing. Just say a value 12:56:49 8 converted from the position -- as it says, 12:56:51 9 positioning error HDOP, which, again, I disagree 12:56:55 10 with. But that's -- what's -- what's -- positioning 12:56:58 11 error is unknown. HDOP is known. It's something we 12:57:02 12 can directly calculate as Nohara shows. 12:57:04 13 So based -- we can calculate HDOP and, 12:57:10 14 therefore, calculate the radius of the circle to 12:57:14 15 display on the -- on the -- circle of the radius that 12:57:17 16 is shown on the display. 12:57:21 17 BY MR. HABER: 12:57:26 18 Q. Maybe this is a naming convention that 12:57:27 19 we're -- you know, you seem to be having a problem 12:57:29 20 with in Nohara. I mean, you agree that Nohara 12:57:31 21 describes a way to calculate HDOP; right? 12:57:36 22 A. Yes. 12:57:40 23 Q. And HDOP is at least a characterization of 12:57:41 24 positioning error; right? 12:57:45 25 A. Yes. Specifically HDOP is an input to 12:57:51 Page 81

1 the -- is an aid to characterizing position error, 12:57:55 2 because you can connect HDOP to the distribution -- 12:57:59 3 the distribution of positioning error. 12:58:02 4 Q. Right. 12:58:07 5 A. And HDOP is not an actual estimate of the 12:58:07 6 position error. 12:58:10 7 Q. Okay. And then in order to plot the error 12:58:11 8 circle that's on Figure 15-B, assuming that it's a 12:58:16 9 map that has certain units and distance, you need to 12:58:21 10 have some estimate of the radius of that circle so 12:58:25 11 that you can plot it on the map; right? 12:58:30 12 MR. JUGLE: Objection. Form. 12:58:32 13 THE WITNESS: The radius is not -- itself is 12:58:34 14 not an estimate. I'm going back and forth. Let me 12:58:36 15 go back to Paragraph 160. 12:58:42 16 So HDOP is a calculation. So it's something 12:58:52 17 that's known. If H -- if the positioning error were 12:58:56 18 HDOP, then we would use it to adjust the position, 12:59:00 19 and there would be no error remaining, which is not 12:59:04 20 possible, and a POSITA would understand that's not 12:59:08 21 possible. 12:59:10 22 What is in Paragraph 160 is we calculate 12:59:11 23 HDOP, convert it to a radius. So, again, that radius 12:59:15 24 is known. It's not an estimate. It's just a 12:59:19 25 calculated value, and it's used to display a circle 12:59:21 Page 82	1 Yes, I see that paragraph. 13:02:14 2 Q. There's reference there to, "On screen 13:02:16 3 display, such as the circle Cerr equivalent to the 13:02:18 4 magnitude of the positioning error HDOP." 13:02:23 5 Do you see that? 13:02:26 6 A. Yes. 13:02:27 7 Q. Do you disagree that -- with Nohara's 13:02:31 8 statements that Cerr is equivalent to the magnitude 13:02:34 9 of the positioning error HDOP? 13:02:36 10 A. Paragraph 160 is a more accurate 13:02:40 11 description. It explains that Cerr that -- given the 13:02:42 12 known HDOP, calculated HDOP, we convert that which 13:02:47 13 HDOP reflects two dimensions of position, the -- for 13:02:54 14 simplicity -- I mean, you could -- you could plot an 13:03:03 15 ellipse based on HDOP, but for simplicity, a circle 13:03:07 16 with the constant radius, meaning that the radius -- 13:03:13 17 you know, so it's a circle and the suggesting, you 13:03:17 18 know, consistent -- consistent position and potential 13:03:25 19 differences in position in both dimensions instead of 13:03:33 20 varying north versus east. 13:03:37 21 So the known HDOP is used to calculate a 13:03:40 22 known radius that is used to plot the circle 13:03:46 23 Cerr. 13:03:52 24 Q. Very long answer to a question I think is 13:03:55 25 straightforward; so let me just ask it again. 13:03:58 Page 84
1 show -- put a circle on the display for the user. 12:59:25 2 BY MR. HABER: 12:59:25 3 Q. Right. 12:59:30 4 And so that radius is a known value, but 12:59:30 5 that radius is intended to provide some sort of a 12:59:33 6 characterization or what Nohara says, a check on the 12:59:38 7 degree of precision; right? 12:59:43 8 So it's intended to communicate some 12:59:45 9 information to a user about potential errors in the 12:59:47 10 position; right? 12:59:50 11 MR. JUGLE: Objection. Form. 12:59:54 12 THE WITNESS: It -- strictly speaking, it is 13:00:02 13 an attempt to show -- to convert the HDOP, the 2D 13:00:03 14 HDOP calculation to a 1D radius that can be shown to 13:00:12 15 the user as a suggestion of the underlying 13:00:16 16 uncertainty in the position error but not an 13:00:20 17 estimate. 13:00:27 18 Again, if I double the size of the circle, 13:00:27 19 the estimate -- that would not change the estimate 13:00:29 20 very much. 13:00:32 21 BY MR. HABER: 13:00:32 22 Q. Flip to Paragraph 215 of Nohara. 13:01:51 23 A. Of Nohara; correct? 13:02:02 24 Q. Yeah. 13:02:10 25 A. Okay. Hold on. 13:02:10 Page 83	1 Do you agree or disagree with the statement 13:04:00 2 here in Nohara, Paragraph 215, "Cerr is equivalent to 13:04:03 3 the magnitude of the positioning error HDOP"? 13:04:08 4 Do you agree or disagree with that specific 13:04:11 5 statement in Nohara? 13:04:14 6 MR. JUGLE: Objection. Form. 13:04:16 7 THE WITNESS: I agree -- because Cerr is 1D, 13:04:20 8 the Cerr, a circle with a given radius, the radius is 13:04:27 9 converted from HDOP; therefore, C -- Cerr reflects 13:04:32 10 HDOP, and what I disagree with is that HDOP 13:04:42 11 represents positioning -- is the equivalent to 13:04:47 12 positioning error. 13:04:49 13 BY MR. HABER: 13:04:49 14 Q. I understand that you dispute Nohara's 13:04:53 15 statement that HDOP is equivalent to position error, 13:04:56 16 but that's not the question I'm asking you. 13:04:59 17 The question I'm asking you is, as stated 13:05:01 18 here in Paragraph 215, Cerr is equivalent to the 13:05:04 19 magnitude of the positioning error. 13:05:10 20 Do you see that? 13:05:13 21 A. Yes, I see the words. Yes. 13:05:14 22 Q. Do you agree or disagree with what Nohara 13:05:17 23 says here? 13:05:20 24 A. It's not -- 13:05:21 25 MR. JUGLE: Objection. Form. 13:05:21 Page 85

1 THE WITNESS: What I'm saying is that this 13:05:22 2 is a simplification of what is said more accurately 13:05:24 3 in 160, and it's not literally true. The words in 13:05:27 4 215 are not literally true. 13:05:32 5 BY MR. HABER: 13:05:32 6 Q. So you disagree with Nohara's Paragraph 215? 13:05:35 7 MR. JUGLE: Objection. Form. 13:05:40 8 THE WITNESS: I'm saying it's an imprecise 13:05:42 9 restatement of what's described better in 160. 13:05:45 10 BY MR. HABER: 13:05:51 11 Q. That's -- assume for my benefit that 13:05:55 12 Nohara's statement in Paragraph 215 is true, is it 13:05:59 13 your opinion that Nohara is not enabled? It can't 13:06:05 14 actually do what it says in Paragraph 215? 13:06:10 15 MR. JUGLE: Objection. Form. 13:06:13 16 THE WITNESS: What I'm saying is that Nohara 13:06:16 17 can implement the calculation of HDOP and the 13:06:17 18 conversion of HDOP in two dimensions to a radius in 13:06:25 19 one dimension and show C -- and show Ceer, the radius 13:06:29 20 that -- the circle with that radius on the display, 13:06:38 21 as said in 15 -- Cer -- Ceer -- I'll make it a little 13:06:42 22 more clear. 13:06:49 23 Ceer is a rep -- is derived from HDOP. 13:06:49 24 Whether it's equivalent to HDOP, that's a semantic, 13:06:57 25 but I'm saying that 160 is more precise. CE -- the 13:07:01 Page 86	1 are determined from the plurality of combinations 13:09:36 2 respectively." 13:09:39 3 Do you see that? 13:09:40 4 A. Yes. 13:09:41 5 Q. Do you disagree that Nohara determines 13:09:44 6 positioning errors in the approximate positions that 13:09:46 7 it determines? 13:09:51 8 A. Repeat the question, please. 13:10:01 9 Q. Do you disagree that Nohara determines 13:10:02 10 position errors in the approximate positions that its 13:10:05 11 system determines? 13:10:08 12 A. Yes, I disagree for the reasons mentioned 13:10:11 13 before. 13:10:13 14 Q. Is the basis of your disagreement that what 13:10:18 15 Nohara describes as positioning errors does not 13:10:21 16 include distance units? 13:10:25 17 A. Again, repeat the question. I want to make 13:10:39 18 sure I heard it clearly. 13:10:41 19 Q. Is your basis -- strike that. 13:10:42 20 Is the basis of your disagreement that 13:10:45 21 Nohara determines positioning errors in approximate 13:10:48 22 positions the fact that, in your opinion, what Nohara 13:10:51 23 describes as positioning errors do not have units of 13:10:57 24 distance? 13:11:00 25 A. No, that's not correct. HDOP can be -- 13:11:05 Page 88
1 radius that determines Ceer is converted from HDOP. 13:07:05 2 BY MR. HABER: 13:07:05 3 Q. Okay. So then you agree that Ceer is 13:07:12 4 converted from HDOP, and your dispute is that HDOP is 13:07:16 5 not actually a positioning error. 13:07:20 6 Is that fair? 13:07:24 7 A. It -- that and the fact that Ceer equivalent 13:07:26 8 to HDOP is not the same as Ceer converted from HDOP. 13:07:30 9 The reason is that, again, HDOP describes 13:07:35 10 two dimensions, and Ceer is one dimension. 13:07:38 11 When you go from a two-dimensional 13:07:42 12 distribution to a one-dimensional distribution, 13:07:44 13 they're no longer equivalent. 13:07:47 14 Q. Okay. So what's described in Paragraph 13:07:54 15 216 -- I'm sorry. Strike that. 13:07:58 16 What is described in Paragraph 160 is more 13:08:00 17 accurate in that Ceer is converted from HDOP, but, in 13:08:04 18 your view, HDOP is not a positioning error. Fair? 13:08:13 19 A. That's a simplification, but that's fair. 13:08:18 20 Q. If you can go to Paragraph 32 of Nohara. 13:09:12 21 A. One second. Paragraph 32 on Page 3. Yes, 13:09:21 22 I'm there. 13:09:27 23 Q. In the middle of that paragraph, Nohara 13:09:28 24 states, "Approximate positions of the mobile station 13:09:30 25 and positioning errors in the approximate positions 13:09:33 Page 87	1 different versions of HDOP can be computed. The 13:11:10 2 typical one is unitless. You can also compute one 13:11:14 3 that has units, but either -- in either way, HDOP 13:11:17 4 does not determine position error. 13:11:21 5 Q. So despite that Nohara says specifically its 13:11:30 6 determining position errors in the approximate 13:11:33 7 positions and describes how it does that, your 13:11:35 8 opinion is that the description in Nohara is wrong; 13:11:41 9 right? 13:11:47 10 MR. JUGLE: Objection. Form. 13:11:48 11 THE WITNESS: The apparent -- the linkage -- 13:11:52 12 the apparent definition of positioning error as HDOP 13:11:57 13 is incorrect. 13:12:00 14 BY MR. HABER: 13:12:00 15 Q. Okay. That's not the question I'm asking 13:12:02 16 you. 13:12:03 17 The question that I'm asking you here, for 13:12:04 18 example, in Paragraph 32, it doesn't say anything 13:12:06 19 about HDOP; right? 13:12:09 20 A. Not here. 13:12:11 21 Q. It says, "Positioning errors in the 13:12:12 22 approximate positions are determined." Right? 13:12:14 23 MR. JUGLE: Objection. Form. 13:12:18 24 THE WITNESS: Reading from Paragraph 32, 13:12:22 25 that's what's written there. 13:12:25 Page 89

1 BY MR. HABER: 13:12:25 2 Q. Right. 13:12:26 3 And so is it your opinion that where Nohara 13:12:27 4 describes, for example, here in Paragraph 32, 13:12:31 5 "positioning errors in the approximate positions are 13:12:35 6 determined using the systems and algorithms that are 13:12:37 7 disclosed by Nohara," that that statement is wrong? 13:12:41 8 MR. JUGLE: Objection. Form. 13:12:46 9 THE WITNESS: The statement here -- let me 13:12:57 10 just double-check. 13:13:00 11 In the introduction, it's speaking in 13:13:04 12 general terms, but the meaning of the statement is 13:13:08 13 not clear -- Nohara -- it's not clear until Nohara 13:13:13 14 specifically defines -- shows how he's -- how he is 13:13:16 15 determining what he calls position error. 13:13:20 16 And it's that latter part that we've 13:13:23 17 discussed that I disagree with, that what he 13:13:26 18 disclose -- what he discloses is the equivalent of 13:13:28 19 position error. 13:13:32 20 BY MR. HABER: 13:13:32 21 Q. All right. It's your opinion that what he 13:13:33 22 discloses is not the equivalent of position error. 13:13:36 23 Instead, HDOP is merely a characterization of 13:13:38 24 position errors? 13:13:42 25 A. A -- 13:13:43 Page 90	1 Q. Do you see -- you state here the patent 13:16:00 2 owner has argued that this term should be construed 13:16:02 3 in a disjunctive manner. 13:16:05 4 Do you see that? 13:16:06 5 A. Yes. 13:16:07 6 Q. And so in the disjunctive manner, only one 13:16:08 7 of the two options is required; right? 13:16:11 8 A. Yes. 13:16:16 9 Q. Do you agree that this term should be 13:16:18 10 construed in a disjunctive manner? 13:16:19 11 A. I have not formulated an opinion on that. 13:16:24 12 As the -- as it says in Paragraph 19, I understand a 13:16:28 13 disjunctive interpretation is broader, meaning it 13:16:35 14 includes a greater set of conditions. So I've simply 13:16:37 15 applied that -- that interpretation. I don't have an 13:16:41 16 opinion as to which is correct or which is more 13:16:45 17 appropriate. 13:16:48 18 Q. But sitting here today, you don't -- you 13:16:48 19 haven't formed an opinion one way or the other on 13:16:50 20 whether the conjunctive or disjunctive view is more 13:16:52 21 appropriate; right? 13:16:55 22 A. That's correct. 13:16:57 23 Q. And you say you've only provided analysis 13:16:58 24 with respect to the disjunctive interpretation; is 13:17:00 25 that correct? 13:17:05 Page 92
1 MR. JUGLE: Objection. Form. 13:13:44 2 THE WITNESS: It's a characterization of 13:13:45 3 the -- it's really a characterization of an input to 13:13:48 4 the distribution of position error. 13:13:51 5 BY MR. HABER: 13:13:51 6 Q. You had your Exhibit 2001 open before. If 13:14:29 7 you can go to Paragraph 19 of your Exhibit 2001. 13:14:33 8 A. Hold on one second. Yes, I'm there. 13:14:44 9 Q. There is reference to a disjunctive and 13:14:56 10 conjunctive construction. 13:14:58 11 Do you see that? 13:14:59 12 A. Yes, I do. 13:15:00 13 Q. Do you understand what is meant by the terms 13:15:01 14 "disjunctive" and "conjunctive" here? 13:15:05 15 A. Yes. 13:15:09 16 Q. Can you explain your understanding? 13:15:10 17 A. Disjunctive, these -- these words, in my 13:15:21 18 interpretation, they're intended to describe whether 13:15:27 19 two conditions -- whether you're taking the union of 13:15:31 20 two conditions or the intersection of two conditions 13:15:36 21 or two sets mathematically. 13:15:40 22 Q. So in layman terms -- in layman's terms, 13:15:45 23 whether or not you have to satisfy one of two 13:15:48 24 conditions or both conditions; right? 13:15:51 25 A. Yes. 13:15:55 Page 91	1 A. Yes. 13:17:05 2 Q. So you haven't provided any analysis with 13:17:07 3 respect to the conjunctive interpretation; correct? 13:17:09 4 A. Yeah, I haven't provided any analysis 13:17:13 5 specific to the conjunctive construction. Of course, 13:17:15 6 my analysis for the disjunctive one is -- is -- how 13:17:19 7 to put it? Is -- my conclusions with respect to the 13:17:27 8 claims and the prior art are -- my conclusions are 13:17:33 9 with respect to disjunctive, but they would also 13:17:38 10 influence a conjunctive construction, but I did not 13:17:41 11 specifically address that. 13:17:43 12 Q. That's fair. 13:17:45 13 So if you were to apply the conjunctive 13:17:46 14 construction, you would apply the prior art in the 13:17:50 15 same way; correct? 13:17:53 16 A. Yes. 13:17:55 17 Q. You just haven't applied the conjunctive 13:17:57 18 construction to the prior art in forming your 13:17:59 19 opinions; correct? 13:18:02 20 A. Correct. 13:18:03 21 Q. Your Paragraph 21, looking at the last 13:18:46 22 sentence, the page where Paragraph 21 starts, goes 13:18:56 23 over to the next page, this first -- the '206 patent 13:18:59 24 describes the manner of calculating position error 13:19:02 25 that is consistent with position error being 13:19:05 Page 93

1 expressed in units of distance. 13:19:07 2 Do you see that? 13:19:09 3 A. Yes, I do. 13:19:10 4 Q. Is it your opinion that the way the patent 13:19:14 5 describes the calculation of position error requires 13:19:16 6 in all cases position error expressed in units of 13:19:21 7 distance? 13:19:28 8 A. Repeat the question, please. 13:19:38 9 Q. Is it your opinion that the way the patent 13:19:39 10 describes calculation of position error requires in 13:19:41 11 all cases that position error be expressed in units 13:19:43 12 of distance? 13:19:46 13 A. The -- the calculation -- the calculation of 13:19:55 14 position error requires the use of units of distance. 13:20:02 15 So position error is -- position error itself is 13:20:11 16 expressed in units of distance. As explained in the 13:20:16 17 footnote to Paragraph 20 on the previous page, you 13:20:20 18 can also -- you can also derive normalized position 13:20:25 19 error parameters and estimates like we discussed 13:20:28 20 earlier in the deposition. 13:20:33 21 Q. And a normalized position error is unitless. 13:20:38 22 That's what the footnote says; right? 13:20:43 23 A. In this case, yes, you can define a 13:20:46 24 normalized error that's not unitless, but most cases 13:20:48 25 it's unitless. 13:20:51 Page 94	1 on that to convert it to something else that may also 13:22:58 2 be useful. 13:23:01 3 Q. And so your opinion is that it's not 13:23:18 4 sufficient to satisfy these claims to characterize 13:23:20 5 position error in some way. You actually have to 13:23:24 6 calculate a specific value. 13:23:29 7 Is that fair? 13:23:32 8 MR. JUGLE: Objection. Form. 13:23:37 9 THE WITNESS: No, that's not accurate. 13:23:38 10 BY MR. HABER: 13:23:38 11 Q. So a characterization of position error, in 13:23:44 12 your opinion, will satisfy these claims. 13:23:46 13 Is that fair? 13:23:50 14 MR. JUGLE: Objection -- 13:23:51 15 THE WITNESS: No. 13:23:51 16 MR. JUGLE: -- form. 13:23:52 17 THE WITNESS: No. What I've said is what 13:23:53 18 I've said before that a position -- you -- a position 13:23:54 19 error in the claims requires an estimate of the error 13:24:02 20 that goes beyond a characterization. The 13:24:07 21 characterization -- a characterization is 13:24:10 22 sufficient -- is -- really goes as far as producing 13:24:15 23 the information shown, again, in Figure 5 from 13:24:22 24 Specht, which is in -- again, in Paragraph 57, and 13:24:25 25 that is not an estimate of position error. 13:24:29 Page 96
1 Q. Right. 13:20:53 2 And so a position error as described by the 13:20:55 3 '206 patent may be a unitless normalized position 13:20:58 4 error; correct? 13:21:03 5 A. The '206 patent and -- and the knowledge of 13:21:07 6 a POSITA would understand position error literally is 13:21:12 7 expressed in units of distance, just as report -- 13:21:17 8 just as said at the end of that Paragraph 21 of my 13:21:20 9 declaration. 13:21:23 10 He or she would also understand that you can 13:21:24 11 create a normalized -- a different quantity by 13:21:27 12 normalizing the position error as described in the 13:21:31 13 footnote. 13:21:36 14 Q. And so what you're saying here at the top of 13:22:08 15 Page 16 is not that the manner of calculating the 13:22:09 16 position error is consistent with position error 13:22:19 17 being expressed in units of distance. Your opinion 13:22:22 18 is that it actually requires position error being 13:22:24 19 expressed in units of distance; right? 13:22:26 20 A. Yes. Given my definition -- given the 13:22:38 21 definition of position error that I apply, the '206 13:22:41 22 patent applies and a POSITA would apply, position 13:22:45 23 error itself is expressed in units of distance. 13:22:49 24 And then you can perform various 13:22:52 25 calculations -- you know, calculations, conversions 13:22:55 Page 95	1 BY MR. HABER: 13:24:29 2 Q. Right. 13:24:32 3 And so I think this gets back to my first 13:24:32 4 question. Is it your opinion that characterizing 13:24:35 5 position error, without providing, for example, a 13:24:38 6 specific estimate, is insufficient to satisfy the 13:24:41 7 claim language? 13:24:44 8 MR. JUGLE: Objection. Form. 13:24:48 9 THE WITNESS: The character -- the 13:24:55 10 characterization of position error, as we've been 13:24:58 11 discussing it based on HDOP or other inputs, is 13:25:03 12 insufficient to meet the claims that require an 13:25:08 13 estimate of position error. 13:25:11 14 The estimate of position error need not be a 13:25:13 15 single point, but it goes beyond what is shown -- 13:25:16 16 what -- the characterization that we've been 13:25:21 17 discussing. 13:25:22 18 BY MR. HABER: 13:25:22 19 Q. So is it your opinion that the challenge 13:25:23 20 claims require an estimate of position error? 13:25:25 21 A. Just to make sure. When we're talking about 13:25:31 22 the challenge claims, we're talking about -- sorry, 13:25:33 23 let me go back to -- in discussing -- what you mean 13:25:38 24 by "the challenge claims," is the Claims 37 and 13:25:50 25 beyond in the '206 patent; is that correct? 13:25:52 Page 97

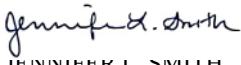
1 Q. Okay. 13:25:58 2 A. Okay. Now please recite your question. 13:25:59 3 Q. Okay. Let me ask it more precisely. 13:26:01 4 Is it your opinion that Claim 37 of the '206 13:26:05 5 patent requires an estimate of position error? 13:26:07 6 A. Going back to it. Repeat it one more time. 13:26:17 7 Now I'm looking at Claim 37. 13:26:45 8 Q. Is it your opinion that Claim 37 of the '206 13:26:47 9 patent requires an estimate of position error? 13:26:49 10 A. Under the disjunctive interpretation, the 13:26:53 11 clause of -- let's see, the clause that begins, "Said 13:26:57 12 when said embedding G -- GPS module" -- I'll just 13:27:03 13 continue reading -- "should be powered on being 13:27:06 14 dependent on at least one of a current radio position 13:27:08 15 and a position error of said mobile device." 13:27:11 16 So under the disjunctive interpretation, you 13:27:16 17 could use some form of current radio position or -- 13:27:21 18 or a position error. So either one. 13:27:29 19 So if you're relying on the position error, 13:27:31 20 it needs to satisfy the definition of position error 13:27:34 21 that I've explained. 13:27:38 22 Q. All right. Well, maybe I can just ask it 13:27:40 23 again so that we're focused on the position error 13:27:44 24 term. 13:27:47 25 So in the case where we are relying on 13:27:47 Page 98	1 you're relying on as support for the requirement that 13:29:53 2 there be an estimate of position error, despite that 13:30:01 3 the claim doesn't use that word? 13:30:04 4 A. One second. 13:30:08 5 Okay. I've reviewed this again. Please 13:31:23 6 repeat the question to make sure I'm answering the 13:31:26 7 right one. 13:31:29 8 Q. Can you point me in this particular claim to 13:31:30 9 what words or phrases that you're relying on as 13:31:34 10 support for the requirement that there be an estimate 13:31:36 11 of position error, despite that the claim doesn't use 13:31:38 12 that word? 13:31:41 13 A. Moving back to it. I'm in the wrong place. 13:32:08 14 Hold on. Okay. 13:32:16 15 So there -- my basis for interpreting a 13:32:25 16 position error of said mobile device is that which, 13:32:30 17 in my view, would be understood by a POSITA to be at 13:32:38 18 least an estimate and more than a characterization. 13:32:44 19 And this is -- this is the same as the other term, a 13:32:46 20 current radio position. 13:32:51 21 If you're -- if your determination of when 13:32:53 22 the module should be powered on is dependent on a 13:32:57 23 current radio position, that has to be an estimate of 13:33:01 24 the position, not a characterization of it in the way 13:33:04 25 a POSITA would understand the term. 13:33:11 Page 100
1 position error under the disjunctive view, is it your 13:27:50 2 opinion that Claim 37 of the '206 patent requires an 13:27:57 3 estimate of position error? 13:28:01 4 A. In short, yes. An estimate that goes beyond 13:28:12 5 the characterizations we've been discussing. 13:28:16 6 Q. Claim 37 doesn't state or recite an estimate 13:28:20 7 of position error, does it? 13:28:28 8 A. It says a -- it says, "And a position error" 13:28:36 9 and goes on to talk about the wireless communications 13:28:42 10 network. 13:28:44 11 What I'm giving you is interpretation of 13:28:45 12 what the claim requires. 13:28:47 13 Q. And so in your interpretation where the 13:28:48 14 claim recites "a position error," that should 13:28:51 15 actually say "an estimated position error." 13:28:54 16 Is that fair? 13:29:05 17 A. It requires a determinate -- an estimate of 13:29:11 18 position error that goes beyond a characterization. 13:29:14 19 Yes, that's my interpretation. 13:29:18 20 Q. Okay. And the word "estimate" that doesn't 13:29:21 21 appear in the claim language or adding that into the 13:29:26 22 claim language; right? 13:29:30 23 A. I'm interpreting the claim language. 13:29:31 24 Q. And so can you point to me in this 13:29:38 25 particular claim language what words or phrases 13:29:48 Page 99	1 So what I'm giving you is my interpretation 13:33:12 2 of how a POSITA would understand the -- the words in 13:33:15 3 37 applied in practice. 13:33:20 4 Q. Understood. 13:33:23 5 So what I'm trying to understand is, you 13:33:24 6 know, the claim doesn't say "estimate" or 13:33:29 7 "characterization." It says "dependent on," and what 13:33:34 8 I'm trying to understand from you is if there is any 13:33:38 9 sort of language in Claim 37 that you are pointing to 13:33:39 10 as support for the idea that these claims should be 13:33:44 11 limited to an estimate of position error. 13:33:51 12 MR. JUGLE: Objection. Form. 13:33:54 13 THE WITNESS: Again, as I explained, the 13:34:03 14 determination of when the GPS module should be 13:34:11 15 powered on is dependent on the -- it clearly says 13:34:16 16 it's dependent on the determination -- it doesn't 13:34:25 17 say "determination," but that's clearly meant. 13:34:27 18 If it refers to current radio position, 13:34:34 19 that's an estimate of the position. If it refers to 13:34:36 20 position error, again, determination -- because we 13:34:39 21 don't know the position error. We can't know the 13:34:41 22 position error, but we have to estimate it. This -- 13:34:44 23 estimate in the same means we would -- in the same 13:34:48 24 level of exactitude that we would estimate the 13:34:51 25 current radio position, which is also uncertain. 13:35:02 Page 101

1 BY MR. HABER: 13:35:02 2 Q. Okay. So, for example, if a system were to 13:35:06 3 determine, based on any number of factors, that 13:35:08 4 position error were especially high -- it didn't 13:35:10 5 quantify it -- is it your opinion that that sort of 13:35:17 6 determination would not satisfy the language of 13:35:22 7 Claim 37? 13:35:26 8 MR. JUGLE: Objection. Form. 13:35:28 9 THE WITNESS: Repeat the question. The 13:35:39 10 issue is the meaning of the term "especially high." 13:35:40 11 BY MR. HABER: 13:35:40 12 Q. Right. 13:35:40 13 Well, let's say there's a hypothetical 13:35:47 14 system out there that analyzes a number of factors 13:35:48 15 and returns a result. Position error high or 13:35:52 16 position error low, it's just -- that's what it 13:35:58 17 returns. It doesn't provide an estimate. It doesn't 13:36:02 18 provide a number. It just says positioning error is 13:36:04 19 high, or positioning error is low. 13:36:06 20 Do you understand the hypothetical? 13:36:09 21 A. Yes, I do. 13:36:12 22 Q. So if that system were operating and in a 13:36:14 23 particular scenario determined that positioning error 13:36:19 24 were high, would that not satisfy the claim language 13:36:21 25 of Claim 37? 13:36:27 Page 102	1 Is that fair? 13:37:58 2 A. To be precise, if -- if we characterize the 13:38:01 3 position error as high, we don't -- is -- we don't 13:38:05 4 know the position error. We just say that really a 13:38:10 5 characterization of position error is high. All that 13:38:15 6 translates to technically is the distribution of 13:38:18 7 position error is more likely to be -- is -- includes 13:38:22 8 more high values than low values. But that's not an 13:38:30 9 estimate. It's not a determination or an estimate of 13:38:37 10 position error, because it -- because it's just a -- 13:38:40 11 it's still uncertain whether the position error is 13:38:41 12 low or high. 13:38:44 13 Q. So is it your opinion that such a system 13:38:46 14 would not be able to determine what the claim says, 13:38:51 15 said embedded GPS module should be powered on, being 13:38:56 16 dependent on such a characterization of position 13:38:59 17 error that we just discussed? 13:39:03 18 MR. JUGLE: Objection. Form. 13:39:06 19 THE WITNESS: I don't quite understand your 13:39:08 20 question. Could you rephrase it? 13:39:09 21 BY MR. HABER: 13:39:09 22 Q. Sure. 13:39:11 23 Let me -- the claim says that you have to 13:39:12 24 turn GPS module on, dependent on. 13:39:14 25 Do you see that? 13:39:19 Page 104
1 MR. JUGLE: Objection. Form. 13:36:29 2 THE WITNESS: A determination -- excuse me, 13:36:32 3 give me one second. 13:36:43 4 BY MR. HABER: 13:36:43 5 Q. No problem. 13:36:45 6 A. I think the words you used were "a 13:36:58 7 determination that the position error is high." Is 13:37:01 8 that right? 13:37:05 9 Q. That was the word I used, but we could use a 13:37:05 10 different word. "Characterize the positioning error 13:37:08 11 is high." Whatever. 13:37:11 12 A. Those are two different things. 13:37:13 13 MR. JUGLE: Objection. Form. 13:37:14 14 BY MR. HABER: 13:37:14 15 Q. Okay. So let me ask you that question: If 13:37:16 16 the system were operating in a particular scenario, 13:37:18 17 characterized the positioning error that it was 13:37:22 18 experiencing as high, would that not satisfy the 13:37:26 19 claim language of Claim 37? 13:37:29 20 A. In the context of how we -- we've explained 13:37:35 21 characterization in the prior art, that would not 13:37:40 22 satisfy the claim language. 13:37:42 23 Q. And in your opinion, that would not satisfy 13:37:48 24 the claim language because characterization is not an 13:37:50 25 estimation. 13:37:56 Page 103	1 A. Yes. 13:39:20 2 Q. One of two things: A current radio position 13:39:22 3 or a position error in the disjunctive view; right? 13:39:25 4 A. Yes. 13:39:30 5 Q. And so is it your opinion that a system 13:39:30 6 designed as we discussed, that characterizes position 13:39:40 7 error as high or low, would be unable to power on a 13:39:42 8 GPS module, dependent on that characterization of 13:39:46 9 position error? 13:39:50 10 MR. JUGLE: Objection. Form. 13:39:51 11 THE WITNESS: The -- I think you misstated 13:39:56 12 what Claim 37 covers. You could -- you could 13:39:57 13 potentially, I think -- let me think of a specific 13:40:09 14 example. 13:40:17 15 That you could certainly determine when to 13:40:21 16 power on the embedded GPS module, based on your 13:40:26 17 characterization of whether the error is low or high. 13:40:31 18 But to satisfy the language of Claim 37, you 13:40:37 19 need to provide an actual estimate of position error, 13:40:41 20 not a characterization, well, maybe it's high, but we 13:40:46 21 don't know, or maybe it's low now. It's got to be an 13:40:49 22 estimate that can be quantified in a way -- that the 13:40:55 23 quantification of that estimate connects to when the 13:41:00 24 module should be powered on or not. 13:41:04 25 /// 13:41:04 Page 105

1 BY MR. HABER: 13:41:04 2 Q. Okay. So in your opinion, the claim 13:41:07 3 requires an estimate of position error; right? 13:41:11 4 A. Yes. In the way I've described it, yes. 13:41:21 5 Q. And a claim also requires that the estimate 13:41:24 6 of position error specifically be expressed in units 13:41:27 7 of distance; correct? 13:41:32 8 A. The -- the position error -- the estimate of 13:42:00 9 position error in Claim 37 has to include -- it has 13:42:07 10 to be effectively in units of distance, although once 13:42:20 11 you have a position error estimate in units of 13:42:29 12 distance, whichever distance is units are reflective 13:42:32 13 of the current -- or match -- correspond to the 13:42:37 14 current radio position, once you have that, you can 13:42:40 15 go further and convert that position error estimate 13:42:43 16 into other variables you use to make the decision of 13:42:45 17 powering on or off. 13:42:50 18 But it starts with a position error estimate 13:42:53 19 in units of distance consistent with units of the 13:42:56 20 current radio position. 13:43:02 21 Q. Is it fair to say that the claim requires an 13:43:25 22 estimate of position error, calculated using the same 13:43:28 23 units as whatever units were used for position. Is 13:43:31 24 that your opinion? 13:43:42 25 A. What I said is the units have to be 13:43:43 Page 106	1 determined in angular units, lat -- 2D latitude and 13:45:46 2 longitude. That -- the estimate of position error 13:45:53 3 can be expressed in those same units. It could be 13:46:01 4 expressed as a -- in units of, you know, linear 13:46:07 5 distance such as meters after converting from the 13:46:13 6 current radio position -- the current lat-long, but 13:46:19 7 the units would be consistent. They're both -- and 13:46:25 8 they're both essentially representing position and 13:46:28 9 position error in units of distance. 13:46:32 10 Q. So I'm asking, I think, a different 13:46:33 11 question. 13:46:35 12 Is it possible to calculate a position, for 13:46:36 13 example, in latitudes and longitudes, and describe a 13:46:40 14 position error in something other than distance 13:46:45 15 units, for example, confidence level or some -- 13:46:50 16 something else that is not based on distance at all? 13:46:54 17 MR. JUGLE: Objection. Form. 13:47:00 18 THE WITNESS: I understand the question 13:47:01 19 better. 13:47:02 20 Confidence, such as a confidence interval, 13:47:03 21 an estimate with a confidence interval, the 13:47:08 22 confidence interval would be expressed in the same 13:47:14 23 units as the estimate, and in some example, distance. 13:47:17 24 As explained in my declaration, you could 13:47:20 25 go -- you could go beyond that and normalize the 13:47:23 Page 108
1 consistent. The units in which the radio position is 13:43:46 2 expressed and the units in which the position error 13:43:51 3 estimate are expressed have to be consistent. 13:43:54 4 The way -- there are several ways to do the 13:43:57 5 calculation in -- but in the end, the position error 13:44:03 6 estimate has to be in the same units as -- or units 13:44:06 7 strictly -- that correspond to the units of the radio 13:44:16 8 position. 13:44:18 9 Q. How about a question similar to the question 13:44:25 10 I was asking previously about the word "estimate." 13:44:26 11 Is there any particular place in Claim 37 13:44:29 12 that uses the word "units"? 13:44:36 13 A. I don't see -- no, the use of the 13:44:44 14 word "units" is not there. 13:44:47 15 Again, I'm just describing how a POSITA 13:44:49 16 would interpret Claim 37. 13:44:52 17 Q. Would you agree that it is possible to 13:45:13 18 describe a position, for example, in latitudes and 13:45:15 19 longitudes and a position error as something that 13:45:20 20 doesn't have those units, like a confidence level or 13:45:26 21 some such? 13:45:28 22 A. That's mixing several elements that we've 13:45:35 23 discussed previously. Let me try to describe with an 13:45:39 24 example. 13:45:43 25 Let's say the current radio position is 13:45:44 Page 107	1 elements of the confidence interval such that they're 13:47:26 2 unitless or in different units. But the starting 13:47:30 3 point, the basis of any such calculation, is an 13:47:33 4 estimate of position error in the units that 13:47:38 5 correspond to the radio -- current radio position. 13:47:41 6 BY MR. HABER: 13:47:41 7 Q. Couldn't you have a system that describes 13:47:47 8 the outputs of position, in latitudes and longitudes, 13:47:52 9 and then also outputs a position error, not based on 13:47:56 10 distance at all? It could be an estimate of position 13:48:03 11 error based on signal-to-noise ratio or some -- 13:48:05 12 something that has nothing to do with distance. 13:48:08 13 Couldn't you -- couldn't you design a system 13:48:10 14 like that? 13:48:11 15 MR. JUGLE: Objection. Form. 13:48:13 16 THE WITNESS: I think what you're asking is 13:48:21 17 could you use a signal-to-noise ratio as a basis 13:48:23 18 for -- as an input to estimating position error 13:48:31 19 characterizing it, either one. 13:48:36 20 The answer is, yes, but the actual position 13:48:38 21 error estimate has to be in units of distance that 13:48:40 22 are consistent with the units of the current radio 13:48:43 23 position. 13:48:46 24 Once you have that, you can convert it into 13:48:48 25 other forms, unitless forms or other units, but you 13:48:50 Page 109

1 need to start with an estimate consistent with the 13:48:54 2 units of the current radio position. 13:48:59 3 BY MR. HABER: 13:48:59 4 Q. So I guess that's the part that I'm not 13:49:01 5 understanding. 13:49:03 6 If you have a system that estimates 13:49:04 7 signal-to-noise ratio in a signal, and you 13:49:07 8 characterize, describe, estimate, determine whatever 13:49:11 9 that signal-to-noise ratio, couldn't you output a 13:49:17 10 value indicative of a position error estimate that's 13:49:22 11 based only on the signal-to-noise ratio, whether 13:49:25 12 it's, you know, the value of that signal-to-noise 13:49:30 13 ratio? 13:49:33 14 MR. JUGLE: Objection. Form. 13:49:33 15 THE WITNESS: I think you're describe -- 13:49:40 16 you're trying to connect an estimate -- either a 13:49:41 17 characterization or an estimate of the 13:49:47 18 signal-to-noise ratio of the act true signal-to-noise 13:49:49 19 ratio. The calculated signal-to-noise ratio has 13:49:54 20 error in it, just like any other parameter. You 13:49:56 21 can -- you can estimate or characterize 13:50:01 22 signal-to-noise ratio, but to -- and that is one 13:50:08 23 input to position -- that's one range domain error 13:50:13 24 source -- not error source. It's one range domain 13:50:17 25 characteristic that is influence -- correlated with 13:50:21 Page 110	1 requirements that you understand for the term 13:52:19 2 "current radio position"? 13:52:21 3 MR. JUGLE: Objection to form. 13:52:23 4 THE WITNESS: I haven't evaluated this 13:52:36 5 specifically in forming my opinions; so I'd need to 13:52:37 6 think about it further. 13:52:40 7 But, in short, yes, there would be specific 13:52:42 8 requirements on how that current radio position is 13:52:46 9 estimated -- is derived and estimated. Again, it is, 13:52:50 10 as well, an estimate. 13:52:54 11 BY MR. HABER: 13:52:54 12 Q. What requirements do you have in mind for 13:52:55 13 how that current radio position is estimated? 13:52:59 14 MR. JUGLE: Objection. Form. 13:53:04 15 THE WITNESS: Yeah, I've not reviewed the 13:53:05 16 specifics of this issue in detail, but I can give you 13:53:09 17 one example. 13:53:12 18 The current -- the estimate of current radio 13:53:13 19 position requires in the context of GPS or the 13:53:20 20 cellular system, an estimate of the ranges between 13:53:24 21 the radio and the GPS satellites or the cellular 13:53:31 22 transmission cites. 13:53:36 23 BY MR. HABER: 13:53:53 24 Q. Estimated through whatever means are 13:53:53 25 available to the system? 13:53:57 Page 112
1 position error. 13:50:24 2 However, when you finally get back to the 13:50:25 3 position error estimate, it has to be -- you have 13:50:29 4 to -- you have to connect the distribution or 13:50:32 5 estimate of signal-to-noise ratio to the estimate of 13:50:36 6 position error. 13:50:40 7 And then the position -- there are formulas 13:50:43 8 that you can use to do that, although they're 13:50:45 9 approximations. 13:50:47 10 The position error -- the final position 13:50:48 11 error estimate to be useful and to satisfy the claims 13:50:52 12 has to be back in the units of -- that correspond to 13:50:57 13 current radio position. 13:51:00 14 BY MR. HABER: 13:51:00 15 Q. Moving away from the position error term. 13:51:35 16 When the claim says GPS module should be powered on, 13:51:37 17 being dependent on at least one of a current radio 13:51:45 18 position, are there specific requirements that you 13:51:48 19 understand for the term "current radio position"? 13:51:53 20 MR. JUGLE: Objection. Form. 13:51:59 21 THE WITNESS: Repeat the question, please. 13:52:09 22 BY MR. HABER: 13:52:09 23 Q. When the claim says, "GPS module should be 13:52:10 24 powered on, being dependent on at least one of a 13:52:13 25 current radio position," are there specific 13:52:15 Page 111	1 A. Estimated through whatever -- through the 13:54:06 2 means available and known to a POSITA with respect to 13:54:08 3 GPS positioning and cellular positioning. 13:54:11 4 Q. Let's go back to a figure in Nohara, which 13:54:29 5 is Exhibit 1006, and it is Figure 31. 13:54:32 6 A. One second. 13:54:47 7 Yes, I see it. 13:54:56 8 Q. Would you agree that Nohara's Figure 1 -- 13:54:57 9 sorry, strike that. 13:55:01 10 Would you agree that Nohara's Figure 31 13:55:01 11 describes a situation where there is an error between 13:55:04 12 the point P and the point Pe that is shown there? 13:55:09 13 A. Repeat the question, please. 13:55:23 14 Q. Would you agree that in Nohara's Figure 31 13:55:24 15 describes a situation where there is an error between 13:55:27 16 the point P shown in the middle of the figure and the 13:55:29 17 point Pe? 13:55:33 18 A. I will consult the description of the 13:55:36 19 figure. 13:55:39 20 I see both points, P and P sub e -- Pe. So 13:55:39 21 one second. 13:55:45 22 I don't see a reference to Figure 31 in the 13:57:01 23 specification of Nohara. Is there a place you can 13:57:05 24 point me to? 13:57:11 25 Q. Just one second. Let's see. I think it is 13:57:12 Page 113

1 mentioned in Paragraph 18. 13:58:25 2 A. Yes. I see Paragraph 18, and I see that it 13:58:46 3 cites Figure 31. 13:58:49 4 Q. Okay. Let me ask the question again. 13:58:51 5 Would you agree in Nohara -- Nohara's Figure 13:59:01 6 31, it describes a situation where there is an error 13:59:04 7 between the point P, shown in the middle of the 13:59:08 8 figure, and the point Pe? 13:59:13 9 A. Ask the question again. I've read 13:59:28 10 Paragraph 18. 13:59:31 11 Q. Would you agree that Nohara's Figure 31 13:59:32 12 describes a situation where there is an error between 13:59:34 13 the actual position P and the estimated position Pe? 13:59:43 14 A. Yes, it does. 13:59:53 15 Q. And would you agree that one of the objects 14:00:20 16 of Nohara is to describe or characterize the errors 14:00:22 17 between an actual position, point P, and an estimated 14:00:34 18 position, point Pe, as shown in Figure 31? 14:00:41 19 MR. JUGLE: Objection. Form. 14:00:44 20 THE WITNESS: Figure 31, which is noted as 14:00:48 21 prior art, simply illustrates the fact that an 14:00:49 22 estimate of position, Pe, may and is, in fact, very 14:00:55 23 likely to be different from the true position. 14:01:02 24 Elsewhere in Nohara is, as we discussed 14:01:04 25 previously, Nohara attempts to use variables like 14:01:07 Page 114	1 MR. HABER: Yeah, Monday would be great. 14:12:45 2 MR. JUGLE: And I don't need anything 14:12:47 3 expedited. So, you know, if you're going to have it 14:12:49 4 done for them, we'll take it then but, otherwise, 14:12:52 5 whatever time works. 14:12:56 6 THE COURT REPORTER: Okay. And did you want 14:12:59 7 a rough as well? 14:13:01 8 MR. JUGLE: I don't need a rough. 14:13:02 9 THE COURT REPORTER: Okay. That's it for 14:13:03 10 me. Thank you. 14:13:06 11 THE VIDEOGRAPHER: All right. This 14:13:07 12 completes today's deposition. We are going off the 14:13:08 13 record. The time is 2:12 PM. 14:13:10 14 15 (Whereupon, the proceedings were concluded 16 at 2:12 PM. The total time on the record was 17 3 hours, 57 minutes.) 18 19 20 21 22 23 24 25 Page 116
1 HDOP to characterize what this physical relationship 14:01:12 2 might be. But as I described before, HDOP is not an 14:01:21 3 estimate, just a characterization of the 14:01:27 4 relationship. 14:01:28 5 MR. HABER: All right. Why don't we take a 14:01:34 6 quick break. 14:01:36 7 THE VIDEOGRAPHER: Going off the record. 14:01:38 8 The time is 2:00 PM. 14:01:39 9 (Recess taken.) 14:01:40 10 THE VIDEOGRAPHER: Back on the record. The 14:12:01 11 time is 2:11 PM. 14:12:09 12 MR. HABER: All right. I don't have any 14:12:12 13 questions at this time. 14:12:13 14 MR. JUGLE: All right. I do not have any 14:12:16 15 questions either. 14:12:19 16 MR. HABER: This deposition is concluded, 14:12:21 17 and thank you for your time, Mr. Pullen. 14:12:23 18 THE VIDEOGRAPHER: Jennifer? 14:12:30 19 THE COURT REPORTER: Counsel, if I could 14:12:30 20 just get transcript orders for the record. 14:12:31 21 MR. HABER: I want to rough today, if I can, 14:12:34 22 and I think we have might a standing order, but if I 14:12:36 23 can get it -- 14:12:40 24 THE COURT REPORTER: I think I have it for 14:12:42 25 Monday is when you needed yours. 14:12:43 Page 115	1 I, SAMUEL PHILLIP PULLEN, PH.D., the 2 deponent in the above deposition, do hereby 3 acknowledge that I have read the foregoing transcript 4 of my testimony, and state under oath that it, 5 together with any attached Amendment to Deposition 6 pages, constitutes my sworn testimony. 7 8 _____ I have made changes to my deposition 9 _____ I have NOT made any changes to my deposition 10 11 12 _____ 13 SAMUEL PHILLIP PULLEN, PH.D. 14 15 Subscribed and sworn to before me this _____ 16 day of _____, 20____. 17 18 My Commission expires: _____ 19 20 _____ 21 Notary Public 22 23 _____ 24 Address 25 Page 117

1 REPORTER'S CERTIFICATE 2 3 I, JENNIFER L. SMITH, California CSR No. 4 10358, Washington CCR No. 3101, RMR, CRR, CRC, do 5 hereby certify that previous to the commencement of 6 the examination, the witness was duly sworn by me to 7 testify the truth in relation to matters in 8 controversy between the said parties; that the said 9 deposition was taken in stenotype by me at the time 10 and place aforesaid and was thereafter reduced to 11 typewritten form by me; and that the foregoing is a 12 true and correct transcript of my stenotype notes 13 thereof. 14 That I am not an attorney nor counsel nor in 15 any way connected with any attorney or counsel for 16 any of the parties to said action nor otherwise 17 interested in the outcome of this action. 18 19  20 JENNIFER L. SMITH 21 CA CSR NO. 10358 22 WA CCR NO. 3101 23 RMR, CRR, CRC 24 25 Page 118	

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[34 - agree]

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[agree - audio]

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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