

Page 1 1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 MEDIATEK, INC., 4 Petitioners, 5 v. IPR2024-00796 6 PARKERVISION, INC., U.S. Patent No. 7,483,686 7 Patent Owner. 8 9 10 Videotaped Deposition of DR. DAVID RICKETTS 11 Via Videoconference 12 Thursday, May 29, 2025 13 14 15 16 17 18 19 20 Reported Stenographically by 21 Michael P. Hensley, RDR, CSR No. 14114 22 23 24 25	Page 3 1 APPEARANCES: 2 For the Petitioners: 3 PERKINS COIE LLP 4 BY: EVAN S. DAY, ESQ. 5 11452 El Camino Real 6 Suite 300 San Diego, California 92130 7 858.720.5700 8 eday@perkinscoie.com 9 10 For the Patent Owner: 11 DAIGNAULT IYER LLP 12 BY: SCOTT SAMAY, ESQ. 13 8229 Boone Boulevard 14 Suite 450 Vienna, Virginia 22182 15 908.723.0981 16 ssamay@daignaultiyer.com 17 18 Also Present: 19 STUART MEURER 20 MCKENZIE CHEN 21 SAID HOFIANI, Videographer 22 23 24 25
Page 2 1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 MEDIATEK, INC., 4 Petitioners, 5 v. IPR2024-00796 6 PARKERVISION, INC., U.S. Patent No. 7,483,686 7 Patent Owner. 8 9 Videotaped Deposition of DR. DAVID RICKETTS, 10 commencing at the hour of 6:43 A.M. and concluding 11 at the hour of 11:42 A.M. on Thursday, May 29, 2025, 12 via videoconference, remotely appearing before 13 Michael Hensley, Registered Diplomat Reporter, 14 Certified Shorthand Reporter No. 14114, in and for 15 the State of California. 16 17 18 19 20 21 22 23 24 25	Page 4 1 INDEX 2 3 EXAMINATIONS 4 WITNESS: DR. DAVID RICKETTS Page 5 BY ATTORNEY DAY 6 6 7 EXHIBITS 8 No. Description Page 9 1050 MDL-3-15-cv-01477-151 Markman order 58 10 11 PREVIOUSLY MARKED EXHIBITS 12 No. Description Page 13 1005 Appendix ESTABROOK01 - Proquest 107 14 1006 Avitabile - S-Band Digital 89 15 Downconverter 16 17 18 19 20 21 22 23 24 25

1 Via Videoconference Page 5 2 Thursday, May 29, 2025 3 6:43 A.M. - 11:42 A.M. 4 -000- 5 THE VIDEOGRAPHER: Good morning. We are 6 on the record at 6:43 PST. 7 Today's date is May 29th, 2025. This is 8 the recorded remote deposition of Dr. David Ricketts 9 in the matter of Mediatek, Inc., versus 10 ParkerVision, Inc., Case Number IPR2024-00796. 11 This deposition is being held via web 12 conference. My name is Said Hofiani. I am the 13 videographer with Focus Litigation Solutions. The 14 court reporter is Mike Hensley. 15 Counsel, please introduce yourselves and 16 state whom you represent, after which the court 17 reporter will state his or her CSR license number 18 and swear in the witness. 19 ATTORNEY DAY: My name is Evan Day from 20 Perkins Coie on behalf of Textron Mediatek, and I'm 21 joined by our Perkins Coie summer associates, Stuart 22 Meurer and McKenzie Chen. 23 ATTORNEY SAMAY: Scott Samay with 24 Daignault Iyer on behalf of ParkerVision and the 25 witness.	Page 7 1 you to wait until I've finished answering my -- 2 excuse me -- until I've finished asking my question 3 to begin answering. And I'll do the best I can to 4 wait until you've finished answering before I pose 5 the next question. 6 Do you understand that? 7 A. I understand. 8 Q. We may take breaks periodically throughout 9 this deposition. I understand you may have to break 10 for a call at some point. What I do ask, however, 11 is that during a break that you not discuss the 12 substance of your testimony with counsel. 13 Do you understand that? 14 A. I understand. 15 Q. Is there anyone in the room where you're 16 located? 17 A. No, there's not. 18 Q. Do you have any form of communication 19 accessible to you right now other than the Zoom 20 meeting that's being used for the deposition? 21 A. Not that's up on my machine. My computer, 22 of course, has email, but it's not up. I'm not 23 viewing it or using it. 24 Q. Do you have any materials with you? 25 A. Yes. I have the downloaded files that you
Page 6 1 THE COURT REPORTER: Good morning. My 2 name is Mike Hensley. I'm a California Certified 3 Shorthand Reporter, CSR #14114. Today's proceedings 4 are being captured by stenographic means. 5 DR. DAVID RICKETTS, 6 having been first duly sworn, was examined and 7 testified as follows: 8 EXAMINATION 9 BY ATTORNEY DAY: 10 Q. Morning, Dr. Ricketts. 11 A. Good morning. 12 Q. Before we get into the substance of 13 today's deposition, I want to go over some basic 14 procedural matter. 15 I assume you've been deposed on a few 16 occasions; is that right? 17 A. That's correct. 18 Q. And are you generally familiar with the 19 procedures for taking a deposition? 20 A. I am. 21 Q. There are just a few that you may have 22 heard before that I do want to reiterate for this 23 deposition because they are common issues. 24 The first is that I want to make sure that 25 we don't talk over each other; so I'm going to ask	Page 8 1 sent. I also have copies I downloaded from the PTAB 2 of the IPR. I have those files also. And then I 3 have printed just a listing of the claims and the 4 constructions used in my declaration in a paper 5 format. 6 Q. Are all of those materials you referred 7 to, are all those -- are those clean copies? 8 A. They are all unmarked. 9 Q. And by "clean," I mean they're as filed, 10 no annotations? 11 A. Oh, correct, sorry. No annotations, not 12 marked, as filed, and downloaded from the PTAB. 13 Q. I'm just going to -- 14 ATTORNEY DAY: A really brief technical 15 note. Can we go off the record in place for a 16 moment. 17 For the court reporter and the 18 videographer, is it possible to adjust the volume on 19 your side at all? 20 THE WITNESS: Counsel, are you having 21 difficulty hearing me? 22 ATTORNEY DAY: Yes. Although it's not 23 just you, and it's not -- I don't normally have 24 problems with the speaker. 25 THE COURT REPORTER: This is the court

1 reporter. Will videographer take us off the record, 2 please. 3 (Discussion off the record.) 4 THE VIDEOGRAPHER: Ready. 5 THE COURT REPORTER: Yes, go ahead. 6 ATTORNEY DAY: All right. Sorry about the 7 delay. 8 BY ATTORNEY DAY: 9 Q. Okay. So going back to the electronic 10 exhibits. Doctor, since we may refer to some 11 electronic copies of exhibits, I may also ask you 12 to -- to refer to those or search through those. 13 Since we are being recorded by the court 14 reporter, what I will ask you to do, though, is if 15 you're searching for anything in electronic copy of 16 an exhibit, that you verbalize what you're searching 17 for. For example, what search terms you're using. 18 Do you understand that? 19 A. I do understand that. 20 Q. Dr. Ricketts, when were you retained on 21 this matter? 22 A. I was retained by Daignault Iyer. -- I 23 believe it was in 2023 -- for several matters, and 24 there wasn't a specific retainer for this IPR. So, 25 yeah. I think that answers it.	Page 9 1 don't have an approximate number for you. You know, 2 I would say typically somewhere between 50 and 100. 3 Q. In a typical case, you said? 4 A. Yeah, in a typical case, but I don't have 5 the actual number for this. 6 Q. Did you write your declaration? 7 A. The declaration is mine, I'm the author, 8 and it represents my opinions. 9 Q. Okay. And that's the standard answer. 10 Are -- were any portions of your 11 declaration drafted by counsel? 12 ATTORNEY SAMAY: Objection. Form. 13 THE WITNESS: I don't believe I can 14 discuss the work product with counsel. Mr. Samay 15 can advise on that matter. 16 BY ATTORNEY DAY: 17 Q. What materials did you review to prepare 18 your declaration? 19 A. So I reviewed the materials considered. 20 It's listed in paragraph 17 of my declaration. And 21 I also had a call with counsel. 22 Q. How many calls? 23 A. For preparation for this deposition, one 24 call specifically on that topic. 25 Q. All right. I'm going to ask you. With
Page 10 1 Q. When you say you were retained for 2 "several matters," which matters would those be? 3 A. I believe there's several district court 4 cases that ParkerVision has that I've been asked to 5 opine on. 6 Q. Have you been retained by Daignault Iyer 7 for any other matters, other than ParkerVision? 8 A. No, sir. 9 Q. Have you ever been retained by or worked 10 as a consultant for ParkerVision prior to 2023? 11 A. No. 12 Q. Were you aware of ParkerVision prior to 13 2023? 14 A. I can't say that I recall knowing the 15 name. 16 Q. When did you begin preparing the 17 declaration you submitted in this IPR? 18 A. Typically, I review my materials and 19 analyze things about a month or two out before the 20 final deadline. I'd have to check notes. I don't 21 know the exact date. 22 Q. How much time did you spend on your 23 declaration in this IPR prior to signing it? 24 A. I don't track the hours in that way. It's 25 not a metric I track; so I don't have an exact -- I	Page 12 1 regard to preparation for filing your declaration, 2 how many calls with counsel did you have prior to 3 filing your declaration? 4 A. So I wouldn't know how many calls relate 5 to this matter. I -- I could only say that there 6 would be a number of calls. More than perhaps 7 three, but I couldn't count because I speak to 8 counsel about other matters other than this one. 9 Q. When you say "perhaps three," are you 10 referring to this matter specifically or across all 11 ParkerVision matters? 12 A. With respect to this matter, I imagine it 13 was discussed on at least three calls. 14 Q. Now, I notice there are a couple different 15 versions of your declaration that ParkerVision 16 served: A first corrected and a second corrected 17 version of your declaration. 18 Do you have any understanding as to what 19 the reason was for the service of the corrected 20 version? 21 A. I believe the first correct was filed on 22 the 12th, and I believe that's related to stamping 23 or branding that's required for the PTAB. And then 24 my understanding is my CV was not attached 25 originally to it, and so it -- the second revision

1 attached my CV to it. 2 Q. When those corrected versions were filed, 3 did you reattach your signature? 4 A. As these were just taking my existing 5 declaration, adding branding and CV, I did not 6 reattach my signature to those. 7 Q. Okay. And we talked a moment ago about 8 the materials you reviewed in preparation for your 9 declaration which are listed in, as you said, 10 paragraph 17 of your declaration. 11 Did you review anything in preparation for 12 signing your declaration that's not listed in those 13 materials considered? 14 A. I do not recall any other. Certainly if 15 there was a citation in my declaration that would 16 have been something I would have reviewed. But the 17 materials considered and anything that's cited, 18 there may be something in there. If I see it, I'll 19 be sure to mention it. 20 Q. Do you believe that you reviewed anything 21 to prepare for your declaration that would not be 22 listed either in the materials considered or in a 23 citation elsewhere on your declaration? 24 A. Not specifically for the declaration. I, 25 of course, generally will review technical materials	Page 13 1 IPR? 2 A. In the "claim construction" section of my 3 report, I believe I cite a number of other 4 ParkerVision cases where there's been some prior 5 claim construction. But other than that, I don't 6 recall anything specific for this declaration. 7 Q. Okay. You mentioned citing claim 8 construction materials for other ParkerVision cases; 9 so that actually brings me to my next question. 10 Did you review any of the claim 11 construction filings in the ParkerVision district 12 court case against Mediatek prior to signing your 13 declaration? 14 A. I have, at some point, reviewed the claim 15 constructions just as a matter of course of just 16 reviewing materials for that other matter. I don't 17 believe any are cited here. 18 So my declaration has the constructions 19 that I've used in my opinions for this. And as I 20 said, I don't think I've cited anything that is from 21 the district court case. 22 Q. Did you review the -- I'll start again. 23 Are you aware that there was a claim 24 construction report and recommendation issued by a 25 special master prior to your declaration?
Page 14 1 all the time on this subject matter. 2 Q. Now, you mentioned the related litigation. 3 Does that include the related litigation by 4 ParkerVision against Mediatek? 5 A. Yes, it does. 6 Q. And you understand there are at least 7 three cases filed by ParkerVision against Mediatek; 8 correct? 9 A. I do recall there was multiple cases. I'm 10 not sure the status of where they all -- whether 11 they've been combined or not. But I do recall there 12 being multiple cases. 13 Q. And one of those was -- one of those is -- 14 (Clarification inquiry by The Court 15 Reporter.) 16 BY ATTORNEY DAY: 17 Q. One of those litigations filed by 18 ParkerVision is against Mediatek asserts the same 19 '686 patent that's at issue in this IPR; is that 20 right? 21 A. I believe that's correct. 22 Q. Did you review any filings from that 23 particular case, the case filed by ParkerVision 24 against Mediatek asserting the '686 patent, in 25 preparation for signing your declaration in this	Page 16 1 A. I wouldn't be surprised if there was. I 2 can't recall reviewing that specifically. 3 Q. So as you sit there today, you cannot say, 4 one way or another, whether you reviewed the special 5 master's report in the litigation -- excuse me. 6 I'll start again. 7 As you sit there today, you can't say, one 8 way or another, whether you reviewed the special 9 masters report and recommendation regarding claim 10 construction specifically in the litigation between 11 ParkerVision and Mediatek regarding the '686 patent? 12 A. I do not recall specifically sitting here 13 reviewing it. I may have, but I don't recall it 14 specifically. 15 Q. Would that have been important for your 16 review for your declaration? 17 ATTORNEY SAMAY: Objection. Form. 18 THE WITNESS: My declaration was prepared 19 for the IPR in response to the questions brought up 20 in the petition. And I think throughout my claim 21 construction I cite to what I know to be established 22 constructions. So I think I've cited the relevant 23 other case and construction. So I think that was 24 what was needed for my declaration and what I did. 25 ///

1 BY ATTORNEY DAY: 2 Q. So when you say that you can't be certain 3 whether you reviewed any other claim construction 4 materials related -- I'll start again. 5 So I think I've said several times "the 6 litigation filed by ParkerVision against Mediatek 7 asserting the '686 patent." Just so I don't have to 8 keep saying that mouthful, are you -- can we just 9 refer to that as the "district court case" and 10 assume that that's the matter that I'm referring to? 11 And if we need to refer to any other cases, I'll 12 refer to those specifically. 13 Are you comfortable with that? 14 A. Yeah. Just to confirm. When you say 15 "district court case," it's the one that's relating 16 to the '686 patent and Mediatek and ParkerVision. 17 Q. Did you review the joint claim 18 construction chart submitted by the parties in the 19 district court case prior to serving your 20 declaration? 21 A. Once again, it's probably a material in 22 reviewing for the district court case that I have 23 read, but I don't recall it specifically sitting 24 here. 25 Q. So as you sit there right now, you can't	Page 17	1 that ParkerVision took in the district court case? 2 ATTORNEY SAMAY: Objection. Form. 3 THE WITNESS: Once again, the -- I have 4 the constructions in my reports. I referenced prior 5 cases. I don't reference the district court case. 6 I -- I don't recall doing a side-by-side comparison. 7 I put forth the constructions as I understand them 8 in my declaration for the IPR matter. 9 BY ATTORNEY DAY: 10 Q. So you don't know one way or another 11 whether you're advancing any constructions in your 12 declaration that are different from what 13 ParkerVision proposed in the district court case? 14 A. I'd have to check. 15 Q. Okay. I think -- I think that answers my 16 question. 17 You also cite -- you mentioned that you 18 cited some other claim construction materials from 19 other -- from other cases. 20 I did want to ask about -- about those 21 because there are a few different times in your 22 declaration. 23 So I think that the "claim construction" 24 section of your declaration generally starts on 25 about page 48; right?	Page 19
1 say whether you reviewed the joint claim 2 construction chart prior to signing your 3 declaration? 4 A. Just to be specific, the declaration here 5 in the IPR -- I'm sure I saw the joint claim 6 construction chart for that. I'm just -- I don't 7 recall what was in the chart, sitting here. 8 Q. Did you do anything prior to signing your 9 declaration to check whether the constructions that 10 you were proposing in your declaration were 11 consistent with ParkerVision's proposals in the 12 district court case? 13 A. In my declaration, as I think I mentioned 14 before, I checked other constructions that have been 15 put forth by the courts, and I don't cite anything 16 from the district court case. 17 Q. So my construction was specifically 18 about -- I'll start again. 19 My question was specifically about 20 ParkerVision's proposals. 21 As you're appearing on this IPR on behalf 22 of ParkerVision, did you do anything to check 23 whether the proposed claim constructions you're 24 advancing on behalf of ParkerVision as 25 ParkerVision's expert were consistent with positions	Page 18	1 A. Page 48, yes. 2 Q. And on page 50 of your declaration, you -- 3 actually cite a couple of opinions. 4 So on paragraph -- I'll start again. 5 Can you go to page 50 of your declaration, 6 please, and let me know when you're there. 7 A. I'm there. 8 Q. So in paragraph 167, you cite a PTAB 9 opinion in IPR2020-01265. 10 Do you see that? 11 A. I do see that. 12 Q. Did you read the opinion that is cited in 13 that paragraph in preparation for signing your 14 declaration? 15 A. I don't believe I read the entire opinion. 16 I looked at it to verify that -- the construction 17 that was put forth, and I copy and list it in 18 paragraph 167. 19 Q. So when you say that you "looked at it to 20 verify," did you read the discussion that led to the 21 PTAB's conclusion on that term? 22 A. I don't recall reading the discussion. 23 Q. So "looked at it to verify," you basically 24 would've just turned to the page that had the 25 construction adopted by the PTAB, looked at that,	Page 20

1 and then that was it? Is that right? 2 ATTORNEY SAMAY: Objection. Objection. 3 Form. 4 THE WITNESS: Well, I would've opened up 5 the document and checked that -- about what the 6 construction was just to verify that I had it 7 correct. 8 BY ATTORNEY DAY: 9 Q. But you can't say whether you -- I'll 10 start again. 11 Do you recall whether you read any part of 12 that opinion that discussed what the competing 13 proposals for the claim construction were? 14 A. I don't recall reading the discussion. My 15 understanding is the PTAB provided a construction, 16 and so I wanted to document that I am consistent 17 with that construction. 18 Q. Were you concerned at all about what the 19 dispute was that led to that construction? 20 ATTORNEY SAMAY: Objection. Form. 21 THE WITNESS: My understanding is that 22 it's the court's role to construe a term. And so 23 when the PTAB construed it, my understanding is that 24 is -- that is how I should take the construction as 25 they have done it.	Page 21 1 Q. And you can't say whether you ever 2 reviewed anything else just that led to the PTAB to 3 that construction; is that right? 4 ATTORNEY SAMAY: Objection. Form. 5 THE WITNESS: I don't recall reviewing the 6 discussion in that -- in that claim construction 7 order. 8 BY ATTORNEY DAY: 9 Q. Okay. Turning back to page 50 of your 10 declaration, in the following paragraph -- and we 11 were just talking about paragraph 167. 12 In paragraph 168, you also refer to a 13 federal circuit opinion. 14 Do you see that? 15 A. I do see that. 16 Q. Did you read that federal circuit opinion? 17 A. That opinion -- I may have looked at it, 18 but I believe counsel provided that reference for 19 me, and I just checked that it was consistent. 20 Q. When you say "checked that it was 21 consistent," can you elaborate what you mean about 22 that. 23 A. I would've looked in the document to see 24 the construction. 25 Q. Okay. Did you read the discussion in that
Page 22 1 BY ATTORNEY DAY: 2 Q. So any constructions that -- I'll start 3 again. 4 So any constructions that were proposed by 5 ParkerVision in that -- that -- that PTAB case 6 played no role in your analysis in your declaration; 7 is that right? 8 A. I don't think that's a fair statement. So 9 my understanding is that it's the court's role to 10 provide a construction. This IPR is in front of the 11 PTAB. The PTAB has provided a construction; so I 12 just used that construction. 13 Q. So as you see sit there today, you don't 14 know if there's anything -- any elements of the 15 ParkerVision's proposal in that case that was 16 rejected that you're using again in your 17 construction now? 18 A. No. Once again, my understanding is this 19 is what the PTAB construed. The term "storage 20 element as," I think it's the one we referring to 21 right here. 22 And so, you know, as an expert opining on 23 a technical matter, I take the construction -- the 24 PTAB's already done a construction; so I've adopted 25 that construction here for my declaration.	Page 24 1 document regarding how the federal circuit came to 2 that construction? 3 A. I don't recall specifically reading the 4 discussion in that. 5 Q. So as you sit there today, you're not 6 aware of what the dispute between parties was that 7 led the federal circuit to its construction in that 8 case that's cited in paragraph 168 -- 9 A. -- right here, no, I do not. 10 (Procedural admonition from The Court 11 Reporter.) 12 BY ATTORNEY DAY: 13 Q. Okay. Yeah. I'm happy to reask it. 14 So as you sit there today, you're not -- 15 I'll start again. 16 So with respect to the federal circuit 17 opinion cited in paragraph 168 of your declaration, 18 as you sit there today, you're not aware of what the 19 dispute between the parties was that led the federal 20 circuit to adopt the construction that it did; is 21 that right? 22 ATTORNEY SAMAY: Objection. Form. 23 THE WITNESS: I -- 24 Sitting here, I don't recall what the 25 issues were in the discussion that led to the final

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1 claim construction. 2 BY ATTORNEY DAY: 3 Q. Do you know whether you ever read that 4 discussion prior to signing your declaration? 5 A. Once again, I don't recall reading that 6 discussion. 7 Q. Okay. And I believe there's one other 8 place where you cite a federal circuit opinion in 9 your declaration, and I believe that's on pages 74 10 and 75 of your declaration in paragraph 244. 11 Let me know when you're there. 12 A. I am at paragraph 244. 13 Q. All right. And that paragraph cites 14 another ParkerVision federal circuit case. 15 Do you see that? 16 A. Yes, it does. ParkerVision 17 116 F.4th 1435, Federal Circuit 2024. 18 Q. And I'm going to ask the same question 19 with that one: Did you read that federal circuit 20 case? 21 A. I read that opinion, yes. 22 Q. You read the entire opinion? 23 A. I believe so. The -- I recall reading the 24 federal circuit discussing the differences between 25 voltage sampling and energy sampling. You know, I	1 to page 18 of your declaration and look at 2 paragraph -- paragraphs 68 and 69. 3 Let me know when you're there. 4 A. I'm at page 18 -- paragraph 68. 5 Q. All right. And in paragraph 68, you give 6 a formula for the energy of a capacitor as e_{sub}^2 7 C_{Cap}, which I understand is energy of the capacitor, 8 equals $C \text{ times } V^2 \text{ over } 2$. 9 Do you see that? 10 A. I do see that. 11 Q. And C is capacitance; right? 12 A. That's correct. 13 Q. And capacitance is generally a fixed value 14 for a capacitor; correct? 15 A. I would state that for a fixed capacitor, 16 it's a fixed value. There's many variable 17 capacitors that have variable values. But for a 18 fixed capacitor, it's intended to be roughly the 19 same value. 20 Q. Did any of the circuits that -- discussed 21 in the prior art in the petition use variable 22 capacitors? 23 ATTORNEY SAMAY: Objection. Form. 24 THE WITNESS: Well, I mean, Estabrook 25 discusses barrier junction capacitances, which are
Page 26	Page 28
1 don't recall all of the documents, but I do recall 2 reading that document. 3 Q. Are you aware that that particular federal 4 circuit opinion cited an earlier federal circuit 5 case from -- from 2015 between ParkerVision and 6 Qualcomm? 7 A. I do believe, yes, it was related to that 8 ParkerVision and Qualcomm case. 9 Q. Did you review the 2015 federal circuit 10 opinion in the ParkerVision versus Qualcomm case? 11 A. I may have. I don't recall specifically. 12 Q. Dr. Ricketts, what priority date did you 13 use in your analysis of the '686 patent? 14 A. In my declaration, I don't offer any 15 specific opinion on the priority date. The '686 16 cites to a provisional filed on April 10th, 2000, 17 and another one on August 4th, 1999. And so, on the 18 face of the document, I used 1999. 19 Q. Okay. So is it your opinion that all of 20 the claim elements are disclosed as of 1999? 21 A. I've not offered that opinion in my 22 declaration. I haven't offered any opinion on 23 priority date. I just used what's on the face of 24 the patent. 25 Q. All right. I'm going to ask you to turn	1 nonlinear with respect to diodes and diode models. 2 Outside of that, I don't recall any nonlinear 3 capacitors. 4 BY ATTORNEY DAY: 5 Q. And would you agree that there are 6 different commonly used symbols for variable 7 capacitors in electrical engineering diagrams? 8 A. Typically, a variable capacitor has a 9 notation on the symbol so that a POSITA would know 10 it its variable unless it's somehow referenced 11 elsewhere on the schematic. 12 Q. In typical electrical engineering notation 13 that that variable -- one of the most common 14 notations is some sort of diagonal arrow through the 15 capacitor symbol; is that right? 16 A. A common symbol to represent a variable 17 component is to place an arrow at a diagonal across 18 it. 19 Q. All right. So going back to a -- the 20 formula in your declaration, is it fair to say that 21 for a fixed capacitor the energy stored in the 22 capacitor is proportional to the square of the 23 voltage? 24 A. For a fixed capacitor, the energy stored 25 would be proportional to the square of the voltage.

Page 29 1 Q. So, therefore, for a fixed capacitor, a 2 higher voltage would indicate an increased energy 3 stored in the capacitor; is that right? 4 A. The energy stored in the capacitor with a 5 higher voltage than another capacitor at a lower 6 voltage would have more energy, yes. 7 Q. And within the same capacitor, when that 8 capacitor is at a higher voltage, it's storing more 9 energy; correct? 10 A. When a capacitor is at one voltage, it has 11 a specific energy; and then if it's at a higher 12 voltage, it will have a different energy which is 13 higher. 14 Q. And to go from a lower voltage to a higher 15 voltage within the same capacitor, energy would 16 needed to be added to that capacitor; correct? 17 ATTORNEY SAMAY: Objection. Form. 18 THE WITNESS: For a -- assuming a fixed 19 capacitor, to increase the voltage, you would have 20 to add charge, and that charge would be adding 21 energy to the capacitor as seen by the change in the 22 voltage. 23 BY ATTORNEY DAY: 24 Q. And if you measured a higher voltage -- 25 I'll start again.	Page 31 1 (Clarification inquiry by The Court 2 Reporter.) 3 THE WITNESS: The -- claim 11, I believe, 4 refers to a first EM signal and a second EM signal. 5 And the second EM signal could be a -- could be 6 described generically as a baseband signal. 7 BY ATTORNEY DAY: 8 Q. Does the second -- does the second EM 9 signal -- 10 (Clarification inquiry by The Court 11 Reporter.) 12 BY ATTORNEY DAY: 13 Q. In claim 11 of the '686 patent, does the 14 second EM signal need to be a baseband signal? 15 ATTORNEY SAMAY: Objection. Form. 16 THE WITNESS: It doesn't -- well, I guess 17 we'd have to go into the specific definition of 18 "baseband." The claim states: 19 [As Read] The second EM signal is 20 generated from the said stored energy. 21 The second EM signal having a frequency 22 different from the said first EM signal. 23 So the claim requires that they be 24 different. Now, a baseband signal would be an 25 example of the different signal.
Page 30 1 If you measured a lower voltage at one 2 time in a capacitor and a higher voltage in the same 3 capacitor at another time, that would indicate that 4 the -- that more energy was stored in the capacitor 5 at the second measurement; correct? 6 A. Okay. So this is a hypothetical. The 7 capacitor at two different times. I think we 8 discussed previously that if we've got a fixed 9 capacitor, the same capacitor, if it has a higher 10 voltage on it, it has a higher energy because it's 11 proportional to V squared; so I think that's the 12 same answer as before. 13 Q. All right. I'm going to ask you to turn 14 to page 32 of your declaration. And paragraph 113. 15 And I'm going to ask you to look at the 16 last two sentences of that paragraph. 17 In the second-to-last sentence, you write: 18 [As Read] Energy does not become part 19 of the baseband signal. Instead, energy 20 is effectively thrown away and wasted. 21 Do you see that? 22 A. I do see that sentence. 23 Q. Do the claims of the '686 patent refer to 24 a baseband signal? 25 ///	Page 32 1 (Procedural admonition from The Court 2 Reporter.) 3 THE WITNESS: I'll repeat the answer which 4 should be approximately the same as before. 5 The claim reads: 6 [As Read] Wherein the second EM 7 signal is generated from said storage 8 energy, said second EM signal having a 9 frequency different from said first EM 10 signal, the claim requires them to be 11 different. An example of a different 12 frequency would be a baseband signal. 13 BY ATTORNEY DAY: 14 Q. Thank you. 15 And just one other administrative 16 technical note. I think one thing that I've seen 17 helpful in depositions before for the court reporter 18 where there are technical terms being thrown around 19 is -- I can add it to the chat window. I don't 20 think that actually becomes part of the record, but 21 it will still help out to clarify -- make sure that 22 what's being said is spelled correctly. 23 So in this case, we're talking about 24 baseband signals. 25 All right. So going back to what you

1 wrote in your -- well, actually -- sorry, one other 2 question. 3 Are -- Dr. Ricketts, I assume you're 4 familiar with the concept of an intermediate 5 frequency? 6 A. I am, yes. 7 Q. And what is intermediate frequency? 8 A. Intermediate frequency would be -- is 9 generally discussed as being something that is a 10 frequency translation before the baseband is 11 created. So it's an intermediate between the 12 baseband and the RF. 13 Q. It would be some nonzero frequency that's 14 not baseband; is that right? 15 A. I think we should be careful. 16 So baseband could be a frequency that's 17 not zero. 18 And so -- but typically, a intermediate 19 frequency would be between zero and the RF 20 frequency. 21 Q. All right. So going back to what -- what 22 you wrote in your -- in your declaration. In 23 paragraph 113, you say: 24 [As Read] Energy does not become part 25 of the baseband signal.	Page 33 1 coupled to the switch and configured to 2 store said transferred energy, wherein the 3 second EM signal is generated from said 4 stored energy. 5 So I think your question was "Is the 6 second EM signal from transferred energy?" 7 And I think the claims lay out the 8 sequence of events that -- that put the energy into 9 that second EM signal. 10 BY ATTORNEY DAY: 11 Q. So is -- is your testimony, then, that the 12 claim language generated from -- I'll start again. 13 Is your testimony that the claim language 14 generated from said stored energy requires energy 15 from the first EM signal to make up part of the 16 second EM signal? 17 A. The claim says "Wherein the second EM 18 signal is generated from said stored energy." 19 I mean, if we back to where we had 20 before -- "configured to operate according to an 21 energy transfer signal," which is -- is a -- 22 represents a -- it's in the claim construction, an 23 energy transfer system. 24 And so the claims are describing 25 transferring energy from the first EM signal to a
Page 34 1 Does claim 11 of the '686 patent require 2 energy to be part of a baseband signal? 3 ATTORNEY SAMAY: Objection. Form. 4 THE WITNESS: Claim 11 requires the second 5 EM signal to be different; so it could be a baseband 6 signal, or it could be a intermediate frequency. 7 BY ATTORNEY DAY: 8 Q. All right. So with regard to your 9 statement, does claim 11 of the '686 patent require 10 energy to become part of the second EM signal? 11 A. I'm sorry. Could you reask the question. 12 Q. Does claim 11 of the '686 patent require 13 energy to become part of the second EM signal? 14 ATTORNEY SAMAY: Form. 15 THE WITNESS: Claim 11 -- 16 (Clarification inquiry by The Court 17 Reporter.) 18 THE WITNESS: Okay. I'm just checking. 19 Can you hear me now? 20 THE COURT REPORTER: Yes, I can hear you. 21 THE WITNESS: Okay. So claim 11 states: 22 [As Read] Configured to operate 23 according to an energy transfer signal and 24 to subsample and transfer energy from the 25 first EM signal and the storage module	Page 35 1 storage module, and that the storage module's 2 configured to store. And then the second EM is 3 generated from the stored energy that was 4 transferred into that capacitor. 5 Q. All right. In the following sentence in 6 paragraph 113, which you've just discussed, you say: 7 [As Read] In other words, in voltage 8 sampling, energy from the input signal is 9 not integrated, nor does it make up/become 10 part of the baseband signal itself. 11 You see that? 12 A. I do see that sentence. 13 Q. Does claim 11 of the '686 patent require 14 energy from the input signal to make up or become 15 part of the baseband signal itself? 16 ATTORNEY SAMAY: Objection. Form. 17 THE WITNESS: Claim 11 requires that the 18 second EM signal is generated from the said storage. 19 And stored energy, which we discussed previously, is 20 the transferred energy and that it has to be a 21 second frequency -- has to be a different frequency. 22 So a baseband is an example. An IF would be another 23 example of a different frequency. 24 BY ATTORNEY DAY: 25 Q. So my question relates to the statement

1 that you made in your -- in your declaration. Page 37 2 Does claim -- you use the phrase "energy 3 from the input signal does not make up or become 4 part of the baseband signal itself." 5 With respect specifically to that phrase 6 that you used, "make/become part of," does claim 11 7 of the '686 patent require energy from an input 8 signal to make up or become part of the baseband 9 signal? 10 A. So we're reading from a paragraph in an 11 overview section of just down conversion in the 12 section 82, which is about energy sampling, where 13 I'm describing an example of energy sampling that 14 converts the energy into the baseband signal. So 15 that's the sentence we're looking at there. 16 That sentence is not part of a claim 17 element analysis in the -- in my declaration. 18 And I think -- in my previous answer, I 19 think I've covered this: The second EM signal is 20 generated from the storage energy, which is 21 transferred, and it requires a second EM signal 22 having a different frequency. 23 So it says "a different frequency from 24 said first EM signal." 25 Q. Is it your testimony that the phrase "make	1 overview section. It's not a claim analysis in my Page 39 2 declaration. 3 THE COURT REPORTER: This is the court 4 reporter. Apologies for the interruption, but may 5 we go off record for a brief moment? 6 ATTORNEY SAMAY: Sure. And before we do, 7 Mike -- 8 THE VIDEOGRAPHER: Stand by. 9 ATTORNEY SAMAY: -- confirm whether you've 10 been hearing me because I've seen that some of my 11 objections have been not getting onto the realtime. 12 Can you hear me now? 13 THE COURT REPORTER: Said, if you would 14 take us off record for a moment. 15 THE VIDEOGRAPHER: Yes. We are off 16 record. 17 (A break was taken.) 18 THE VIDEOGRAPHER: All right. We are back 19 on the record at 7:49 PST. 20 BY ATTORNEY DAY: 21 Q. All right. Dr. Ricketts, I wanted to ask 22 about something you said in a couple of your last 23 answers. 24 So I asked you some questions about a 25 paragraph that was within section 8 of your
1 up/become part of" is synonymous with the phrase Page 38 2 "generated from" that's used in claim 11, '686 3 patent? 4 A. I apologize. Can you give me the 5 paragraph number where we are. I had just checked 6 the table of contents of my declaration; so I moved 7 away from it. 8 Q. Sure. We're at last sentence of 9 paragraph 113 of page 32. 10 A. Thank you. 11 So this section is on describing, at a 12 high level, voltage sampling. And in paragraph 113, 13 I'm making a contrast to describe how energy is not 14 transferred into, as for an example, the baseband in 15 voltage sampling systems. And so that's what I'm 16 doing in this overview in this section in 17 paragraph 113. 18 I think you're asking me about 11. I 19 think in your numbering in the petition, 11FTM2.2. 20 And once again, it's a second EM signal 21 generated from the stored energy which was 22 transferred, and second EM signal having a 23 differently frequency. So that's the claim 24 language. 25 What we're looking at here is a high-level	1 declaration; is that right? Page 40 2 A. I believe, section 8.2. 3 Q. Okay. And you said something a couple of 4 times along the lines of, like, those paragraphs 5 were supposed to be a general overview of the 6 technology rather than the discussion of the 7 specific claim elements. 8 Did I recall that correctly? 9 ATTORNEY SAMAY: Objection. Form. 10 THE WITNESS: I think that generally this 11 background section is going over concepts such as 12 heterodyning, sampling, et cetera, and one of those 13 paragraphs was in the section labeled "Voltage 14 Sampling." 15 BY ATTORNEY DAY: 16 Q. So it -- is it fair to say that section 8 17 of your declaration doesn't necessarily refer to 18 requirements of the claims of the '686 patent? 19 A. I don't know that that would be an 20 accurate description. Section 8 is a background of 21 technology, and to the extent the claims or the 22 constructions refer to technological concepts, those 23 may be found in that section 8 there. 24 Q. But not -- not all the technological 25 concepts that you discuss in section 8 of your

1 declaration are necessarily elements or requirements 2 of the claims; is that right? 3 A. The elements of the claims are the 4 elements of the claims. Section 8 is a -- is just a 5 background section on technology. So for 6 instance -- I don't know if I could give you a 7 specific example, but it talks about basic 8 technologies of power, energy, voltage, charge. 9 These are just basic backgrounds. And so this is 10 not analyzing the claims. This is a technology 11 background of the field. 12 Q. Okay. And I'm going to go back to the 13 sentence -- or excuse me, to the paragraph and the 14 sentence that we were talking about. 15 In paragraph 113 where you said -- the 16 last sentence of that paragraph, you say: 17 [As Read] Energy from the input 18 signal is not integrated. 19 What do you mean by "integrated" in that 20 sentence? 21 A. So the last sentence says: 22 [As Read] In other words, in voltage 23 sampling, energy from the input signal is 24 not integrated nor does it make it or 25 become part of the baseband signal.	Page 41 1 signal. 2 And in my claim construction for claim 11, 3 I used the energy transfer signal, which is in the 4 claims, as an independent control input of an energy 5 transfer system having pulses with nonnegligible 6 apertures. 7 And so with that construction, claim 11 8 requires an energy transfer system. And certainly 9 energy -- energy transfer system, which is -- 10 Just a moment. 11 -- which, for instance, could integrate 12 over multiple pulses. 13 BY ATTORNEY DAY: 14 Q. Now, you say "could integrate over 15 multiple pulses." Under your construction of the 16 phrase "energy transfer signal," is it necessary to 17 integrate over multiple pulses to be an energy 18 transfer signal? 19 A. So once again, I think there was a slight 20 difference in the language here. So the claim term 21 is -- and I just want to be specific here: 22 [As Read] A switch configured to 23 operate according to an energy transfer 24 signal. 25 And then the claim construction that I
Page 42 1 Integrated in the sense of -- in energy 2 transfer, the energy is integrated from one sample 3 to the next or can be integrated from one sample to 4 the next, and that's what I was referring to there. 5 In a voltage sampler, the energy is made 6 to be the voltage, and then the next sample is the 7 next voltage. In a voltage sampling system, the 8 successive voltage measurements have no basis on the 9 previous ones. 10 Q. What do you mean from energy to be -- I'll 11 start again. 12 What do you mean for energy to be 13 "integrated from one sample to the next"? 14 A. The -- so each sample you're transferring 15 energy, and the energy -- just as a way of an 16 example, the energy in a capacitor can be based upon 17 the energy that was there before plus additional 18 energy that was transferred. So that would be 19 energy over two samples. 20 Q. Does claim 11 of the '686 patent require 21 energy to be integrated from one sample to the next? 22 ATTORNEY SAMAY: I'll object to form. 23 THE WITNESS: Claim 11 is configured to 24 operate according to an energy transfer signal to 25 subsample and transfer energy from the first EM	Page 44 1 used states that: 2 [As Read] The phrase "energy transfer 3 signal" is an independent control input of 4 an energy transfer system having pulses 5 with nonnegligible apertures. 6 And so a energy transfer system would be 7 a -- and I believe I discuss an energy transfer 8 system in my report in -- starting on page -- 9 paragraph 134 -- where energy is transferred into a 10 storage capacitor, and then that energy is then used 11 to provide energy for the -- for a load. 12 And so capacitor -- sorry, go ahead. 13 Q. If you were going to finish your answer, 14 go ahead. 15 A. I think the '686 and the '551 clearly 16 envision that the capacitor will have energy 17 transferred to it in every sampling time, and so 18 energy -- it would have energy from the last sample 19 as well as the current sample. 20 Q. So, I mean, you used the phrase 21 "envision." I'm asking about your opinion about 22 what the claims require. 23 Is it your opinion that the claims 24 require -- I'll start again. 25 Is it your opinion that claim 11 of the

1 '686 patent requires energy to be integrated from 2 one sample to the next? 3 ATTORNEY SAMAY: Form. 4 THE WITNESS: The -- once again, claim 11 5 requires a energy transfer signal, and I've provided 6 a construction for that, which is an independent 7 control input of an energy transfer system having 8 pulses with nonnegligible apertures. The -- which 9 requires in an energy transfer system that energy is 10 transferred to the capacitor, and then energy is 11 then transferred from the capacitor to the load. 12 That capacitor can have energy from the 13 previous pulse on it, but it also can have energy 14 where the energy could be discharged from it so that 15 it doesn't have energy from the previous pulse. 16 BY ATTORNEY DAY: 17 Q. So just to clarify that last response, 18 it -- it sounded like you said the capacitor -- I'll 19 just read: 20 [As Read] The capacitor can have 21 energy from the previous pulse on it, but 22 also can have energy where the energy 23 could be discharged from it so that it 24 doesn't have energy from the previous 25 pulse.	Page 45 1 does not have any energy -- sorry -- where the 2 storage element does not have energy from the 3 previous pulse. 4 Q. So I still want to clarify that. 5 If you have a system where the storage 6 element never has energy from the previous pulse and 7 only receives energy from any given pulse, could 8 that system still be an energy transfer system with 9 an energy transfer signal as you've construed it? 10 ATTORNEY SAMAY: Objection. Form. 11 THE WITNESS: An energy transfer system 12 having a storage capacitor that stores charge, 13 stores transferred energy, and then is used to drive 14 a load, the stored energy in the capacitor could be 15 just from that one -- just from that one sampled 16 pulse. 17 BY ATTORNEY DAY: 18 Q. So is it your testimony, then, that a 19 capacitor -- I'll start again. 20 Is it your testimony the system where the 21 capacitor never stores energy from a previous pulse 22 could still be an energy transfer system? 23 A. The energy transfer system storage 24 capacitor needs to be able to drive the load. If it 25 has sufficient energy from a single sample to Page 47
1 That last portion of your answer where -- 2 referring to "energy could be discharged," would 3 that be a situation where the energy is not 4 integrated over successive pulses? 5 A. If, for instance, you're going to a zero 6 crossing and the energy was discharged by the load 7 so the capacitor had a zero voltage, then it would 8 have no charge from the previous sample. 9 Q. So is it your testimony, then, that 10 claim 11 of the '686 patent did not require energy 11 to be integrated over multiple pulses? 12 A. It requires an energy transfer signal, 13 which, as I've construed, requires energy transfer 14 system. And as we just discussed, near zero 15 crossings, for instance, an energy system could just 16 can discharge to zero where there is no energy from 17 the previous pulse. 18 Q. Does your interpretation of an energy 19 transfer system require the system to be capable of 20 integrating energy from multiple pulses? 21 A. The energy transfer system would require 22 the capacitor to be able to drive the load connected 23 to it. If it could drive that load with the energy 24 that's on it from a single pulse, then it would 25 not -- as I said, there is a portion where the pulse Page 46	1 provide it, then it would be an energy transfer 2 system. 3 Q. You use this phrase: "The capacitor needs 4 to be able to drive the load." 5 What do you mean by that? 6 A. The '551 describes an energy transfer 7 system, and, for instance, I discuss that in 8 paragraph 138. Where just -- 138 says: 9 [As Read] As shown in Figure 82B, 10 energy stored in the storage capacitor is 11 discharged to a low-impedance load 8212. 12 For this reason -- 13 (Clarification inquiry by The Court 14 Reporter.) 15 THE WITNESS: To a low-impedance -- 16 i-m-p-e-d-a-n-c-e -- load 8212. 17 [As Read] For this reason, the 18 storage capacitor is said to drive the 19 load. 20 And there's a citation to the '551 patent. 21 BY ATTORNEY DAY: 22 Q. Okay. Is that the conclusion of your 23 answer there? 24 A. Yes, sir. 25 Q. All right. Page 48

1 So just to back up here, do you agree that 2 the phrase "energy transfer system" doesn't actually 3 appear in those terms in claim 11 of the '686 4 patent? Is that right? 5 A. Claim 11 includes the term "energy 6 transfer signal," which is a term used in the 7 patents. And I've provided my construction of that 8 term as an independent control input of an energy 9 transfer system. So the energy transfer system, 10 those words do not appear on the face of the claim, 11 but they do in the construction. 12 Q. And did you propose any separate 13 construction of the term "energy transfer system"? 14 A. In my declaration, I have in the 15 construction section I -- there's not a section on 16 that in the construction section. There is in the 17 section on energy transfer, but that is not in the 18 construction section. 19 Q. So since you haven't actually proposed a 20 definition of "energy transfer system," is it your 21 opinion that an energy transfer system requires a 22 capacitor to drive a load? 23 ATTORNEY SAMAY: Objection. Form. 24 THE WITNESS: As I explained in the 25 section on energy transfer, the '551 describes the	Page 49 1 "drive," you mean there's energy delivered from the 2 capacitor to the load; is that right? 3 A. With the -- yes. When the switch is on, 4 and also when the switch is off. 5 Q. You also talk a few different places in 6 your declaration about the impedance of the load. 7 And I think you mentioned it a couple question -- 8 couple answers ago. 9 Under your interpretation of the phrase 10 "energy transfer system," if it's interpreted in 11 part of the claim at all, do you believe that the 12 energy transfer system requires the load to have a 13 low impedance? 14 A. I think in paragraph 138. I'm citing once 15 again from language in the '551, the storage 16 capacitor 828 is discharged to the load impedance, 17 load 8218. And the '551, when it describes an 18 energy transfer system, describes it as driving 19 low-impedance load as part of that. 20 Q. So, again, you're talking about an example 21 in the patent. My question is whether it's a 22 requirement of the claim as you've construed it? 23 Does an energy transfer system require the 24 load to have a low impedance? 25 A. The energy transfer system would need Page 51
1 energy transfer system as transferring energy to a 2 storage element. When the sampling switch is on, 3 and when the sample switch is off, that energy is 4 driven to -- and the quote from the '551 is to 5 "drive the load." 6 BY ATTORNEY DAY: 7 Q. So my question is whether that's a 8 requirement of the claim. And you quoted the phrase 9 "drive the load." 10 Is it your opinion that the capacitor 11 driving the load is a requirement of an energy 12 transfer system? 13 A. The energy transfer system would have a 14 capacitor that drives a load, provides power to a 15 load when a switch is off. 16 Q. What do you mean by "provides power to the 17 load"? 18 A. I apologize. We were using the word 19 "drive the load," which is in the '551. I was 20 just -- maybe just adding a little bit of 21 clarification what the word "drive" means. 22 Drive the load would mean energy is 23 delivered to the load. That's just clarifying what 24 the word "drive" would mean. 25 Q. Okay. Okay. So when you -- you're -- by Page 50	1 to -- would need a -- to transfer energy into a load 2 which would be low impedance. Low impedance would 3 be relative to a POSITA understanding what the 4 specific system is and requirements. 5 Q. So as you are interpreting these claims, 6 you're requiring an energy transfer signal to have 7 an energy transfer system, and that energy transfer 8 system needs to transfer energy to a load which has 9 a low impedance; is that correct? 10 ATTORNEY SAMAY: Objection to form. 11 THE WITNESS: The energy transfer system 12 would require a storage capacitor, and that 13 capacitor would transfer energy to a low-impedance 14 load. 15 BY ATTORNEY DAY: 16 Q. All right. So I think one thing I've 17 heard you say a few different times -- you know, 18 we've talked about the '686 patent, and some of your 19 answers have referred back to the '551 patent. 20 Now, would you agree that the '686 patent 21 and the '551 patent use terminology consistently? 22 ATTORNEY SAMAY: Objection to form. 23 THE WITNESS: I would -- I think in 24 general terminology is used consistently. We have 25 to talk about specific words to check the meaning if Page 52

1 there is any difference in meaning there. The '686 2 is meant to incorporate the '551; so I could imagine 3 the '686 might extend language or add additional 4 language that wasn't in the '551. 5 BY ATTORNEY DAY: 6 Q. So specifically with respect to the phrase 7 "energy transfer signal" -- I'll ask you about 8 energy transfer signal because you referred back to 9 the '551 in some of your answers about that term. 10 Do you believe that the phrase "energy 11 transfer signal" is used consistently between the 12 '686 patent and the '551 patent? 13 ATTORNEY SAMAY: And I'll object to form. 14 THE WITNESS: I think in many of the 15 embodiments it's used in the same way between the 16 patents. I'm not sure if you're asking about a 17 specific paragraph. But the energy transfer signal 18 is used in the context of an energy transfer system. 19 BY ATTORNEY DAY: 20 Q. Are you aware of any reason to think that 21 the '686 patent uses the phrase "energy transfer 22 signal" any differently from the '551 patent? 23 A. I haven't included any differences in my 24 declaration. 25 Q. I mean, as you sit there today, either	Page 53 1 aliasing rate. This is in my construction section. 2 That was presented to me by counsel; so I 3 assume that's what the parties agreed upon for that 4 definition. 5 (Clarification inquiry by The Court 6 Reporter.) 7 THE WITNESS: That is correct. 8 And "aliasing" is a specific word that may 9 come up. There we go. 10 BY ATTORNEY DAY: 11 Q. Okay. So in the sampling in an aliasing 12 rate would refer to the "sub" portion of that term 13 in subsample; right? 14 A. Well, I mean, subsample has an agreed-upon 15 construction, at least with the parties. That means 16 sampling at an aliasing rate. So I wouldn't break 17 apart the word subsample because subsample has a 18 construction. 19 Q. And you didn't propose any construction 20 for the word "sample" specifically; is that right? 21 A. There's no separate section on sample in 22 my construction section. 23 Q. So would you agree, then, that the word 24 "sample" by itself should be given its plain and 25 ordinary meaning?
Page 54 1 from your declaration or from anywhere else, are you 2 aware of any reason to think that the meaning of the 3 phrase "energy transfer signal" is any different in 4 the '686 patent than it is in the '551 patent? 5 ATTORNEY SAMAY: I'll object to form. 6 THE WITNESS: I -- I think in the context 7 where I've cited, I think they're used consistently 8 as energy transfer signal is being used in an energy 9 transfer system. But if there's a specific place 10 you'd like to ask about, I could certainly look at 11 that. But I think where I've cited them in my 12 declaration, I've been consistent. 13 BY ATTORNEY DAY: 14 Q. All right. The '686 patent also uses the 15 phrase "subsample" in claim 11. 16 Do you recall that? 17 A. Using the numbering in the petition, 18 11FTM-1.3, I see, yes: 19 [As Read] Into subsample and transfer 20 energy from the first electromagnetic 21 signal. 22 Q. Did you propose a construction for the 23 term "subsample"? 24 A. My understanding is that the parties agree 25 the term "subsample" refers to sampling at an	Page 55 1 A. Yes. I used its plain and ordinary 2 meaning of -- to sample a -- reference to a signal, 3 I assume. We'd have to, you know, just specify the 4 word sample, I think you're saying, is when you 5 sample a signal. Like, I use "voltage sampling" and 6 "energy sampling" in my declaration. 7 Q. Sure. And I -- 8 A. I'm sorry, I just want to correct. 9 Voltage sampling -- I think I misspoke. Energy 10 sampling, I described energy transfer and not 11 energy. I do describe it also as energy sampling; 12 so I guess that's -- I use both in my declaration. 13 Q. Okay. Yeah, and I can expand a little bit 14 on my last question to clarify that -- that the word 15 "sample" used by itself should be given its plain 16 and ordinary meaning in the context of communication 17 systems? 18 A. I -- I don't think I would agree with 19 that, specifically with the word "communication 20 systems." So we're talking about frequency 21 translation; so up-and-down conversion. 22 And so specifically in the '686 and the 23 '551, they're talking about sampling signals; so 24 it's an actually voltage signal or energy that 25 they're sampling. And I'm just differentiating

Page 57 1 between -- you could have samples in mathematic 2 terms and other terms other than sampling a signal, 3 but we're talking about sampling a voltage or a 4 current signal. 5 Q. Okay. You would agree, then -- and I'll 6 back up. 7 And I was just sort of trying to clarify 8 that it's the plain and ordinary meaning within the 9 context of what we're talking about here. 10 So would it be fair to describe that 11 context as signal processing? 12 A. I think specifically what we're looking 13 at, it's sampling signals. It's a hardware thing. 14 It's not a software thing. 15 And so when you say "signal processing," I 16 think that that could just be mathematics in a 17 microprocessor. So I look at it as a -- it's a 18 physical sampling of a signal, either a voltage or a 19 current, would be the common meaning. 20 Q. Okay. So within that context, however, 21 would you agree that there's no -- no unique 22 definition given to the term "sample" in the '686 23 patent or the '551 patent? 24 A. The '686 and the '551 use "sampling" 25 consistently as a POSITA would understand it to take	Page 59 1 Middle District of Florida filed by ParkerVision 2 against Apple and Qualcomm? 3 A. I do see on the cover that it is a case 4 between ParkerVision and Qualcomm. 5 Q. All right. Can you turn to page 28, 6 please. 7 Let me know when you're there. 8 A. Just a moment, please. 9 And I know we -- just for clarity, I know 10 we spoke earlier about a federal circuit describing 11 voltage and energy sampling. I didn't know if this 12 construction's from that same matter or a different 13 matter because the matter we spoke of earlier also 14 involved Qualcomm. 15 Q. Okay. So I'm going to refer back to 16 page 28 of Exhibit 1050. 17 A. I'm on page 28. 18 Q. And do you see towards the bottom of that 19 page, there's a section labeled "Agreed Upon Claim 20 Constructions" followed by a table? 21 A. I do see that table. 22 Q. And in that particular case, with respect 23 to another ParkerVision patent, the parties agreed 24 to construe the term "sampling aperture" as: 25 [As Read] A period of time during
Page 58 1 a voltage of currents -- 2 (Clarification inquiry by The Court 3 Reporter.) 4 THE WITNESS: Okay. 5 -- voltage or currents to sample them. So 6 to physically take a sample at a discrete time would 7 be how a POSITA would understand the plain and 8 ordinary meaning of sampling. You take a discrete 9 section of a continuous signal, a voltage or a 10 current signal, and sampling takes that discrete 11 portion of it. 12 ATTORNEY DAY: All right. I'm going to 13 ask to have an exhibit marked, which I don't believe 14 has been previously marked. 15 So this should be Exhibit 1050. 16 (Exhibit 1050 was marked for 17 identification.) 18 BY ATTORNEY DAY: 19 Q. And the -- I dropped the exhibit in the 20 chat. The file name starts off with "MDFL" followed 21 by a case number followed by "Markman order." 22 Do you see that? 23 A. I do. I do see the file. 24 Q. And do you see from the first page that 25 that's a claim construction order from a case in the	Page 60 1 which the claimed switch is in its closed 2 (on) state, thereby reducing a continuous 3 time signal to a discrete time signal. 4 Do you see that? 5 A. I do see what's on page 28. 6 Q. Would it be fair to say that the second 7 portion of that construction following the comma, 8 "thereby reducing a continuous time signal to a 9 discrete time signal," would be referring to 10 sampling portion of that construction? 11 ATTORNEY SAMAY: Objection. Form. 12 Wait. Let me just get my objection on the 13 record. 14 Objection to form. Foundation. 15 Relevance. 16 THE WITNESS: I haven't seen this 17 construction before. I don't recall. I provided a 18 opinion in my declaration on this construction. 19 This is in a different matter. 20 BY ATTORNEY DAY: 21 Q. Well, I'll ask it a different way. 22 So the -- would you agree that producing a 23 continuous time signal to a discrete time signal is 24 consistent with a POSITA's understanding of the term 25 "sampling"?

Page 61 1 ATTORNEY SAMAY: Objection to form. 2 THE WITNESS: Returning to the '686 IPR, 3 the matter in front of us, I don't construe samples 4 separately. And so we would take a POSITA's plain 5 and ordinary understanding of that. And from the 6 context of the frequency translation systems that 7 we're looking at, a sample would be a finite time 8 that it would capture voltage or current, and then 9 there would be a time when it would not be. 10 So let me rephrase that this way: It 11 would provide discrete sampling of the voltage or 12 current on a relatively periodic basis based upon 13 the system that it's being used in. 14 BY ATTORNEY DAY: 15 Q. Okay. 16 All right. So as I understand it, your 17 understanding of a POSITA's understanding of the 18 plain and ordinary meaning of the term "sample" is 19 that it would provide discrete sampling of the 20 voltage or current on a relatively periodic basis 21 based upon the system that it's being used in; is 22 that right? 23 ATTORNEY SAMAY: Objection to form. 24 THE WITNESS: Yeah. 25 I mean, a POSITA would look at the '686	Page 63 1 something to be a sample according to a POSITA's 2 understanding of the plain and ordinary meaning of 3 the term? 4 ATTORNEY SAMAY: Objection. Form. 5 THE WITNESS: Well, I do think that we 6 have to look at the construction that I'm using 7 under "energy transfer signal," which is: 8 [As Read] An independent control 9 input of an energy transfer system having 10 pulses with nonnegligible apertures. 11 And that's what's shown in the patents. 12 And that's what a POSITA would understand is the 13 sampling. 14 So to the -- I'm just adding that, from 15 the construction, these discrete times are done with 16 pulses, not something else. There's -- there's more 17 clarity in the construction on the sampling being of 18 a -- using a pulse, which is shown in the patents. 19 BY ATTORNEY DAY: 20 Q. You did not propose those additional 21 limitations in construction of the term "sample"; is 22 that right? 23 A. I -- well, so "sampling," plain and 24 ordinary meaning, would be to take discrete time 25 pieces from a signal. And all I'm saying is -- I
Page 62 1 and the '551. They would see they have frequency 2 translations. They'd see the word "sample." They 3 would see samples are being used in discrete time to 4 sample a voltage or sample or transfer energy. 5 Typically, they're periodic. I just -- 6 one could envision where maybe they aren't periodic. 7 But I don't think a POSITA would need to have a -- 8 that sampling would necessarily need to be periodic, 9 I think. It's just a finite time that it captures 10 the voltage, current, or energy. 11 BY ATTORNEY DAY: 12 Q. So you have a finite time where the -- the 13 system captures the voltage, current, or energy, and 14 then a finite time where it does not; is that right? 15 A. I -- just to clarify, I think your 16 question brings an important point. 17 When I say "finite time," I mean there's a 18 discrete. So when you sample, you take discrete 19 samples at some time basis. And when it's taking a 20 sample, it's either sampling the voltage or the 21 current or, in the case of energy transfer, it'd be 22 transferring energy. And then there's a period 23 where there's no sampling, and then there's another 24 discrete event where it samples again. 25 Q. Are there any other requirements for	Page 64 1 think you're asking -- there's nothing else about 2 sampling. 3 The actual sampling that's described in 4 all the patents are done with an energy transfer 5 system having pulses that are doing those -- those 6 samples. So there's just a -- the construction 7 around energy transfer signal provides information 8 more on how the sampling's done. 9 Q. Okay. So under the constructions that 10 you've proposed, the -- the requirement for pulses 11 falls in your construction of energy transfer 12 signal; is that right? 13 A. That is correct. 14 Q. All right. I'm referring back to claim 11 15 of the '686 patent. 16 You see in claim 11 of the '686 patent 17 recites: 18 [As Read] A switch configured to 19 operate according to an energy transfer 20 signal. 21 You see that? 22 A. I do see that in the claim. 23 Q. So is it fair to say that the energy 24 transfer signal is what controls the switch? 25 A. The energy transfer signal is an

1 independent control input of an energy transfer 2 system having pulses of nonnegligible apertures, and 3 that is what is controlling the switch. 4 Q. All right. And that anticipates my next 5 question. 6 So since your construction requires the 7 energy transfer signal to have an independent 8 control input, would it be fair to say that, if the 9 board adopts your construction of energy transfer 10 signal, that the claim would require the switch to 11 be controlled by an independent control input? 12 ATTORNEY SAMAY: Objection to form. 13 THE COURT REPORTER: The court reporter 14 will clarify. I believe I noticed commentary from 15 Mr. Samay. 16 To be certain, would you repeat that. 17 ATTORNEY SAMAY: I just objected to form. 18 THE COURT REPORTER: Thank you. 19 THE WITNESS: The energy transfer system 20 would have an independent control that controls the 21 switch. 22 BY ATTORNEY DAY: 23 Q. So -- 24 A. And -- sorry, go ahead. 25 Counsel, I just wanted to let you know I	Page 65 1 THE VIDEOGRAPHER: Okay. Going off the 2 record. 3 (A break was taken.) 4 THE VIDEOGRAPHER: We are back on record 5 at 9:04 PST. 6 BY ATTORNEY DAY: 7 Q. All right. Dr. Ricketts, you offered a 8 number of opinions in your declaration with regard 9 to complaints with certain standards; is that right? 10 A. Yes. I discuss both with Avitabile and 11 Estabrook standards with the 802.11 and Bluetooth. 12 Q. All right. And I'm going to ask you to 13 turn to page 76 of your declaration and look at 14 paragraph 250. 15 All right. And in paragraph 250, you say 16 that it, referring to Avitabile, does not account 17 for the protocol specific modulation, error 18 correction, and synchronization requirements 19 necessary for Bluetooth or IEEE 802.11 operation. 20 Do you see that? 21 A. I do see that. 22 Q. What do you mean by protocol specific 23 modulation? 24 A. So in Bluetooth and Wi-Fi, you have to 25 shape your pulses so that they fit inside of a Page 67
1 do have to leave at 11:40, and I just want to make 2 sure you got your questions pending out before then. 3 Q. Okay. And just to loop back on that last 4 question. I think we actually might be close to a 5 good point. I think I'll just finish up this area, 6 and then there'll be a good break. 7 So under your construction, the switch 8 would need to have an independent control input; is 9 that correct? 10 ATTORNEY SAMAY: Same objection. 11 THE WITNESS: The -- an independent 12 control input of the energy transfer system for the 13 switch in the nonnegligible apertures. 14 ATTORNEY DAY: All right. I think that's 15 probably a logical breaking point. So I mean, do we 16 need to set a fixed time for you to take your call, 17 or should we just come back on the noon your time or 18 something like that? 19 THE WITNESS: Yeah. I expect to be done 20 at noon. It might be just a few minutes later. So 21 if you guys can -- I'll just jump back on Zoom at 22 noon or 12:05. 23 ATTORNEY DAY: All right. We can go off 24 the records. 25 THE WITNESS: Okay. I appreciate it. Page 66	1 spectrum. And so I believe Bluetooth uses a 2 Gaussian shaping. And 802.11 also have that 3 requirement; so you consider to -- it's on -- not a 4 just an AM signal. You have to shape it for fitting 5 inside of the band. 6 Q. Okay. So when you refer to pulses in your 7 last response, that would be referring to pulses in 8 the modulated signal itself; is that right? 9 A. In the answer I just gave, we were 10 discussing modulation of protocol specific. And the 11 protocol specific requires shaping of the wave forms 12 to minimize bandwidth. And there's a variety of 13 different one examples. A Nyquist pulse, I use the 14 word pulse because that's the term that's used to 15 describe the shaping that's needed of the 16 modulation. So if that's the pulse you're talking 17 about, yes, that's with respect to modulation. 18 Q. Okay. Yeah, because I think we talked 19 about pulses in a different context here earlier in 20 this deposition. 21 A. Correct. 22 Q. I just want to make sure that's clear that 23 when you're talking about pulses in the context of 24 modulation, that that's a different pulse from the 25 pulse you were referring to in the context of the Page 68

1 energy transfer signal; is that right? 2 A. That's correct. The -- in terms of 3 Bluetooth, use -- there -- yes. In the terms of 4 modulation with respect to 250, we're not talking 5 about the sampling pulses. We're talking about 6 modulation; correct. 7 Q. What part of a receiver circuit would 8 provide protocol specific modulation? 9 A. In general, you would have for a receiver, 10 you would need hardware to do image rejection. You 11 would also have to make sure that your receiver 12 had -- would meet all the limitations for the 13 interference and nonlinearities. All the standards 14 have specs on how good receiver can be or needs to 15 be. And so they set those out. So that's the 16 hardware. 17 And then, of course, there is a digital 18 portion that would do, you know, if it's a digital 19 transmission, like in Bluetooth, it would decode the 20 packets and, et cetera, from there. 21 Q. Okay. And the last portion of your 22 answer, the digital portion that would decode the 23 packets, that would be a separate portion of the 24 receiver from any down converter; correct? 25 A. Digital portion that decodes the ones and	Page 69 1 shown that that's going to work to be able to do a 2 protocol like Bluetooth or 802.11. 3 BY ATTORNEY DAY: 4 Q. Okay. So is it your opinion that the 5 reference would need to show that it meets all of 6 those requirements that you've just discussed, for a 7 particular protocol in order to disclose claim 11 in 8 the '686 patent? 9 A. So if -- with respect to Avitabile, I 10 state Avitabile circuitry, if incorporated in NEVO, 11 would need to show that it complies with the 12 plurality of protocol and standards and operates in 13 conformance with the first and second protocol and 14 standard combination. 15 And so Avitabile is a down converter, but 16 Avitabile doesn't demonstrate on the face of the 17 documents that it would meet all the performance 18 requirements for these protocols and standards and 19 Bluetooth and both 802.11 have very strict protocols 20 and standards for the hardware. They also have some 21 for the digital too. 22 Q. So is it your opinion that in order to 23 practice claim 11 of the '686 patent, the reference, 24 on its face, would need to show a compliance with 25 every Bluetooth and 802.11 requirement?
Page 70 1 zeros and understands what they mean would be the 2 digital portion. That's separate from the analog 3 electronics that would be in the radio. 4 Q. And you also mention "error correction" in 5 that same paragraph. Is it also fair to say that 6 error correction would occur in the digital portion 7 of a receiver? 8 A. Error correction would be something that 9 the digital portion would handle. 10 Q. All right. So with respect to protocol 11 specific modulation, is it your opinion that in 12 order to meet claim 11 of the '686 patent, a 13 reference would need to demonstrate that it met 14 protocol specific modulation requirements for a 15 specific protocol? 16 ATTORNEY SAMAY: Objection to form. 17 THE WITNESS: I think we've been looking 18 at Avitabile, so specifically paragraphs 250 and 19 251. 20 The 802.11 and Bluetooth both have 21 requirements for shaping the modulation for 22 bandwidth. And so that includes some digital 23 information, but that also includes dynamic range, 24 sensitivity, image rejection, interference 25 rejection. All of that has to be considered and	Page 72 1 A. Well, I guess I'll start with "on its 2 face." I'm not a -- I'm not a lawyer; so I don't 3 know if that word has a specific legal meaning, but 4 the reference is the reference. 5 And so, Avitabile is built for S band 6 radar applications, and they've designed this down 7 converter for radar. And the claim 11 says: 8 [As Read] Operating a first 9 transceiver in conformance with the first 10 protocol standard combination using a 11 first standard or protocol submodule. 12 So a standard, as mentioned in the 13 petition, 802.11 and Bluetooth both have very 14 specific requirements on the performance. And none 15 of that's analyzed or looked at in Avitabile to know 16 that it would be capable of doing that. 17 Q. So is it your opinion that the reference 18 itself would need to analyze or look at the very 19 specific requirements in 802.11 and Bluetooth to 20 know that it's capable of meeting those 21 requirements? 22 ATTORNEY SAMAY: Objection to form. 23 THE WITNESS: So the claim requires 24 conformance with a first protocol/standard. And so 25 to show the combination anticipates -- sorry, makes

1 obvious the claims of the '686, you'd have to show 2 that Avitabile conforms with the first 3 protocol/standard as well as the second 4 protocol/standard. 5 BY ATTORNEY DAY: 6 Q. And would that showing need to be on the 7 document -- in the document itself? 8 A. A -- well, I think it's -- we shouldn't 9 speak of general documents. Just looking at 10 Avitabile, Avitabile doesn't, for instance, have 11 image rejection. Avitabile doesn't really analyze 12 and discuss its capabilities for carrier to 13 interferer rejection, as required by Bluetooth and 14 802.11. 15 So that information isn't in Avitabile to 16 know that Avitabile would be able to meet those 17 standards. 18 Q. And as a general matter, can you say, one 19 way or another, without knowing one specific -- I'll 20 start again. 21 So can you say what information you would 22 need from a reference in order to meet, for example, 23 Bluetooth protocol standards? 24 A. Well, I think the -- in my declaration 25 on -- starting on page 246, I think the petition	Page 73 1 nonlinearity, for carrier to interference ratios. 2 So that's all laid out in the Bluetooth spec. So 3 those are known. 4 A POSITA would know what Bluetooth needs, 5 and a POSITA would know what 802.11 would need. So 6 that would be known. 7 And a POSITA looking at Avitabile, 8 Avitabile doesn't disclose that it meets all those 9 requirements. 10 Q. I see. So if you're looking at just a 11 generic reference, you could look at the Bluetooth 12 technical requirement for sensitivity, for example, 13 and then look at the reference to see if it meets 14 it; is that right? 15 A. Sensitivity would be one example. 16 Bluetooth has a sensitivity requirement. You can 17 look at the reference and see whether it discloses 18 that it would be able to meet that. I think I 19 mentioned Avitabile has a 26-DB insertion loss which 20 is very, very, very, very high for a frequency 21 translator. 22 And so that would be a reason why a POSITA 23 may -- would look at Avitabile and will say that's a 24 really, really high insertion loss. There is 25 nothing that says it's going to meet the sensitivity Page 75
1 argues that Avitabile can be just stuck into NEVO as 2 a frequency translator. And a POSITA looking at 3 Avitabile would understand it's a down converter for 4 radar in the S band. But there's nothing in the 5 document that disclosed it's going to be capable of 6 the performance metrics required by any one of the 7 standards cited like 802.11 and Bluetooth. 8 So there's nothing in Avitabile that says 9 it's going to meet those requirements and the claims 10 require that it conforms with those standards. 11 Q. So I understand that that portion of your 12 document -- your declaration's talking about 13 Avitabile. But what I'm trying to get at is, is 14 there any way that you, as a POSITA, could, before 15 you look at a document, say I'm going to define -- 16 these are the requirements. This is what I'm going 17 to need to see from this document to see whether it 18 meets Bluetooth standards? 19 Or could you -- if you were looking at 20 just a generic reference, before you started looking 21 at that reference, what would you be looking for to 22 see whether it makes Bluetooth -- meets Bluetooth 23 standards? 24 A. The Bluetooth standards has a set of the 25 technical requirements for sensitivity, for Page 74	1 retirement. 2 Q. So you would look -- to go back to the 3 beginning of that answer, you would look at the 4 sensitivity requirement in a Bluetooth 5 specification, and then look at the reference to see 6 if there's any disclosure of that reference meeting 7 that sensitivity requirement; is that right? 8 A. So once again, my understanding is that 9 the petition is put forward. NEVO needs a frequency 10 translator. Avitabile can be just stuck into it. 11 A POSITA reading Avitabile would know of 12 Bluetooth standards, would know there's 13 requirements. And it's not obvious that Avitabile 14 would be able to just be used in NEVO for these 15 standards. 16 Q. And I'm -- I'm asking outside of the 17 context of Avitabile specifically. I'm asking you 18 how you as a -- how a POSITA would go about 19 evaluating whether any reference would meet those 20 Bluetooth standards. 21 And I think you started to answer that in 22 the beginning of your question. I want to make sure 23 I understood your answer. 24 As I understood your answer, you said you 25 would look at a requirement in the standard. For Page 76

1 example, the sensitivity standard in Bluetooth. And 2 then -- and then you would look at the reference to 3 see if there's a disclosure to the reference meeting 4 that standard; is that right? 5 ATTORNEY SAMAY: Objection. Form. 6 THE WITNESS: A POSITA would certainly be 7 aware of the standards. 8 (Clarification Inquiry by The Court 9 Reporter) 10 THE WITNESS: And the requirements. 11 And so looking at Nevo would -- if they 12 were looking for a frequency translator, they would 13 be looking for a frequency translator that could 14 meet the specs of Bluetooth. That would be sort of 15 the common thing that a POSITA would do. 16 BY ATTORNEY DAY: 17 Q. Would that be true of any reference? 18 A. If a POSITA was looking to design a 19 receiver, a transceiver in Bluetooth, they would 20 know of the requirements, technical requirements, 21 and if they were looking at something to use for 22 that, they would certainly need to know if it's 23 going to be able to meet those requirements. 24 Q. And if there were -- if a reference did 25 not disclose meeting the requirements for Bluetooth,	Page 77 1 POSITA would need to know that it does conform with 2 the standard. Otherwise, you couldn't use it for 3 Bluetooth. 4 BY ATTORNEY DAY: 5 Q. That would be true of a single reference; 6 correct? 7 A. I am sorry. I don't quite understand. 8 What do you mean by a "single reference"? 9 Q. So if you're looking at a single document 10 and trying to establish whether it taught claim 11 11 in the '686 patent, you would need to look at the 12 standard and -- and then look to see -- look to the 13 document to see whether all the technical 14 requirements of the standard are met; is that right? 15 A. I mean, that's one approach. I mean, for 16 a single document, so a single document would be 17 anticipation for claim 11, my understanding. You go 18 through the document; you look for the first 19 transceiver; you look for it conforming with the 20 standard. 21 And maybe the document says, you know, 22 "This is a Bluetooth transceiver," and, therefore, a 23 POSITA reading that would be, "Okay, I understand 24 that this circuit, this structure that I'm looking 25 at here, conforms with the standard."
Page 78 1 then it's your opinion that it would not satisfy 2 claim 11 of the '686 patent, at least as it relates 3 to Bluetooth; right? 4 ATTORNEY SAMAY: Objection to form. 5 THE WITNESS: Claim 11 requires the 6 transceiver to conform with the protocol or 7 standard. So to meet the claim limitation, the 8 transceiver needs to confirm -- conform with that 9 protocol. And a POSITA would understand the 10 requirements for the standard or protocol because 11 those are published documents. 12 And so they would know what they had to 13 meet, and they would know to meet the claim 14 language, it would have to conform to that standard. 15 So they would have to know that whatever they're 16 going to use for their transceiver is going to meet 17 the standard or conform with the standard. 18 BY ATTORNEY DAY: 19 Q. So if the reference or combination of 20 references did not show that it conformed to the 21 requirements and the standard, it would not satisfy 22 claim 11 of the '686 patent; correct? 23 ATTORNEY SAMAY: Objection to form. 24 THE WITNESS: To make the combination, the 25 transceiver has to conform with the standard. So a	Page 80 1 If it doesn't say it conforms with the 2 standard, then somehow a POSITA needs to have a 3 understanding of how it would conform because that's 4 required for the claim. 5 Q. Okay. So your testimony is that just a 6 document describing something as a Bluetooth 7 transceiver would be enough to show that it conforms 8 with the standard? 9 A. I'm not sure that's precisely correct. If 10 a document discloses a full transceiver that does 11 frequency translation and describes that it's doing 12 that in combination with -- sorry, and that it's 13 able to meet the Bluetooth standard -- so for 14 instance, maybe it's a transceiver, there's a mixer, 15 an LNA, and the document says, "Hey, this meets 16 Bluetooth standards," then that would be sufficient 17 to a POSITA. 18 Q. I see. So if the document says it's -- 19 it's Bluetooth, you don't need to actually analyze 20 whether its circuit would meet those standards? 21 A. I think you would check certainly before 22 you made a product. But right now, if you have a 23 structure, a circuit, you don't know that's going to 24 meet the standards. 25 If it says, "This structure has been

1 designed, tested, simulated, and meets the 2 requirements of Bluetooth," then I think that would 3 be a disclosure that this circuit would meet 4 Bluetooth. 5 Q. I see. So if you have a reference that 6 just says "You might use this with Bluetooth," but 7 it doesn't actually show that it's been designed, 8 tested, simulated, meets the requirements of 9 Bluetooth, then it still might not meet the 10 requirements of claim 11 in the '686 patent; 11 correct? 12 A. So all of our discussion of the single 13 reference, this is hypothetical; right? So we're 14 not looking -- we're not discussing a specific 15 reference; so it's very hard to say what words are 16 required. A POSITA would look at a document, 17 understand it from a technical standpoint, and 18 understand whether it would meet the claims -- 19 limitations -- sorry, the claim limitations or not. 20 So, you know, whether it -- how it 21 referenced Bluetooth, what it is, you'd have to look 22 at the specific document to understand that. 23 Q. And -- so claim 11 of the '686 patent 24 refers to first and second protocols; correct? 25 A. The last two limitations recite a first	Page 81	1 A. The claim limitation is a second 2 transceiver that conforms with a second protocol. 3 Q. And the question was, will you still need 4 to show a compliance for that second protocol? 5 A. The claim says a second transceiver in 6 conformance with the second protocol standard. 7 Q. And is it your testimony that showing 8 compliance would require a showing that every 9 technical requirement of the protocol standard is 10 met? 11 A. A POSITA would understand that that's a 12 baseline requirement for a standard. You have to 13 meet all of the -- you have to meet or conform with 14 all of the standards requirements to be able to do 15 that standard. So Bluetooth being a standard, for 16 instance. You can't do partial Bluetooth and not 17 the other technical specifications. 18 Q. And that would include protocol specific 19 modulation? 20 A. So -- 21 ATTORNEY SAMAY: Objection to form. 22 THE WITNESS: -- the Bluetooth, as an 23 example, uses Gaussian frequency shift keying. So 24 you would need to be able to do that modulation in 25 order to meet the Bluetooth standard.	Page 83
1 protocol standard, and the last one is a second 2 protocol standard. 3 Q. Do those protocol standards need to be 4 different? 5 ATTORNEY SAMAY: Objection to form. 6 THE WITNESS: My understanding of the last 7 claim is that it requires a first transceiver with a 8 first protocol, second transceiver with a second 9 protocol. Not the same protocol as the first 10 protocol. 11 BY ATTORNEY DAY: 12 Q. All right. So if you had a reference that 13 disclosed compliance with one protocol, it still 14 wouldn't necessarily meet the claim requirement for 15 the second one; is that right? 16 A. Well, once again, the claim requires two 17 transceivers; right? 18 Q. Yeah. Let me reask the question. 19 So if you had a -- let's assume you had a 20 reference that sufficiently discloses compliance in 21 meeting all those requirements for the first 22 protocol, that would not be sufficient, by itself, 23 to meet the claim requirement for the second 24 protocol; right? You still have to show compliance 25 for the second protocol?	Page 82	1 BY ATTORNEY DAY: 2 Q. Does that also include error correction? 3 A. I would need to check the spec for 4 Bluetooth, but I'm pretty sure it has an error -- it 5 does have an error correction as part of its packet 6 definition. The -- I think it's the last portion of 7 the packet, but in the packet it sends an error code 8 that then gets check. 9 Q. Does that also include synchronization? 10 A. To do the Gaussian frequency shift key, 11 you would need to synchronize the LOs of the two 12 radios. 13 Q. All right. Can you explain what you mean 14 by "synchronization." 15 A. So these are coherent systems; so they 16 rely on the frequency of the oscillator in the 17 Bluetooth receiver, for example, being at the proper 18 frequency of the signal coming in. And so they have 19 a phase lock loop that synchronizes the phase and 20 the frequency to the signal coming in so that it can 21 properly demodulate the signal. So it adjusts the 22 LO phase and frequency -- or the sampling LO 23 frequency. 24 (Clarification inquiry by The Court 25 Reporter.)	Page 84

Page 85 1 BY ATTORNEY DAY: 2 Q. All right. You mentioned a "phase lock 3 loop." Can you elaborate on that. 4 A. In general, coherent radios -- so for 5 instance there's bands for Bluetooth. I'll use this 6 as an example, and you have to transmit within that 7 frequency band. And so phase lock loop is just one 8 piece of architecture that can synchronize those two 9 together; so your LO has to be -- or your sampling 10 has to be at the proper frequency for the signal 11 that you're receiving. 12 Q. And that technology was known in Bluetooth 13 systems at the priority date of the '686 patent; 14 correct? 15 A. A phase lock loop would've been known at 16 the priority date of the '686. 17 Q. Okay. Same with error correction? Error 18 correction would have been known at the priority 19 date of the '686 patent? 20 A. Error correction was known at the priority 21 date of the '686. 22 Q. Okay. Let's turn to the -- well, we have 23 been discussing the Avitable reference. Let's turn 24 to the next page, page 77 of your declaration. 25 Paragraph 253.	Page 87 1 right? 2 ATTORNEY SAMAY: Objection to form. 3 THE WITNESS: Certainly a radar's going to 4 have a certain range, in a hypothetical radar. 5 BY ATTORNEY DAY: 6 Q. So is it your testimony that it -- that 7 radar -- that even in a scenario where a radar 8 system is looking for a distant target that is 9 designed not to be detectable by radar, that the 10 signals will still be high and stable? 11 ATTORNEY SAMAY: Objection. Form. 12 THE WITNESS: The -- most radar systems 13 use a phase shift or frequency shift to understand 14 their distance. And those signals are not as 15 sensitive to amplitude as in, for instance, a radio 16 system where you're communicating information. 17 And so radars do tend to be very high 18 power. And you could have a far away tank that has 19 a weak return signal, but, once again, radars 20 typically use the frequency of phase 21 information because the amplitude doesn't provide 22 sufficient distance information. 23 BY ATTORNEY DAY: 24 Q. Would you agree that multipath fading can 25 be an issue in radar systems?
Page 86 1 A. I see 253. 2 Q. Okay. You make the assertion that 3 Avitable is designed for a radar environment from 4 input signal levels are typically high and stable. 5 Do you see that? 6 A. I -- that's what's stated in 253. 7 Q. Would it be a fair statement that -- I'll 8 start again. 9 So would you agree that sometimes in radar 10 systems, the radar system might be looking for a 11 target that doesn't even want to be found; right? 12 A. In general, I can imagine a hypothetical 13 situation where there's a tank that doesn't want to 14 be found. 15 Q. And a radar system might even be designed 16 to be tracking something that -- I'll start again. 17 In the military radar system, you might be 18 trying to find a target that is specifically 19 designed to not be detectable by a radar system; 20 right? 21 A. Once again, in a hypothetical, I can 22 imagine, yeah, a tank doesn't want to be found. 23 Q. Okay. 24 And in a -- and a radar system might also 25 be trying to find a target that's pretty far away;	Page 88 1 A. I don't believe I provided an opinion on 2 that. I'd have to think about that. 3 Q. So you can't say, one way or another, 4 whether multipath fading is an issue that affects 5 radar systems? 6 A. I'm saying that I haven't considered that, 7 and so I haven't offered that as an opinion. So 8 sitting right here, I'd have to think about that 9 longer and consider it to be able to provide any 10 kind of answer. 11 Q. Okay. Same question with respect to 12 attenuation. Is attenuation an issue in radar 13 systems? 14 A. The radar systems that I've worked with, 15 attenuation, as you mentioned before, amplitude is 16 generally not a reliable variable to use for 17 distance estimation. Phase and frequency are, and 18 that's generally what they use, phase and frequency. 19 Q. Okay. Are radar systems subject to 20 interference? 21 A. I think any radio frequency circuit could 22 be subject to interference. 23 ATTORNEY DAY: All right. So let's look 24 at the Avitable reference itself, and I think it's 25 in the chat. You should have it, but it's

1 Exhibit 1006. Page 89 2 (Exhibit 1006 was previously marked for 3 identification.) 4 BY ATTORNEY DAY: 5 Q. And it's also in the chat window? 6 Let me know when you have it. 7 A. I do have it. 8 Q. And can you turn to Figure 7, which I 9 believe is on page 4 of the PDF, page 340 of the 10 reference. 11 A. I see Figure 7. 12 Q. And Figure 7 is a trace showing that -- 13 trace of an output signal over time; is that right? 14 A. Figure 7 illustrates an expansion of the 15 sampled signal, which my understanding would be from 16 Figure 6 above it. 17 Q. And, actually, if you can go back briefly 18 to Figure 2. Figure 2 shows an equivalent circuit 19 model in sampling mode; is that right? 20 A. So the legend for Figure 2 says: 21 [As Read] Equivalent circuit model in 22 sampling mode. 23 And section 4.1 says: 24 [As Read] The models in figures 2 and 25 3 are used for error analysis.	Page 91 1 voltage across CH, the holding capacitor; is that 2 right? 3 A. That is -- just a moment. 4 Yeah, that would be the sample wave form 5 in Figure 6, and then there's a blowup shown in 6 Figure 7. 7 Q. All right. And we talked earlier in this 8 deposition about the relationship between the energy 9 stored by capacitor in the voltage. 10 Is -- do you recall that? 11 A. The energy in a capacitor is CV squared 12 over 2. 13 Q. So it -- in -- in this system, you see 14 there -- I'll start again. 15 In Figure 7 of Avitabile, you see that 16 there are two different voltage levels labeled Y1 17 and Y2. 18 You see that? 19 A. I do see those. 20 Q. And those correspond to different -- I'll 21 start again. 22 So there's a voltage trace that runs 23 across Figure 7 over time; is that right? 24 A. That is correct. It's a voltage on the Y 25 axis and time on the X axis.
Page 90 1 Q. Okay. And Figure 2 depicts a capacitor in 2 parallel with a resistor -- with a load resistor; is 3 that right? 4 A. So the circuit of Figure 2, C, and RL 5 represent respectively the hold capacitor and the 6 load of a buffer stage following the sample and hold 7 circuit. 8 Q. All right. And Figure 7, which we were 9 just looking at, would be measured across the load; 10 is that right? 11 ATTORNEY SAMAY: Objection. Form. 12 THE WITNESS: So the Figure 7's relating 13 to a sample and hold 1 prototype, and it says the 14 operation is very easily illustrated with reference 15 to Figure 4, which is showing a hold capacitor and a 16 diode bridge. And so that's the circuits that had a 17 Figure 7, I believe, is relating to. 18 BY ATTORNEY DAY: 19 Q. All right. So what's your understanding 20 of where the voltage is shown in Figure 7 where you 21 measure it? 22 A. The "H" would be the output of the voltage 23 sampler, and that would be my understanding of what 24 they're plotting in Figure 6 and Figure 7. 25 Q. All right. So Figure 7 would show the	Page 92 1 Q. And Y1 would show the voltage reached by 2 the capacitor during one sampling cycle, and Y2 3 would show the voltage reached by the capacitor 4 during the following cycle; is that right? 5 A. Y1 is showing the -- I think Figure 7's 6 showing the hold time of the sampled signal, and so 7 Y1 would be showing the voltage which is showing 11 8 millivolts, and then Y2 is showing a different held 9 voltage at 33.4 millivolts. 10 Q. And those two voltages correspond to the 11 held voltage in two different sampling cycles; 12 correct? 13 A. Those two voltages are the held voltages 14 from two different samples, two different sampling 15 instances. 16 Q. And because voltage in a -- I'll start 17 again. 18 Because energy and voltage in a capacitor 19 are proportional, there is more energy being held in 20 the capacitor in Y2 than there is in the capacitor 21 in Y1; correct? 22 A. The -- during the sampling period, 23 current's going to flow from V bias down through the 24 diode and put charge in CH, raises its voltage to 25 33.4 millivolts, that's a higher voltages CV squared

1 over 2 would be a higher energy in that capacitor. 2 Q. And I think you just anticipated my next 3 question, but that higher energy between those two 4 states comes from charge flowing into the capacitor 5 CH; correct? 6 A. Current flowing from the bias into the 7 capacitor, not from the RF input. 8 Q. Did you offer any opinion in your 9 declaration the signal from -- or excuse me, that 10 the current flowing into the capacitor was not 11 coming from the RF input? 12 A. I don't believe I discuss the details of 13 Figure 4, which is the circuit for Figure 7 in my 14 declaration. But just from reading the circuit here 15 today in our deposition, you can see it. 16 Q. You would agree that the sample -- 17 (Clarification inquiry by The Court 18 Reporter.) 19 BY ATTORNEY DAY: 20 Q. Would you agree that the sample and hold 21 circuit in Avitabile takes a sample of the input 22 signal? 23 A. So Figure 4 takes the RF signal and then 24 puts that RF voltage, when it's being tracked, on 25 CH, and then when the diode bridge is turned off and	Page 93 1 mode, energy is being stored on the capacitor; 2 correct? 3 A. Energy is flowing from V bias down through 4 the left-hand diodes into the capacitor CH, and as 5 CH rises, more charge is being put in it from that 6 current. 7 Q. And that energy is stored on the capacitor 8 for that period of time when the voltage trace is 9 steady at Y2; correct? 10 A. My understanding is Y2 is representing the 11 holdings -- hold period, and that would be the 12 voltage on CH. 13 Q. And CH maintains that voltage during that 14 hold period; correct? 15 A. It states here that it maintains that the 16 1.6 hold time is measured. It's not measured there, 17 but it looks about 1.6 nanoseconds for the time the 18 voltage is held. 19 Q. Okay. And in order to hold that voltage, 20 that capacitor needs to store a proportional amount 21 of energy for that time; correct? 22 A. The -- a capacitor with a nonzero voltage 23 would have an energy that's equal to CV squared over 24 2. 25 Q. And that energy is being held during the	Page 94 1 then it's held on CH. 2 So the voltage on CH is mirroring what's 3 coming in on the RF signal in Figure 4. 4 Q. Okay. So turning back to Figure 7 of 5 Avitabile, you can see that the -- there is a time 6 labeled "X1." 7 A. I see X1. 8 Q. And X1 almost corresponds to a local 9 minimum in the voltage trace; is that right? 10 ATTORNEY SAMAY: Objection to form. 11 THE WITNESS: Just looking at where X1 is 12 placed, it's -- yeah. I -- X1 is placed where it's 13 placed. I don't know that I'd further describe it 14 than that. 15 BY ATTORNEY DAY: 16 Q. Yeah, I guess I said almost because it's 17 not exactly what looks like the local -- 18 In any event, following X1, there is a 19 time period where the -- the voltage trace slopes 20 upward until it reaches Y2; is that right? 21 A. The wave form goes up. My understanding 22 is that's the -- if you will, the tracking -- the 23 tracking mode. So it's -- the voltage is going up, 24 just referencing back to Figure 6 for context. 25 Q. And during that time period, the tracking	Page 95 1 whole time; correct? 2 A. Voltage is being held in this wave form 3 here, and, once again, energy is CV squared over 2. 4 Q. And because energy is proportional to 5 voltage, energy would need to be stored in order to 6 hold the voltage; correct? 7 A. Just a quick correction. Energy is 8 proportional to the voltage squared. Here it's 9 showing there's 33.4 millivolts; so there would be 10 energy on the capacitor equal to CV squared divided 11 by 2 for that voltage. 12 Q. Now, there is a period of time -- there is 13 some period of time between the time point X1 and 14 when that voltage trace reaches Y2; correct? 15 A. I think you're referring to, if we start 16 at X1, the wave form in Figure 7 moves up and to the 17 right from level Y1 to level Y2. And then it 18 flattens out, as we discussed previously. 19 Q. And the -- the switch needs to be closed 20 for that -- that full length of time in order for 21 the voltage on capacitor to reach Y2; correct? 22 ATTORNEY SAMAY: Objection to form. 23 THE WITNESS: So Figure 7 is results of 24 the circuit of sample and hold 1 prototype, which is 25 Figure 4, and so it's using a diode bridge, and once
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1 again, the diode bridge looks to the right side, 2 which is the RF signal, and the bridge balances the 3 voltage on the left side so that they're the same. 4 And so during the rising portion, CH would follow 5 the RF signal that's on the right side of the diode 6 bridge. 7 BY ATTORNEY DAY: 8 Q. So if that switch were opened -- let's say 9 that switch were opened halfway during that time 10 period, the capacitor then wouldn't reach that 11 voltage Y2; correct? 12 A. Okay. So Avitabile states in the sample 13 mode the switching MESFETs are turned off and the 14 diodes of the bridge are directly biased, letting 15 the input wave form drop across CH. And then in the 16 hold mode, the MESFET is turned on. The voltage 17 difference between the drain and the source drops 18 about .5 volts. 19 Consequently, the two series connected 20 diodes and two arms of the bridge become inversely 21 biased and the hold capacitor is disconnected by the 22 RF source. 23 So whenever the MESFET is turned on, the 24 diode bridge, which is balancing the voltage from 25 the RF into the hold, would stop. So if you	Page 97 1 discharge? 2 A. The -- first off, are we talking about 3 Figure 4 in Avitabile? Figure 7, sorry. 4 Q. Well, I don't think this question actually 5 needs to be answered with reference to Figure 7. 6 Is it -- you made a statement in your 7 declaration, and I'm asking you if that's a 8 requirement -- if that relates to a requirement in 9 the claim. 10 ATTORNEY SAMAY: Objection to form. 11 THE WITNESS: So claim 11 is configured to 12 operate according to an energy transfer signal. We 13 discussed that previously, which is an independent 14 control signal for an energy transfer system. 15 And then it is to subsample and transfer 16 energy from the first electromagnetic, store it on 17 the storage module, and then the second EM signal is 18 generated from said stored energy. And in an energy 19 transfer system, that would be the energy from the 20 capacitor -- the storage module leaving to generate 21 the second EM signal. 22 So that would be a energy leaving the 23 capacitor. 24 BY ATTORNEY DAY: 25 Q. So is it your testimony that the energy Page 99
1 stopped -- if you turn the MESFET on at a different 2 time, it would stop rising whenever you turn that 3 MESFET on. 4 Once again, MESFET is controlling the 5 diode bridge, and the diode bridge is what's doing 6 the track and hold. 7 Q. All right. I'll ask you to turn to 8 page 70 of your declaration. Actually, pages -- 9 yeah, sorry, page 70. And look at paragraph 227. 10 In the second sentence of paragraph 227, 11 you state: 12 [As Read] If the capacitor 13 discharged, the voltage on the capacitor 14 could not be accurately read/reproduced 15 and Avitabile would not work as a sample 16 and hold circuit. 17 You see that? 18 A. I do see that. 19 Q. Is there any element of claim 11 in the 20 '686 patent that requires the capacitor to 21 discharge? 22 A. I'm sorry. Could you ask that question 23 again. 24 Q. Is there any element of claim 11 of the 25 '686 patent that requires the capacitor to Page 98	1 transfer signal requires a capacitor to be 2 discharged? 3 A. Claim 11 -- 4 ATTORNEY SAMAY: Objection. Form. 5 THE WITNESS: -- says that the second EM 6 signal is generated from the stored energy. 7 BY ATTORNEY DAY: 8 Q. So are you saying that the generated from 9 the stored energy element of claim 11 in the '686 10 patent requires energy to be discharged from a 11 capacitor? 12 ATTORNEY SAMAY: Objection. Form. 13 THE WITNESS: To generate a second EM 14 signal, you would take energy from the capacitor to 15 generate that EM signal. And so that capacitor 16 would -- the energy would change as it generates the 17 EM signal. 18 BY ATTORNEY DAY: 19 Q. Okay. So is it your testimony, then, that 20 the generating limitation requires that the second 21 EM signal be generated by discharging energy from a 22 storage device? 23 A. I just want to be clear because RF signals 24 are positive and negative. So discharge/charge may 25 be relative to what we're looking at, but the second Page 100

1 EM signal is generated from the energy. So the 2 energy on the capacitor is the energy that is 3 generating the second EM signal. 4 Q. All right. I'm going to ask you to look 5 at paragraph 231 of your declaration. 6 And you state: 7 [As Read] Avitabile is not using 8 energy integrated or otherwise to generate 9 the claim second signal. 10 You see that? 11 A. I do see that. 12 Q. Is there any claim element of claim 11 in 13 the '686 patent that requires energy to be 14 integrated? 15 A. I believe we discussed this earlier today. 16 Claim 11 has a energy transfer signal which is an -- 17 is an independent control input of an energy 18 transfer system. And we discussed earlier, for 19 example, an energy transfer system can integrate 20 across multiple pulses. When you're at a zero 21 crossing, for instance, then it would not integrate. 22 So the claim 11 requires a energy transfer 23 system per the construction, and that can be 24 integrated or not integrated. 25 ATTORNEY DAY: Okay. I think we're at	Page 101 1 embodiment of a down converted signal in 2 an energy transfer system. 3 That's followed by figures 57E and 57F 4 from the 551 patent. 5 Do you see that? 6 A. I do see that. 7 Q. And would you agree that Figure 57E would 8 depict an output wave form of a down conversion 9 system? 10 A. 57E illustrates a demodulated basebound 11 signal. 5712, I think is what the spec says. 12 Q. Does Figure 57E represent the output of a 13 sampling process? 14 A. Could you just repeat which figure you 15 were referring to, just so I can properly answer. 16 Q. So Figure 57E. And I'll read the question 17 again. 18 Would you agree that Figure 57E would 19 depict an output wave -- sorry, I'm reading the 20 wrong question. 21 Does Figure 57E represent the output of a 22 sampling process? 23 A. 57E illustrates a demodulate baseband 24 signal, which is generated by a down conversion 25 process. And if we look up above, there's 57C is
Page 102 1 kind of a logical stopping point. Do you want to go 2 off the record for a moment? 3 ATTORNEY SAMAY: Sure. You want to take 4 five? Ten? 5 THE COURT REPORTER: Let's have the 6 videographer take us off, first. 7 THE VIDEOGRAPHER: Stand by. 8 Sorry, one second. 9 All right. We are off the record at 10 10:03. 11 (A break was taken.) 12 THE VIDEOGRAPHER: All right. The time is 13 now 10:31 PST, and we are back on record. 14 BY ATTORNEY DAY: 15 Q. All right. Good afternoon, Dr. Ricketts. 16 A. Good afternoon. 17 Q. Have you discussed your testimony with 18 counsel during any of the breaks today? 19 A. I have not. 20 Q. All right. Can you turn to page 42 of 21 your declaration and paragraph 141. 22 So in paragraph 141, which continues on to 23 page 43, you say: 24 [As Read] The figures below 25 illustrate a close-up view of another	Page 104 1 the energy transfer signal. So these would be from 2 an energy transfer process. 3 Q. My question is whether Figure 57E 4 represents a sampling process. 5 ATTORNEY SAMAY: Objection to form. 6 THE WITNESS: On paragraph 134 of my 7 declaration, I discuss energy transfer and then in 8 parentheses energy sampling system. 9 So 57 is an energy transfer system. It is 10 a discrete time, and so it is -- I think a POSITA 11 would understand that this is an energy transfer 12 system with nonnegligible apertures and discrete 13 energy transfer pulses, 5707. 14 So in the context of the energy transfer 15 system, it would be -- the energy transfer pulses 16 would be discrete; so it would be an energy 17 sampling. 18 BY ATTORNEY DAY: 19 Q. So there is a discrete time during which 20 energy is being stored on a capacitor; is that 21 right? 22 A. There is a -- at discrete intervals, there 23 is energy being transferred to a capacitor, and -- 24 there we go. Portion 5710A represents energy 25 transferred from the input to the storage device,

1 and then 5710B would be the energy that is -- drives 2 the load. 3 And so I think I'm answering your 4 question. When 5707 is on, we're transferring 5 energy to storage element. And then when we turn it 6 off, it's leaving the storage element. 7 Q. And so the on time where the energy is 8 being stored, 5710A, and off time when energy is 9 being discharged from the storage element is 5710B; 10 is that right? 11 A. 5710 -- sorry, 5710A is when energy is 12 transferred from the EM signal, and so that's going 13 into the load and also to the capacitor. 14 Q. Can you turn back to page 41 of your 15 declaration and paragraph 138. 16 And in that paragraph, you cite a couple 17 of excerpts -- or a couple of figures from the 18 specification, what you have linked together, 19 figures 83E and 82B. 20 Do you see that? 21 A. I see that figure in my declaration. 22 Q. All right. And in the first sentence of 23 paragraph 138, you write: 24 [As Read] As shown in Figure 82B 25 above left.	Page 105 1 Q. So in order for that storage capacitance 2 to function as a storage element, there would need 3 to be some nonnegligible impedance at the load; is 4 that right? 5 ATTORNEY SAMAY: Objection. Form. 6 THE WITNESS: 8218 would need to be a 7 value other than zero. 8 BY ATTORNEY DAY: 9 Q. And for a nonnegligible amount of energy 10 to stored on the capacitor, it would need to be an 11 amount that load resist impedance would need to be 12 nonnegligibly different from zero; correct? 13 A. I don't believe I've provided any opinion 14 on a nonnegligible load. I mean, I can say if it's 15 zero -- 16 ATTORNEY SAMAY: Sorry. 17 THE WITNESS: If it's zero ohms, then 18 there's no voltage across the capacitor. And there 19 would be no energy stored on the capacitor. 20 ATTORNEY DAY: All right. Can you bring 21 up Exhibit 1005, which is the Estabrook thesis. 22 (Exhibit 1005 was previously marked for 23 identification.) 24 BY ATTORNEY DAY: 25 Q. And just an administrative note, there's
Page 106 1 I think it's actually below, but in any 2 case: 3 [As Read] As shown in Figure 28B 4 above, when the switch is on during the 5 aperture a portion of the input EM 6 signal 8204 blue passes to the storage 7 capacitor 8208 and the low impedance load 8 8218. 9 You see that? 10 A. I do see that. 11 Q. Does the circuit that's shown in 12 Figure 82B require some impedance at the load for 13 energy to be stored on the capacitor? 14 A. I'm not sure I get your question. Could 15 you maybe rephrase it for me, so I understand. 16 Q. Okay. 17 If the load 8218 in the circuit shown in 18 Figure 82B was zero impedance, would energy still be 19 stored on the capacitor? 20 A. So if it was is zero ohms? 21 Q. Correct. 22 A. If it was zero ohms, then the voltage 23 across the capacitor would be zero because the 24 impedance is connected to ground, and so there'd be 25 no energy on the capacitor.	Page 108 1 two different numbering systems in Estabrook. 2 There's the original numbering and then the 3 numbering on the exhibit. I'm going to refer based 4 on the numbering on the exhibit, which will also be 5 the page that you would go to in the PDF version? 6 So can you turn to page 25 of Estabrook, 7 which should have Figure 1 on it, and let me know 8 when you're there? 9 A. I see Figure 1. 10 Q. All right. So when you see in the upper 11 left hand corner of Figure 1, there is a common 12 mixer symbol with a circle with an X through it? 13 A. I see the circle with the X, and I'll -- I 14 understand that as a mixer. 15 Q. And later in the Estabrook thesis, it 16 describes a few different potential types of mixers 17 that can be used within that particular block of a 18 direct conversion receiver; is that right? 19 ATTORNEY SAMAY: Objection to form. 20 THE WITNESS: It describes several 21 theoretical mixers, and then it does describe some 22 mixers that could be used in a functioning circuit. 23 BY ATTORNEY DAY: 24 Q. And most of the discussion in the petition 25 and in your -- in response in your declaration

1 resolved around a single ended mixer in Figure 14? 2 (Clarification inquiry by The Court 3 Reporter.) 4 BY ATTORNEY DAY: 5 Q. Is that right? 6 A. I discuss Figure 14 in my declaration. 7 Q. And it would be fair to say that Figure 14 8 describes one particular example of a mixer that 9 would correspond to just that mixer symbol at the 10 top left of Figure 1? 11 ATTORNEY SAMAY: Objection to form. 12 THE WITNESS: So the resistive mixer is a 13 mixer -- it's a simulation model. Figure 1 is 14 showing, I guess, a down conversion system. So, you 15 know, from a theoretical standpoint, you could put 16 Figure 14 in it, but Figure 14 doesn't have a real 17 diode in it. It's got a theoretical diode for the 18 simulation analysis they're doing. 19 So agree Figure 14 is a simulation of a 20 mixer, but its junction capacitance is zero, and I 21 don't know that you could actually use that in a 22 actual practical -- or any kind of system. And 23 that's what Chapter 5 is all about, about building a 24 real mixer with a real diode. 25 ///	Page 109 1 circuits that are driving those mixers; is that 2 right? 3 A. The local oscillator is either a sine or a 4 cosine in Figure 1. 5 Q. So those local oscillators would be offset 6 by 90 degrees; is that right? 7 A. The local oscillator that's cosine would 8 be 90-degree out of phase with the sine local 9 oscillator, just by trigonometry. 10 Q. So just looking at the top left portion of 11 Figure 1 of Estabrook, following the symbol for a 12 mixer, there -- would you agree there's also a 13 symbol for an amplifier followed by a low pass 14 filter? 15 Is that right? 16 A. Estabrook describes it as the low level 17 signal processing comprising RF mixers and the first 18 stage of amplification and filtering. 19 Q. So it -- in that -- there's a box labeled 20 "low level front end circuitry." 21 Would you agree that the box in the upper 22 right-hand corner, the symbol on the upper 23 right-hand corner of that box is a symbol -- is a 24 symbol for a low pass filter? 25 A. Estabrook describes it as a filter, and
Page 110 1 BY ATTORNEY DAY: 2 Q. So my question was just the -- that 3 Figure 14, in this theoretical system, would 4 correspond to the mixer symbol at the top left of 5 Figure 1; is that right? 6 ATTORNEY SAMAY: Objection to form. 7 THE WITNESS: Figure 1 has a mixer in it. 8 I agree with that in Figure 1. Figure 14 is this 9 simulation model of this, I guess, mixer circuit 10 that Estabrook puts together. 11 So, I mean, they're -- one is a mixer 12 symbol, one is a simulation of a -- I don't want to 13 call it -- a theoretical mixer. So, I mean, they're 14 both -- one's a symbol for a mixer. 14A is a 15 resistively matched mixer that Estabrook is 16 analyzing; so they're both mixers. 17 BY ATTORNEY DAY: 18 Q. Figure 1 actually shows two mixers; 19 correct? 20 A. Figure 1 shows a mixer on the top, and 21 then a mixer on the bottom. One connected to 22 cosine, one's connected to sine. 23 Q. Thanks. You anticipated my next question. 24 So when you say one is connected to sine and one is 25 connected to cosine, that's referring to the LO	Page 112 1 that shape is generally consistently with a low pass 2 filter. 3 Q. Okay. Now, you did a few simulations 4 based on the Estabrook thesis in your declaration -- 5 that are discussed in your declaration; is that 6 right? 7 A. I simulated the Figure 15 -- sorry, 14A 8 using the spice models given in Estabrook. 9 Q. And none of those simulations added a low 10 pass filter; is that right? 11 A. I only simulated what was in Figure 14A. 12 Q. All right. Since we were talking about 13 Figure 14, let's go to it. It's pages -- page 60 of 14 Estabrook. 15 A. I'm -- I am there. 16 Q. So Figure 14, that has a circuit diagram 17 in Figure 14A, followed by parameters for a 18 simulation of that circuit in Figure 14B; is that 19 correct? 20 A. The -- it's a little bit more than 21 parameters. It's a net list. So the text is 22 describe being the same thing as the pictures above. 23 It just has the values of all the components 24 inserted. 25 Q. What is the ILO in figures 14A and 14B?

1 A. ILO is a -- it is a current source that is 2 a sine with 900 megahertz frequency. 3 And -- yes. And 4 -- it looks like it's 4 4 million amps is the amplitude. 5 Q. So to the right of the ILO in Figure 14A, 6 and then two lines below it in Figure 14B, there's a 7 description of the IRF. 8 Do you see that? 9 A. I do see IRF in the Figure A and in the 10 text in B. 11 Q. And "RF" is the RF input; correct? 12 A. RF would stand for radio frequency, which 13 would be the signal coming in. 14 Q. And the ILO shown in Figure 14B does not 15 depend on the IRF; correct? 16 ATTORNEY SAMAY: Objection. Form. 17 THE WITNESS: The text line describing ILO 18 only mentions -- I mean, ILO and IRF have a common 19 node. They're both sine waves. But the text for 20 ILO does not have a function of IRF in its -- in the 21 text description. 22 BY ATTORNEY DAY: 23 Q. The line for the IRF also includes the 24 value of the amplitude of the IRF signal; correct? 25 A. IRF is a sine wave with a 0.4 mille amp	Page 113 1 small amount of current will flow. 2 Q. Let's turn to Figure 16 which is on 3 page 71. 4 So in figure -- 5 A. Could you remind me of the page again. 6 Q. 71. 7 A. Page 71. There you go. 8 Q. All right. And figures 16B and C depict 9 the voltage and current across the diode in 10 Figure 14; correct? 11 A. Figure 16 shows the output voltage and 12 diode waveforms of Figure 14B. 13 Q. So -- and the shaded portions of those two 14 waveforms -- I'll start again. 15 So the difference between Figure 14 -- 16 between Figure 16B and Figure 16C is that in 17 Figure 16B, the IRF is in phase with the ILO, and in 18 Figure 16C the IRF is out of phase with the ILO; is 19 that right? 20 A. That's my understanding. 21 Q. And the shaded portions of figures 16B and 22 16C represent the time periods during which current 23 is being conducted by the diode; is that right? 24 A. The wave form is labeled "ID," and so I 25 think Estabrook has shaded in underneath it, but the Page 115
1 amplitude at 909 megahertz. 2 Q. And the IRF -- I'll start again. 3 Figure 14B also includes a model of a 4 diode; correct? 5 A. 14B contains a diode model that's been 6 reduced to something for this theoretical analysis. 7 As I mentioned before, it doesn't have any junction 8 capacitance; so it's not a real diode, but a diode 9 that Estabrook has modified for this analysis. 10 Q. And that diode, as it's modeled in 11 Estabrook, has a minimum voltages that's required 12 for it to conduct current; is that right? 13 A. The diode model has a VJ of .9 volts. I 14 think the model's a little more complicated, but 15 these parameters would go together to have a -- an 16 effective on voltage. 17 Q. Is the amplitude of the -- I'll start 18 again. 19 And the amplitude of the IRF by itself is 20 not sufficient to reach that on voltage for the 21 diode; is that right? 22 A. So the diode is an exponential device; so 23 any positive voltage across the terminals will have 24 current flowing through it. So when IRF is creating 25 a positive voltage on the input to the diodes, a Page 114	1 current is listed there with the waveform labeled 2 "ID." 3 Q. And the current is only positive during 4 those shaded time periods; is that right? 5 A. Well, the -- 6 ATTORNEY SAMAY: Objection to form. 7 THE WITNESS: In the shaded regions, the 8 current is positive. The Y axis doesn't really show 9 us what it is outside of that. But certainly where 10 the shaded portion is, you can see visually that 11 it's positive there. 12 BY ATTORNEY DAY: 13 Q. What do you mean by the "Y axis doesn't 14 really show what it is outside of that"? 15 A. So as I mentioned before, a diode conducts 16 at any forward voltage; so there could be a small 17 amount of current in the diode between the two 18 shaded regions. But you'd have to zoom in to see 19 it. On this scale, it's not showing anything that 20 you can discern. 21 Q. And your own simulations reached similar 22 results; correct? 23 A. My simulations, I -- yes. In 24 paragraph 218, I compared my simulations to this 25 figure. Page 116

1 Q. Would it be fair to describe the shaded regions in Figure 16B and 16C as on times of the diode? 2 3 4 A. The shaded regions are when the diode current is the highest in magnitude. The diode current -- sorry, the diode current is going to be a mixture of the inputs. Certainly, that's where it's the highest magnitude is where it's in the shaded portion. 5 6 (Clarification inquiry by The Court Reporter.) 7 8 BY ATTORNEY DAY: 9 10 Q. And I don't think that directly addresses my question. 11 12 Are those shaded portions the on times of the diode? 13 14 ATTORNEY SAMAY: Objection to form. 15 16 THE WITNESS: As I described in my declaration, this is a diode mixer. So there's RF currents and LO currents both sinusoids going into the diode, mixing with the barrier -- being mixed with the barrier resistance to create Harmonics. 17 18 And certainly both currents are flowing in that shaded -- the shaded region. So the two currents are actively mixing in that shaded region. 19 20 21 22 23 24 25	Page 117 1 just visually, I would say it's fair to say that 2 it's at least an order of magnitude smaller in the -- in between the shaded regions. 3 4 Q. And the shaded regions where the diode is conducting significant amounts of current are discrete from each other in Figure 16B and 16C; correct? 5 6 A. The two shaded regions are the two peaks of a sinusoid; so they just follow the -- you know, the top half of a sinusoid every cycle. 7 8 Q. All right. I want to shift gears and talk a little bit about the simulations that you performed. 9 10 Now, you describe number of simulations of the Estabrook reference in your declaration; correct? 11 12 A. Yes. I believe I have a section. Section 12 describes the basis of the simulations, and then later I discussed the specific simulations for different performance metrics for mixers. 13 14 Q. Did you have any assistance in performing the simulations? 15 16 A. I -- these simulations are similar to ones that I use in my class; so I have basic building 17 18 19 20 21 22 23 24 25
Page 118 1 Outside of the shaded region, once again, it's -- can't really see if -- what the current level is there. 2 3 4 BY ATTORNEY DAY: 5 6 Q. Would it be fair to characterize the time period outside of that shaded region as an off period? 7 8 A. So once again, a diode's an exponential device; so it -- as long as it's got any forward voltage, it is on conducting some current. Certainly, between the two shaded regions, the current isn't nearly at the magnitude that it is in the shaded regions. 9 10 Q. And it is -- in fact, it's such a low magnitude that the current is indistinguishable from zero, at least in this figure; is that right? 11 12 A. Visually indistinguishable in this figure. If we had a simulation up, we could certainly go and see exactly what the currents were. 13 14 Q. The magnitude of that current during those in between -- those times in between the shaded regions is many orders of magnitude less than the P current in the shaded regions; is that right? 15 16 A. Once again, without pulling up a simulation where we could measure it specifically, 17 18 19 20 21 22 23 24 25	Page 120 1 blocks that other faculty built, and I use those to put this together. And then I ran all the simulations. 2 3 4 Q. Did you run these on your own computer? 5 6 A. Yes. 7 8 Q. All right. So turn to page 92 of your declaration. 9 10 Can you describe the simulation that you're showing on page 92. 11 12 A. Okay. So I think the description starts in 316. Looking at the second order and third order intermodulations. 13 14 So what you do is IRF1 and IRF2 are two tones, and let's just -- two tone tests was performed. So there was two equal magnitudes separated by one megahertz. And then you increase the input to the tones, and then you look at what the intermodulation products are for that. 15 16 And if you look in 318, paragraph 318, you know, I can find the intermodulation product 2 at 1 megahertz, and then I could find the intermodulation 3 at 8 and 11. And so then I could just sweep the input power and plot those. 17 18 Q. What is IM2? 19 20 A. So IM2 is the second order intermodulation 21 22 23 24 25

1 product; so the way I sort of explained it to my 2 class is the two input tones will mix with one 3 another; so you've got two RF signals. One acts as 4 an LO for the other one. So the difference between 5 the two is 1 megahertz, and that's going to be down 6 convert to a 1 megahertz signal. So that's the 7 intermodulation project 2. And it's because you've 8 got one RF signal and one RF signal and one plus one 9 is 2. That's where the 2 comes from. 10 Q. What is IM3? 11 A. So IM3 is the third order intermodulation. 12 And so if you go through all of the math, when you 13 have a nonlinearity, you will get tones that are 14 adjacent, specifically they're 2RF1 minus RF2. And 15 then that gets down converted by the LO. And so 16 that's where the 3 comes from. 17 You've got 2RF1. It's twice the frequency 18 RF1 plus 1 of RF2. That's where the 3 comes from. 19 And that brings it down to 8 megahertz and 11 20 megahertz because the fundamental is at 9 megahertz. 21 I'm sorry. The fundamentals -- there's 22 two fundamentals there, one at 9 and 10. So they're 23 spaced 1 megahertz aside from there. 24 Q. All right. Turn to page 94 of your 25 declaration and explain the simulations you	Page 121 1 have two Bluetooth devices talking in the same room 2 and they can't step on one another. 3 BY ATTORNEY DAY: 4 Q. Now, this is a simulation just of the 5 single ended mixer in Estabrook by itself; is that 6 right? 7 A. This is using the schematic and net list 8 from 14A and B. 9 Q. This is not a simulation of a complete 10 receiver as described in Estabrook? 11 ATTORNEY SAMAY: Objection to form. 12 THE WITNESS: This is a simulation of 14A, 13 which is a mixer. Estabrook also has chapters on 14 low noise amplifiers and active filters. And this 15 is just a simulation of Figure 14 mixer. 16 BY ATTORNEY DAY: 17 Q. All right. So in the graphs that you have 18 copied on page 94 of your declaration, the X axis is 19 frequency; is that right? 20 A. That's correct. 21 Q. And the frequency is shown here is on a 22 logarithmic scale; is that right? 23 A. The X axis is frequency, and it is on a 24 logarithmic scale. 25 Q. The Y axis is that signal strength
Page 122 1 conducted there. 2 ATTORNEY SAMAY: Objection to form. 3 THE WITNESS: So, first off, I describe 4 sort of the steps starting in, I think, 323, 324. 5 So Estabrook was using a 900 megahertz, so I used 6 the same 900 megahertz and put in a 2 megahertz RF 7 signal. 8 And so, like in Bluetooth, there's a bunch 9 of bands, and you want to receive one band and you 10 don't want to receive what's called the image of 11 that. So if somebody's transmitting a second 12 Bluetooth signal at the image frequency, you've got 13 to get rid of that. 14 And so all I did was I put in one RF at 15 902 megahertz, and what I show above 326 is I get 2 16 megahertz. And then I put in 898 megahertz instead 17 of 902. I also get two megahertz. 18 And what that means is if you wanted to 19 receive a signal at 902 megahertz, if anybody's 20 transmitting at 898, it would basically get down 21 converted right on top of you, and you couldn't tell 22 the difference between the two. 23 And so there's no -- what we call here 24 there's no image rejection for this. And that -- 25 with Bluetooth wouldn't allow that because you could	Page 124 1 measured in decibels; is that right? 2 A. That is correct. And decibels would be a 3 logarithmic. 4 Q. All right. So you go on to talk about the 5 carrier to interference ratio. 6 What is a carrier to interference ratio? 7 A. So -- 8 The carrier to interference ratio is, 9 let's assume I have a signal at what I want to down 10 convert, and then you look at what kind of output do 11 you get out of your system for that. And then you 12 put in a signal at a different frequency. Might be 13 a different radio, for instance, and that's called 14 an interferer. 15 And so you're measuring at the output of 16 the mixer what the ratio of the carrier to the 17 interferer power is. And Bluetooth and other 18 standards, this is a spec they have. 19 And so they say for instance, you know, if 20 your interferer is 3 megahertz away from your 21 carrier, the output of your receiver should have at 22 least a 40-DB difference between the carrier and the 23 interferer. 24 Q. How is that ratio measured? 25 A. So what I did in 96 is I -- maybe this

1 goes a little bit to your point. So I took the 2 minimum sensitivity for a Bluetooth signal at minus 3 70. A system would have some kind of amplification, 4 so 30-DB was a reasonable number. I put my 30-DB 5 in, and then I saw what Estabrook Figure 14 down 6 converts, and its down conversion was minus 44-DB. 7 And that was at my desired signal of 902. 8 I then turned -- I then turn off the 9 carrier, and then I put an interferer in, and I put 10 in two channels at 906 and 908. They're both 11 greater than 3 megahertz away. And then I measured 12 at the same frequency. 13 So when I put my carrier in, I got 2 14 megahertz out. That's my desired signal. I'm now 15 putting in to two signals at 906 and 908, and 16 because of the nonidealities and nonlinearity of the 17 mix it's going to create a component at 2 megahertz, 18 which is the same down converted frequency of my 19 main. 20 And that was minus 73, and that's just 21 measured right from the simulation. And then we 22 just do some math. The difference between minus 73 23 and minus 44 is 31-DB. And for any interferer 24 greater than 3 megahertz, it should be at least 40 25 for Bluetooth.	Page 125 1 I'll just pause if anybody was speaking. 2 Okay. 3 So the definition is what comes out of 4 your receiver. And so that's what I'm looking at 5 here. Coming out of the mixer is minus 44 on the 6 left and minus 73 on the right. 7 If I didn't use Estabrook 14, and I put 8 some other, you know, mixer in there, I would get 9 two values out, and the ratio would be the ratio. 10 BY ATTORNEY DAY: 11 Q. Okay. So your test is looking at the 12 ratio of outputs that you're receiving from your 13 carrier and your interfering frequency; is that 14 right? 15 A. To be clear, it's the output of the mixer 16 and the receiver because that's where the 17 nonlinearity exists. After the mixer, both signals 18 would receive the same gain, both at the same exact 19 frequencies; so they'd be the same for any 20 filtering. 21 So if you will, the ratio of the two 22 should not change as you go down the rest of the 23 receiver change. It changes from the antenna to the 24 output of the mixer. 25 Q. And just to be clear, like, your testimony Page 127
Page 126 1 Q. What is the source of your assertion that 2 the -- that ratio should be at least 40 for 3 Bluetooth? 4 A. We use Bluetooth in my lab. We build 5 Bluetooth receivers. That's my understanding of the 6 requirement for Bluetooth. 7 Q. Did you check the Bluetooth specification 8 to come up with that requirement? 9 A. I mean, I have checked it before. Like I 10 said, we use it in my research lab. 11 Q. Did you check it specifically before you 12 conducted the simulations? 13 A. I guess -- I think the answer to that is 14 I've checked the spec many times, and so I -- I 15 mean. Let me put it this way: Our work in 16 Bluetooth has been going on for years. I did the 17 simulations more recent to the March time frame when 18 I submitted the declaration. 19 Q. Is there a -- any difference in the way 20 that carrier to interference ratios are tested in 21 the context of an analog receiver compared to a 22 digital receiver? 23 ATTORNEY SAMAY: Objection to form. 24 THE WITNESS: So the definition of 25 "carrier to interference" is I am -- I apologize.	Page 128 1 is that the -- what you measured in your simulation 2 was the magnitude of the output of the receiver at a 3 particular frequency given that both the carrier and 4 then the interference; is that right? 5 A. Just to clarify, the output of the 6 receiver in this simulation was an example 2 7 megahertz. So I measured the power of the carrier, 8 which is down converted to 2 megahertz, and then I 9 measured the interferer, which because of 10 nonidealities is down converted to 2 megahertz also. 11 I'm looking at the same frequency. I just 12 wanted to clarify that. 13 Q. And in your interference, the interference 14 portion of the test, did you add the two interfering 15 frequencies at the same time? 16 A. Yes. That's -- yes. 17 Because that's how it exists in the real 18 world. You've got Bluetooth. You can have any of 19 the Bluetooth channels active. 20 Q. Now, the carrier signal that you used in 21 your test, was that carrier just a sine wave at a 22 specified frequency? 23 A. The carrier was of the same format of 14B 24 which was a sinusoid with a magnitude and a 25 frequency.

1 Q. Is it possible -- I'll start again. Page 129 2 You didn't use any sort of modulated wave 3 form in your testing? 4 A. I did the simulation the same way 5 Estabrook did with single tones and no modulation 6 other than the RF and the LO are different 7 frequencies. 8 Q. Is it possible to simulate a modulated 9 wave form in spice? 10 ATTORNEY SAMAY: Objection. Form. 11 THE WITNESS: Just in general, spice 12 simulators can simulate a lot of things. You could 13 put a modulated signal in and do simulations and 14 calculations in spice. 15 BY ATTORNEY DAY: 16 Q. And are you familiar with the term "bit 17 error rate"? 18 A. I am familiar with bit error rate. 19 Q. What is bit error rate? 20 A. Bit error rate is the rate at which the 21 digital 1 or 0 you received has an error. So a bit 22 error rate of 10 to the minus 6, I believe, means 23 every million bits, one is wrong, on average. 24 Q. And, in fact, the Bluetooth standard 25 actually -- there are a number of tests in Bluetooth	1 signal at a specified intensity, and then tell me if Page 131 2 it could -- it then could figure out if it meets a 3 particular bit error rate? 4 ATTORNEY SAMAY: Objection. Form. 5 THE WITNESS: I guess, once again, my 6 simulations have a specified input. And this 7 simulation was just looking at the mixer. 8 Performance just looking at the ratio. To calculate 9 a bit error rate, you need to have a complete 10 digital signal. You need to then use that, 11 calculate it, find the bit error rate. 12 All I'm showing here is simply that I can 13 simulate the carrier to interference ratio, and it's 14 nonzero. 15 Let me rephrase that. It's -- it's 31-DB, 16 which is too big a number. 17 BY ATTORNEY DAY: 18 Q. Are you familiar with National 19 Instruments? 20 A. I am familiar with National Instruments. 21 Q. Do you have any reason to believe that 22 National Instruments would put out an inaccurate 23 guide to Bluetooth testing? 24 A. I don't know what National Instruments 25 would put out. I'm certainly familiar with the
1 standard that would describe what -- I'll start it Page 130 2 again. 3 The carrier to interference test in the 4 Bluetooth standard actually involves setting up the 5 carrier and interfering signals at specified input 6 powers and then determining whether the output bit 7 error rate is sufficient; is that right? 8 A. The spec for Bluetooth specifies the input 9 magnitude; so it's the sensitivity, which is minus 10 70, and then the interferers are 3-DB above that. 11 And then you measure the ratio of the carrier to 12 interferer. 13 Bluetooth has other checks, and I'm sure 14 there's a bit error rate check related to some of 15 the specs, but this is just looking at the ratio of 16 the frequency output. 17 Q. So your testimony is if I looked at the 18 relevant Bluetooth specification in effect at the 19 time of the alleged invention of the '686 patent, it 20 would tell me to look at the ratio of the frequency 21 output to do a carrier to interference test? 22 A. That's how carrier to interference test is 23 done. 24 Q. Okay. It wouldn't tell me to set up a 25 carrier at a specified intensity and an interference	1 company and the materials that they put out. Page 132 2 Q. Would you agree with the statement that in 3 a Bluetooth -- I'll start again. 4 Would you agree with the statement that in 5 the Bluetooth carrier to interference ratio test, 6 the device under test is tested by placing 7 interfering signals at a known set of frequencies 8 and amplitudes and measuring the one in signals bit 9 error rate? 10 A. That could be a test that natural -- 11 National Instruments does. 12 Q. All right. 13 A. I mean, just to be clear, a bit error rate 14 doesn't give you a ratio of carrier to interferer. 15 Q. Can you tell me what portion of the 16 Bluetooth specification your test comes from. 17 A. I can't tell you off the top of my head 18 here, no. It's just one we use in the lab. 19 Q. Does your declaration cite the Bluetooth 20 specification? 21 A. I don't see a -- I don't see a citation in 22 that paragraph. 23 Q. Okay. So, you know, as you sit there 24 today, you can't tell me what -- where specifically 25 the test you performed comes from out of the

1 Bluetooth specification? Page 133 2 A. You know, which pages, no. Like I said, 3 there's not a cite in that paragraph. It's just 4 something that we do in the lab. 5 ATTORNEY DAY: All right. I think I might 6 be fairly close to wrapping up with my questions. I 7 think I'm -- what I'd like to do just to make sure 8 is maybe take like a ten-minute in place recess, and 9 then come back and see if I have anything else. 10 Is that all right for your side? 11 ATTORNEY SAMAY: Sure. Why don't we come 12 back at, like, 2:40. If you need a couple more 13 minutes, take them. 14 ATTORNEY DAY: Sure. 15 ATTORNEY SAMAY: All right. Sounds good. 16 ATTORNEY DAY: All right. Thanks. 17 ATTORNEY SAMAY: Yep. 18 THE VIDEOGRAPHER: Okay. Are we ready to 19 go off the record? 20 THE COURT REPORTER: Yes. Go ahead. 21 THE VIDEOGRAPHER: All right. Going off 22 the record at 11:28. 23 (A break was taken.) 24 THE VIDEOGRAPHER: All right. We're back 25 on the record at 11:41.	1 Going off record at 11:42. Page 135 2 (Deposition concluded at 11:42 A.M.) 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
1 BY ATTORNEY DAY: Page 134 2 Q. All right. Dr. Ricketts, thank you for 3 your time and subject to any follow-up that your 4 counsel may have, I have no further questions. 5 ATTORNEY SAMAY: All right. I think I 6 probably have one question. 7 EXAMINATION 8 BY ATTORNEY SAMAY: 9 Q. Professor Ricketts, does Avitabile meet 10 the home RF standard? 11 A. There's nothing that I saw in Avitabile 12 that said it'd be compliant with standard for home 13 RF. 14 ATTORNEY SAMAY: That's all I've got. 15 THE COURT REPORTER: Is there any further 16 commentary before we close the record? 17 ATTORNEY DAY: Nothing further. 18 ATTORNEY SAMAY: Nothing here. 19 THE COURT REPORTER: Hearing none, we will 20 go off the record. Videographer, please take us off 21 the record. 22 THE VIDEOGRAPHER: Okay. I just wanted to 23 know if we wanted to get copy orders on record. 24 THE COURT REPORTER: I'll do that after. 25 THE VIDEOGRAPHER: Okay. All right.	1 TRANSCRIPT ORDERS Page 136 2 ATTORNEY DAY: Normal delivery. Rough. 3 Draft. 4 ATTORNEY SAMAY: Yes, copy. Rough draft. 5 If any need to expedite, somebody will be in touch. 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

1 CERTIFICATE OF SHORTHAND REPORTER

2
3 I, Michael P. Hensley, Registered Diplomate

4 Reporter for the State of California, CSR No. 14114,

5 the officer before whom the foregoing deposition was

6 taken, do hereby certify that the foregoing

7 transcript is a true and correct record of the

8 testimony given; that said testimony was taken by me

9 stenographically and thereafter reduced to

10 typewriting under my direction; that reading and

11 signing was not requested; and that I am neither

12 counsel for, related to, nor employed by any of the

13 parties to this case and have no interest, financial

14 or otherwise, in its outcome.

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19 _____
20 Michael P. Hensley, CSR, RDR
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12:05 (1)	316 (1)	7 (18)	account (1)
12th (1)	318 (2)	7,483,686 (2)	accurate (1)
134 (2)	31-DB (2)	7:49 (1)	accurately (1)
138 (5)	32 (2)	70 (4)	active (2)
14 (15)	323 (1)	71 (3)	actively (1)
141 (2)	324 (1)	73 (3)	acts (1)
14114 (4)	326 (1)	74 (1)	actual (3)
1435 (1)	33.4 (3)	75 (1)	add (4)
14A (8)	340 (1)	76 (1)	added (2)
14B (8)	3-DB (1)	77 (1)	adding (4)
15 (1)		7's (2)	additional (3)
16 (2)	< 4 >		addresses (1)
167 (3)	4 (9)	< 8 >	adjacent (1)
168 (3)	4.1 (1)	8 (8)	adjust (1)
16B (6)	40 (2)	8.2 (1)	adjusts (1)
16C (5)	40-DB (1)	802.11 (12)	administrative (2)
17 (2)	41 (1)	82 (1)	admonition (2)
18 (2)	42 (1)	8204 (1)	adopt (1)
1999 (3)	43 (1)	8208 (1)	adopted (2)
	44 (2)	8212 (2)	adopts (1)

advancing (2) advise (1) afternoon (2) ago (2) agree (21) agreed (3) agreed-upon (1) ahead (5) aliasing (4) alleged (1) allow (1) amount (5) amounts (1) amp (1) amplification (2) amplifier (1) amplifiers (1) amplitude (8) amplitudes (1) amps (1) analog (2) analysis (8) analyze (4) analyzed (1) analyzing (2) annotations (2) answer (16) answered (1) answering (4) answers (6) antenna (1) anticipated (2) anticipates (2) anticipation (1) anybody (1) anybody's (1) apart (1) aperture (2) apertures (7) Apologies (1) apologize (3) APPEAL (2) appear (2) APPEARANCES (1) appearing (2) Appendix (1) Apple (1) applications (1) appreciate (1)	approach (1) approximate (1) approximately (1) April (1) architecture (1) area (1) argues (1) arms (1) arrow (2) art (1) aside (1) asked (2) asking (8) asserting (2) assertion (2) asserts (1) assistance (1) associates (1) assume (7) assuming (1) attached (2) attenuation (3) ATTORNEY (160) August (1) author (1) average (1) Avitabile (40) aware (8) axis (7) < B > back (27) background (4) backgrounds (1) balances (1) balancing (1) band (5) bands (2) bandwidth (2) barrier (3) baseband (24) basebound (1) based (5) baseline (1) basic (4) basically (2) basis (5) beginning (2) behalf (4)	believe (32) best (1) bias (3) biased (2) big (1) bit (17) bits (1) block (1) blocks (1) blowup (1) blue (1) Bluetooth (77) BOARD (3) Boone (1) bottom (2) Boulevard (1) box (3) branding (2) break (8) breaking (1) breaks (2) bridge (11) brief (2) briefly (1) bring (1) brings (3) brought (1) buffer (1) build (1) building (2) built (2) bunch (1) < C > calculate (2) calculations (1) California (4) call (6) called (2) calls (5) Camino (1) Cap (1) capabilities (1) capable (4) capacitance (5) capacitances (1) capacitor (100) capacitors (4) capture (1)	captured (1) captures (2) careful (1) carrier (27) Case (33) cases (9) certain (4) Certainly (13) CERTIFICATE (1) Certified (2) certify (1) cetera (2) CH (12) change (4) changes (1) channels (2) Chapter (1) chapters (1) characterize (1) charge (8) chart (4) chat (4) check (11) checked (7) checking (1) checks (1) CHEN (2) circle (2) circuit (36) circuitry (2) circuits (3) citation (4) cite (10) cited (12) cites (2) citing (2) claim (100) claimed (1) claims (17) Clarification (13) clarify (9) clarifying (1) clarity (2) class (2) clean (2) clear (5) clearly (1) close (3) closed (2)
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close-up (1)	connected (7)	created (1)	device (5)
code (1)	Consequently (1)	creating (1)	devices (1)
coherent (2)	consider (2)	crossing (2)	diagonal (2)
COIE (3)	considered (6)	crossings (1)	diagram (1)
combination (6)	consistent (7)	CSR (5)	diagrams (1)
combined (1)	consistently (6)	current (33)	Diego (1)
come (5)	construction (70)	currents (7)	difference (9)
comes (7)	constructions (15)	current's (1)	differences (2)
comfortable (1)	construction's (1)	CV (8)	different (41)
coming (6)	construe (3)	cycle (3)	differentiating (1)
comma (1)	construed (5)	cycles (1)	differently (2)
commencing (1)	consultant (1)	< D >	difficulty (1)
commentary (2)	contains (1)	DAIGNAULT (4)	Digital (13)
common (7)	contents (1)	date (9)	diode (34)
commonly (1)	context (14)	DAVID (5)	diodes (5)
communicating (1)	continues (1)	DAY (92)	diode's (1)
communication (3)	continuous (4)	deadline (1)	Diplomate (2)
company (1)	contrast (1)	decibels (2)	direct (1)
compared (2)	control (13)	declaration (93)	direction (1)
comparison (1)	controlled (1)	declaration's (1)	directly (2)
competing (1)	controlling (2)	decode (2)	discern (1)
complaints (1)	controls (2)	decodes (1)	discharge (3)
complete (2)	conversion (7)	define (1)	discharge/charge (1)
compliance (6)	convert (2)	definition (7)	discharged (10)
compliant (1)	converted (6)	degrees (1)	discharging (1)
complicated (1)	converter (4)	delay (1)	disclose (3)
complies (1)	converts (2)	delivered (2)	disclosed (3)
component (2)	copied (1)	delivery (1)	discloses (3)
components (1)	copies (3)	demodulate (2)	disclosure (3)
comprising (1)	copy (4)	demodulated (1)	disconnected (1)
computer (2)	corner (3)	demonstrate (2)	discrete (20)
concept (1)	correct (54)	depend (1)	discuss (10)
concepts (3)	corrected (4)	depict (3)	discussed (16)
concerned (1)	correction (10)	depicts (1)	discusses (1)
concluded (1)	correctly (2)	deposed (1)	discussing (4)
concluding (1)	correspond (4)	Deposition (15)	Discussion (13)
conclusion (2)	corresponds (1)	depositions (1)	dispute (3)
conduct (1)	cosine (4)	describe (12)	distance (3)
conducted (3)	Counsel (14)	described (5)	distant (1)
conducting (2)	count (1)	describes (11)	district (13)
conducts (1)	couple (9)	describing (6)	divided (1)
conference (1)	coupled (1)	Description (6)	Doctor (1)
Configured (8)	course (4)	design (1)	document (24)
confirm (3)	court (47)	designed (7)	documents (4)
conform (8)	courts (1)	desired (2)	doing (7)
conformance (4)	court's (2)	details (1)	Downconverter (1)
conformed (1)	cover (1)	detectable (2)	downloaded (3)
conforming (1)	covered (1)	determining (1)	DR (13)
conforms (6)	create (2)		Draft (2)

drafted (1) drain (1) drive (14) driven (1) drives (2) driving (3) drop (1) dropped (1) drops (1) duly (1) dynamic (1) < E > earlier (7) easily (1) eday@perkinscoie.com (1) effect (1) effective (1) effectively (1) either (5) El (1) elaborate (2) electrical (2) electromagnetic (2) electronic (3) electronics (1) element (13) elements (6) EM (41) email (1) embodiment (1) embodiments (1) employed (1) ended (2) energy (253) engineering (2) entire (2) environment (1) envision (3) equal (3) equals (1) equivalent (2) error (25) ESQ (2) establish (1) established (1) Estabrook (25)	ESTABROOK01 (1) estimation (1) et (2) evaluating (1) EVAN (2) event (2) events (1) exact (3) exactly (2) EXAMINATION (2) EXAMINATIONS (1) examined (1) example (20) examples (1) excerpts (1) excuse (4) exhibit (12) EXHIBITS (4) existing (1) exists (2) expand (1) expansion (1) expect (1) expedite (1) expert (2) explain (2) explained (2) exponential (2) extend (1) extent (1) < F > F.4th (1) face (6) fact (2) faculty (1) fading (2) fair (13) fairly (1) falls (1) familiar (7) far (2) federal (15) field (1) Figure (97) figures (8) file (2) filed (10) files (2)	filing (2) filings (2) filter (5) filtering (2) filters (1) final (2) financial (1) find (5) finish (2) finished (3) finite (5) first (33) fit (1) fitting (1) five (1) fixed (10) flattens (1) Florida (1) flow (2) flowing (6) Focus (1) follow (2) followed (6) following (7) follows (1) follow-up (1) foregoing (2) form (67) format (2) forms (1) formula (2) forth (3) forward (3) found (4) Foundation (1) frame (1) frequencies (4) frequency (58) front (3) full (2) function (2) functioning (1) fundamental (1) fundamentals (2) further (4) < G > gain (1) Gaussian (3)	gears (1) general (8) generally (9) generate (4) generated (17) generates (1) generating (2) generic (2) generically (1) getting (1) give (4) given (7) go (30) goes (2) going (42) Good (9) graphs (1) greater (2) ground (1) guess (8) guide (1) guys (1) < H > half (1) halfway (1) hand (1) handle (1) happy (1) hard (1) hardware (4) Harmonics (1) head (1) hear (3) heard (2) hearing (3) held (9) help (1) helpful (1) Hensley (6) heterodyning (1) Hey (1) high (6) higher (13) highest (2) high-level (1) HOFIANI (2) hold (17) holding (1)
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holdings (1) home (2) hour (2) hours (1) hypothetical (5) < I > ID (2) identification (3) IEEE (1) illustrate (1) illustrated (1) illustrates (3) ILO (9) IM2 (2) IM3 (2) image (6) imagine (4) impedance (13) i-m-p-e-d-a-n-c-e (1) important (2) inaccurate (1) include (4) included (1) includes (5) incorporate (1) incorporated (1) increase (2) increased (1) independent (13) INDEX (1) indicate (2) indistinguishable (2) information (7) input (32) inputs (1) inquiry (12) inserted (1) insertion (2) inside (2) instance (13) instances (1) Instruments (5) integrate (5) integrated (16) integrating (1) intended (1) intensity (2) interest (1)	interference (19) interferer (10) interferers (1) interfering (4) intermediate (6) intermodulation (6) intermodulations (1) interpretation (2) interpreted (1) interpreting (1) interruption (1) intervals (1) introduce (1) invention (1) inversely (1) involved (1) involves (1) IPR (12) IPR2020-01265 (1) IPR2024-00796 (3) IRF (13) IRF1 (1) IRF2 (1) issue (4) issued (1) issues (2) it'd (2) its (16) IYER (4) < J > joined (1) joint (3) jump (1) junction (3) < K > keep (1) key (1) keying (1) kind (5) know (53) knowing (2) known (7) < L > lab (4) labeled (7) laid (1)	language (8) lawyer (1) lay (1) leave (1) leaving (3) led (6) left (7) left-hand (1) legal (1) legend (1) length (1) letting (1) level (6) levels (2) license (1) limitation (3) limitations (5) line (2) lines (2) linked (1) list (3) listed (5) listing (1) Litigation (6) litigations (1) little (6) LLP (2) LNA (1) LO (8) load (42) local (6) located (1) lock (4) logarithmic (3) logical (2) long (1) longer (1) look (33) looked (8) looking (33) looks (4) loop (5) LOs (1) loss (2) lot (1) low (14) lower (3) low-impedance (4)	< M > machine (1) magnitude (10) magnitudes (1) main (1) maintains (2) make/become (1) making (1) March (1) MARKED (7) Markman (2) master (1) masters (1) master's (1) matched (1) material (1) materials (15) math (2) mathematic (1) mathematics (1) matter (19) matters (6) MCKENZIE (2) MDFL (1) MDFL-3-15-cv-01477-151 (1) mean (32) meaning (13) means (5) meant (1) measure (3) measured (12) measurement (1) measurements (1) measuring (2) MEDIATEK (12) meet (26) meeting (6) meets (10) megahertz (26) mention (2) mentioned (11) mentions (1) MESFET (5) MESFETs (1) met (3) metric (1) metrics (2) MEURER (2)
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Michael (4)	need (36)	one's (2)	pending (1)
microprocessor (1)	needed (3)	opened (3)	performance (5)
Middle (1)	needs (11)	operate (6)	performed (3)
Mike (3)	negative (1)	operates (1)	performing (1)
military (1)	neither (1)	Operating (1)	period (13)
mille (1)	net (2)	operation (2)	periodic (5)
million (2)	never (2)	opine (1)	periodically (1)
millivolts (4)	NEVO (5)	opining (1)	periods (2)
mine (1)	node (1)	opinion (32)	PERKINS (3)
minimize (1)	noise (1)	opinions (4)	petition (8)
minimum (3)	nonidealities (2)	order (18)	Petitioners (3)
minus (10)	nonlinear (2)	orders (3)	phase (13)
minutes (2)	nonlinearities (1)	ordinary (9)	phrase (16)
mirroring (1)	nonlinearity (4)	original (1)	physical (1)
misspoke (1)	nonnegligible (10)	originally (1)	physically (1)
mix (2)	nonnegligibly (1)	oscillator (4)	pictures (1)
mixed (1)	nonzero (3)	oscillators (1)	piece (1)
mixer (31)	noon (3)	outcome (1)	pieces (1)
mixers (8)	Normal (1)	output (17)	place (5)
mixing (2)	normally (1)	outputs (1)	placed (3)
mixture (1)	notation (2)	Outside (6)	places (1)
mode (6)	notations (1)	overview (4)	placing (1)
model (7)	note (3)	Owner (3)	plain (9)
modeled (1)	notes (1)	< P >	played (1)
models (3)	notice (1)	packet (3)	please (6)
model's (1)	noticed (1)	packets (2)	plot (1)
modified (1)	Number (13)	Page (41)	plotting (1)
modulated (4)	numbering (6)	pages (4)	plurality (1)
modulation (15)	Nyquist (1)	paper (1)	plus (3)
module (4)	< O >	paragraph (51)	point (8)
module's (1)	o0o (1)	paragraphs (4)	portion (24)
moment (8)	object (3)	parallel (1)	portions (4)
month (1)	objected (1)	parameters (3)	pose (1)
morning (4)	Objection (54)	parentheses (1)	POSITA (26)
mouthful (1)	objections (1)	PARKERVISION	POSITA's (4)
moved (1)	obvious (2)	(33)	positions (1)
moves (1)	occasions (1)	ParkerVision's (4)	positive (6)
multipath (2)	occur (1)	part (20)	possible (3)
multiple (8)	offer (2)	partial (1)	potential (1)
< N >	offered (4)	particular (8)	power (7)
name (5)	OFFICE (2)	parties (8)	powers (1)
nanoseconds (1)	officer (1)	pass (4)	practical (1)
National (5)	offset (1)	passes (1)	practice (1)
natural (1)	Oh (1)	PATENT (63)	precisely (1)
near (1)	ohms (3)	patents (5)	preparation (6)
nearly (1)	Okay (57)	pause (1)	prepare (2)
necessarily (4)	Once (19)	PDF (2)	prepared (1)
necessary (2)	ones (3)	peaks (1)	preparing (1)
			Present (1)

presented (1)	question (33)	reduced (2)	resist (1)
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previous (11)	quick (1)	refer (13)	resistive (1)
PREVIOUSLY (8)	quite (1)	reference (36)	resistively (1)
printed (1)	quote (1)	referenced (3)	resistor (2)
prior (13)	quoted (1)	references (1)	resolved (1)
priority (7)		referencing (1)	respect (11)
probably (3)	< R >	referred (3)	respectively (1)
problems (1)	radar (20)	referring (13)	response (4)
procedural (3)	radars (2)	refers (3)	rest (1)
procedures (1)	radar's (1)	regard (3)	results (2)
proceedings (1)	radio (5)	regarding (3)	retained (5)
process (5)	radios (2)	region (4)	retainer (1)
processing (3)	raises (1)	regions (11)	retirement (1)
producing (1)	ran (1)	Registered (2)	return (1)
product (4)	range (2)	reiterate (1)	Returning (1)
products (1)	rate (16)	rejected (1)	review (10)
Professor (1)	ratio (17)	rejection (6)	reviewed (10)
project (1)	ratios (2)	relate (1)	reviewing (5)
proper (2)	RDR (2)	related (7)	revision (1)
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prototype (2)	reask (3)	remotely (1)	room (2)
provide (8)	reason (7)	repeat (3)	Rough (2)
provided (8)	reasonable (1)	rephrase (3)	roughly (1)
provides (3)	reattach (2)	report (5)	run (1)
provisional (1)	recall (27)	Reported (1)	runs (1)
PST (4)	receive (4)	Reporter (40)	
PTAB (12)	received (1)	reports (1)	< S >
PTAB's (2)	receiver (18)	represent (6)	SAMAY (74)
published (1)	receivers (1)	representing (1)	sample (40)
pulling (1)	receives (1)	represents (4)	sampled (3)
pulse (18)	receiving (2)	requested (1)	sampler (2)
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put (23)	recite (1)	required (6)	sampling (58)
puts (2)	recites (1)	requirement (19)	sampling's (1)
putting (1)	recommendation (2)	requirements (30)	San (1)
	record (24)	requires (27)	satisfy (2)
< Q >	recorded (2)	requiring (1)	saw (3)
Qualcomm (6)	records (1)	research (1)	saying (5)

says (18)	simulate (3)	stable (2)	sweep (1)
S-Band (1)	simulated (4)	stage (2)	switch (19)
scale (3)	simulation (18)	stamping (1)	switching (1)
Scans (1)	simulations (17)	Stand (3)	sworn (1)
scenario (1)	simulators (1)	standard (36)	symbol (13)
schematic (2)	sine (8)	standards (23)	symbols (1)
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search (2)	sinusoid (3)	start (27)	synchronize (2)
searching (2)	sinusoids (1)	started (2)	synchronizes (1)
second (55)	sir (2)	starting (3)	synonymous (1)
second-to-last (1)	sit (9)	starts (3)	system (76)
section (31)	sitting (5)	State (9)	systems (14)
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sensitivity (11)	software (1)	stenographic (1)	talk (5)
sent (1)	Solutions (1)	Stenographically (2)	talked (4)
sentence (14)	somebody (1)	step (1)	talking (16)
sentences (1)	somebody's (1)	steps (1)	talks (1)
separate (4)	sorry (22)	stop (2)	tank (3)
separated (1)	sort (6)	stopped (1)	target (4)
separately (1)	sounded (1)	stopping (1)	taught (1)
sequence (1)	Sounds (1)	storage (27)	technical (12)
series (1)	source (4)	store (4)	technological (2)
served (1)	spaced (1)	stored (27)	technologies (1)
service (1)	speak (2)	stores (3)	technology (5)
serving (1)	speaker (1)	storing (1)	tell (7)
set (5)	speaking (1)	strength (1)	Ten (1)
setting (1)	spec (6)	strict (1)	tend (1)
shaded (23)	special (3)	structure (3)	ten-minute (1)
shape (3)	specific (30)	STUART (2)	term (20)
shaping (4)	specifically (26)	stuck (2)	terminals (1)
shift (5)	specification (7)	sub (2)	terminology (2)
Shorthand (3)	specifications (1)	subject (4)	terms (7)
show (16)	specified (5)	submitted (3)	test (11)
showing (15)	specifies (1)	submodule (1)	tested (4)
shown (12)	specify (1)	subsample (11)	testified (1)
shows (4)	specs (3)	substance (2)	testimony (17)
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side-by-side (1)	spelled (1)	sufficient (6)	tests (2)
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signals (12)	spice (4)	Suite (2)	Textron (1)
signature (2)	spoke (2)	summer (1)	Thank (4)
significant (1)	square (2)	supposed (1)	Thanks (2)
signing (9)	squared (8)	sure (21)	theoretical (6)
similar (2)	ssamay@daignaultiyer	surprised (1)	thesis (3)
simply (1)	.com (1)	swear (1)	

thing (6)	underneath (1)	weak (1)
things (2)	understand (27)	web (1)
think (81)	understanding (25)	Well (17)
third (2)	understands (1)	we're (18)
three (4)	understood (2)	we've (3)
thrown (2)	unique (1)	Wi-Fi (1)
Thursday (3)	UNITED (2)	window (2)
time (54)	unmarked (1)	WITNESS (71)
times (11)	up/become (2)	word (13)
today (11)	up-and-down (1)	words (5)
Today's (3)	upper (3)	work (4)
tone (1)	upward (1)	worked (2)
tones (5)	use (28)	world (1)
top (7)	uses (4)	would've (4)
topic (1)	< V >	wrapping (1)
touch (1)	value (5)	write (3)
trace (7)	values (3)	wrong (2)
track (3)	variable (9)	wrote (2)
tracked (1)	variety (1)	< X >
tracking (4)	verbalize (1)	X1 (8)
TRADEMARK (2)	verify (4)	< Y >
transceiver (15)	version (3)	Y1 (6)
transceivers (1)	versions (2)	Y2 (11)
TRANSCRIPT (2)	versus (2)	yeah (14)
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transferred (16)	Videographer (20)	Yep (1)
transferring (5)	Videotaped (2)	< Z >
translation (4)	Vienna (1)	zero (17)
translations (1)	view (1)	zeros (1)
translator (5)	viewing (1)	Zoom (3)
transmission (1)	Virginia (1)	
transmit (1)	visually (3)	
transmitting (2)	VJ (1)	
TRIAL (2)	voltage (93)	
trigonometry (1)	voltages (5)	
true (3)	volts (2)	
trying (5)	volume (1)	
turn (18)	< W >	
turned (6)	wait (3)	
Turning (2)	want (21)	
twice (1)	wanted (7)	
two (41)	wasted (1)	
types (1)	wave (13)	
typewriting (1)	waveform (1)	
typical (3)	waveforms (2)	
Typically (7)	waves (1)	
< U >	way (15)	
U.S (2)		