

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KANGXI COMMUNICATION TECHNOLOGIES (SHANGHAI) CO.,

LTD.,

Petitioner,

v.

SKYWORKS SOLUTIONS, INC.,

Patent Owner.

Case IPR2024-01456
U.S. Patent No. 9,450,579

Case IPR2024-01457
U.S. Patent No. 9,148,194

Washington, D.C.
Thursday, December 11, 2025

CROSS-EXAMINATION OF

DR. DAVID WENTZLOFF

REPORTED BY: SUSAN L. CIMINELLI, CRR, RPR

Henderson Legal Services

202-220-4158

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EX-1050

Kangxi Communication Technologies (Shanghai) Co., Ltd. v. Skyworks Solutions, Inc.

1 Cross-Examination of DR. DAVID
2 WENTZLOFF, a witness herein, called for examination
3 by counsel for Petitioner in the above-entitled
4 matter, pursuant to notice, the witness being duly
5 sworn by SUSAN L. CIMINELLI, CRR, RPR, a Notary
6 Public in and for the District of Columbia, held at
7 WilmerHale, LLP, 2100 Pennsylvania Avenue, N.W.,
8 commencing at 9:46 a.m.

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1 C O N T E N T S

2 DR. DAVID WENTZLOFF

3 EXAMINATION PAGE

4 By Mr. Tyson 6

5 By Mr. Perry 192

6

7 AFTERNOON SESSION: 87

8

9 E X H I B I T S

10 (Previously marked exhibits referred to.)

11 EXHIBIT NO. PAGE NO.

12 1 - CV Dr. David Wentzloff (Exhibit
13 2002) 1014 2 - Wentzloff University of Michigan
15 Wayback Machine website 1316 3 - Declaration of Dr. David Wentzloff
17 Skyworks Ex. 2001 IPR 01456 2218 4 - Declaration of Dr. David Wentzloff
19 Skyworks Ex. 2001 IPR 01457 2220 5 - Larson Declaration '579
21 Exhibit 1003 23

22

1	E X H I B I T S	
2	(Previously marked exhibits referred to.)	
3	EXHIBIT NO.	PAGE NO.
4	6 - Larson Declaration '914	
5	Exhibit 1003	23
6	7 - U.S. Patent 9,450,579 B2	37
7	8 - U.S. Patent 9,148,194 B2	38
8	9 - '579 Prosecution History	
9	Exhibit 1002	43
10	10 - McGraw-Hill Dictionary of	
11	Electrical and computer	
12	Engineering Excerpt	144
13	11 - Skyworks McGraw-Hill Exhibit 2005	144
14	12 - Penguin Dictionary of Electronics	150
15	13 - Huang paper, Fully Integrated	
16	Switch Exhibit 1011	161

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1 P R O C E E D I N G S

2 Whereupon,

3 DR. DAVID WENTZLOFF,

4 was called as a witness, and having been duly sworn,

5 was examined and testified as follows:

6 CROSS-EXAMINATION

7 BY MR. TYSON:

8 Q. Good morning, Dr. Wentzloff.

9 A. **Good morning.**

10 Q. How are you?

11 A. **Good.**

12 Q. Thank you for your patience this morning.

13 Can you please state your full name for the record?

14 A. **Yes, David Wentzloff.**

15 Q. And, Dr. Wentzloff, you've been deposed
16 before, correct?

17 A. **Yes, one other time.**

18 Q. One other time. Okay. Since it's only
19 been one other time, I'll just do a couple of ground
20 rules. You would have gone over this in your last
21 deposition, but we've got a court reporter here.
22 She will be transcribing things that you say or

1 things that I say, any objections from counsel. So
2 it's a written transcript. We are not videoing
3 this, so head nods won't show up on the transcript.
4 So I just ask that you say affirmatively yes or no
5 instead of a head nod. Do you understand that?

6 **A. Yes.**

7 Q. With respect to, if I ask a question and
8 you don't understand it, please just ask me for
9 clarification. I'm sure your counsel will object,
10 but you can do the same thing. You can ask me for
11 that clarification.

12 **A. Okay.**

13 Q. Is there any reason that you cannot
14 testify fully, accurately, and truthfully today?

15 **A. No.**

16 Q. You're not on any medications that would
17 impact your ability to testify truthfully and
18 accurately today?

19 **A. No.**

20 Q. Do you understand that we are here today,
21 there are two IPR proceedings that occurred in this
22 case. Do you understand that?

1 **A. Yes.**

2 Q. And IPR is an abbreviation for inter
3 partes review, is that right?

4 **A. I believe so, yes.**

5 Q. If I use the term IPR, you understand
6 what that means?

7 **A. Yes.**

8 Q. There are two patents involved in this
9 case. One is U.S. Patent Number 89,450,579. If I
10 refer to that patent as the '579 patent, would you
11 understand which patent I'm referring to?

12 **A. You.**

13 Q. The same thing, U.S. Patent Number
14 9,148,194. If I use the abbreviation '194 patent,
15 would you understand what patent I'm talking about?

16 **A. Yes.**

17 Q. Okay. Are you familiar with the term
18 person of ordinary skill in the art?

19 **A. Yes, I am.**

20 Q. I believe both in your declaration and in
21 Dr. Larson's declaration, you use the abbreviation
22 POSITA. Do you understand that?

1 **A. Yes.**

2 Q. If I use the word POSITA instead of
3 person of ordinary skill in the art, would you know
4 what I'm referring to?

5 **A. Yes, that's fine.**

6 Q. There are two IPR numbers. And if I use
7 the last four numbers, so one is the IPR2024-01457
8 and the other is IPR2024-01456. If I use the last
9 four numbers of those IPRs -- you'll have documents,
10 too -- but if I use the last four numbers, would you
11 understand which IPR I'm referring, for example, the
12 1456 IPR?

13 **A. No, I would prefer to have those written**
14 **in front of me.**

15 Q. Yes. Okay.

16 **A. I'm familiar with the patent numbers.**
17 **And I know the IPRs correspond to each of the two**
18 **patents, but I'm less familiar with those last four**
19 **digits.**

20 Q. Sure. So am I honestly. So if -- in
21 this case, the two patents have the same priority
22 date, is that correct?

1 **A. Yes, that's my understanding.**

2 Q. And that priority date is July 7th of
3 2012?

4 **A. I know 2012. I forget the month and day.**

5 Q. And --

6 **A. But that sounds about right.**

7 Q. Okay. So the opinions that you rendered
8 in your declarations, those were as to the knowledge
9 and understanding of a POSITA as of the priority
10 date of the patents, is that right?

11 **A. That's correct.**

12 Q. Let's -- I'm going to introduce your CV.
13 I'm going to put it in the ShareFile and give you a
14 copy of that and put it up there. Here is a copy.
15 So if you open that folder, you should see your CV
16 there.

17 (Exhibit No. 1 was marked for
18 identification.)

19 BY MR. TYSON:

20 Q. Dr. Wentzloff, you've been handed a
21 document that's been marked as Deposition Exhibit 1.
22 It's uploaded to the ShareFile as well. Do you have

1 that document?

2 **A. Yes, I do. Could I just ask a question**
3 **about using this system?**

4 Q. Yes.

5 **A. Is now an okay time?**

6 Q. Yes.

7 **A. So I see David Wentzloff at the top. I**
8 **just searched for Wentzloff and it found zero**
9 **results. Just a test, a search. So it does not**
10 **appear that that is --**

11 Q. It's possible that the document that
12 Skyworks submitted in the IPR was in OCR.

13 **A. I can highlight and select the text using**
14 **the Windows system.**

15 Q. Maybe we'll test it at a break.

16 **A. I was just testing it. It's okay.**

17 Q. Okay. So, Dr. Wentzloff, you're familiar
18 with this exhibit?

19 **A. Yes.**

20 Q. What is it?

21 **A. This is my CV.**

22 Q. Do you see it was marked as Exhibit -- at

1 the bottom, it says Skyworks Exhibit 2002?

2 A. Yes.

3 Q. And it has an IPR number 2024-01456?

4 A. Yes, I see that.

5 Q. So you understand this exhibit was
6 submitted by Skyworks in the IPRs in this case?

7 A. Yes.

8 Q. At the bottom of page 1 of Exhibit 1 of
9 your CV, there is a section that's headed teaching
10 experience, do you see that?

11 A. Yes.

12 Q. And that section continues on to page 2,
13 is that right?

14 A. Yes.

15 Q. And the first, I guess, section of
16 teaching experience is that University of Michigan
17 at Ann Arbor, is that right?

18 A. Yes.

19 Q. And you're still a professor there?

20 A. Yes.

21 Q. Can you turn to the top of page 2? In
22 the second line, it says that you are a lecturer of

1 the course EECS 215, Introduction to Electronic
2 Circuits in the fall of 2012 and 2014 and 2020. Do
3 you see that?

4 A. Yes.

5 Q. Do you recall that course, EECS 215?

6 A. Yes, very well.

7 Q. And that's an entry level course for
8 double E and computer engineering students at
9 Michigan?

10 A. Yes.

11 Q. I'm going to ask you -- I'll upload it to
12 the ShareFile. It should be on the ShareFile if you
13 would refresh it again.

14 A. Okay. Yes, I have it up.

15 (Exhibit No. 2 was marked for
16 identification.)

17 BY MR. TYSON:

18 Q. So, Dr. Wentzloff, you've been handed a
19 document that's marked as Deposition Exhibit 2. Do
20 you recognize this document?

21 A. It looks like an older version of my
22 website, I believe.

1 Q. Yes, it is. Are you familiar with the
2 Internet archive Wayback Machine?

3 A. Yes. I've not used it personally, but
4 I'm -- I know that it exists, yes.

5 Q. So I'll just represent to you and your
6 counsel that this is a printout from the Internet
7 archive Wayback Machine. If you look at the bottom
8 like left, it's a little bit hard to see. It has a
9 URL. This is a standard URL from the Internet
10 archive. Do you see it says web.archive.org/web/
11 and then it has a date and time stamp there.

12 A. Yes, I see that.

13 Q. So I'll represent to you that according
14 to the Internet archive, this is a printout of your
15 website bio from September 4th of 2014. Does that
16 sound about right?

17 A. Yes, it could be. Like I said, it's a --
18 I recognize it as an older version of my website.

19 Q. It's a younger picture.

20 A. I just don't know the --

21 Q. It's a younger picture. My web -- my
22 Duane Morris bio from this time, I looked like a

1 17-year-old kid. I had a change when they were
2 promoting. Too young to be working here, so -- but
3 do you generally recognize the web page?

4 A. Yes.

5 Q. At the bottom, the bottom section is
6 labeled teaching. Do you see that?

7 A. Yes.

8 Q. And one of the courses, the top course
9 listed there is EECS 215: Electronic Circuits, is
10 that right?

11 A. Yes.

12 Q. Is the EECS 215 Electronic Circuits
13 course in Exhibit 2 the same course that was listed
14 in your CV on page 2 EECS 215 Introduction to
15 Electronic Circuits?

16 A. Yes, it is.

17 Q. And do you see that on the first page of
18 Exhibit 2, there is -- it shows a hyperlink on that
19 EECS 215 Electronic Circuits. Do you see that?

20 A. Yes.

21 Q. So I'll represent to you that the second
22 and third pages, if you click on the hyperlink,

1 these are the pages that show up. And again, if you
2 look at the bottom of the page, you'll again see the
3 URL from the Internet archive, and again, it has
4 that same 20140904 at the beginning of the date and
5 time stamp. Do you see that?

6 **A. Yes.**

7 Q. So this is the same day and day, month
8 and year as the first page, is that right?

9 **A. Yes, same date.**

10 Q. Do you recognize this page that's on
11 Deposition Exhibit 2, page 2?

12 **A. Again, I recognize it as an older version**
13 **-- like an older version of our website. I do not**
14 **believe I created this particular page. I think I**
15 **just linked to it. So I'm not that familiar with**
16 **it. But I'm happy to answer any questions about it**
17 **that you have.**

18 Q. If you just -- under the textbooks, do
19 you see that about halfway down? Toward the bottom
20 of page 2 in Exhibit 2.

21 **A. Yes.**

22 Q. There is two textbooks listed there. Do

1 you see those?

2 **A. Yes.**

3 Q. Were those the textbooks that you used in
4 this course?

5 **A. No.**

6 Q. Are you familiar with either of those
7 textbooks?

8 **A. Yes, one of them.**

9 Q. Which of the textbooks?

10 **A. The first one, Ulaby.**

11 Q. Would you agree that the Ganago Circuits
12 Make Sense, the second textbook was a textbook that
13 was used in this course taught by other professors?

14 **A. Could you repeat your question.**

15 Q. Sure, the second textbook, are you
16 familiar with that textbook as being used by other
17 professors in the same course at University of
18 Michigan?

19 **A. No, I'm not.**

20 Q. I was able -- I have copies of both of
21 these textbooks here. So I don't know if -- I don't
22 know that we'll be -- we will need to use them at

1 any point, but I brought them in case there was a
2 section or something that I wanted to ask you
3 questions about.

4 **A. Okay.**

5 **Q.** And again, these are both textbooks that
6 would have been used in this introductory course for
7 electrical engineering and computer engineering
8 students at the University of Michigan, is that
9 right?

10 **A.** That would be correct for the first one,
11 **Ulaby.** I don't use the second one. I'm not aware
12 of anyone who uses the second one for EECS 215. If
13 you look at the top of this page, you'll notice that
14 **Ulaby** is the instructor. He was a professor
15 emeritus at University of Michigan. He wrote the
16 first book that you're referring to.

17 **Ganago** is a lecturer also at U of M still
18 in my department. He teaches a different course,
19 not 215. So I am not sure why **Ulaby** included that
20 textbook here. But I can tell you that in the
21 versions of the course that I have taught, I have
22 not used that book. I only used the **Ulaby** text.

1 Q. So did you use a different lab book or
2 just the Ulaby text?

3 A. **I only used the Ulaby text and I did not**
4 **use any lab book. Lab assignments were issued**
5 **electronically during the weeks that we had labs.**
6 **So there was no lab book.**

7 Q. Okay. Do you see like at the middle of
8 the course, it says, lab, and there is six
9 experiments. Lab experiments listed there?

10 A. **I see that.**

11 Q. And lab 1, it says, DC circuits. Lab 2,
12 AC circuits. Lab 3, Op Amps. Lab 4, transients.
13 Lab 5, filter frequency response. And then lab 6,
14 audio system.

15 A. **Yes.**

16 Q. And are those the labs that you would
17 have provided electronically to students?

18 A. **To answer that question, I'd like to look**
19 **at a syllabus from that date. We certainly cover**
20 **topics like that in 215. But as I mentioned, I did**
21 **not use, nor am I aware of any instructors that used**
22 **the Ganago lab book in 215. That text was used in**

1 **EECS314. That's a different course.**

2 Q. So the EECS 314 course used this Ganago
3 textbook?

4 A. **I believe so. Professor Ganago teaches**
5 **it. And I believe he does use a lab book when he**
6 **teaches it. Just so it's clear, EECS is short for**
7 **EECS, in case that wasn't obvious?**

8 Q. I'm going to hand you a copy of this
9 book, and if you can just look at, I'll flip it to
10 -- it's a page, and you can look at it with your
11 counsel. It has six different -- the page itself is
12 not marked. Dr. Wentzloff, the Ganago textbook that
13 I've handed you, do you see it also has six labs
14 listed on that page?

15 A. **Yes.**

16 Q. And do those labs names correspond to the
17 names of the labs that are listed on page 2 of
18 Exhibit 2?

19 A. **With slightly different names, yes, the**
20 **topics correspond.**

21 Q. And do you know, just looking at this
22 textbook, whether you would have taken excerpts from

1 the pages in this textbook, even if you didn't know,
2 weren't familiar with it being combined into a
3 textbook at the labs that your students would have
4 performed in EECS 215?

5 MR. PERRY: Objection. Form.

6 THE WITNESS: I'm not familiar with this
7 particular lab book. I'm familiar with the labs
8 that I gave when I taught 215. I never taught with
9 Ulaby. So I don't -- I believe you're asking me,
10 was any of the material in this used in any of my
11 lab assignments, and I don't think I could answer
12 that sitting here today.

13 BY MR. TYSON:

14 Q. All right. I can take -- I'll just take
15 that back. Thank you. This textbook, the circuits
16 textbook, is this the textbook that you used in EECS
17 215 in 2014?

18 A. There has been a few additions. I think
19 we are on the third edition today. So I would need
20 to look at the edition, but it's -- but it's largely
21 the same book, just with, you know, changes over
22 time.

1 Q. Okay. Looking at the copyright page, can
2 you see what date it is?

3 A. **2009. So certainly this was before 2012**
4 **or '14. I believe the first time I taught was 2012.**
5 **So it's possible we were using this edition, yes.**

6 Q. I'll just grab it. Thank you. Again, I
7 may or may not refer to these. I'm not sure.
8 Shifting gears. So I'm going to introduce your
9 declarations that you submitted in the IPRs as
10 Deposition Exhibits 3 and 4. And I'll hand you
11 copies of those as well.

12 (Exhibit Nos. 3-4 were marked for
13 identification.)

14 BY MR. TYSON:

15 Q. I've uploaded them to the public folder
16 on the ShareFile site. You should have an
17 electronic copy of that as well. Dr. Wentzloff,
18 what did you do to prepare to write these
19 declarations?

20 A. **I reviewed material such as the patents,**
21 **other exhibits. I reviewed -- I have to think about**
22 **the timeline. I reviewed Dr. Larson's deposition,**

1 as well as his declarations. I also reviewed the --
2 I believe they were called petitions for the IPR
3 cases. And perhaps other materials related to the
4 topics and then my own experience.

5 Q. If you go to the -- it's like the last
6 three pages of both Exhibits 3 and 4, which are the
7 declarations. You'll see a list of materials
8 considered here.

9 A. Yes.

10 Q. Are there any -- did you review any
11 documents that aren't listed in the list of
12 materials considered?

13 A. I don't think so. I see this is a long
14 list and much longer than what I just named, so I
15 don't think so. I see the deposition of Dr. Larson
16 here. I see the petition. Yes, I think this is
17 inclusive.

18 Q. I'm going to hand you -- introduce
19 Exhibits 5 and 6, which are the declarations of
20 Dr. Larson that he submitted in these IPRs.

21 (Exhibit Nos. 5-6 were marked for
22 identification.)

1 BY MR. TYSON:

2 Q. So Exhibit 5, you'll see, which is -- do
3 you see at the bottom, it's marked the first page
4 EX-1003.

5 A. I see two with that.

6 Q. So both Exhibits 5 and 6, which are
7 Dr. Larson's declarations, and the two IPRs, they
8 both have the annotation EX-1003 in the bottom right
9 corner, is that right?

10 A. In my copies, yes.

11 Q. Looking at -- going back to your
12 declarations, just the list of materials considered.
13 I don't see EX-1003 in either of the materials
14 considered. You did review Dr. Larson's
15 declarations in preparing your declarations, is that
16 right?

17 A. Yes, I did.

18 Q. So because I look at your list of
19 materials considered in your declaration, I see the
20 petition, but I don't see his declaration for some
21 reason. Would you agree with that?

22 A. Yes, I don't see 1003.

1 Q. You did review and consider Dr. Larson's
2 declarations which were Exhibit 1003 in preparing
3 your declarations for the two IPRs in this case,
4 right?

5 A. Could you help me with the -- there. I
6 found it. The date. Well, yes, I know I reviewed
7 them. I don't know why it's not listed. I was just
8 looking for the dates.

9 Q. Well, Dr. Wentzloff, are the omissions
10 just a mistake that you need to correct in your
11 declarations?

12 A. Possibly.

13 Q. But did you -- I guess Exhibit 1003 are
14 the declarations of Dr. Larson, so did you review
15 and consider those declarations in preparing your
16 declarations in the IPRs?

17 A. I absolutely reviewed these. I'm
18 wondering why they are not included in my list of
19 references or materials considered. And I'm trying
20 to reconcile the dates of the two documents. I
21 don't believe these were submitted after I submitted
22 my declarations.

1 Q. I think if you look at the -- it would be
2 the last page of -- the signature page of
3 Dr. Larson's declarations.

4 A. **Does not have a date.**

5 Q. Well, I can assure you that Dr. Larson's
6 declarations were submitted and filed as Exhibit
7 1003 on the same date that the IPR petition was
8 filed. I'll represent that to you.

9 A. **Okay.**

10 Q. And these are the -- Exhibits 5 and 6 are
11 the declarations from our copies of the declarations
12 from -- that were filed in the IPR. So given that
13 they were filed the same date as the petitions in
14 these IPRs, is there any reason other than just a
15 typo that they would not be listed on your list of
16 materials considered?

17 A. **I can't think of another reason. I think**
18 **it is just an omission. And I absolutely reviewed**
19 **both declarations.**

20 Q. When did you last read your declarations,
21 Exhibits 3 and 4?

22 A. **Yesterday, I reviewed them. As recently**

1 **as yesterday.**

2 Q. Did you notice any mistakes in your
3 declarations or anything you need to correct?

4 A. **Beyond maybe what we just pointed out?**

5 Q. Yes, maybe that one point.

6 A. **No.**

7 Q. Are your declarations complete?

8 A. **Yes.**

9 Q. And you cited all of the factual support
10 that you believe is necessary for your opinions, is
11 that right?

12 A. **Yes.**

13 Q. If we can go in Exhibit 5, which is
14 Dr. Larson's declaration for the IPR2024-01456.

15 A. **For the '579.**

16 Q. For the '579 patent. Let me know when
17 you're there.

18 A. **Do you mind if I mark exhibit numbers on**
19 **here?**

20 Q. Please do.

21 A. **The '579 is 5?**

22 Q. It's 5. And the '194 declaration is

1 Exhibit 6.

2 A. Okay. Thank you.

3 Q. And can you turn to the document page 35,
4 of Exhibit 5.

5 A. Okay.

6 Q. And do you see about halfway down, there
7 is a section VI called, state of the art. Do you
8 see that?

9 A. Yes.

10 Q. And you see it has a section -- the state
11 of the art section has a subsection A called level
12 of ordinary skill in the art. Do you see that?

13 A. Yes.

14 Q. And that section spans from pages 35 to
15 the top of page 37. Do you see that?

16 A. Yes.

17 Q. And then there is a -- starting on page
18 37, there is a subsection B to the state of the art
19 section 6 which is titled state of the art and the
20 general knowledge of a POSITA. Do you see that?

21 A. Yes.

22 Q. And do you see that subsection B of the

1 state of the art in Dr. Larson's declaration
2 continues on page 37 to page 64.

3 **A. Mr. Tyson, you said ending on page 64.**

4 **Q. Yes.**

5 **A. Yes, I see that.**

6 **Q. Okay. In preparing your declaration in**
7 **this same IPR, your declaration is Exhibit 3. This**
8 **declaration, Dr. Larson's declaration in this IPR is**
9 **Exhibit 5. Did you read this subsection B of**
10 **Dr. Larson's state of the art section?**

11 **A. Yes.**

12 **Q. Do you disagree with any statements that**
13 **Dr. Larson made in that state of the art subsection**
14 **B of his declaration for the 1456 IPR in Exhibit 5?**

15 **A. I believe so. Yes, I would want to refer**
16 **to my report just to give the most accurate answer**
17 **there. But I don't believe I agree with all of his**
18 **statements in this section.**

19 **Q. Do you know, was there anything**
20 **inaccurate in Dr. Larson's state of the art**
21 **subsection B in Exhibit 5?**

22 **A. I would still want to refer to my report**

1 **just to give the most accurate answer there.**

2 **Because like I said, I don't necessarily agree with**
3 **everything that's in this section. And that could**
4 **be because of inaccuracies of just disagreement.**

5 Q. When I reviewed your declaration, Exhibit
6 3, I didn't see anything that you had identified as
7 being inaccurate from this statement in subsection
8 B. And I guess I'll ask this, Dr. Wentzloff, if you
9 had identified inaccuracies in the state of the art
10 subsection B of Dr. Larson's declaration, you would
11 have discussed those in your declaration for the
12 same IPR, Exhibit 3?

13 A. **Yes.**

14 Q. So if you were key word searching, you
15 can use that option if it works for your
16 declaration. But for example, if you look at
17 Dr. Larson's subsection B of the declaration, it now
18 has the pages we discussed, but it spans from
19 paragraphs 54 to 77.

20 A. **54 to 77. Those are different page**
21 **numbers.**

22 Q. I'm sorry, the paragraph numbers are 54

1 to 77.

2 **A. Okay. Yes.**

3 Q. In Exhibit 5, the subsection of the state
4 of the art I'm talking about is from -- encompasses
5 paragraphs 54 to 77. In Exhibit 3, and feel free to
6 check, but I did not find any reference to any of
7 those paragraphs from Dr. Larson's declaration.
8 '579, which I believe is Exhibit 3, is that correct,
9 the '579?

10 **A. Yes. So on page 19, the second sentence,**
11 **the first complete sentence, I agree with this**
12 **definition, except for the last qualification and**
13 **then I go on to explain my disagreement.**

14 Q. I see that. So in this citation on page
15 19 of Exhibit 3, you're citing to paragraphs 50 to
16 53 of Dr. Larson's declaration, is that right?

17 **A. Yes, which I believe was his -- just**
18 **looking at my section, I think that was his section**
19 **describing POSITA, the definition of a POSITA.**

20 Q. And if you look at Exhibit 5, those
21 paragraphs 50 to 53, which are starting on page 35.

22 **A. Yes.**

1 Q. So paragraphs 50 to 53 of Exhibit 5 are
2 in the state of the art subsection A, level of
3 ordinary skill in the art, is that right?

4 A. Yes.

5 Q. My specific question was related to
6 subsection B of Dr. Larson's declaration, Exhibit 5,
7 and whether you disagree with any statements or
8 identified any inaccuracies in subsection B of the
9 state of the art section, which is from paragraphs
10 54 to 77.

11 A. In my opinions on the Huang and Seshimo
12 patents, for example, and what would be obvious to a
13 POSITA, you know, that is where -- as well as
14 Dr. Larson's arguments about similar topics, that is
15 where he would likely draw from these sections to
16 draw his conclusions. And I have disagreements with
17 some of those.

18 So I would not extrapolate that to a
19 broad statement that I agree with everything in
20 section B. If there is something specific that you
21 want to refer to in section B, I'm happy to discuss
22 that. But I would not make a broad statement that

1 **I, for example, agree with everything in section B.**
2 **Even if I don't specifically call out a paragraph**
3 **from section B in my declaration.**

4 Q. Understood. So I guess I'll just ask it
5 this way. Actually, let's -- there are two
6 paragraphs. Let's look at paragraph 57 of your
7 declaration, sorry, which is Deposition Exhibit 3,
8 page 41.

9 A. **Okay, I'm there.**

10 Q. So it looks like the third sentence, you
11 have a statement that even references Dr. Larson's
12 cites in this section that confirms that blocking
13 capacitor means DC blocking and then you cite to, I
14 think, one, two, three, four documents. Is that
15 right?

16 A. **Yes.**

17 Q. In this paragraph 57, you're not -- you
18 don't reference Dr. Larson's discussion of these
19 references in the state of the art section,
20 subsection B of his declaration, is that right?

21 A. **I believe that's correct. I don't see a**
22 **reference to Exhibit 1003 for that paragraph number.**

1 **But these -- this line is referring to the state of**
2 **the art section which I would assume is section B**
3 **that you were asking about earlier and the**
4 **references were those cited by Dr. Larson in that**
5 **section.**

6 Q. So this paragraph is referring to the
7 references, but not referring to Dr. Larson's
8 statements in the state of the art section of his
9 declaration. Is that fair?

10 A. **Yes, even the references Dr. Larson**
11 **cites, is how that starts.**

12 Q. And then one other place, paragraph 67 of
13 your declaration. It's page 47 to 48. I see you
14 cite here that -- again, you cite -- this is five
15 different documents. And you identify that, at the
16 last sentence before the bullets, you say, moreover,
17 the references cited suffer from the same
18 deficiencies as Huang, for example, and then you
19 list one, two, three, four five references. Is that
20 right?

21 A. **Yes.**

22 Q. Again, so your citation here is to the

1 references in the state of the art section, but not
2 at any of Dr. Larson's statements regarding these
3 references in subsection B of his declaration, is
4 that right?

5 **A. These bullets include the references.**
6 **Paragraph 67 starts out with a reference to**
7 **paragraph 114 of Exhibit 1003, which is not directly**
8 **in the state of the art section in his declaration.**
9 **But I believe he referred back to his state of the**
10 **art section in that paragraph. We could double**
11 **check that.**

12 **Q. I guess I can just ask it a different**
13 **way. If you had identified inaccuracies in the**
14 **state of the art subsection B of Dr. Larson's**
15 **declaration, you would have discussed those in your**
16 **declaration for the same IPR, is that right?**

17 **A. Yes, as they would have pertained to my**
18 **opinions, or as they would have influenced my**
19 **opinions.**

20 **Q. Related -- similar questions related to**
21 **the other IPR. So your deposition Exhibit 4,**
22 **Dr. Larson's Deposition Exhibit 6. Your**

1 declaration, Exhibit 4 and Dr. Larson's declaration,
2 Exhibit 6 for the 1457 IPR, which is on the '194
3 patent. And in Exhibit 6, which is Dr. Larson's
4 declaration for the '194 patent IPR, the 1457 IPR,
5 if you go -- like, again, it's paragraph 47 is the
6 start of the state of the art section 6 of his
7 declaration on page 23. Do you see that?

8 **A. Yes.**

9 Q. And again, subsection A, level of
10 ordinary skill in the art of Dr. Larson's state of
11 the art section is paragraphs 47, 48, 49 to 50, is
12 that right?

13 **A. Yes.**

14 Q. And then subsection B of Dr. Larson's
15 state of the art section 6 which is entitled, state
16 of the art and the general knowledge of a POSITA.
17 That spans from paragraph 51 and it goes to
18 paragraph 75. Do you see that? With the last part
19 of paragraph 75 ending on page 55?

20 **A. Thank you. Yes, I see that.**

21 Q. If you had identified any inaccuracies in
22 the state of the art subsection B of Dr. Larson's

1 declaration, which is Exhibit 6, you would have
2 discussed those in your declaration for the same
3 IPR, which is Exhibit 4, is that right?

4 **A. I would have only as it would have**
5 **pertained to or affected my opinions on the claims**
6 **for the references that were cited. But I would not**
7 **extrapolate any silence on any given section from**
8 **his section B here to imply that I agree with**
9 **everything in section B.**

10 **Q. Sitting here today, you don't have any**
11 **opinions as to Dr. Larson's declaration subsection B**
12 **of this state of the art section, other than what**
13 **you've put in your declaration, is that fair?**

14 **A. Yes. Only the ones that are, again,**
15 **obtained to relate to my opinions on the references**
16 **or the patents or the claims. But like I said, not**
17 **-- I wouldn't extrapolate any omission of that to**
18 **mean that I agree with everything in section B.**

19 **Q. I'm going to hand you another exhibit.**
20 **This is the '579 patent and we are going to mark it**
21 **as Exhibit 7.**

22 (Exhibit No. 7 was marked for

1 identification.)

2 BY MR. TYSON:

3 Q. I'll upload it to the ShareFile. I'll
4 actually give you the other patent, too, the '194
5 patent. That will be Exhibit 8.

6 (Exhibit No. 8 was marked for
7 identification.)

8 BY MR. TYSON:

9 Q. Dr. Wentzloff, Deposition Exhibit 3,
10 which is your declaration for the '579 patent IPR
11 contains your opinions with respect to validity of
12 the claims of the '579 patent which is Deposition
13 Exhibit 7. Is that right?

14 A. Yes.

15 Q. And Deposition Exhibit 4, which is your
16 declaration for the '194 patent for the IPR, that
17 Deposition Exhibit 4 contains your opinions with
18 respect to the validity of the claims of the '194
19 patent, which is Deposition Exhibit 8, is that
20 right?

21 A. Yes.

22 Q. You understand that when doing the

1 validity analysis, it's actually -- you have heard
2 this -- it's a two-step process?

3 **A. Perhaps. Could you explain?**

4 Q. So with the first step in the validity
5 analysis being claim construction and the second
6 step being analyzing the prior art in view of the
7 claim construction.

8 **A. Yes, I'm familiar with that.**

9 Q. So you, as part of preparing your
10 declaration in these IPRs, you construed the terms
11 in the challenged claims of the '579 patent, is that
12 right?

13 **A. What do you mean by construed?**

14 Q. So you did a claim construction analysis
15 and looked at the words of the claims as part of
16 your validity analysis, and determined what those
17 words would mean to a POSITA?

18 **A. Yes, I did.**

19 Q. And you also construed the terms in the
20 challenged claims for the '194 patent as part of
21 your validity analysis, is that right?

22 **A. Yes. That may have been one claim**

1 **construction. I don't recall if these were separate**
2 **or together. But I am familiar with the claim**
3 **constructions that I think you're referring to.**

4 Q. Okay. When you are -- so you reviewed
5 the challenged claims in both the '194 patent and
6 '579 patent as part of your analysis, correct?

7 A. **Yes.**

8 Q. And did you consider all of the words of
9 the claims when performing that analysis?

10 A. **Yes.**

11 Q. And you interpreted various terms at
12 least to an understanding of a skilled person in
13 performing your analysis?

14 A. **Yes.**

15 Q. Did you consider the file histories of
16 the '194 patent and '579 patent in performing that
17 claim construction analysis?

18 A. **Yes, I did.**

19 Q. And did you consider those file histories
20 from the perspective of a POSITA?

21 A. **Yes.**

22 Q. The '579 patent, which is Exhibit 7, and

1 the '194 patent, Exhibit 8, outside of the claims,
2 they share a common specification, is that right?

3 **A. That's my understanding, yes.**

4 Q. And did you consider the words in this
5 common specification when doing your claim
6 construction analysis of the claims of the '579
7 patent and '194 patent?

8 **A. Could you repeat your question, please?**

9 Q. Did you consider the words in the common
10 patent specification when performing your claim
11 construction analysis of the challenged claims of
12 these two patents?

13 **A. The claim construction analysis is**
14 **certainly based on a POSITA, and a POSITA's**
15 **understanding of the words in the claims. It should**
16 **also be a function of the description or the**
17 **specification in the patent.**

18 **So, yes, I think, in general, but the --**
19 **I think your question is around the interpretation**
20 **of words or how you would consider the words of the**
21 **claim. And I think it's probably both. It's**
22 **certainly a POSITA and how they would interpret the**

1 **claims or that claim language.**

2 Q. Okay. In the '579 patent, which is
3 Exhibit 7, let's go to claim 1 of the patent.

4 A. **'579.**

5 Q. Yes. This is the '579 patent, Exhibit 7,
6 and the claim spans from -- just being mindful,
7 we've been about an hour. So if you want to stop,
8 this is fine.

9 MR. PERRY: If this is a good place, we
10 should probably take a break.

11 (Recess.)

12 BY MR. TYSON:

13 Q. Welcome back, Dr. Wentzloff.

14 A. **Thank you.**

15 Q. We were talking about claim 1 to the '579
16 patent. And I actually want to talk about this
17 claim in the context of the file history. So I'm
18 going to upload -- I have uploaded the file history,
19 the entire file history which is Exhibit 1002 from
20 the two IPRs.

21 In the interest of saving trees, I have
22 only printed the first 55 pages. Those are the

1 questions I had. But if you need to reference more
2 of that -- so this is one of the exhibits that I was
3 saying if we end up looking at more, we may not use
4 the electronic copy. But this will be Exhibit 9.

5 (Exhibit No. 9 was marked for
6 identification.)

7 BY MR. TYSON:

8 Q. Dr. Wentzloff, looking at Exhibit 9,
9 which is the '579 patent file history. Can you turn
10 -- so on the bottom, you'll see Bates -- these are
11 Bates numbered Exhibit 1002, the first page is 001,
12 and then it goes consecutively from there. And I'll
13 represent to you that this is the first 55 pages
14 consecutively from Exhibit 1002.

15 If you can turn to Bates page 030 of
16 Exhibit 9. And on Bates page 030, you see this is
17 entitled -- has the title of, response to final
18 office action dated January 4, 2016. Do you see
19 that?

20 A. Yes.

21 Q. And if you look between Bates pages 030
22 and 040, would you agree that Bates pages 030 and

1 040 of Exhibit 9 are an office action response by
2 the applicant to the Patent Office that's dated
3 April 4th, 2016?

4 **A. I don't see the date you mentioned.**

5 Q. I meant to tell you that. The date is on
6 Bates page 040.

7 **A. Okay. I see the date. And could you**
8 **repeat your question, please? Sorry.**

9 Q. Bates pages 030 to 040 of Exhibit 9,
10 would you agree that this is an office action
11 response by the applicant to the Patent Office dated
12 April 4th of 2016?

13 **A. Yes.**

14 Q. If we look at Bates pages 031 to 035 of
15 Exhibit 9, these are the applicant's amendments to
16 the claims that were at this time numbered 1 to 20
17 in that office action response. Is that right?

18 **A. Yes, looks like it.**

19 Q. In preparing your declarations submitted
20 in these two IPRs, which is Exhibits 3 and 4, you
21 reviewed this office action response, is that right?

22 **A. Yes.**

1 Q. If you turn to Bates page 015.

2 A. Okay.

3 Q. And from 015 to 017 is the notice of
4 allowability in this office action. Do you see
5 that?

6 A. It looks like it might continue to 018.
7 But, yes, I see that.

8 Q. Yes, to 018, you're right. Do you see on
9 Bates page 015, the notice of allowability, you have
10 a paragraph, and then there is a check box 1 that
11 says this communication is responsive to 04/04/2016.
12 Do you see that?

13 A. Yes.

14 Q. And then if you go to the next page 016,
15 under detailed action, it says, the applicant's
16 remarks filed on 4/4/2016 have been carefully
17 reviewed with updated search and claims 1 to 6 and 9
18 to 20 are allowed over the prior art of record.
19 Claims 7 and 8 are canceled. Do you see that?

20 A. Yes.

21 Q. So you would agree that the claim
22 amendments at Bates pages 31 to 35 were the last

1 claim amendments that the applicant made to the '579
2 patent claims before they issued in the patent?

3 **A. I believe so. And this is a long**
4 **document. I believe so. And I would not be**
5 **surprised if that was the last communication.**

6 Q. If we go to Bates page 037 of Exhibit 9.

7 **A. Say that page again, please?**

8 Q. 037 of Exhibit 9.

9 **A. Okay.**

10 Q. And comparing that to the issued Exhibit
11 1, issued claim 1 of Exhibit 7, which is the '579
12 patent, so under the heading independent claim 1,
13 you see that the applicant reproduced all of the
14 limitations of claim 1 with the exception of the
15 preamble and the first limitation of the claim, is
16 that right?

17 **A. In the beginning of your question, you**
18 **were asking me to compare to something. What --**

19 Q. Yes. So I can ask it without it. I was
20 giving you the issued claim as a reference. You can
21 also use Bates page -- I believe it is 31, which is
22 the amended claim text.

1 And my question on Bates page 37 there is
2 the heading independent claim 1, and then you'll see
3 that the applicant reproduced all of the limitations
4 of claim 1 except for the preamble of the claim and
5 the first limitation of the claim, is that right?

6 **A. Yes, it appears that's what they have**
7 **done in this paragraph on page 37.**

8 Q. And referring again to Bates page 37, the
9 applicant emphasized certain words in the reproduced
10 limitations of claim 1, is that right?

11 **A. I see that in bold.**

12 Q. On the bottom of Bates page 37, the
13 emphasized claim language, it says, the features of
14 amended claim 1 can be understood with reference to
15 figure 9, which is provided in annotated form below,
16 colon. Do you see that?

17 **A. Yes.**

18 Q. And at the top of the next page, do you
19 see that the applicant reproduced figure 9 of the
20 '579 patent and annotated it with labels
21 corresponding to the recited components of claim 1
22 that the applicant had emphasized on the previous

1 page?

2 **A. I do see that. Would you like me to**
3 **check that they are all there or --**

4 Q. No.

5 **A. Okay. I do see that, for example, they**
6 **are referring to, you know, one ST switch circuit as**
7 **in first switch circuit which is showing up in the**
8 **paragraph on page 37, and so on and so forth.**

9 Q. Do you agree that in the figure on Bates
10 page 38 of Exhibit 9, would you agree that the
11 applicant accurately mapped those same components
12 from claim 1 on to figure 9 of the '579 patent?

13 **A. For that, I'll take a moment to double**
14 **check.**

15 Q. Sure.

16 **A. And just for clarification, are you**
17 **asking for the published or allowed claim, or for**
18 **this paragraph on page 37?**

19 Q. So would you agree -- do you agree that
20 in the figure on Bates page 38 of Exhibit 9, that
21 the applicant accurately mapped the components
22 recited in claim 1 as emphasized on Bates page 37 on

1 to figure 9 of the '579 patent.

2 **A. Okay. Thank you. Yes, it appears they**
3 **have mapped all those emphasized words on to figure**
4 **9.**

5 Q. And would you agree that a POSITA reading
6 claim 1 of the '579 patent would map the same
7 components on to figure 9 of that patent in the same
8 way that the applicant did on Bates page 38?

9 **A. Yes.**

10 Q. Can you please read aloud the first two
11 sentences on Bates page 38 that are under the
12 annotated figure 9?

13 **A. Yes. The applicant submits that the**
14 **cited references fail to disclose or render obvious**
15 **the particular configuration claimed in amended**
16 **claim 1, particularly with respect to the**
17 **positioning of the first and second capacitors with**
18 **respect to the antenna node, and further with**
19 **respect to the shunt arm. Therefore, the applicant**
20 **respectfully requests that the rejection of claim 1**
21 **be withdrawn.**

22 Q. Dr. Wentzloff, thank you. Given the

1 emphasized language of claim 1 on Bates page 37, the
2 annotated figure and Bates page 38 and the sentences
3 that you just read, what would a skilled person
4 understand -- what would a POSITA understand the
5 applicant meant by those statements?

6 **A. Well, as I mentioned before, a POSITA**
7 **would produce the same mapping from the emphasized**
8 **words to figure 9. And now reading the sentences**
9 **under that annotated figure, it would appear the**
10 **applicant is disagreeing with the Patent Office**
11 **specifically with regards to the first and second**
12 **capacitors and the shunt arm, and then is asking the**
13 **Patent Office to withdraw the rejection of claim 1**
14 **as a result.**

15 **Q. Just using -- and I'm going to use the**
16 **language of this paragraph. Would you -- do you**
17 **agree that "the positioning of the first and second**
18 **capacitors with respect to the shunt -- with respect**
19 **to the antenna node and further with respect to the**
20 **shunt arm" is the claimed feature that the applicant**
21 **stated distinguished the prior art -- distinguished**
22 **claim 1 for the prior art?**

1 MR. PERRY: Objection. Form.

2 THE WITNESS: That is not what I would
3 interpret from these sections that I'm reading. So
4 if there is further explanations from the applicants
5 in this document, maybe they would expand on that
6 there. But I would not interpret that from this
7 language.

8 BY MR. TYSON:

9 Q. So the applicant -- I mean, you can look
10 through the office action response for the '579
11 patent claim 1, the applicant did not identify any
12 other claim features as distinguishing the prior art
13 other than the positioning of the first and second
14 capacitors with respect to the antenna node, and
15 further with respect to the shunt arm, correct?

16 A. **Could you repeat the question, please?**

17 Q. The applicant did not identify any other
18 claim features in '579 patent claim 1 as
19 distinguishing the prior art other than the
20 positioning of the first and second capacitors with
21 respect to the antenna node and further with respect
22 to the shunt arm, is that correct?

1 **A. No, I don't believe so.**

2 **Q. What other claim features did the**
3 **applicant identify?**

4 **A. This particular section we are in has**
5 **omitted the preamble and the first limitation of**
6 **claim 1. So in this particular section, they are**
7 **only discussing a portion of claim 1, not the**
8 **entirety of it.**

9 **Q. That's by the applicant's choice, is that**
10 **right?**

11 **A. Yes, this came from the applicant from**
12 **that section. I can't -- I don't know what they**
13 **were thinking when they wrote this document. I**
14 **can't know that. But this particular section is**
15 **only referring to a subset of claim 1.**

16 **Q. And the applicant chose to only include**
17 **that subset of claim 1 in making its patentability**
18 **arguments to the Patent Office, is that right?**

19 **A. Is it okay if I take a moment to review**
20 **the office action?**

21 **Q. Yes.**

22 **A. The applicant makes reference to claim 1**

1 in their office action response referring back to
2 that paragraph we were looking at for some of the
3 dependent claims. And then notably, in the last
4 section on page 39, although the present
5 communication may include alterations to the
6 application or claims or characterizations of claim
7 scope or reference art, the applicant is not
8 conceding in this application that previously
9 pending claims are not patentable over the cited
10 references.

11 So they do mention that they are not
12 conceding that the previously pending claims are not
13 patentable over the cited reference. So while they
14 only talk about claim 1, I believe in that one
15 section of this office action, they do, I see,
16 include a broader statement at the end.

17 Q. Okay. But you'd agree that the only
18 claim feature that the applicant emphasized in this
19 office action response as distinguishing the prior
20 art was the positioning of the first and second
21 capacitors with respect to the antenna node and
22 further with respect to the shunt arm, is that

1 right?

2 **A.** **I disagree with that statement. I think**
3 **that is perhaps extrapolating what they put into**
4 **this document. They have emphasized portions of**
5 **claim 1 in the document. That appears to be the**
6 **only area where they refer back to claim 1.**

7 And then they reference that later in
8 **that same document, but at the end, they have a**
9 **disclaimer that the applicant is not conceding in**
10 **this application that previously pending claims are**
11 **not patentable over the cited references.**

12 So there the applicants are referring
13 **back to the references and the objections, and so**
14 **that -- that is what tells me that we can't**
15 **extrapolate what they have said in that limited**
16 **section to be all of the claims and all of the**
17 **references.**

18 **Q.** **If you can turn to the amendment to claim**
19 **1 on Bates page 31.**

20 **A.** **Okay.**

21 **Q.** **So the original or the claim prior to the**
22 **amendment, the claim recited the preamble of a**

1 semiconductor die comprising. Is that right?

2 A. Are you reading from claim 1 currently
3 amended, a semiconductor die comprising?

4 Q. Yes.

5 A. Because that is not redlined that existed
6 before the amendment?

7 Q. Yes.

8 A. Is that your question?

9 Q. That is my question.

10 A. That's my understanding of this document.
11 To double check that, I would want to go back to the
12 submitted claims to the Patent Office, but
13 typically, if something was changed in an amendment,
14 it would be redlined. And I see there are no
15 redlines on that text.

16 Q. And you see that there is no redlines to
17 the limitation under the preamble of semiconductor
18 substrate in claim 1 of the '579 patent, right?

19 A. Yes, I see that, too.

20 Q. Do you see there is no redlines under the
21 language a switch formed on the semiconductor
22 substrate. Is that right?

1 **A. You're in the next element of the claim.**

2 Q. The next element of the claim.

3 **A. Yes, I see that.**

4 Q. Do you see there are no redlines --

5 skipping down to the line that says, a first

6 capacitor. Tell me when you're there?

7 **A. I'm there.**

8 Q. Do you see there are no redlines to a

9 capacitor formed on a semiconductor substrate and

10 connected in series with the switch, is that right?

11 **A. Yes.**

12 Q. Do you see also that the applicant

13 deleted the language. It kept the word capacitor,

14 and then deleted the language after capacitor

15 configured to inhibit a low frequency blocker signal

16 from mixing with the fundamental frequency signal in

17 the switch. Do you see that?

18 **A. Yes.**

19 Q. If you go to Bates page 47 and 48. In

20 fact, it starts on Bates page 44. So Bates page 44

21 through -- 44 through 55. Do you see this is the

22 office action on Bates page 44 dated January 4,

1 2016?

2 A. Which page are you on for the Bates?

3 Q. 44.

4 A. And the date is?

5 Q. Under notification date.

6 A. I see, January 4th, 2016. Was that the
7 date that you gave me?

8 Q. Yes.

9 A. Yes, I see that.

10 Q. So Bates page 44 to 55 are the office
11 action from the Patent Office dated January 4, 2016,
12 is that right?

13 A. I believe so, yes.

14 Q. And just flipping forward to Bates page
15 30 again?

16 A. Okay.

17 Q. Bates page 30, you'll see that the
18 response to the office action that we just talked
19 about was to an office action dated January 4, 2016.
20 Do you see that?

21 A. Yes.

22 Q. And that's the same date as the office

1 action on Bates page 44 to 55, is that right?

2 A. Yes.

3 Q. If you turn to Bates page 47 and 48.

4 A. Yes. I'm there.

5 Q. Okay. Under the claim rejections, you'll
6 see that the office in paragraph 5 rejected claims 1
7 to 6, 9 to 12, and 15 to 18 as being patentable over
8 a reference called Yasuda in view of a reference
9 called Granger Jones. Do you see that?

10 A. Yes.

11 Q. And then in the rejection, the Patent
12 Office stated, considering claim 1, Yasuda teaches a
13 semiconductor die comprising of semiconductor
14 substrate, provides citations, a switch formed on
15 the semiconductor substrate, and including a stack
16 of field-effect transistors that's connected in the
17 series. Do you see that?

18 A. Yes.

19 Q. And you see the next sentence, Yasuda
20 does not explicitly show that a capacitor formed on
21 the semiconductor substrate and connected in series
22 with the switch, the capacitor configured to inhibit

1 a low frequency blocker signal from mixing with the
2 fundamental frequency signal in the switch. Do you
3 see that?

4 **A. Yes.**

5 Q. But the examiner then says, in the same
6 field of endeavor, Granger Jones teaches a capacitor
7 formed on the semiconductor substrate and connected
8 in series with the switch, the capacitor configured
9 to exhibit a low frequency blocker signal from
10 mixing with the fundamental frequency signal in this
11 switch. Do you see that?

12 **A. Yes.**

13 Q. And the examiner goes on to identify why
14 it would have been obvious to one of ordinary skill
15 in the art at the time the invention was made to use
16 a capacitor formed on the semiconductor substrate in
17 connected in series with the switch, the capacitor
18 configured to inhibit a low frequency blocker signal
19 from mixing with the fundamental frequency in the
20 switch as taught by Granger Jones in order to
21 provide a stack of field-effect transistor, FET,
22 switch having a plurality of FET devices coupled in

1 series to form a FET device stack. Do you see that?

2 **A. Yes.**

3 Q. So my question is related to the
4 amendments on claim -- on Bates page 31 to claim 1
5 that the applicant made. You would agree that the
6 applicant deleted the language, the limitation for a
7 capacitor that it was configured to inhibit a low
8 frequency blocker signal from mixing with a
9 fundamental frequency signal in the switch in
10 response to that prior art rejection from the Patent
11 Office?

12 **A. Yes, they deleted that in response to the**
13 **office action, but further explained that they are**
14 **not agreeing with the decision or that the claims**
15 **were not patentable over the cited references. They**
16 **are disagreeing in committee, in other words.**

17 Q. Let's go back to Bates page 37 --
18 actually 38.

19 **A. Okay.**

20 Q. In looking at the figure here, the
21 annotated figure from the applicant that we
22 discussed earlier. So this is annotated figure 9 by

1 the applicant on Bates page 38. And also using, I
2 guess, the claim language on Bates page 37 that the
3 applicant emphasized. So looking at --

4 **A. Yes, I'm there.**

5 Q. Looking at Bates page 38 is probably what
6 I would use, would the first capacitor that is
7 connected between the first switch circuit and the
8 antenna node, would that capacitor block a DC
9 signal?

10 **A. Yes, it would. All capacitors block a DC**
11 **signal.**

12 Q. Is there a particular value that a
13 capacitor needs to block a DC signal?

14 **A. No.**

15 Q. So every capacitor blocks a DC signal?

16 **A. Every capacitor with a finite**
17 **capacitance, meaning not zero or non-infinity, would**
18 **block a DC signal.**

19 Q. The patents disclosed at the first switch
20 circuit, which is the box labeled S, the first
21 switch circuit the patents disclose that as one or
22 more field-effect transistors, or FETs, is that

1 right?

2 **A. When you say the patent discloses, are**
3 **you referring to the claim language?**

4 **Q. I'm referring to the -- like, the '579**
5 **patent, the specification.**

6 **A. Oh, I don't see that specifically in**
7 **claim 1 in the '579. But the inventors do refer to**
8 **series connected FETs, and I believe it's in one of**
9 **their figures. Figure 4 or figure 8 even shows it**
10 **as well, so the specification refers to multiple**
11 **FETs, yes.**

12 **Q. So if you even look at the patent at**
13 **column 9, around line 31. This is the '579 patent,**
14 **Exhibit 7. Do you see it says, in some embodiments,**
15 **each of the switched circuits can include one or**
16 **more FETs, such as SOI FETs. Do you see that?**

17 **A. Yes.**

18 **Q. So each of these switch circuits -- so I**
19 **see first switch circuit, second switch circuit, and**
20 **third switch circuit labeled on Bates page 38?**

21 **A. Where are you reading?**

22 **Q. On Bates page 38 of Exhibit 9, I'm**

1 looking at the blocks labeled first switch circuit,
2 second switch circuit, and third switch circuit.

3 **A. In the figure.**

4 Q. In the figure.

5 **A. Yes, I see that.**

6 Q. Those switch circuits would need to be
7 biased in order to be turned on or turned off, is
8 that right?

9 **A. The FETs need to be biased. So if those**
10 **switches are comprised of FETs, then those FETs**
11 **would need a bias.**

12 Q. Okay. So in the examples where these --
13 the first switch circuit, second switch circuit, and
14 third switch circuit are FETs, you'd agree that each
15 of those switch circuits would need to be biased to
16 be turned on or off, is that right?

17 **A. Yes.**

18 Q. And biasing of the switch circuits would
19 be done using a DC voltage, is that right?

20 **A. Yes.**

21 Q. So the first switch circuit, the second
22 switch circuit, and third switch circuit in the case

1 that they are FETs, they would each have a gate, a
2 body, and a source and a drain, is that right?

3 **A. Yes. Sometimes the body is shared or not**
4 **exposed, meaning can't be connected to. But the**
5 **drain source and gate are almost always exposed and**
6 **those would be biased, yes.**

7 Q. Could you draw on annotated figure 9 -- I
8 think you have a pen. Can you just draw where the
9 gate and source and drain would be on the -- for the
10 first switch circuit, the second switch circuit, and
11 the third switch circuit if those were FETs. And
12 you can use the patent examples if you need them.

13 **A. First, second, and third switch would --**
14 **how would you like me to annotate this figure?**

15 Q. With a respective gate and source and
16 drain for each of them.

17 **A. Would you like me to redraw it or just**
18 **draw over?**

19 Q. You can just draw it right on the page.
20 Okay. And this is what -- how a POSITA would draw
21 the gate source and drain of the first switch
22 circuit, second switch circuit, and third switch

1 circuit if those switch circuits were FETs?

2 A. It's certainly one possible way. You
3 will see multiple different symbols for FETs. What
4 I've done is, I've used a very common symbol for the
5 FET, so one that would be recognizable. I have not
6 labeled specifically a drain or a source, because
7 some FETs, those terminals are interchangeable.

8 And in the specification, the drain and
9 source terminals are not identified. They are
10 unlabeled drain or source. Probably because they
11 are interchangeable terminals, so -- but I would --
12 I believe a POSITA would recognize what I've drawn
13 as a FET.

14 Q. Thank you. The patents also disclose
15 that forming -- they disclose forming these switch
16 circuits on a silicon substrate, correct?

17 A. Yes.

18 Q. And they disclose forming the switch
19 circuits using silicon on insulator or SOI
20 technology, is that right?

21 A. Yes.

22 Q. By July 2012, which is the priority date

1 of the patents, techniques to form FETs on a silicon
2 substrate was well known to POSITAs, is that right?

3 **A. Yes, that's right.**

4 Q. And would you also agree that by July
5 2012, techniques to form FETs using silicon on
6 insulator technology was well-known to POSITAs?

7 **A. Yes.**

8 Q. The benefits and consequences of forming
9 FETs on a silicon substrate or on a
10 silicon-on-insulator technology, those were
11 well-known to POSITAs as well?

12 **A. Not necessarily. SOI was not as widely**
13 **adopted as bulk silicon at the time. So it's**
14 **possible that a POSITA may not have had experience**
15 **with SOI specifically, and may not be familiar with**
16 **all of the advantages and disadvantages of SOI.**

17 **But I would argue that a POSITA would be**
18 **aware of SOI and understand that you could implement**
19 **transistors in an SOI technology.**

20 Q. I want to -- using your annotated figure
21 9, I want to talk about the case that is sort of the
22 example in the patent where the RF switch, the

1 switch and configuration is in transmit mode, okay?

2 If the RF switch overall, figure 9, is in
3 transmit mode, the first -- the first switch circuit
4 would be biased, is that right?

5 **A. You're referring to figure 9 now of the**
6 **patent.**

7 Q. I'm referring to the figure on Bates page
8 38.

9 **A. Okay.**

10 Q. Figure 9 that you annotated.

11 **A. Okay.**

12 Q. And that the applicant annotated.

13 **A. And in transmit mode, the first switch**
14 **circuit would be configured on.**

15 Q. And in the same transmit mode, the third
16 switch circuit would be configured off?

17 **A. Correct.**

18 Q. And in the same transmit mode, the second
19 switch circuit would also be configured off?

20 **A. Correct.**

21 Q. And those -- when we say -- when I am
22 asking that as the first switch circuit in the

1 transmit mode would be -- would receive a bias
2 voltage to be configured as on, is that right?

3 **A. Yes.**

4 Q. And at the same time, that the first
5 switch circuit is receiving a bias voltage to be
6 turned on, the second switch circuit, and third
7 switch circuit would be receiving a bias voltage to
8 be turned off, is that right?

9 **A. Yes, those biased voltages aren't**
10 **necessarily the same, so you mentioned a bias**
11 **instead of, you know, biases with the different**
12 **switches. So it's possible that they are the same.**
13 **It's possible they are different.**

14 Q. If the switch circuits were formed on a
15 silicon substrate, the first switch circuit, second
16 switch circuit, third switch circuit, they were
17 formed on a silicon substrate, the DC voltage to
18 bias the first switch on, and the DC voltage to bias
19 the second switch circuit, and the third switch
20 circuit off would be different, is that right?

21 **A. All three could be different biases.**

22 **But, yes, I would assume. Obviously, it depends on**

1 **the circuit itself, the technology and the**
2 **configuration of the circuit. But I think it is a**
3 **safe assumption that they are different voltages,**
4 **yes.**

5 Q. Great. So the DC voltage to bias a
6 transistor on and the DC voltage the bias a
7 transistor off, if there was a silicon substrate on
8 which all these switches would be formed, they would
9 be different. At least those would be different,
10 the on voltage and the off voltage?

11 A. They would most likely be different.
12 They don't necessarily have to be different. It
13 might depend on the process technology. In the
14 Huang reference, for example, which does describe DC
15 biasing, I believe they do get values in that
16 description for those voltages and they are
17 different. So that would be one example of a switch
18 circuit with different on state and off state bias
19 voltages.

20 Q. For a silicon substrate, are there
21 problems that are -- that a designer would face if
22 he was using a silicon substrate forming the FETs

1 that are shown in annotated figure 9 and using the
2 same DC bias voltage for on and off configurations
3 of the transistors?

4 **A. I think you'll have to be a bit more**
5 **specific with your question. If you're asking about**
6 **tradeoffs, engineering tradeoffs or design**
7 **tradeoffs, there are tens or hundreds of those, and**
8 **those do change between a discrete circuit and a**
9 **circuit that is not integrated on a single substrate**
10 **and a circuit that is. There would be different**
11 **tradeoffs.**

12 **But those are numerous, so if there is**
13 **one, or if there is any that you want to**
14 **specifically talk about, I'm happy to go into those**
15 **details.**

16 **Q. Well, let's -- I mean, the patent does**
17 **not references that it provides benefits of biasing**
18 **of circuits if we look at column 5?**

19 **A. Of the '579.**

20 **Q. Of the '579 patent. It's really starting**
21 **on column 4, line 60, and then it runs through about**
22 **column 5, line 55. This is a discussion on biasing**

1 FETs with reference to figures 5 and 6. Are you
2 familiar with this?

3 A. Yes.

4 Q. At column 5, line 29 to 35, it says, some
5 implementation designs or features, the gate
6 bias/coupling circuit 150 can improve performance of
7 the switch on 140. Such improvements in performance
8 can include, but are not limited to, device
9 insertion loss, isolation performance, power
10 handling capability and/or switching device
11 linearity. Do you see that?

12 A. Yes, I do.

13 Q. And at column 5, line 41 to 42. Column
14 5, 42 to -- sorry, column 5, line 40 to 45, it
15 repeats the same language for the body bias/coupling
16 circuit. Do you see that?

17 A. Yes.

18 Q. And then at column 5, line 50 to 55, it
19 repeats the same language for the source drain
20 coupling circuit, do you see that?

21 A. Yes.

22 Q. Do you agree that the patents don't

1 identify or provide any details on how the design or
2 features of the gate body that were source and drain
3 biasing circuits would make those performance
4 improvements?

5 MR. PERRY: Objection. Form.

6 THE WITNESS: Is your question in regards
7 to the specific values of the voltages?

8 BY MR. TYSON:

9 Q. I think I'm asking just a broader
10 question now. The patents don't provide any details
11 on how the design or features of these transistor
12 biasing circuits would result in improvements in
13 switching device linearity, insertion loss, nor
14 isolation, is that right?

15 A. I don't recall any other sections that
16 specifically talk about the biasing voltages.

17 Q. Well, the patents didn't need to describe
18 those details because they were known to a POSITA,
19 is that right?

20 A. Biasing of FETs is -- I would consider
21 known to a POSITA, yes.

22 Q. And biasing of FETs on a silicon

1 substrate versus a pHEMT substrate versus a silicon
2 insulator substrate, those were -- the patent
3 doesn't need to provide those details because they
4 were well-known to a POSITA, is that right?

5 **A. Well, perhaps with some clarifications on**
6 **the specific technology. You mentioned a handful of**
7 **technologies there. And some of those are standard**
8 **and some of those are not as standard. And POSITAs**
9 **may not have a very deep understanding of perhaps**
10 **all semiconductor technologies. So I wouldn't make**
11 **such a blanket statement. But certainly DC biasing**
12 **of FETs was known to a POSITA at the time.**

13 **Q. I guess I'll just ask it. The patents**
14 **don't provide any details on DC biasing of FETs when**
15 **using a silicon insulator technology and how those**
16 **would result in improvements in switching device**
17 **linearity insertion loss or isolation, is that**
18 **right?**

19 **A. I would disagree with that general**
20 **statement. They do make reference in other parts of**
21 **the patent to how SOI would improve those**
22 **performance parameters. Part of that is from the**

1 **biasing. Part of that is from the on or off states**
2 **of the switches. Part of that would be from, for**
3 **example, the SOI technology itself. They do refer**
4 **to that elsewhere in the description. And I can --**
5 **if you give me a moment, I could find those sections**
6 **for you.**

7 Q. Sure. I mean, it's on section -- in
8 claim 7, line 31, it talks about it. And I guess my
9 question is specific to the DC biasing when you're
10 using SOI technology. The patent doesn't provide
11 any details how designing of the DC biasing of the
12 FETs would result in improvements in switching
13 device linearity, insertion loss or isolation, is
14 that right?

15 A. They don't mention specific values, as I
16 said, about DC biasing. The improvements or the
17 impact on, for example, insertion loss or isolation,
18 they do refer to that in the specification. But the
19 patent isn't necessarily teaching new methods for
20 biasing transistors. And perhaps can rely on a
21 POSITA's knowledge of how to DC bias FETs.

22 Q. And so the patents would be relying on a

1 POSITA's knowledge of how to DC bias FETs when using
2 silicon-on-insulator technology, is that right?

3 **A. It was known how to DC -- a POSITA would**
4 **know how to DC bias FETs. SOI technology, as I**
5 **mentioned before, has -- it's not standard bulk FET**
6 **technology. So it does have some subtle differences**
7 **in how those FETs are biased different than other**
8 **FETs in bulk semiconductor technologies. And a**
9 **POSITA would not necessarily have had exposure to**
10 **SOI technology.**

11 **Q. So if the patents don't discuss how to DC**
12 **bias FETs using -- when you are using silicon**
13 **insulator technology, then they are still relying on**
14 **the knowledge of a skilled person to implement the**
15 **DC biasing of FETs on silicon-on-insulator**
16 **technology, is that right?**

17 **A. To generate the DC bias voltages**
18 **themselves, yes. The patent does not mention at all**
19 **how those DC bias voltages would be generated or**
20 **applied to the FETs.**

21 **Q. Going back to the annotated figure 9 on**
22 **Bates page 38.**

1 **A. Yes.**

2 **Q. If I'm using a silicon substrate where**
3 **I've formed the first switch circuit, second switch**
4 **circuit, and third switch circuit, I've formed all**
5 **of those on silicon substrate. Why would I use a**
6 **different DC voltage to turn on a switch circuit and**
7 **compared to the DC voltage used to turn off the**
8 **switch circuit? What are some of the known benefits**
9 **or consequences of doing that?**

10 **A. FETs require a DC bias to put them in a**
11 **desired region of operation. And if we just**
12 **simplified our analysis for a moment, in order to**
13 **put a FET in the on region versus the off region, I**
14 **would use different DC bias values to do that.**

15 **And so one reason why a designer would**
16 **choose different DC voltage values for an on switch**
17 **versus an off switch would be to put them in the on**
18 **region or the off region.**

19 **Q. So -- and thank you. In the case where**
20 **the transmit -- where the RF switch is in transmit**
21 **mode, the biasing voltage and using the example of**
22 **where you'd have different DC bias voltages for on**

1 or off, the first switch circuit would be biased on
2 at a different bias voltage than the second switch
3 circuit, and third switch circuit which are off, is
4 that right?

5 **A. That's, again, a function of the process**
6 **that the switches or FETs are implemented in, and**
7 **the circuit details. So I wouldn't make a general**
8 **statement, but for example, Huang describes a**
9 **specific implementation, and then I believe gives**
10 **examples of on DC voltages and off DC voltages for**
11 **those particular FETs. Typically, they would be**
12 **different values.**

13 **Q. And where would the biasing voltages be**
14 **applied to the FETs?**

15 **A. Bias signals for FETs include voltages**
16 **and currents. They would be applied to the gate,**
17 **drain, source, and sometimes the body terminal.**

18 **Q. So in the case where you're biasing the**
19 **first switch circuit on, where would the DC bias**
20 **signal be applied, and you have your figure that**
21 **you've drawn on -- annotated figure 8?**

22 **A. First switch circuit. So the figure**

1 **itself just has a block labeled S. And then I**
2 **switched a very general schematic over that. Bias**
3 **voltages are specific to the process in the**
4 **implementation and all. Details that I've mentioned**
5 **already, so -- but to bias a FET, you would apply a**
6 **DC voltage to its gate, drain, source, sometimes the**
7 **body.**

8 Q. And in the transmit mode, when the power
9 switch is in transmit mode, the RF signal that would
10 be passing from the transmit node toward the antenna
11 and through the on for a switch circuit, that would
12 be passing it through the source and drain of the
13 transistor, the channel. That would be the path, is
14 that right?

15 A. **Yes.**

16 Q. And at that same point in time, my third
17 switch circuit and my second switch circuit, I'm
18 applying a different DC bias voltage, is that right?

19 A. **It would depend on the process and**
20 **parameters and the implementation. Huang gives**
21 **examples of that. And in Huang's example, they are**
22 **different values.**

1 It is safe to say that for a switch that
2 is meant to be configured on, you would apply DC
3 bias voltages to the FETs that would put it in the
4 on region. And for the ones that are meant to be
5 configured off, you would apply DC bias voltages to
6 configure those in the off region. But the exact
7 values and if they are the same or different, those
8 would depend on the process and implementation
9 details.

10 Q. But I think you said earlier that it's
11 fairly common that you would use a different DC bias
12 voltage to bias a FET on and bias other FETs off?

13 A. Yes, it would be common, but not
14 necessary. And I'm referring to all of the DC bias
15 voltages that you applied to the FET.

16 Q. And it would be common to apply for all
17 of the FETs a different DC bias voltage for turning
18 them on and turning them off, is that right?

19 A. Yes, that would be typical.

20 Q. We talked about where the DC bias voltage
21 would be applied to the first switch circuit in
22 turning it on. Where would the different DC bias

1 voltage be applied to the first switch circuit -- I
2 mean the second switch circuit, and third switch
3 circuit to turn them off?

4 A. Well, you mentioned the different DC bias
5 and just to clarify, the values are dependent on the
6 process and implementation details, but the DC bias
7 for the second switch circuit would be applied to
8 its gate, drain, source, sometimes body terminals.
9 And similar for the third switch circuit.

10 Q. So in the -- we called it common or
11 typical. In the common or typical case, where you
12 are using one DC bias voltage to turn on the first
13 switch circuit, and a different DC bias voltage to
14 turn off the first and third switch circuit, it is
15 important that the first capacitor block DC signals.
16 Would you agree with that?

17 MR. PERRY: Objection. Form.

18 THE WITNESS: I believe you may have
19 misspoke when you were referring to the switches and
20 the number.

21 BY MR. TYSON:

22 Q. Okay.

1 **A. But to your specific question about the**
2 **first capacitor and is it blocking DC, all**
3 **capacitors block DC, including that first capacitor.**

4 Q. And in the -- I think I did misspeak. In
5 the common or typical example where the first switch
6 circuit is biased on and the third switch circuit is
7 biased off and the second switched circuit is biased
8 off, where the off voltage is a different DC voltage
9 than the on voltage, it is important that the first
10 capacitor block DC signals. Would you agree with
11 that?

12 **A. Yes, I agree with that statement.**

13 Q. Why is that?

14 **A. Because all DC biased -- or all**
15 **capacitors block DC, first of all. And second, if**
16 **the bias voltages are different on let's say the**
17 **drain or source of the first switch FET from the**
18 **drain or source terminal of the second switch FET,**
19 **then in order to apply different DC values to those**
20 **two terminals, you'd need a DC blocking capacitor in**
21 **between. And the first capacitor performs that**
22 **function, as does the second capacitor, because all**

1 **capacitors block DC.**

2 Q. So in this case, where we have the first
3 switch circuit using one DC bias voltage to turn on
4 and the third switch circuit having a different DC
5 bias voltage to turn off, is it also the case that
6 the -- the capacitor that's in the first shunt arm,
7 it's important that that capacitor block DC signals
8 as well?

9 A. **All capacitors block DC signals. For**
10 **this particular configuration, there are two**
11 **capacitors. The first and the second capacitor both**
12 **are blocking DC. So for the purpose of blocking DC**
13 **between the first switch and the second switch, it**
14 **is important that there is at least one DC blocking**
15 **capacitor in between the terminals. And in this**
16 **configuration in figure 9, there are two. The first**
17 **and the second capacitor.**

18 Q. And with respect to the capacitor that's
19 unlabelled, but in the first shunt arm, so it's in
20 the shunt arm above the third switch circuit, would
21 you agree that it's important that that capacitor
22 block DC signals as well?

1 **A.** If the DC bias on the drain of the third
2 switch, drain or source of the third switch circuit
3 is different or if it's desired that that is
4 different than the DC bias on the drain source
5 terminal of the first switch circuit, then it would
6 be important to have a DC blocking capacitor there
7 to allow to you apply those different voltages at
8 DC.

9 **Q.** And what value -- what capacitance value
10 would be needed for first capacitor, second
11 capacitor, and third capacitor to block DC signals?

12 **A.** Well, any value other than zero or
13 infinity. All capacitors block DC.

14 **Q.** In the same common example, if the
15 switched circuits were formed using SOI technology,
16 why would a POSITA want to form the capacitors on
17 the same substrate as the switch circuit?

18 **A.** There are multiple reasons why one might
19 want to include the capacitor on the same substrate.
20 Again, there is tradeoffs with on-chip versus
21 off-chip capacitor. Perhaps one reason would be to
22 reduce the number of external components to have a

1 **more integrated or smaller solution.**

2 Q. So in an integrated and smaller solution,
3 would it also assist with costs?

4 A. **Not necessarily. That would depend on**
5 **the technologies used.**

6 Q. So if we are using silicon insulator
7 technology, would it be cheaper to form a capacitors
8 on the same substrate as the switch circuits?

9 A. **Not necessarily. Again, that would**
10 **depend on sort of all of the options available at**
11 **your disposal and the costs of those options and the**
12 **costs for park aging and integration and all of the**
13 **above.**

14 **SOI technology is typically more**
15 **expensive than bulk, on a semiconductor or bulk CMOS**
16 **technology. Therefore, area on SOI technology is**
17 **usually higher cost than area on bulk CMOS**
18 **technology, just to give you one example.**

19 Q. What about compared to pHEMT technology?

20 A. **I'm less familiar with the wafer cost of**
21 **pHEMT. So I would guess it is more expensive than**
22 **SOI. But I don't have those costs, especially at**

1 **the time of 2012, fresh in my memory.**

2 Q. You had mentioned that one of the reasons
3 you may want to include the capacitors on the same
4 substrate as the switch circuits would be to reduce
5 the number of external components to have a more
6 integrated or smaller solution. Do you recall that?

7 A. **Yes.**

8 Q. Okay. And would having a smaller
9 solution, a more integrated or smaller solution have
10 a benefit if this switch is used in a cellular
11 phone, for example?

12 A. **It could, yes.**

13 Q. And would that same benefit of having an
14 integrated or smaller solution be beneficial in the
15 case of a wireless LAN radio?

16 A. **Wireless LAN meaning WiFi?**

17 Q. WiFi.

18 A. **It could.**

19 MR. PERRY: We've been going for about
20 another hour now. Take a break?

21 MR. TYSON: That's fine.

22 (Whereupon, at 12:08 p.m., the deposition

1 in the above-entitled matter was
2 recessed, to reconvene at 12:58 p.m.)
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1 AFTERNOON SESSION

2 (12:58 p.m.)

3 Whereupon,

4 DR. DAVID WENTZLOFF,

5 the witness on the stand at the time of recess,

6 having been previously duly sworn, was further

7 examined and testified as follows:

8 CROSS-EXAMINATION (RESUMED)

9 BY MR. TYSON:

10 Q. Welcome back, Dr. Wentzloff.

11 A. Thank you.

12 Q. I'm going to go to Exhibit 4, which is
13 your declaration for the '194 patent IPR.

14 A. Okay.

15 Q. If can you turn to page 16 and 17.

16 A. Yes.

17 Q. So on page 16 and 17 of Exhibit 4, I see
18 you reproduced the text of claims 1 and 2 of the
19 '194 patent, is that right?

20 A. Yes.

21 Q. I'd like to -- we've been talking about
22 the figure in Exhibit 9, which is on Bates 38 that

1 the applicant labeled. And I understand that this
2 -- I guess we discussed this figure in the context
3 of the '579 patent claim 1. And I believe we
4 discussed that the applicant had accurately mapped
5 these components from '579 patent claim 1 on to
6 figure 9 of the patent. Do you recall that?

7 **A. I recall that.**

8 Q. Would you agree that a POSITA reading
9 '194 patent claim 1 on to figure 9 of the patent
10 would map the claim components just as the applicant
11 did on Bates page 38 of Exhibit 9?

12 **A. Just for the relevant subset of the**
13 **claim, right, like the first switch circuit. The**
14 **first capacitor, for example. Just that language.**

15 Q. Yes.

16 **A. If that's what you're asking.**

17 Q. Yes, I mean, yes, the labeling. Is it
18 accurate? Is it an accurate mapping of what is
19 labeled or what is claimed on to what is labeled on
20 Bates 38, figure 9?

21 **A. Yes. There are some notable differences.**

22 Q. Okay.

1 A. For example, the claim 1 of the '194 ends
2 with a second shunt arm. That is neither in claim 1
3 of the '579, nor is it labeled on this figure, so --
4 and in the preamble and the first claim element are
5 different here.

6 So there are some notable differences,
7 but for example, the first switch circuit connected
8 between the antenna and the transmit node. That
9 would -- a POSITA would understand that to be the
10 first switch circuit labeled or annotated on page
11 38.

12 Q. Okay. The -- regarding the last
13 limitation of claim 2, the second shunt arm and the
14 fourth switch circuit. Would a POSITA -- would a
15 POSITA map the second shunt arm and fourth switch
16 circuit on to this received side shunt arm in the
17 same way as the applicant mapped the first shunt arm
18 and third switch circuit on to the transmit side
19 shunt arm?

20 A. Yes, I think that's fair to say. This
21 Exhibit 9 is the office action for the '579 patent,
22 correct?

1 Q. It is.

2 A. Okay. And we are looking at the '194.

3 So these are different. But conceptually, I would
4 agree with you.

5 Q. And then let's look at the '194 patent
6 claim 2.

7 A. Okay.

8 Q. Which is on -- which you reproduced on
9 page 17 of Deposition Exhibit 4.

10 A. I'm there.

11 Q. Sure. And claim 2 says, the switch
12 system of claim 1, wherein at least one of the first
13 and second capacitors is configured to inhibit a low
14 frequency blocker signal from mixing with the
15 fundamental frequency signal in the switch. Do you
16 see that?

17 A. Yes.

18 Q. What would a POSITA reading the patent
19 understand inhibit to mean in the context of claim
20 2?

21 A. In the context of claim 2, as well as the
22 description for this patent, a POSITA would

1 **understand that to mean attenuate or reduce.**

2 Q. So it's not your testimony that inhibit
3 in the context of claim -- let me strike that.

4 So a similar limitation to what is
5 recited in claim 2 is recited in other claims of the
6 '579 patent and '194 patent, is that right?

7 **A. You're referring to inhibiting?**

8 Q. Yes. Inhibit a low frequency blocker
9 signal from mixing with the fundamental frequency
10 signal of the switch. That limitation appears in
11 other claims in the '579 patent and the '194 patent,
12 is that right?

13 **A. Yes, I believe so.**

14 Q. And would your -- would your answer
15 related to what a POSITA would understand inhibit
16 mean, would that apply to the use of inhibit or
17 inhibiting in those other phrases meaning
18 attenuating or reducing?

19 **A. Specifically for inhibiting a low**
20 **frequency blocker signal, yes. And actually, I do**
21 **believe we have a claim construction for inhibit**
22 **which might be helpful, too. I don't have that in**

1 front of me, though.

2 Q. Okay. Is that from the litigation you're
3 saying?

4 A. Isn't it called the Markman brief?

5 Q. Okay.

6 A. There is a claim construction language
7 there.

8 Q. But I guess in your validity analysis
9 that you did for your declaration in Exhibit 4, and
10 Exhibit 3, the construction that you used for
11 inhibit was attenuate or reduce, is that right?

12 A. I believe going off memory, the claim
13 construction language was reduce or block. But I
14 would want to double check that. And was consistent
15 with -- I was consistent with that language. And
16 also reduce and attenuate, these would be synonymous
17 words to a POSITA. And I was consistent with that
18 throughout, if that's your question.

19 Q. So it's -- I guess just a clarification.
20 It's not your testimony that inhibit in the context
21 of these claims, where it's used, would mean prevent
22 a low frequency blocker signal from mixing with the

1 fundamental frequency signal. It's not limited to
2 that.

3 **A. It's not limited to preventing. Was that**
4 **your question?**

5 Q. Yes.

6 **A. Correct. It's not limited to just**
7 **preventing.**

8 Q. Inhibit could mean attenuate or reduce
9 which you said was synonymous, is that right?

10 **A. Yes.**

11 Q. As far as attenuate, it's similar to
12 prevent. It's not your testimony -- it's not your
13 testimony that inhibit would require 100 percent
14 attenuation of a low frequency blocker signal, is
15 that right?

16 **A. That it requires?**

17 Q. Yes, that it requires.

18 **A. Correct. It does not require that.**

19 Q. How much reduction in the amplitude or
20 how much attenuation in the amplitude of a low
21 frequency blocker signal would a POSITA understand
22 as meeting the construction of inhibit a signal from

1 mixing with a fundamental frequency signal?

2 A. So that would come down to the
3 application, and specifically the desired
4 performance levels. So in the context of this
5 invention, inhibiting a low frequency blocker
6 specifically is reducing or attenuating as I had
7 mentioned.

8 The value of that blocker to prevent
9 mixing with a fundamental in the switch to then
10 produce intermodulation distortion. So to answer
11 your question, we kind of have to talk about, you
12 know, how does IMD, short for intermodulation
13 distortion, how does IMD affect the rest of the
14 performance of the radio.

15 So the blocker and the amount, the level
16 of the blocker determines the amount of IMD which
17 then determines the amount of degradation and
18 performance of the main radio, of the main
19 communication.

20 Q. Okay. I guess let's talk about the rest
21 of the claim limitation, then. So we talked about
22 inhibit can mean reduce or attenuate. What would a

1 POSITA understand a low frequency blocker signal to
2 mean in the context of the claims?

3 A. I would answer that in two parts. First,
4 low frequency, and second, blocker. Low frequency
5 in the context of wireless communication would be a
6 relative term, so -- and the frequency would be
7 relative to the frequency of the fundamental, the
8 fundamental meaning the main frequency that the
9 radio is using to communicate, and the fundamental
10 frequency would usually exist in what we call a
11 band.

12 A band is a range of frequencies, where
13 the fundamental could be -- could take on any one of
14 those frequencies in the band. And then a low
15 frequency signal would be a frequency that is below
16 or has a frequency value that is less than the
17 frequency of the lower edge of that band. So that's
18 in the low frequency part.

19 The second part is on a blocker. A
20 POSITA would understand a blocker to mean a signal
21 at a specific frequency that causes spurious
22 emissions that would then degrade the performance of

1 **your radio. So not all signals are necessarily**
2 **blockers. Not all low frequency signals are**
3 **necessarily blockers.**

4 Q. So inhibit means reduce or attenuate.
5 Low frequency means at a frequency value less than
6 the lower edge of the fundamental frequency band.
7 The fundamental frequency signal is the frequency
8 that the radio uses to communicate within a band and
9 blocker means a signal at a specific frequency that
10 causes spurious emissions that would degrade the
11 performance of your radio. That's your testimony a
12 POSITA would understand for those terms?

13 MR. PERRY: Objection. Compound.

14 THE WITNESS: It would help me to take
15 all that in parts, if we could.

16 BY MR. TYSON:

17 Q. Sure. So take it in parts. It's your
18 testimony that a POSITA would understand inhibit to
19 mean reduce or attenuate, is that right?

20 A. Yes. Again, I just -- I want to just be
21 accurate with the definition that I believe was --
22 well, maybe not agreed upon by the parties for

1 **inhibit, which is -- and that's specifically what I**
2 **was trying to look for in my report. So if you know**
3 **where that is, that would be helpful. I could**
4 **probably search for it.**

5 Q. You have your claim construction section,
6 like, right after claim 2, paragraphs 38 through 30.

7 A. **I saw that, but I did not see that --**

8 Q. Well, then I guess if you look at your
9 materials considered, I see the Exhibits 2001 and
10 2005. The petition we talked about. The
11 declaration from Dr. Larson. And then the rest of
12 the exhibits are what was filed by the petitioner at
13 the time the petition was filed, Exhibits 1001,
14 1002, 1003, and then Exhibits 1005 through 1009. Do
15 you see that?

16 A. **You are listing the included materials or**
17 **materials considered?**

18 Q. Yes. So I'm not sure what document they
19 are talking about, but it's not listed in your
20 materials considered. And --

21 A. **Do you mind if I search?**

22 Q. Sure.

1 **A. Okay.**

2 **Q. Okay.**

3 **A. I didn't see that reproduced in here. I**
4 **believe it's from -- I think it's called a Markman**
5 **brief that I was reviewing that had that language.**
6 **But I think it is fair to say that inhibit would**
7 **mean to reduce or attenuate and I think a POSITA**
8 **would certainly understand it that way. So we**
9 **can -- we can adopt that meaning for the word**
10 **inhibit.**

11 **Q. Okay. I believe you said that a POSITA**
12 **would understand that the construction of inhibit in**
13 **the context of the claims would require a**
14 **determination of the desired performance levels for**
15 **a particular application, is that right?**

16 **A. Yes, to determine the amount of**
17 **inhibiting, for example. That would be dependent on**
18 **the application and the desired performance levels.**
19 **Yes.**

20 **Q. Where in the patent -- the patents does**
21 **it disclose a varying amount of attenuation based on**
22 **desired performance levels of the application?**

1 **A. I don't believe the patent gives any**
2 **numbers specifically for those amounts. I think for**
3 **a POSITA who understands switch systems blockers and**
4 **their impact on IMD would understand the impact that**
5 **IMD has on the performance of the main radio.**

6 Q. Does a POSITA -- I think we'll go back to
7 that. Let's talk about the construction of low
8 frequency blocker signal. I believe for the low
9 frequency component, it's your testimony that low
10 frequency in the context of the claims means below
11 the lower edge of the fundamental frequency band, is
12 that right?

13 **A. Yes, that's correct.**

14 Q. And for blocker signal, it's your
15 testimony that a POSITA would understand blocker
16 signal in the context of the challenged claims means
17 a signal that causes spurious emissions that would
18 decrease the performance of the radio. Is that
19 right?

20 **A. A POSITA would understand a blocker to be**
21 **mixed with the fundamental to then produce IMD which**
22 **is the spurious emissions that then interferes with**

1 **the main radio.**

2 Q. So the -- it's your -- I guess let's walk
3 through an example and let's look at column 6 of the
4 patent.

5 **A. Okay.**

6 Q. And looking at column 6, line -- starting
7 at 14. And then at line 16, column 6, line 16, it
8 gives an example of two signals having fundamental
9 frequencies F1 and F2 that are relatively close to
10 each other in the frequency space. So F1 is less
11 than F2, is that right?

12 **A. Yes, in this example.**

13 Q. And F1 -- let's say F1 is the fundamental
14 frequency signal in the switch that we are talking
15 about. I'm sorry. F2 is the fundamental frequency
16 in the switch in the claim.

17 The next line after it gives that
18 example, it says mixing of such signals can result
19 in peaks in frequency spectrum at frequencies
20 corresponding to different products of fundamental
21 inharmonic frequencies of the two signals. And it
22 gives examples of intermodulation distortion that --

1 both second order and third order -- that would be
2 created by the mixing of those signals.

3 **A. Yes.**

4 Q. Is it your testimony that claim 2 would
5 read on to reducing or attenuating the signal at the
6 F1 frequency from mixing with the signal at the F2
7 frequency in the switch?

8 MR. PERRY: Objection. Form.

9 THE WITNESS: If F1 is the frequency of a
10 blocker and F2 is the fundamental, then that would
11 read on claim 2, which refers to a blocker signal, a
12 low frequency blocker signal from mixing with a
13 fundamental frequency signal in the switch. That
14 would be one example. But there are numerous
15 examples and it depends on the application.

16 BY MR. TYSON:

17 Q. Is it your testimony that -- I mean,
18 column 6 identifies that mixing F1 and F2 causes
19 IMD. You agree with that, right?

20 **A. Yes, that mixing of F1 and F2 causes IMD.**
21 **Yes.**

22 Q. And F1 is a lower frequency than F2,

1 right?

2 A. Yes.

3 Q. So is it -- it is your testimony -- I'm
4 just confirming that configured to inhibit would be
5 configured to reduce or attenuate the F1 frequency
6 signal described in column 6 from mixing with the F2
7 signal described in column 6 in the switch?

8 A. Yes. Assuming F1 is the frequency of the
9 blocker and F2 is the fundamental.

10 Q. And where in the patent does it describe
11 -- let me strike that.

12 So you understand that in this example,
13 that the patent gives F2 and F1 are relatively close
14 to each other in frequency space. Do you see that?

15 A. Yes.

16 Q. Where in the patent does it disclose --
17 actually, let's look at -- let's go to the Exhibit 9
18 and looking at figure 9, annotated figure 9 of the
19 patent on page 38. So in this example, the R
20 frequency, my fundamental frequency let's say is
21 going from the transmit node out to the antenna. Do
22 you understand that? And that would be frequency F2

1 in the column 6 example.

2 And -- okay.

3 **A. Was that a question for me?**

4 **Q.** No, I'm laying the groundwork here. So
5 then where in the patent does it describe how the
6 first capacitor would reduce or attenuate a signal
7 at the F1 frequency which is relatively close to the
8 F2 frequency, how would it reduce or attenuate the
9 amplitude of the F1 signal?

10 **A.** I'm not sure I completely agree with the
11 first part of your question with the transmit signal
12 in the fundamental. But the second part you were
13 asking, how does the -- how does the first capacitor
14 attenuate the F1 frequency which we are agreeing
15 right now for the sake of this discussion that that
16 is the blocker frequency. And --

17 **Q.** And it's relatively close in frequency to
18 the fundamental frequency?

19 **A.** Sure. That's -- that's not a defined --
20 that's a -- that's not -- there is no numerical
21 value given to that, but yes, relatively close.

22 **The impedance of the capacitor will be a**

1 function of frequency and will change as a function
2 of frequency, and at a lower frequency because of
3 the configuration of a circuit, that capacitor will
4 provide more attenuation or more reduction of that
5 particular signal at a lower frequency than the
6 fundamental.

7 Q. But if the fundamental frequency is
8 relatively close to the blocker signal, then the
9 impact that the capacitor have on attenuation, it
10 would attenuate the fundamental frequency a
11 relatively close amount to the blocker signal in
12 this case. Am I right?

13 A. That would depend on the proximity of the
14 frequencies. But the impedance of the capacitor and
15 perhaps the filtering aspect of it would be a
16 continuous function of frequency. The level of
17 filtering is a function of that impedance, as well
18 as other elements in the circuit, not just the
19 capacitor.

20 And the patent doesn't describe the
21 reduction. Or inhibiting of the low frequency
22 blocker as in relative terms to any impact on the

1 **fundamental. It just describes reducing the -- or**
2 **inhibiting that low frequency blocker, so that it is**
3 **not mixing with the fundamental introducing IMD.**
4 **That would then -- you know, a POSITA would**
5 **understand what the need to degrade the performance**
6 **of the radio. I could try that again if it wasn't**
7 **clear.**

8 **Q. No.**

9 **A. Okay.**

10 **Q. The patent identifies -- you'd agree the**
11 **patent identifies look at column 5 that lines 62 to**
12 **63, that decreased switching device insertion loss**
13 **can be desirable to enable improved RF signal**
14 **transmission. Do you see that?**

15 **A. Yes.**

16 **Q. And it also at column 6, lines 5, 6, 7,**
17 **8, so 6 through 8 says, increased switching device**
18 **isolation can improve RF signal integrity in certain**
19 **embodiments and increase in isolation can improve**
20 **wireless device communication performance. Is that**
21 **right?**

22 **A. Yes.**

1 Q. So in the patent, it teaches both
2 decreased insertion loss and increased isolation is
3 also important. Is that right?

4 A. Yes.

5 Q. In the column 6 example, what would a
6 POSITA understand the statement that F1 and F2 are
7 signals that are relatively close to each other in
8 frequency space. Like, what distance is it
9 referring to there?

10 A. That's not defined in the patent
11 description itself. To answer that question depends
12 again on the application. So I'd have to explain in
13 a bit more detail the frequencies of the IMD that
14 gets produced, and then how it could impact or
15 degrade performance. And I'm happy to go into those
16 details if you'd like.

17 Q. I guess my question is the -- other than
18 this example here, the patent doesn't give any other
19 examples of low frequency blocker signals or
20 fundamental frequency signals, is that right?

21 A. I believe that is correct. This is the
22 only section where the patent goes into a specific

1 **example of frequencies. But as I mentioned, a**
2 **POSITA would understand low frequency blockers like**
3 **I described earlier.**

4 Q. If we -- I guess let's assume that we are
5 talking about WiFi, and F2 is the 2.4 gigahertz band
6 of WiFi, so -- and we are talking about wireless LAN
7 radio, WiFi radio. What would a POSITA understand
8 -- so let's say the annotated figure 9 on Bates page
9 38 is an RF switch and a WiFi radio, wireless radio.
10 And the fundamental frequency band is 2.4 gigahertz.

11 When the patent is referring to frequency
12 F1 which you're saying could be a low frequency
13 blocker signal, that is relatively close to each
14 other in frequency space, what would the frequency
15 of F1 be?

16 A. **Low frequency could mean anything below**
17 **the lower edge of the 2.4 gigahertz band which I**
18 **believe is around 2.3 and a blocker would mean a**
19 **signal that is large enough or at a frequency that**
20 **would produce IMD terms that would degrade the**
21 **performance of the main radio.**

22 Q. Well, let's say the frequency is 2.1

1 gigahertz. That's below the band. And if I look at
2 the patent, it identifies that F2, like for example,
3 second order intermodulation distortion. F2 minus
4 F1 in that case, 2.4 gigahertz minus 2.1 gigahertz
5 is 300 megahertz. So that's intermodulation
6 distortion product that it created. In fact, it
7 could be 2 point, let's say it's 2.4 gigahertz and
8 2.3 gigahertz. That's 100 gigahertz signal. That's
9 intermodulation distortion second order that's
10 created?

11 **A. You said second order. Yes, second order**
12 **intermod would produce those intermod -- IMD terms.**

13 **Q.** So I mean, if you had an even very small
14 difference, let's say, I don't know, a hundred,
15 let's say 50 megahertz. But there was just a 50
16 megahertz difference between F2 and F1, and that
17 would create second order intermodulation
18 distortion, according to column 6 of the patent, at
19 this 50 megahertz range.

20 So is it your testimony that claim 2
21 requiring a capacitor configured to inhibit the F1
22 blocker signal that is 50 megahertz less than the

1 fundamental frequency signal from mixing in the
2 switch. Where in the patent does it talk about a
3 capacitor doing that?

4 A. Nowhere that I'm aware of. It doesn't
5 refer to any numbers for specific frequencies. But
6 if in a situation like that, you mentioned 50
7 megahertz as one of the IMD terms for your example,
8 I would agree with that. The question would be is a
9 50 megahertz spurious emission, will that degrade
10 the performance of the main radio, yes or no.

11 And if it doesn't, it could probably be
12 safely ignored. But if it does, then it would need
13 to be dealt with in some way. So this was sort of
14 that longer explanation I was referring to and how
15 we define blockers, we being POSITAs define blockers
16 versus just any signal at a lower frequency.

17 Q. You'd agree that a 50 megahertz signal if
18 it was inside a switch and it mixed with 2.4
19 gigahertz signal, that that -- that's a lot of --
20 that can cause -- if they mix together, that can
21 cause a lot of distortion in the fundamental
22 frequency signal. Would you agree with that?

1 A. Well, there is a lot of -- there is a lot
2 of things that go into that. For a switch with a
3 given linearity -- I'm sorry, a given non-linearity,
4 if you put in two signals at different frequencies,
5 it will produce intermod distortion, intermod terms.

6 And the examples of that are given with
7 this, these F1 and F2 and column 6. But also in
8 this column, somewhere it does mention that higher
9 order distortion terms will produce higher order,
10 you know, non-linears or IMDs so it doesn't just
11 stop there. It says there is going to be a lot of
12 spurious emissions that are produced. The question
13 that a POSITA needs to ask is which ones are
14 degrading the performance of my radio and which ones
15 aren't.

16 And that is how we would -- we POSITAs
17 would define blockers versus signals that could
18 perhaps be safely ignored, low frequency signals
19 that could be safely ignored because they do not
20 degrade the performance of radio.

21 Q. Where in the patent would there be any
22 guidance as to this defining blockers versus signals

1 that could be safely ignored so they don't degrade.
2 Where does it provide any guidance to a POSITA on
3 that?

4 **A. I don't believe the patent description**
5 **itself defines blocker. But a POSITA would**
6 **understand that a blocker would refer to something**
7 **that is harming the performance of my radio.**

8 Q. So the patent doesn't need to disclose
9 what a blocker means because that's just well-known
10 to a POSITA, is that right?

11 **A. I believe a blocker would be well-known**
12 **to a POSITA just like a blocker would understand**
13 **what a DC bias is or what a FET is. These are other**
14 **terms that just aren't defined in the patent. But**
15 **understood by a POSITA.**

16 Q. So just for purposes of this example, if
17 the 50 megahertz intermodulation product that was
18 created by the mixing of the F2 signal, the
19 fundamental frequency signal at 2.4 gigahertz. And
20 the F1 signal was 50 megahertz below that.

21 **A. Okay.**

22 Q. If I look at -- if the fundamental

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1 frequency is being transmitted to the switch, is the
2 transmit frequency for the switch, how is the first
3 capacitor on Bates 38 going to inhibit a blocker
4 signal that's 50 megahertz less than the signal
5 that's supposed to pass through it to transmit?

6 **A. It would have -- first of all, its impedance**
7 **answer is a function of capacity, so the capacitor**
8 **would have a different impedance between the two**
9 **frequencies. I think what you're -- what you're**
10 **arguing is if those frequencies are very close then**
11 **those impedances are very close and therefore**
12 **perhaps the attenuation of the blocker is very close**
13 **to the attenuation of the fundamental.**

14 **The way that intermodulation works is**
15 **because it is higher, what we call these higher**
16 **order terms, meaning the signal raised to the second**
17 **power squared or the signal raised to the third**
18 **power cubed, if you reduce both a blocker and a**
19 **fundamental with the same amplitude, the intermod,**
20 **the IMD terms will reduce twice or three or four**
21 **times as fast or faster than the fundamental term.**

22 **So when you're just concerned about**

1 degradation and performance due to nonlinearity in
2 the switch, sometimes it is an acceptable trade off
3 to prevent or reduce the amplitude of the blocker
4 while also perhaps reducing or attenuating somewhat
5 the amplitude of the fundamental to ultimately
6 reduce the IMD products at a much faster rate to
7 then achieve a desired performance level.

8 Q. And a capacitor which is -- a capacitor
9 is first order high pass, it's a passive first order
10 high pass filter. Am I right? Every capacitor is
11 that?

12 A. No.

13 Q. It's a passive component, a capacitor is
14 a passive component?

15 A. Yes.

16 Q. This configuration of a capacitor that's
17 in figure, the -- the only one disclosed in the
18 patent, the one claimed, that's a first order high
19 pass filter, is that right?

20 A. This figure 9 is a simplified schematic.
21 It shows four capacitors. Technically, that's a
22 fourth order circuit. The patent also refers to

1 **parasitic capacitance of the FETs in this**
2 **description.**

3 Q. I'm talking about this capacitor. That's
4 a passive. The frequency response of that capacitor
5 is a first order response. Is that right?

6 A. Well, the impedance, yes, I would agree
7 that the impedance is. But when we talk about
8 filtering, we -- I could draw you two different
9 circuits that use one capacitor, and one is a low
10 pass filter and one is a high pass filter.

11 So just because a capacitor has an
12 impedance that varies a certain wave of frequency
13 does not inherently make the capacitor a certain
14 type of filter. A filter refers to a circuit with
15 capacitors, switches, resistors, other components.
16 That's why -- that's the disconnect I think between
17 the question.

18 Q. If the capacitor is in series between the
19 input RF signal and the output RF signal, that is a
20 passive first order high pass filter, correct?

21 A. It could be.

22 Q. It's not a low pass filter, is it?

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1 **A. Again, it depends on the circuit**
2 **implementation, so --**

3 **Q. Let's just look at this circuit**
4 **implementation in figure 9. First capacitor is**
5 **connected between transmitter and the node and**
6 **antenna node in series, is that right?**

7 **A. Yes.**

8 **Q. So that a POSITA would understand that**
9 **that first capacitor is a first order high pass**
10 **filter in this figure.**

11 **A. A POSITA would understand that it**
12 **participates in a circuit that would implement a**
13 **filter response.**

14 **Q. And what other parts of the circuit that**
15 **would implement a filter response are disclosed in**
16 **the patent?**

17 **A. The other capacitors. The switches and**
18 **the resistance series, resistance of the switches is**
19 **cited in the description, as well as the parasitic**
20 **capacitance of the switches as they are implemented**
21 **in a semiconductor process.**

22 **Q. But here the claim requires that at least**

1 one of the first or second capacitors be what is
2 configured to inhibit the blocker signal. So is it
3 your testimony that the claim covers inhibiting from
4 all of these other undisclosed components as well?

5 MR. PERRY: Objection. Form.

6 THE WITNESS: I don't think the other
7 components are undisclosed. I think the description
8 does refer to those. And the claim itself mentions
9 the first capacitor being configured to inhibit
10 the -- or a low frequency blocker signal, meaning it
11 is sufficiently attenuating or reducing the signal
12 level for the amplitude of the blocker to produce or
13 reduce the amount of IMD that's produced.

14 BY MR. TYSON:

15 Q. Even if the -- and the capacitor is
16 sufficiently attenuating or reducing the signal
17 level for the amplitude of the blocker, even if the
18 fundamental frequency is 50 megahertz away from it,
19 that's your testimony.

20 A. No, that wasn't my example. That was in
21 example of frequencies that you gave. A blocker
22 signal in its frequency would be determined based on

1 the application and the frequencies that would
2 result in signals that would degrade the performance
3 of the fundamental or the main radio's
4 communication. And it's not my testimony that that
5 is 50 megahertz.

6 Q. But in the example of 2.4 gigahertz and
7 2.35 -- well 2.395 gigahertz, that would create,
8 according to -- that would create second order
9 intermodulation distortion, isn't that right?

10 A. Those signals, if going through a
11 non-linear switch, would create -- would second
12 order nonlinearity would create the second order
13 intermod terms, yes.

14 Q. If we can go to -- let's go to paragraph
15 15. I'm sorry, on page 15 of your declaration,
16 Exhibit 3. Exhibit 4. Sorry. Exhibit 4.

17 A. What page.

18 Q. 15, paragraph 46.

19 A. Okay.

20 Q. The first sentence, you say, the
21 exemplary switching configuration shown in the '194
22 patent incorporates several capacitors specifically

1 chosen to inhibit a low frequency blocker signal
2 from mixing with a fundamental frequency. Do you
3 see that?

4 A. Yes.

5 Q. And by shown in the '194 patent, you're
6 referring to figure 9 that you have reproduced
7 above? Is that right?

8 A. Yes.

9 Q. In the next three sentences -- actually,
10 next four sentences, you cite to the placement of a
11 capacitor between a node and a switch arm. So
12 capacitor C1 is placed between the antenna node and
13 the switch arm of the transmit throw. Capacitor C2
14 is placed between the antenna node and the switch
15 arm of the receive throw. Capacitor C3 is placed
16 between the transmit node and its shunt switch arm.
17 And capacitor C4 is placed between the receive node
18 and its shunt switch arm.

19 And then you say the '194 patent includes
20 these capacitors in this switching configuration
21 because with the foregoing capacitors, the low
22 frequency jammer signal can be blocked or reduced

1 from mixing with any on or off paths. Do you see
2 that?

3 **A. Yes.**

4 **Q.** When you say -- when you state in your
5 declaration, includes these capacitors in this
6 switching configuration, you're referring to the
7 placement of capacitors C1, C2, C3, and C4 that are
8 described in the preceding sentences. Isn't that
9 right?

10 **A. Yes, that was -- that's the description.**
11 **I'm quoting that from the patent. But, yes, that's**
12 **what the inventors were referring to. That's my**
13 **understanding of the patent.**

14 **Q.** And again, above that when you say the
15 first line of paragraph 26 when you say capacitors
16 are specifically chosen, you're referring to the
17 choice of positioning of capacitors C1, C2, C3, and
18 C4 in figure 9, isn't that right?

19 **A. Where did you read or --**

20 **Q.** The first sentence of paragraph 26.

21 **A. Oh, 26. What's referred to as**
22 **specifically chosen would be both the placement**

1 **which was shown in figure 9, as well as their**
2 **values. And as well as how they are implemented.**

3 Q. Where in the patent does it disclose
4 values of capacitor in a way the person skilled in
5 the art would specifically choose the capacitor?

6 A. **I did not see any values given for any**
7 **capacitors in the patent description.**

8 Q. So the patent doesn't need to describe
9 how the POSITA would choose a value because that was
10 just well-known? Let me ask that again. The patent
11 does not need to describe how to choose a value for
12 the capacitors in figure 9 in order for the
13 capacitor to be specifically configured to inhibit a
14 low frequency blocker signal from mixing with the
15 fundamental frequency signal, is that right?

16 A. **Not entirely. The patent does teach**
17 **choosing a value of placement and values and how to**
18 **implement those capacitors to inhibit blockers to**
19 **prevent IMD which is different than how a POSITA**
20 **would normally choose a value for a capacitor if all**
21 **it was doing was blocking DC.**

22 Q. Okay. Where in the patent does it

1 disclose choosing a value of a capacitor to inhibit
2 blockers to prevent IMD?

3 **A. Where it talks about the first capacitor**
4 **C1 and with the foregoing capacitors and low**
5 **frequency jammer signal can be blocked or reduce for**
6 **mixing with an on/off path. That's column 9, lines**
7 **35 to 37, for example. And I think there are**
8 **multiple references to IMD, I believe. There may be**
9 **others in the patent where it talks specifically**
10 **about choosing the first capacitor to inhibit the**
11 **blocker signals.**

12 **Q. I'm asking specifically about where in**
13 **the patent does it teach a POSITA how to choose a**
14 **value of a capacitor to inhibit the low frequency**
15 **blocker signal?**

16 **A. The patent doesn't mention any specific**
17 **values of capacitance. But the patent does teach**
18 **choosing a value to inhibit the low frequency**
19 **blocker again to prevent IMD through mixing with the**
20 **switch non-lineared.**

21 **Q. Give me a specific example of the patent**
22 **teaching choosing a value to inhibit the low**

1 frequency blocker signal to prevent IMD.

2 **A.** The patent doesn't give any values of
3 capacitor. I don't -- I don't think it uses the
4 word value in the patent description. But it would
5 be understood to a POSITA that that is for the
6 figure 9 schematic when we are referring to that
7 first capacitor, that would be one of the design
8 choices for that POSITA would be how to pick the
9 value of that capacitor.

10 And at the time a POSITA was choosing a
11 value for that capacitor purely for blocking DC bias
12 signals would have chosen the largest possible
13 value. And not considered things like necessarily a
14 blocker signal or filtering a blocker signal.

15 **Q.** I'm confused, I guess. It's your
16 testimony that any capacitor value would block DC,
17 isn't that correct?

18 **A.** That's correct, yes.

19 **Q.** So a POSITA could choose any value of
20 capacitor to block a DC bias signal, isn't that
21 right?

22 **A.** Yes.

1 Q. Where in the patent does it disclose how
2 to implement a capacitor to inhibit low frequency
3 blocker signals?

4 A. **What do you mean by implement?**

5 Q. I'm using the word that you used. You
6 said -- and I'll find it. The patent -- this is
7 your -- I'm just reading your testimony. The patent
8 does teach choosing a value of placement and values,
9 and how to implement those capacitors to inhibit
10 blockers to prevent IMD.

11 So where in the patent does it teach how
12 to implement the capacitors in figure 9 to inhibit
13 blockers?

14 A. **By that I was referring to on-chip or**
15 **integrated with the same substrate or on a separate**
16 **die, or I believe off-chip was also covered in the**
17 **description, but certainly implementing them on the**
18 **same die or on a second die was in the description.**
19 **So would you like me to point you to those sections?**

20 Q. Sure. I guess maybe column 9, line 45 to
21 47. Or 48. Is that what you're talking about?

22 A. **Yes. And here the inventors also use the**

1 **term implement to refer to on die versus off die or**
2 **any combination thereof.**

3 Q. And the '194 patent which is Deposition
4 Exhibit 8 at column 9, 45 to 48, it refers to
5 implemented on the same die as switch -- as
6 respective switch circuits off the die, or any
7 combination thereof, as alternatives to each other,
8 right?

9 A. **Yes, but not necessarily equal**
10 **alternatives.**

11 Q. So where does it disclose any inequality
12 between these alternatives as it relates to -- as it
13 relates to anything? Where in the patent does it
14 disclose any inequality between capacitors
15 implemented on the same die as their respective
16 switch circuits versus capacitors implemented off
17 the die? Where in the patent does it disclose any
18 benefits or advantages of one or the other?

19 MR. PERRY: Objection. Form.

20 THE WITNESS: Column 10, line 13
21 describes some embodiments, one or more die having
22 one or more features described herein can be

1 implemented in a packaged module. That would be a
2 packaged module there refers to a module is a
3 component that could include one or more elements
4 inside of it. That could be just a single die or it
5 could be multiple die or it could be multiple die
6 and off-chip capacitors all in a single packaged
7 module, as understood by a POSITA.

8 BY MR. TYSON:

9 Q. Anywhere else?

10 A. That section goes on to describe
11 connecting components inside the module with wire
12 bonds which you would need to do to connect devices
13 on separate die or off-chip, versus on-chip or on
14 the same substrate. It talks about one or more
15 surface mounted devices. I'm at line 34 of column
16 10. It talks about connection paths and contact
17 pads on line 38, 9 and 40.

18 These are all, I think, examples of the
19 inventors describing how you might implement the
20 various elements of the switch circuit of figure 9,
21 switches, capacitors, connections, the wires that
22 connect them and doing so on single substrates,

1 multiple substrates or with off-chip components.
2 And then further integrating all of that in modules.
3 And there may be other parts in the description
4 where they refer to that. I could keep looking if
5 you'd like.

6 Q. I think my question was where in the
7 patent does it disclose advantages or disadvantage
8 between forming the capacitors on a separate die or
9 on the same substrate? So is it your testimony that
10 column 10 is providing advantages or providing
11 disadvantages of having components on different
12 dies. Is that your testimony?

13 A. Well, column 10 is describing some of the
14 different ways you could implement the various
15 elements. And we also talked about column 9 having
16 some examples there. But this, like I said, this
17 may not be the only -- I don't think this is the
18 only spot where they discussed the advantages and
19 disadvantage. So like I said, I could continue
20 looking if you'd like.

21 Q. We were specifically talking about -- I
22 think we were talking about when you said

1 specifically chosen capacitors being specifically
2 chosen to inhibit a low frequency blocker signal.
3 The patent doesn't choose, doesn't disclose any
4 benefits related to the capacitor inhibiting a low
5 frequency blocker signal related to whether it's on
6 die or off die, is that right?

7 **A. I don't believe that's correct. Because**
8 **the patent does describe advantages of, first of**
9 **all, using the capacitor to inhibit low frequency**
10 **blocker signals. And there are numerous advantages**
11 **to that. It also discloses different ways to**
12 **implement that capacitor. And therefore, it is**
13 **disclosing the advantages of using that capacitor or**
14 **implementing it in those ways to then block or**
15 **inhibit blocker signals.**

16 **Q. Where does the patent disclose the**
17 **advantages of implementing a capacitor on the same**
18 **die as the switch circuits for inhibiting blocker**
19 **signals?**

20 **A. Looking at my report, declaration Exhibit**
21 **4, I'm just reading from paragraph 24, which I refer**
22 **back to columns 1 and 2 which do describe advantages**

1 of the invention, and I can go back to those columns
2 in the patent in a second, but I'm just continuing
3 in my report to see if I have other citations.

4 It looks like column 3 as well. Column 9
5 which we talked about. And I just pulled up Exhibit
6 3 then I'm looking at paragraph 68 on page 48. The
7 '579 description. I assume the columns and lines
8 add up, but it's just discussing these on a
9 satellite semiconductor substrate.

10 Column 2, 19 to 25. So column 2 maybe
11 starting at 5 or 6 or so, describes, you know,
12 switching and capacitors and then describes some
13 embodiments where the capacitor is part of a second
14 die on a package substrate or location outside the
15 die. So there it's teaching the different
16 implementations of the capacitors.

17 Q. It teaches -- so here it's what you're
18 deciding it's teaching the different implementations
19 as options that you could choose one or the other,
20 right?

21 A. Well, I wouldn't necessarily say options
22 as in they are all equal and provide the same

1 benefits and disadvantages. It would have been
2 well-known to a POSITA that an off-chip capacitor
3 would have much higher capacitance density than an
4 on-chip capacitor. It would also have much higher
5 quality factor than an on-chip capacitor.

6 So if you were -- if your goal was to
7 choose a capacitor to, for example, minimize an
8 insertion loss, which was very well-known to a
9 POSITA, your goal would be to choose the largest
10 possible value were the highest qualities factor
11 that would result in the smallest insertion loss
12 through that capacitor.

13 And the technology that would do that at
14 the time was off-chip capacitors, could give you
15 higher capacitor density and higher quality factor,
16 therefore, the lowest insertion loss. So I would
17 say teaching away from an integrated capacitor.

18 Q. Where is that in the patent?

19 A. That's just -- that I would consider that
20 knowledge of a POSITA at the time.

21 Q. So the advantages and disadvantages of
22 these different implementations, the patent is

1 relying on the knowledge of a POSITA to understand
2 those, is that right?

3 **A. For off-chip capacitors, yes.**

4 Q. What about on-chip capacitors? It's
5 relying on the knowledge of a POSITA, right?

6 **A. Certainly in part. But the description**
7 **does talk about some of the advantages of**
8 **integrating these together and silicon on insulator,**
9 **for example, and isolation refers to improved**
10 **isolation in those cases, so --**

11 Q. Where does it disclose improved isolation
12 in those cases?

13 **A. It would be under the isolation. There**
14 **is a section with a title isolation. So I'm looking**
15 **at bottom of 5 and top of 6. That's where it refers**
16 **to -- or begins, I think, talking about isolation.**
17 **And then in column 7, I believe this is where the**
18 **inventors begin describing some of the advantages of**
19 **SOI like around line 22, column 7.**

20 Q. You agree that the inventors, the
21 advantages of SOI were well-known to a POSITA, and
22 this isn't Skyworks, this patent isn't the first

1 disclosed of these advantages of SOI?

2 **A. SOI was certainly known before this**
3 **patent. And no, I don't think this patent is the**
4 **first to disclose any advantages of SOI. But they**
5 **do describe a switch implementation in SOI and talk**
6 **about the advantages of such a switch system so I**
7 **guess I can't say if that's for everything in this**
8 **description, if those advantages are the first time**
9 **they are mentioned. But I think SOI was known to a**
10 **POSITA, as well as at least some of the advantages**
11 **of SOI technology.**

12 MR. TYSON: Why don't we take a break.

13 (Recess.)

14 BY MR. TYSON:

15 Q. Dr. Wentzloff, Exhibit 4, your
16 declaration in the '194 patent IPR. Page 11,
17 paragraph 20.

18 **A. Yes, I'm there.**

19 Q. So in the third sentence, you state,
20 unwanted RF signals could come from various sources,
21 including nearby RF transmitters operating in a
22 similar frequency which can introduce interference.

1 Could you see that?

2 **A. Yes.**

3 Q. So nearby RF transmitted -- transmitters
4 were a well-known source of unwanted RF signals for
5 RF switches and RF devices. Would you agree with
6 that?

7 **A. I would agree with that.**

8 Q. And well-known examples of these RF
9 devices could be a cellular phone or a wires LAN
10 radio. Would you agree with that?

11 **A. Yes.**

12 Q. If we go to a couple pages further, page
13 13, we touched on this a little bit in paragraph 23,
14 here you're discussing the concept of linearity in
15 an RF device, is that right. Let me rephrase. That
16 here you're discussing the concept of linearity and
17 the fact that non-linearities exist in an RF device,
18 is that right?

19 **A. Yes, that is -- I mean, it's a long**
20 **paragraph, but at least that is discussed here.**
21 **Yes.**

22 Q. The patents -- would you agree that the

1 patents assume that non-linearities will exist in
2 the switching devices at the RF switch?

3 **A. Oh yes, very much so. Actually, I think**
4 **they rely on that.**

5 Q. Okay. A POSITA would understand that
6 like in reality, there is no RF switch that operates
7 perfectly linearly, is that right?

8 **A. Absolutely.**

9 Q. So non-linearities would exist, a pose
10 Ito would exist that non-linearities exist in
11 switching in any RF device?

12 **A. Well, that's a generalization, but it was**
13 **certainly well understood that non-linearities**
14 **existed in FET switches and SOI switches and you**
15 **know, RF devices that are implemented in those**
16 **technologies.**

17 Q. As a result of non-linearities in the
18 switching device, in the RF switch, that's where an
19 unwanted signal could mix with a desired signal and
20 intermodulation distortion would result, is that
21 right?

22 **A. Yes, that, and a number of other**

1 **possibilities.**

2 Q. If a -- if a switching device did operate
3 perfectly linearly or let's just say -- let's use
4 linearly, but if a switching device operated
5 linearly if an unwanted signal and a desired signal
6 were present in the mix, they just wouldn't mix, is
7 that right?

8 A. **In the switch?**

9 Q. Yes.

10 A. **And the switch is linear?**

11 Q. Right.

12 A. **They would not mix. Right.**

13 Q. And we talked about this a little bit.
14 And I think it's in the context of the patent. But
15 a POSITA would understand that because they are
16 non-linearities in the switching devices in an RF
17 switch, that non-linearities would result in
18 intermodulation distortion being generated, is that
19 right?

20 A. **Yes, through -- from blockers and**
21 **fundamental frequencies or, yes, any combination**
22 **thereof, really.**

1 Q. Okay. We were talking about column 6,
2 and we talked about this F1, F2 example. And if you
3 look at I guess if you look at the example, some of
4 the examples in the patent it talks about
5 intermodulation products both second order and third
6 order including harmonic frequencies. Would you
7 agree with that for example, 2F1, 2F2 and then third
8 order intermodulation that is a product of those
9 harmonic frequencies.

10 A. Well, that's not technically correct, but
11 the -- you know, I would need to explain a little
12 more about intermodulation and mixing. But the
13 inventors here are describing second order
14 distortion, third order distortion and then they go
15 on to refer to higher order distortion and they are
16 giving some examples of intermod terms that would be
17 produced by those distortions, or those
18 non-linearities.

19 Q. And the examples, the second order and
20 third order intermodulation distortion products that
21 are described in the patent, those would include --
22 those do include harmonic, like harmonic frequency,

1 harmonic signals being generated, correct?

2 **A. Harmonic being a 2F1 or 2F2.**

3 Q. That's what you mean when you say
4 harmonic?

5 **A. Yes.**

6 Q. At the same frequencies of those
7 harmonics signals.

8 **A. Yes.**

9 Q. So these would be spurious harmonics
10 signals that were general rated as a result of
11 mixing in a nonlinear switch, is that right?

12 **A. Yes, that's a fair statement.**

13 Q. And those spurious harmonic signals that
14 were generated in the RF switch that was operating
15 nonlinearly the patent identifies those in resulting
16 as second and third order intermodulation distortion
17 being created, is that right?

18 **A. Well, those are the IMD terms. It's not**
19 **that those then create the IMD terms. Those are the**
20 **IMD terms. Those are the result of mixing in the**
21 **switch due to the nonlinearity. And again this is**
22 **one example of an F1 and an F2, it's kind of a**

1 hypothetical example, just to show what second and
2 third order would do.

3 Q. Sure. So there is -- I guess the
4 question is, if there is spurious harmonic signals
5 that are generated in the switch, that is
6 intermodulation distortion that occurred because of
7 the non-linearities in the switch, is that right?

8 A. Well, we would usually remember to the
9 intermod terms as the sum and the difference of the
10 two frequencies. So you see there is an F1 plus F2
11 term, and then there is an F2 minus F1 term. We
12 would usually refer to those as the intermod terms
13 and then the 2F1 and the 2F2 we could refer to those
14 as the harmonic terms.

15 All of these terms would be produced by
16 the mixing function of a nonlinear switch due to the
17 second order distortion. Nonlinearity is a very
18 advanced topics. A POSITA needs to be very skilled
19 to understand it. Not just someone who has taken a
20 single semester of circuits would be at this level.

21 Q. Sure. The patent identifies 2F1 and 2F2
22 which you said someone might call those harmonic

1 signals, others might call them according to the
2 patent intermodulation distortion products, right?

3 **A. Yes. When we refer to intermod, we would**
4 **refer to those as the sum and the difference of the**
5 **two. Not explicitly the 2F1 or the 2F2. But this,**
6 **call it as a general or more broad description of**
7 **those terms.**

8 Q. And if you -- I guess in the third order
9 examples, there are actually 2F1 plus 2F2. Or 2F1
10 minus F2. Do you see that?

11 **A. I do.**

12 Q. So that could be a spurious harmonic
13 signal being generated as a second order
14 intermodulation distortion that is further mixed and
15 creates a third order intermodulation distortion
16 product, is that right?

17 **A. I didn't -- I did not follow your**
18 **question. Could you repeat that for me, please?**

19 Q. Sure. The third order intermodulation
20 distortion examples of the patent include 2F1 plus
21 F2 or 2F1 minus F2, is that right?

22 **A. Yes.**

1 Q. And in the source of the 2F1 or 2F2 in
2 the third order intermodulation distortion examples,
3 that could be second order intermodulation
4 distortion products that are harmonic, is that
5 right?

6 A. I don't -- are you asking me is there
7 some combination of a value of F1 and F2 that would
8 cause the second harmonic distortion to fall at the
9 same frequency as the third harmonic distortion?
10 And if that's your question, there may be a value of
11 F1 and F2 that do that. I'm just -- I would have to
12 do some math to tell you what those are.

13 Q. The patent refers to 2F1 and 2F2 as being
14 second order modulation distortion product, right?

15 A. That's correct.

16 Q. And 2F1 and 2F2, those are spurious
17 harmonic signals that would be generated due to a
18 nonlinear switch?

19 A. Correct.

20 Q. And my question to you is, when we are
21 talking about third order intermodulation, the
22 examples use spurious harmonic signals 2F1 and 2F2.

140

1 Do you see that?

2 A. I do.

3 Q. Would a POSITA understand that the third
4 order intermodulation distortion that is described
5 here as some were subtraction from those spurious
6 harmonic signals, would it understand that the
7 source of the spurious harmonic signal could have
8 been a second order intermodulation distortion
9 product?

10 A. No.

11 Q. So where would the -- where would the
12 harmonic signal come from in a third order
13 intermodulation distortion product?

14 A. It comes from the mixing of the -- in
15 this example, the F1 and the F2 signals due to a
16 third order nonlinearity in the switch. Let me put
17 it this way. If there were no second order
18 distortion, zero.

19 So the second order distortion terms were
20 all zero because there is no second order distortion
21 in the switch, you would still get all of these
22 third order intermod terms. So this -- these third

1 **order intermod terms are not a result of second**
2 **order distortion. They are a result of third order**
3 **distortion.**

4 Q. Okay. So spurious harmonic analysis can
5 be the result of either second order or third order
6 intermodulation distortion with non-linearities in a
7 switch?

8 A. Yes. Or higher order as the patent
9 inventors describe. And like I said, those -- the
10 inventors are actually assuming that there is some
11 given nonlinearity in the switch and they are
12 addressing it in a different way.

13 Q. Thank you. That's helpful. If I'm
14 looking at the patent again and we can just -- you
15 know, we keep referring to it as figure 9, the
16 annotated figure 9 in Exhibit, page 38 of Exhibit 9.
17 Because the -- because switching devices are assumed
18 to operate nonlinearly, would you agree that the
19 patents describe reducing interference
20 susceptibility by using shunt arms that's one of the
21 techniques they would use to produce interference
22 susceptibility?

1 **A. I believe in the description they do**
2 **refer to the advantages of including a shunt arm or**
3 **shunt arms in figure 9 in the switch.**

4 Q. Yes. So if you go to I'm looking at '194
5 patent which is Exhibit 8, like column 4, line -- it
6 looks like 6 to 11. And then again at column 4,
7 line 42 to 48. Do you see that where it says, it
8 talks about the operation of the shunt arm is
9 reducing undesirable interference effects to the
10 pole the first throw operation?

11 **A. Yes. And what were the second lines?**

12 Q. Column 4, line 43 to 48.

13 **A. And those in the 40s, those lines refer**
14 **to noise. Specifically it looks like on the RF**
15 **signals or noise. Oh, so RF signals. Sorry. Yes,**
16 **it does refer to both interference and noise. And**
17 **the shunt arms benefiting that.**

18 Q. If an RF device operated linearly, you
19 wouldn't need shunt arms, is that right?

20 **A. That's incorrect.**

21 Q. Okay. The -- why is that?

22 **A. To filter or attenuate the interfering**

1 signals or undesired signals, even in a linear
2 system, at certain frequencies, those signals
3 propagated through your entire receive chain and got
4 down to the part of the receiver that we call the
5 modem or modulation and demodulation. If there are
6 other signals present, with your desired signal,
7 that can degrade the performance and result in bit
8 errors, for example.

9 Q. So are shunt arms another technique to
10 reduce intermodulation distortion?

11 A. I suppose it could definitely contribute
12 to that. I don't recall if the inventors
13 specifically referred to shunt arms as improving the
14 IMD. I know they referred to the first capacitor,
15 first and second capacitors as improving IMD.

16 Q. Again, we can stick with Exhibit 4. And
17 in your materials considered which we talked about
18 it's on page -- well, after page 59. Exhibit 2005
19 listed there, in the list of materials considered is
20 the McGraw-Hill Dictionary of Electrical and
21 Computer Engineers, 6th Edition from 2003, is that
22 right?

1 **A. Yes.**

2 Q. And in paragraph 57 of your declaration,
3 I think this is where you cite to a definition.

4 **A. Paragraph 57.**

5 Q. 57. Page 41 of Exhibit 4. And it looks
6 like you cite to the definition in Exhibit 2005 of
7 blocking capacitor and coupling capacitor in that
8 dictionary, is that right?

9 **A. Yes.**

10 Q. Did you review in that same dictionary
11 the definition of capacitor?

12 **A. I don't recall that definition. Could**
13 **you refresh my memory?**

14 **(Exhibit Nos. 10-11 were marked for**
15 **identification.)**

16 BY MR. TYSON:

17 Q. Sure. I'll hand you Exhibit 10, which is
18 -- I'll hand you Exhibit 10 and I'll, this is
19 Exhibit 10. And then I'll hand you Exhibit 11.
20 Exhibit 11 is stamped Exhibit 2005.

21 If you compare pages like 2 to 3 -- well,
22 it's really just page 2 of Exhibit 10, 2 to 3 --

1 page 2 to 3 of Exhibit 10 and page 2 of Exhibit 11,
2 would you agree that these are from the same
3 dictionary?

4 **A. These are the same dictionary.**

5 Q. I can give you some clues. If you look
6 on like for example, page 2.

7 **A. I see the same ISBN number.**

8 Q. ISBN number is the same?

9 **A. And the dates are the same. It appears**
10 **to be the same. Yes.**

11 Q. The Library of Congress cataloguing in
12 publication data is all the same.

13 **A. Again, the ISBN is identical. So I**
14 **believe they are the same.**

15 Q. So same dictionary, right?

16 **A. I think so.**

17 Q. Okay. And Exhibit 10, do you see on the
18 right-hand column towards the top, there is the
19 definition of capacitor. Do you see that?

20 **A. Yes.**

21 Q. Can you read the definition of capacitor
22 out loud.

1 **A. Yes. A device which consists essentially**
2 **of two conductors such as parallel metal plates**
3 **insulated from each other by a dielectric and which**
4 **introduces capacitance into a circuit, stores**
5 **electrical energy, blocks the flow of direct**
6 **current, and permits the flow of alternating current**
7 **to a degree dependent on the capacitor's capacitance**
8 **and the current frequency.**

9 Q. Okay. Thank you. We talked about this.
10 So every -- the definition of a capacitor being
11 something that blocks the flow of direct current.
12 Every capacitor blocks the flow of direct current,
13 right?

14 **A. Direct current also known as DC. Yes,**
15 **every capacitor blocks DC.**

16 Q. And it will do that regardless of its --
17 the value of the capacitor, right?

18 **A. Yes.**

19 Q. Do you agree that it would -- with this
20 dictionary definition, Exhibit 10, that every
21 capacitor will permit the flow of alternating
22 current to a degree dependent on the capacitor's

1 capacitance in the current frequency?

2 **A. Yes, I don't disagree with that.**

3 **Q. So would you also with -- related to the**
4 **degree depended on the capacitors or capacitance in**
5 **the current frequency, would a POSITA understand**
6 **that every capacitor attenuates lower frequency**
7 **signals more than they attenuate higher frequency**
8 **signals?**

9 **A. So if we just use this definition as a**
10 **good example, this is specifically talking about**
11 **permitting the flow of current through the**
12 **capacitor. For a POSITA, that would be understood**
13 **as different than the attenuation of a filter which**
14 **would refer to a circuit that may contain one or**
15 **more capacitors, as well as other elements.**

16 **So I would agree that a capacitor**
17 **would -- the same capacitor with the same voltage**
18 **applied to it would permit less current at low**
19 **frequencies AC and high frequencies would permit**
20 **more current again for the same voltage applied to**
21 **it.**

22 **But the voltage and the current are a**

1 **function of the other elements around it as well.**

2 Q. Understood. If we assume that the -- if
3 we assume that the same voltage is applied across a
4 capacitor then would you agree that a POSITA would
5 understand that it would permit less current at low
6 frequency, AC signals than at high frequency AC
7 signals?

8 A. **Yes. For the same voltage applied across**
9 **it.**

10 Q. Going back to paragraph 57 of your -- and
11 we can look at Exhibit 11 which has these
12 definitions but we can read on page 41 of Deposition
13 Exhibit 4, paragraph 57. You, you state that --
14 page 57 of Exhibit 4?

15 A. **Exhibit 4. Okay.**

16 Q. You cite to the McGraw-Hill dictionary
17 that is -- the excerpt that's Exhibit 11 and the
18 other excerpt we provided at the same dictionary,
19 Exhibit 10. But you cite to the same definition for
20 blocking capacitor and coupling capacitor which is a
21 capacitor used to block the flow of direct current
22 while allowing alternating or signal current to

1 pass. Do you see that?

2 **A. What paragraph are you reading from?**

3 **Q. Paragraph 57.**

4 **A. Yes.**

5 **Q. In this definition, where it says, while**
6 **allowing alternating or signal current to pass. It**
7 **is, with respect to that portion of the definition,**
8 **it is not your testimony that that means that every**
9 **AC signal at any frequency would pass unattenuated**
10 **through a blocking capacitor, is that right?**

11 **A. Signals can be voltages or currents. So**
12 **if in this particular case, we are referring to a**
13 **signal current passing and like we said for a same**
14 **voltage, the same AC voltage applied to a capacitor,**
15 **will be a continuous spectrum of AC current that**
16 **will flow through that capacitor. From low current**
17 **at low, at lower frequencies to more current at**
18 **higher frequencies.**

19 **So if you compare any two frequencies for**
20 **the same voltage, the current passing through the**
21 **capacitor at the lower frequency will be less than**
22 **the current passing through the capacitor of the**

1 **higher frequency, therefore attenuated with respect**
2 **to the higher frequency. That's just for a**
3 **capacitor in isolation. Not necessarily any**
4 **capacitor in any certain configuration.**

5 Q. This is Exhibit 12.

6 (Exhibit No. 12 was marked for
7 identification.)

8 BY MR. TYSON:

9 Q. Dr. Wentzloff, are you familiar with this
10 dictionary, Dictionary of Electronics?

11 A. **I don't recall if this was one of the**
12 **exhibits that I had looked at previously. It**
13 **doesn't look familiar to me.**

14 Q. If you go to -- so this isn't -- you
15 don't recall looking at this dictionary in preparing
16 your declarations?

17 A. **I don't recall if it was one of the**
18 **exhibits that I looked at.**

19 Q. If you turn to it's document page 48. In
20 the upper right corner.

21 A. **Sorry.**

22 Q. Of Exhibit 12.

1 **A. Okay.**

2 Q. Can you read -- do you see the definition
3 of the term blocking capacitor there in the
4 dictionary?

5 **A. Yes.**

6 Q. Can you read that definition out loud?

7 **A. Yes. A capacitor included in a circuit**
8 **in order to limit the flow of direct current and low**
9 **frequency alternating current while allowing the**
10 **passage of higher frequency alternating current.**
11 **The capacitance is chosen so that there is a**
12 **relatively small reactance at the lowest frequency**
13 **at which the circuit is designed to operate.**

14 Q. Would you agree that Exhibit 12
15 definition of blocking capacitor provides a well
16 understood meaning of blocking capacitor in the RF
17 field to a POSITA?

18 **A. For RF? Specifically for RF?**

19 Q. Including RF?

20 **A. Including RF. So RF is a far different**
21 **beast than just circuit design in general. There is**
22 **a lot more tradeoffs that will have to deal with or**

1 a POSITA will have to deal with the RF design. I
2 don't disagree with this definition but I do think
3 that there are some obvious omissions for RF design.

4 Q. Related to -- are those definitions
5 included in Exhibit 11, the definition of blocking
6 capacitor?

7 A. No, not for RF design. Specifically
8 insertion loss, for example. Your prior question,
9 you mentioned an RF POSITA and blocking capacitors.
10 And that, I think, maybe brings a little bit more
11 context but for a blocking capacitor in general, the
12 primary use of a blocking capacitor in general would
13 be to block DC signals.

14 Q. And to allow all AC signals to pass
15 unattenuated. Is that your testimony?

16 A. For a DC blocking capacitor, ideally
17 would allow all AC signals to pass and DC to be
18 blocked. And specifically for RF design to minimize
19 insertion loss at the fundamental frequency.

20 Q. So it's your testimony that a -- the
21 definition in Exhibit 11 coupling capacitor is
22 specific to RF?

1 **A. No, not necessarily. Just when a POSITA**
2 **uses the term blocking capacitor, they are referring**
3 **to a capacitor used to block DC.**

4 **Q. And a blocking capacitor in Exhibit 12**
5 **it's your testimony that a POSITA would not**
6 **understand a blocking capacitor to limit the flow of**
7 **low frequency alternating current while allowing the**
8 **passage of high frequency alternating current. Is**
9 **that right?**

10 **A. Again, blocking capacitor would imply**
11 **blocking DC. This definition in Exhibit 12**
12 **specifically says in order to limit the flow of DC**
13 **current and then adds and low frequency AC current**
14 **while allowing the passage of higher frequency AC**
15 **current. So I think this is adding a few more**
16 **qualifications to a blocking capacitor. When we**
17 **refer -- when POSITAs refer to a blocking capacitor,**
18 **the function of a blocking capacitor is to block DC**
19 **and to pass AC signals.**

20 **Q. But every capacitor blocks DC, right?**

21 **A. That's correct.**

22 **Q. And so it's your testimony that -- is it**

1 your testimony that the definition in Exhibit 11, I
2 asked you this before but that when it says
3 allowing, allowing alternating or signal current to
4 pass, it's your testimony that that means in the RF
5 context that all AC signals pass unattenuated in a
6 coupling capacitor or blocking capacitor, is that
7 right?

8 **A. Could you repeat your question, please?**

9 Q. It's your testimony that in RF design,
10 the term blocking capacitor or coupling capacitor as
11 defined in Exhibit 11 means that the capacitor
12 allows alternating or signal current to flow and
13 pass unattenuated regardless of frequency. Is that
14 right?

15 **A. No. No, a DC -- a blocking capacitor**
16 **also known as a DC blocking capacitor would be**
17 **placed at a circuit with the function of blocking**
18 **DC. So the definition there would be a capacitor**
19 **that is blocking DC. Let's say between two, between**
20 **two parts in a circuit. So that you can apply**
21 **different DC voltages to the two sides of that**
22 **capacitor.**

1 Q. A DC blocking capacitor still has a
2 capacitance, correct?

3 A. **Yes.**

4 Q. It's still a capacitor. It still meets
5 the definition of capacitor under, in the exhibit,
6 this dictionary you cited Exhibit 10.

7 A. **Yes, I think we looked at that before.**
8 **But yes.**

9 Q. So a blocking capacitor still has a
10 capacitance that is frequency dependent, correct?

11 A. **No. Capacitance that's frequency**
12 **dependent. No.**

13 Q. I'm sorry. An impedance that's frequency
14 -- a D.C. blocking capacitor still has a capacitance
15 that has an impedance that's frequency dependent?

16 A. **Yes. It's a capacitor and all capacitors**
17 **will have an impedance that varies with frequency.**

18 Q. If we, looking back here I guess at
19 Exhibit 9. The patents. On Exhibit 9, page 38
20 which is the annotated figure 9.

21 A. **What is Exhibit 9?**

22 Q. Page 38 again.

1 **A. Yes.**

2 Q. Okay. And just looking at this first
3 capacitor, which is connecting the series between
4 the transmit node and the antenna node. Do you see
5 that?

6 **A. Yes.**

7 Q. Would a POSITA understand that that
8 capacitor in connection with the RF switch is
9 operating as a first order high pass filter?

10 **A. Not necessarily. Just because there are**
11 **other elements in that circuit. You know, you**
12 **can't, you can't just take out a couple elements or**
13 **point to a couple elements in a circuit without**
14 **considering the entire circuit, so -- but one would**
15 **understand that the impedance of the first capacitor**
16 **will vary with frequency as we've discussed.**

17 Q. Would a POSITA understand that this RF
18 switch in general includes the high pass filter
19 circuit with a capacitor?

20 **A. I think one could, or a POSITA could**
21 **generalize it as such. And say that nominally the**
22 **path from the antenna to the transmit node because**

1 it has a series capacitor and all capacitors block
2 DC, that a DC signal will not pass through from the
3 antenna to the transmit node. And that other AC
4 signals will pass from the antenna or from the
5 transmit node to the antenna or vice versa with
6 perhaps varying levels of attenuation or even gain.

7 Q. And the AC signals passing from the
8 antenna or from the transmit node to the antenna,
9 the capacitor, the first capacitor here would be
10 providing varying levels of attenuation depending on
11 frequency. Would you agree with that?

12 A. I would say it would apply varying levels
13 of impedance because that has to go through that
14 impedance, whether or not it attenuates are other
15 elements of the circuit. But it will that signal
16 will from transmit node to antenna will go through
17 the capacitor and see varying levels of impedance,
18 as well as through the switch and see, an impedance
19 from the switch and both of those can contribute to
20 insertion loss.

21 Q. Is it your testimony that there are --
22 that the first capacitor could be a DC only blocking

1 capacitor and that all frequencies regardless of --
2 that all frequencies, all AC frequencies would pass
3 through that DC only capacitor, blocking capacitor
4 unattenuated?

5 A. No, that's not my testimony. I can
6 explain if you like.

7 Q. Sure.

8 A. So for a DC blocking capacitor, if that
9 is the only function -- first of all, all capacitors
10 block DC. If that is the only function of that
11 first capacitor, then a POSITA would be motivated to
12 use the largest possible value for that capacitor.
13 That would enable that capacitor to A block DC
14 because all caps block DC but by using the largest
15 possible value also with the highest quality factor
16 it would result in the lowest insertion loss for the
17 signal as it's going from the transmit node to the
18 antenna.

19 And a POSITA designing an RF switch such
20 as this with DC blocking capacitors would be
21 motivated to make those design choices for the
22 values and methods for implementing those

1 **capacitors.**

2 Q. As far as choosing the largest possible
3 value for the capacitor, this is a decision that's
4 based on you're saying insertion loss would be the
5 criteria?

6 A. **That would certainly be one of them.**
7 **There are many, you know, criteria that a POSITA**
8 **would use to make a decision. But at the time of**
9 **this patent, it was common practice to use off-chip**
10 **DC blocking capacitors because those have the**
11 **highest capacitance density and the highest quality**
12 **factor resulting in the lowest insertion loss.**

13 Q. With the largest capacitor are you
14 familiar with the term pass band and stop band?

15 A. **Yes. In the context of filters.**

16 Q. Yes.

17 A. **Yes.**

18 Q. And the largest possible capacitor would
19 still have in the circuit would still have
20 theoretically a pass band and stop band that it's
21 operating that's based on frequency dependent
22 frequency, right?

160

1 A. Well, pass band and stop band refers to
2 filters, so if you were to analyze this circuit as a
3 filter which it's not. It's a switch. Then you may
4 be able to identify pass bands and stop bands for
5 it.

6 So under a simple assumption of a single
7 resistor and capacitor to form let's say a high pass
8 filter, then we would usually define a pass band and
9 a stop band for something like that and, yes, the
10 larger value of capacitance would result in a larger
11 pass band, a smaller stop band, for example.

12 Q. Can we just take a quick break?

13 A. Sure.

14 (Recess.)

15 BY MR. TYSON:

16 Q. Looking again at your declaration,
17 Dr. Wentzloff, Exhibit 3.

18 A. Okay.

19 Q. Paragraph 57. You rely on -- I'm looking
20 about three sentences down, you identify that you
21 say even the references Dr. Larson cites in the
22 state of the art section confirms that blocking

1 capacitor means DC blocking. Do you see that?

2 A. Yes.

3 Q. One of those is Exhibit 1011. He cites
4 to page 2617 where it says on-chip DC blocking and
5 decoupling MIM capacitors. Do you see that?

6 A. Yes.

7 (Exhibit No. 13 was marked for
8 identification.)

9 BY MR. TYSON:

10 Q. I'll mark this Exhibit 13. And this is
11 Exhibit 1011 from the IPRs. And I just uploaded it
12 as well to the ShareFile.

13 So just on the first page of Exhibit 13,
14 if you look at the abstract it says, a fully
15 integrated front-end IC is demonstrated for
16 801.11b/g transceivers with integrated power
17 amplifiers. The SP3T-LNA architecture integrates
18 Bluetooth functionality with transmit and receive
19 for wireless LAN. Do you see that?

20 A. Yes.

21 Q. So Exhibit 13, this is discussing a
22 front-end integrated circuit for a wireless LAN

1 radio, is that right?

2 A. Yes.

3 Q. The fundamental frequency band for
4 802.11b and g, and it actually identifies in the
5 next sentence as 2.5 gigahertz. Do you see that?

6 A. Yes.

7 Q. So would you agree that the fundamental
8 frequency for -- the fundamental frequency band for
9 the wireless LAN radio of this paper is the 2.5
10 gigahertz band?

11 A. No, the 2.4 gigahertz band. In the
12 abstract they are quoting a P1 DB at 33 DBM at a
13 specific frequency. But I would agree that this is
14 designed for 2.4 gigahertz band.

15 Q. Yes. If you look it's the first
16 paragraph of the second column. Again, so I think
17 it's the second to last sentence, the penultimate
18 sentence of the first complete paragraph. In the
19 right-hand column on page 1, it says, however, in
20 the present works, the first implementation of a
21 single-chip fully integrated SP3T and LNA front-end
22 on 0.18 micrometers CMOS is reported for 802.11b/g

1 WLAN applications at 2.5 gigahertz. Do you see
2 that?

3 **A. I see that.**

4 Q. I think you said this. It's for the
5 fundamental frequency band for the wireless LAN
6 radio in this paper is the, is the 802.11b/g band,
7 is that right?

8 **A. Yes. We refer to that as the 2.4**
9 **gigahertz band.**

10 Q. Okay.

11 **A. They may have measured at 2.5 for any**
12 **number of reasons.**

13 Q. Okay. If you go to the second page at
14 the top it has some page numbers. 2614 is the top
15 page number, but second page of Exhibit 13. If you
16 look under the heading PRF front-end ICA
17 architecture. It says, the FEIC is a single chip
18 solution with Bluetooth for complement WLAN chipsets
19 with integrated power amplifier and the FEIC
20 integrates SP3T switch and a low noise amplifier
21 with bypass mode. It is capable of switching
22 between WLAN receive WLAN transmit, and Bluetooth as

1 illustrated in figure 2. Do you see that?

2 A. Yes.

3 Q. And then figure 2 is just above that on
4 the right-hand side of this second page?

5 A. That's correct.

6 Q. If we go to the fourth page which is at
7 the top 2616 of Exhibit 13. You see figures four,
8 five and six there?

9 A. Yes.

10 Q. So based on the description that I read
11 to you previously, would a POSITA agree that all the
12 components in figures 4, 5 and 6 are installed on
13 the same, are formed on the same semiconductor chip?

14 A. Based on the abstract, I would say yes.
15 Because they refer to this as a fully integrated
16 front-end IC and that would imply that they are all
17 integrated on the same substrate.

18 Q. Yes. If we turn to the next page, 2617
19 at the top right of Exhibit 13. Do you see figure 8
20 is a die micrograph of the FEIC front-end. FEIC
21 stands for front-end integrated circuit, is that
22 right?

1 **A. That's right.**

2 Q. And then the paragraph below that states
3 a micrograph of the fabricated die is shown in
4 figure 8. Do you see that?

5 **A. Yes.**

6 Q. So a POSITA reading Exhibit 13 would
7 understand that the components of figures 4, 5 and 6
8 are formed on this same semiconductor die that's
9 depicted in figure 8?

10 **A. Yes.**

11 Q. And the next sentence says the MIM
12 dimensions are 06.8 millimeters times 0.8
13 millimeters including -- I think this is where you
14 quote on your declaration -- on-chip DC blocking and
15 decoupling MIM capacitors. Do you see that?

16 **A. Yes.**

17 Q. So they are also included in figures 4, 5
18 and 6 but just to confirm, the, in this example, for
19 a wireless LAN radio, then-chip components include
20 capacitors, all the what they call DC blocking and
21 decoupling MIM capacitors in figures 4 to 6, is that
22 right?

1 **A. Yes, that's right.**

2 Q. If you go back to the introduction which
3 is on the first page. The heading is introduction.
4 It says, wireless local area network WLAN systems
5 switch between transmit and receive functionality
6 using a single-pole double-throw SPDT RF switch at
7 the front-end. Most of the modern -- however, most
8 of the modern WLAN module architectures have settled
9 on the use of an SP3T switch in order to also
10 incorporate Bluetooth functionality.

11 This allows the common blocks such as
12 crystal oscillator, band gap reference, and power
13 management units to be shared between WLAN and
14 Bluetooth thus saving die size, input/output count
15 and cost. And to keep the overall solution cost
16 down, this transceiver should be highly integrated
17 with the base band PHY and MAC as a system on thin
18 solution preferably in a low complexity pure CMOS
19 process. Do you see that?

20 **A. Yes.**

21 Q. Would a POSITA understand that for these
22 WLAN radios that saving die size and cost was

1 important consideration?

2 A. Yes.

3 Q. And would you agree that a POSITA
4 understood that saving cost was important
5 consideration when designing a front-end circuit for
6 a wireless LAN radio?

7 A. Yes.

8 Q. If we look at the figure 4 on the next
9 page. I'm sorry. On page 2616, which is page 4
10 where this figure is labeled TX on the right side.
11 That would stand for transmit, is that right?

12 A. Yes.

13 Q. And so on this side, TX that would be the
14 node where a fundamental frequency signal would be
15 input into the transmit throw from a power amplifier
16 in a wireless LAN radio, is that right?

17 A. Yes. You mentioned throw. Just one side
18 of the switch. Sure.

19 Q. Okay. And ANT on the other side, that's
20 the antenna, is that right?

21 A. Yes.

22 Q. So between the transmit node and the

1 antenna node, you have a 10 pico farad capacitor.
2 You have a multitransistor transmit switch, another
3 10 pico farad capacitor, is that right? And then
4 you have the attenuator?

5 **A. Yes. Plus two L bond conductors. And**
6 **that's the series path between those. Yes.**

7 Q. Okay. So these -- in the pattern, I
8 think this is what you had cited to 2617 of this, in
9 paragraph 57 of your declaration. So the -- this
10 paper refers to the 10 pico farad capacitors that
11 are in series with the transmit node and the antenna
12 as on-chip DC blocking and decoupling capacitors, is
13 that right?

14 **A. A POSITA would understand those 10 pico**
15 **farad are capacitors to be DC blocking capacitors.**
16 **The coupling capacitor part may be referring to one**
17 **of the capacitors in the figure 6, so I think that**
18 **statement, DC blocking and decoupling capacitors is**
19 **a general statement perhaps encapsulating all**
20 **capacitors in the circuit.**

21 Q. Okay. So a POSITA would understand that
22 these 10 pico farad capacitors in the transmit

1 switch are DC blocking capacitors, is that right?

2 **A. Yes.**

3 **Q.** And a POSITA would understand that those
4 10 pico farad capacitors are -- I'm just reading
5 from your declaration at paragraph 57, they would
6 block only DC signals while allowing any frequency
7 AC signal to pass, is that right.

8 **A. Yes. But the AC signal would pass with**
9 **varying levels or through varying levels of**
10 **impedance in that capacitor.**

11 **Q.** So this DC blocking capacitor in Exhibit
12 13 is consistent with the Exhibit 12 definition of
13 blocking capacitor, is that right?

14 **A. Yes, I don't disagree with that. I think**
15 **it's consistent.**

16 **Q.** And what about this DC blocking capacitor
17 as that term is used in this paper would have a
18 POSITA understand that it is not blocking only DC
19 signals?

20 **A. I think that would be based on their**
21 **understanding of capacitors in general and that**
22 **their impedances are a function of frequency. All**

1 capacitors block DC. And then the impedance of that
2 capacitor will vary with frequency. And it would be
3 inversely proportional to frequency in capacitance.

4 So the amount of signal that goes through
5 is, it is a function of the capacitor but it's also
6 a function of all of the other elements in the
7 circuit, such as the ones we've already named. The
8 bond wire inductances, the switches and their
9 resistances and there are others.

10 Q. The DC blocking capacitor in, on page
11 2616 in figure 4, is that DC blocking capacitors
12 consistent with the definition of coupling capacitor
13 in Exhibit 11 which is the same definition of
14 blocking capacitor?

15 A. Well, yes, again, I don't disagree with
16 that. I think when it refers to allowing
17 alternating or signal current to pass, that could
18 pass according to the impedance or the response of
19 the entire circuit including capacitor.

20 Q. So you'd agree that this, that that
21 Exhibit 13 when you cite to it in paragraph 57, that
22 that -- this uses the term DC blocking capacitor.

171

1 If you look at, if we go to 2617, I think we refer
2 to it as you know on-chip DC blocking capacitor. So
3 it's using the term blocking capacitor.

4 It's also using the term DC blocking
5 capacitor. I think if, so you cite to this in
6 paragraph 57 as an example that the term blocking
7 capacitor means DC blocking and would block only DC
8 signals while allowing any AC signal, any frequency
9 AC signal to pass.

10 So would you agree that this is an
11 example of a use of DC blocking capacitor where that
12 term does not mean blocking only DC signals?

13 **A. All capacitors block DC, and a DC**
14 **blocking capacitor would refer to a capacitor whose**
15 **purpose is to block DC and pass the signal of**
16 **interest with the minimum insertion loss. But**
17 **constraints on that will be placed based on the**
18 **implementation.**

19 **In this case, these were on-chip**
20 **capacitors. You referred to figure 8 as the die**
21 **photo. I can see the capacitors on this die photo.**
22 **I can also see that there is not a lot of free space**

1 so one of the constraints here on the size of the
2 capacitor would be how can I fit them all in the
3 area. The finite area of this chip. So the area of
4 this chip will limit the size of those capacitors.

5 And therefore, you won't -- for an
6 integrated capacitor you won't be able to make it as
7 big as let's say an off-chip capacitor because
8 off-chip capacitors would not have the same
9 limitation or constraint. So one would understand
10 for this DC blocking capacitor that it will A, block
11 DC because all capacitors block DC. But B, would be
12 constrained by the area of the chip because it's an
13 integrated TC blocking capacitor, and therefore
14 there would be some amount of insertion loss at the
15 fundamental frequency that is tolerated let's say in
16 this implementation as a result. Does that --

17 Q. Yes.

18 A. Okay.

19 Q. So the chip size is defined by the radio
20 that it's used in. Would you agree with that like
21 in part Ute want to have, I mean this, the paper
22 references that WLAN systems support the same die

1 size and cost. Would you agree with that?

2 A. I agree that paper said that and in
3 general it's usually a good thing to reduce cost or
4 save cost. But there are certainly examples where
5 cost is not the top priority or not even the top 10
6 priority and other performance metrics are far more
7 important.

8 Q. If you look at the -- just below the --
9 under results and discussion which is section 6 on
10 page 2617 of that page. Actually let me back up
11 even before that. If we go to Bates page 003 on the
12 corner of it. But page 2615 on the top right.

13 There is a section for design
14 methodology. Do you see that?

15 A. Yes.

16 Q. The last sentence of the incompletes
17 paragraph above it says the sizes of series DC
18 blocking MIM caps are chosen to provide optimum
19 match at the frequency of interest. Do you see
20 that?

21 A. I do.

22 Q. And would you agree that a POSITA would

1 understand that you choose a size of a DC blocking
2 cap based on providing an optimum match at the
3 POSITA of interest?

4 A. Not necessarily. And in this particular
5 case, their goal, the author's goal was to fully
6 integrate the front-end circuit, therefore relying
7 on no additional components off-chip. It is common
8 to have matching networks off-chip, for example, to
9 provide that matching function. Because those are
10 higher quality factor components.

11 So you can minimize insertion loss by
12 using off-chip components to implement that. So I
13 would say that this is, this is not surprising to me
14 at all, and I think that this goes along with the
15 goal of this paper was to fully integrate the
16 components with the front-end IC.

17 Q. And in integrating all of the components
18 of this IC, it's integrating three different arms
19 and a low noise amplifier on it, correct?

20 A. Yes, I think those were the components.
21 All of them. At least that they cited. Certainly
22 in figures 4, 5 and 6. Switches. And a switch and

1 **LNA circuit.**

2 Q. If we go now back to the results and
3 discussion on, it's Bates 004 of Exhibit 13, page
4 2617. You'll see under column A sub heading A small
5 signal. The second sentence says, the 10 pico farad
6 on-chip series MIM capacitor not only serves as a DC
7 blocking capacitor, but it also helps improve return
8 loss and in turn insertion loss of the switch. The
9 measured insertion loss between the transmit port
10 and antenna is 1.3 dB at 2.4 gigahertz. Do you see
11 that?

12 A. Yes.

13 Q. Would a POSITA understand 1.7 dB to be a
14 low insertion loss for a wireless LAN?

15 A. At the time, I believe this paper was
16 around, it's 2011. There were switches for wireless
17 LAN especially commercially available ones that have
18 much lower insertion loss. Fractions of a dB. Many
19 of those Skyworks products that Dr. Larson cites in
20 his declaration.

21 So from that perspective, 1.3 db could be
22 considered high with respect to a commercially

1 **available RF switch using off-chip DC blocking**
2 **Compass torsion. This particular paper was making**
3 **compromises in some of the specs in order to achieve**
4 **a fully integrated solution.**

5 Q. But a POSITA would understand that this,
6 that this paper provides a -- at least -- let me
7 strike that.

8 The authors of this paper believe that
9 1.3 dB at the fundamental frequency at 2.4 gigahertz
10 was an acceptable insertion loss. Would you agree
11 with that?

12 A. **No, I wouldn't agree with that statement.**
13 **I think that's a generalization. And I can explain**
14 **if you like.**

15 Q. I guess let's go to page 2620 at the top
16 left of Exhibit 13. Table 2 as a summary of 2.4
17 gigahertz CMOS switches. And in the paragraph, it
18 says below that -- the first complete paragraph, it
19 says, table 2 compares the results of this work with
20 state of the art CMOS which it is noteworthy that an
21 SP3T switch is expected to have higher insertion
22 loss compared to SPDT due to the off-state

1 capacitance from the extra throw. Yet the insertion
2 loss of the SP3T switch presented in this work is
3 better or comparable to most of SPDT designs at a
4 similar technology node. Do you see that?

5 **A. Yes, I see that.**

6 Q. And so this is a, would you agree that
7 the authors are saying that if this same work was an
8 SPDT that it had an even lower insertion loss?

9 **A. No, not necessarily. I just compared --**
10 **I looked at the titles of the other references that**
11 **they are comparing in this table. And not**
12 **surprisingly, many of those, not all, but many of**
13 **those references include fully integrated in their**
14 **titles. Therefore, they are -- these authors not**
15 **surprisingly are comparing to other work of fully**
16 **integrated switches which again would make**
17 **compromises on other specs such as insertion loss.**

18 Q. Would you agree that the term blocking
19 capacitor, DC blocking capacitor in the RF field can
20 be consistent with the Exhibit 12 definition of
21 blocking capacitor?

22 **A. Your question is, can it be consistent**

1 with this definition.

2 Q. So this is at least one example. There
3 are other examples of DC blocking capacitor or
4 blocking capacitor in the RF field, but you'd agree
5 that this is an example of blocking capacitor in
6 fact DC blocking capacitor used in the RF field that
7 is consistent with Exhibit 12, is that right?

8 A. When I review this paper, I don't recall
9 any mention of low frequency signals, low frequency
10 blockers or anything like. That I believe they only
11 characterized this circuit in band frequencies and
12 specifically as you pointed out the two and a half
13 gigahertz.

14 So the definition here refers to low
15 frequency alternating current while allowing the
16 passage of high frequency alternating current.
17 That's in Exhibit 12. And then choosing the
18 capacitance so that there is a relatively small
19 reactance at the lowest frequency at which the
20 circuit is designed to operate. So this particular
21 paper from my memory, the only mention to the DC
22 blocking capacitor choice was for that what you

1 pointed out on return loss, minimizing return loss.

2 And gives no mention to the reactance. You know,
3 and whether it's relatively small or large
4 reactance.

5 Q. Well -- go ahead.

6 A. Which is in the definition here in
7 Exhibit 12.

8 Q. Well, relatively small reactance, it says
9 at the lowest frequency at which the circuit is
10 designed to operate, right?

11 A. Yes, I see that.

12 Q. So it selected 10 pico farad capacitors
13 in the series path between the transmit node and the
14 antenna. It did that to provide an optimum match of
15 the frequency of interest which is 2.4 gigahertz, 10
16 pico farad capacitors here have a reactance that you
17 could calculate for a high circuit which is in 259.4
18 gigahertz, right?

19 MR. PERRY: Objection. Form.

20 THE WITNESS: I disagree on the high pass
21 filter part. This is a switch. And that capacity
22 they refer to is DC blocking and they make members

1 of improving return loss, meaning improving
2 insertion loss, but that doesn't mean, that doesn't
3 necessarily imply minimizing or optimizing.

4 BY MR. TYSON:

5 Q. So is it your testimony that the figure 4
6 circuit does not contain a high pass filter circuit?

7 A. Figure 4, it says in the caption what it
8 is. It's a series shunt stack FET switch topology
9 across biasing with the transmit switch and I look
10 at that circuit and yes, that's a switch. That's an
11 RF switch circuit.

12 Q. And that switch would have a high pass
13 filter circuit in it?

14 A. This switch would be designed to pass
15 ideally perfectly pass signals at 2.4 gigahertz with
16 no insertion loss, no linearity, you know. Perfect
17 return loss. And a variety of other, you know,
18 ideal specifications. And then in order to be able
19 to bias a block DC ideally. So that would be an
20 ideal case. But you can't build an ideal circuit.
21 So is this a filter? No. This is a switch. Does
22 this switch have a response that's a function of

1 frequency? Yes, it does. Does it also block DC?

2 Yes, it does.

3 Q. And the switch's response that's a
4 function of frequency is consistent with a high pass
5 filter circuit?

6 A. I'd probably says it's more consistent
7 with a band pass if you want to force it into one of
8 the four commonly known filter topologies. You
9 would probably say it's more consistent with a band
10 pass than a high pass. But it's not filter. It's a
11 switch. And it's a switch with a frequency
12 response. Yes.

13 Q. And would this -- you'd agree that this
14 switch with the capacitors as they are would have a
15 cutoff frequency as that term is used?

16 A. Yes, I think we could -- we could
17 probably define cutoff frequencies for the circuit.

18 Q. And the cutoff frequency would be the
19 frequencies below which you would consider what they
20 call it a stop band. Would you agree with that?

21 A. That language, no, I would not agree with
22 that. That language is more for filters. For an RF

1 circuit like this we might define the cutoff
2 frequencies based on the input match, for example.
3 Which they referred to as, or which is known as S11
4 which is I believe plotted. Yes, this parameter
5 plots it back. Which we could, we could certainly
6 analyze if you'd like.

7 Q. If, but as shown in the, I think the S
8 plots in figure 9, I think figure 9A is the plots
9 for the transmit switch. You'd agree that there is,
10 there are, it appears to be very constant, including
11 in the 2.4 gigahertz band and then at a cutoff
12 frequency it will, those signals which are lower
13 than I don't know if it's like 600 megahertz or
14 something like that, would be attenuated much more
15 than they were, than a signal at 2.4 gigahertz would
16 be attenuated. Would you agree with that?

17 A. I would agree with that. Yes.

18 Q. And that frequency response is performed
19 with by a switch with DC blocking capacitors in
20 them, is that right?

21 A. Yes. Yes.

22 Q. And is it the DC blocking capacitors that

1 are providing the majority of the, of this frequency
2 response that's depicted here?

3 **A. The DC blocking capacitors are certainly**
4 **contributing to it. For example, they are blocking**
5 **DC. But the entire frequency response we are**
6 **looking at will depend on those capacitors, as well**
7 **as the rest of the elements in the circuit. Other**
8 **capacitors, switches. What we call parasitic**
9 **capacitance which are not drawn on the schematic but**
10 **exist nonetheless. All will contribute to that**
11 **frequency response.**

12 **Q. But you agree that the DC blocking**
13 **capacitors contribute to a frequency response that**
14 **where lower frequency AC signals are attenuated more**
15 **than higher frequency signals would be.**

16 **A. For this circuit? Are you asking about**
17 **this circuit?**

18 **Q. This is one example. For this circuit,**
19 **would you agree that the DC blocking capacitors**
20 **contribute to a frequency response where lower**
21 **frequency, AC signals are attenuated more than**
22 **higher frequencies, AC signals?**

1 A. That answer has a lot of dependencies.
2 What frequency and frequency ranges are we talking
3 about. For example, 4 gigahertz versus 5 gigahertz
4 or you mentioned 600 megahertz versus 2.4 gigahertz,
5 for example.

6 And then it would also, my -- in order to
7 answer that accurately, which I'm trying to do. I'm
8 trying to give you the most accurate answers I can.
9 I would need to know more of the details of the
10 circuit itself. The switch resistances, the
11 parasitic capacitances. The DC blocking capacitors
12 certainly contribute to the S parameters that we are
13 looking at.

14 In particular, they are blocking DC
15 signals.

16 Q. If we are looking at the S curve figure
17 9A if we are at 600 megahertz frequency, do you
18 agree that the DC blocking capacitors are
19 contributing to the frequency response shown for 600
20 megahertz which is a higher level of attenuation
21 than the frequency response at higher frequencies
22 like 2.4 gigahertz. Would you agree with that?

1 **A. I'm sorry. Would you mind just restating**
2 **your question. That was a long question.**

3 **Q. Do you agree that the DC blocking**
4 **capacitors in figure 4 are contributing to the**
5 **frequency response shown at 600 megahertz which has**
6 **a higher level of attenuation than the frequency**
7 **response at 2.4 gigahertz?**

8 **A. I don't have enough information on the**
9 **circuit to be able to answer that accurately. That**
10 **was also not the goal of this paper. So it's not**
11 **surprising that they would not disclose all of that**
12 **information in this paper. Since that's not what**
13 **they were setting out to describe in this paper.**

14 **Q. Would you agree that the DC blocking**
15 **capacitors in figure 4 are attenuating, would**
16 **attenuate a 600 megahertz signal more than they**
17 **would attenuate a 2.4 gigahertz signal?**

18 **A. No. Not in that specific terminology.**
19 **The impedance of the DC blocking capacitor will be a**
20 **function of frequency for a fixed voltage across it,**
21 **that will affect the amount of current that would**
22 **flow through the capacitor. But the voltage in the**

1 current signals, these are functions of not just the
2 capacitor but the other elements in the circuit and
3 this paper does not provide any numerical details on
4 the impedance of those other elements.

5 What I can say just based on the topology
6 is the DC blocking capacitor is certainly blocking
7 DC, as all capacitors do. We see that the S11 red
8 dash line goes to 0 and 0 hertz and we see S21 drops
9 to negative infinity at zero hertz and at some
10 point, that is, that is driven by the, or that is a
11 function of that DC blocking capacitor. Because
12 this is a continuous curve so connecting DC all the
13 way to daylight if you will.

14 Q. If those DC blocking capacitors were set
15 at a much higher capacitance value, would you agree
16 that the S21 curve in figure 9A would be changed?

17 A. Yes it could be either based on larger
18 values or higher quality factors, but to what
19 degree, again, I can't say exactly. Because it's a
20 function of the other elements in the circuit.

21 Q. Would you agree that a 10 pico far DC
22 blocking capacitor would have a higher impedance at

1 600 megahertz than at 2.4 gigahertz?

2 **A. Yes.**

3 Q. And is your answer to that question is,
4 that based on the capacitance value of the DC
5 blocking capacitor?

6 **A. Yes. Oh. No. I'm sorry. It's that**
7 **answer is -- the value of the DC blocking capacitor**
8 **actually does not affect my answer to your question.**

9 Q. Okay. So if you had a one, let's say a
10 100 pico farad DC blocking capacitor, it would also
11 have a higher impedance at 600 megahertz than it
12 would at 2.4 gigahertz, is that right?

13 **A. Yes. Most likely. Yes.**

14 Q. Why do you say most likely?

15 **A. Again, trying to answer accurately. All**
16 **capacitors, real capacitors will have finite quality**
17 **factor. Will have other parasitic elements. Those**
18 **things will impact their impedance. For an ideal**
19 **capacitor the ones that you would find in a**
20 **textbook, the ones, for example, that Dr. Larson**
21 **cites in his state, or prior art or state of the art**
22 **section where the impedance is simply 1 over J omega**

1 **C** than absolutely. A lower frequency would result
2 of a higher impedance and that's irrespective of the
3 value capacitance.

4 Q. And that's irrespective of the label
5 that's called DC blocking capacitor, correct?

6 A. **Correct.**

7 Q. Can we just take a quick break and see if
8 we are --

9 A. **Sure.**

10 **(Recess.)**

11 BY MR. TYSON:

12 Q. Dr. Wentzloff, looking at Exhibit -- if
13 you look at Exhibit 3 of your declaration.

14 A. **Okay.**

15 Q. I think it's the same -- in Exhibit 3 of
16 your declaration for the '579 patent, you can go to
17 paragraph 35. And I believe this is also paragraph
18 35 in Exhibit 4, so on pages Exhibit 3, 20 to 21 you
19 have a block quote from paragraph 42 of Exhibit 1005
20 which is the Huang patent. Do you see that?

21 A. **Yes.**

22 Q. On page 21 about halfway down the, this

1 first paragraph, do you see the sentence that starts
2 with in general. Do you see that? It's like maybe
3 it's the second sentence on page 21 of the block
4 quote. It says in general the off state.

5 **A. Yes, I see it now.**

6 Q. So in this sentence, Huang states, in
7 general, the off state VGSD level should be
8 determined after an acceptable upper limit to the
9 spurious harmonic emissions and an acceptable lower
10 limit of linearity have been identified such
11 identification will of course depend upon the
12 application which the switch is to be used. Do you
13 see that?

14 **A. Yes.**

15 Q. When Huang is stating identifying
16 acceptable lower limit of linearity in paragraph 42,
17 the POSITA would understand this to mean identifying
18 how little linearity is acceptable in the RF switch
19 for a particular application. Do you agree with
20 that?

21 **A. Yes.**

22 Q. In other words, a POSITA would understand

1 identifying an acceptable lower limit of linearity
2 in Huang to refer to identify how much non-linearity
3 in the RF switch is acceptable for a particular
4 application, is that right?

5 **A. That's right.**

6 Q. So POSITA reading Huang would understand
7 in every implementation of its solution there are
8 switch operates non-linearly, is that right?

9 **A. I don't know that Huang teaches that**
10 **explicitly. But I would say a POSITA would**
11 **understand that an RF switch would have some finite**
12 **amount of non-linearity.**

13 Q. And here Huang is saying that for,
14 depends upon the application how much non-linearity
15 is acceptable, is that right?

16 **A. That's right. And that's consistent with**
17 **what I've said about non-linearity and IMDs and how**
18 **that's a function of the application and the**
19 **performance that's required.**

20 Q. And then in the same sentence when Huang
21 is stating identifying acceptable upper limit to the
22 spurious harmonic emissions in paragraph 22, a

1 POSITA would understand there to mean identifying
2 how much spurious harmonic signals generated in the
3 switch are acceptable for a particular application,
4 correct?

5 A. Yes. Not necessarily just generated in
6 the switch. But this patent is certainly all about
7 the switch and switch biasing. But non-linearities
8 can come from the switch as well as other sources.
9 So I would need to refresh on the whole patent
10 description to say if these are, if he is talking
11 about just in a general case let's say for all RF
12 systems or specifically for non-linearity of the
13 switch itself.

14 Q. And here in paragraph 42, Huang is
15 identifying that depending upon the application in
16 which the switch is used, you could have a, an
17 acceptable lower limit of linearity that varies
18 application to application, is that right?

19 A. What was the first part of your question?
20 Could you repeat that.

21 Q. Yes. So.

22 A. I got the second part. I just missed the

1 **first part.**

2 Q. I think I'll just withdraw the question.

3 A. **Okay.**

4 Q. I have no more questions for you.

5 REDIRECT EXAMINATION

6 BY MR. PERRY:

7 Q. Dr. Wentzloff, do you recall being asked
8 earlier whether or not you reviewed Dr. Larson's
9 declaration Exhibit 1003?

10 A. **Yes.**

11 Q. And if I could please direct you to
12 deposition Exhibit 3.

13 A. **Yes.**

14 Q. And if you could please turn to page 19.
15 The paragraph at the top of the page, do you see
16 there is a citation there to Exhibit 1003?

17 A. **Yes.**

18 Q. And do you understand Exhibit 1003 to be
19 Dr. Larson's declaration in this matter and to help
20 you out I direct you to --

21 A. **Yes.**

22 Q. Deposition Exhibit 5, I believe, is the

1 Larson.

2 **A. Oh yes, I see 1003. Thank you.**

3 Q. I'd like you to turn to page 26 of
4 Deposition Exhibit 3, paragraph 45, and do you see
5 in the middle of paragraph 45, there is another
6 citation to Exhibit 1003?

7 **A. Yes, I see that. A couple of them.**

8 Q. And do you see back one more page to
9 paragraph 44 there is another citation to Exhibit
10 1003?

11 **A. Yes.**

12 Q. And so does that refresh your
13 recollection as to whether you reviewed Dr. Larson's
14 declaration in forming your opinions for your
15 declaration?

16 **A. Yes. Thanks.**

17 Q. And just to confirm, did you review
18 Dr. Larson's declarations to form your opinion in
19 both of these matters?

20 **A. Yes.**

21 Q. Now, Dr. Wentzloff, do you also recall
22 testifying about non-linearity in RF switches.

1 **A. Yes.**

2 Q. And what is the relationship between
3 non-linearity and mixing of signals at different
4 frequencies?

5 **A. The relationship between those?**

6 Q. Yes.

7 **A. Well, first of all, non-linearity is**
8 **required in order to produce mixing. And the more**
9 **non-linear, the more nonlinearity that a switch or a**
10 **component has, the more mixing, or more higher**
11 **levels of harmonics or intermodulation distortion**
12 **products will be produced as a result.**

13 Q. So then is mixing of signals more or less
14 of a problem in RF switches that are more linear?

15 **A. For a switch that is more linear?**

16 Q. Correct.

17 **A. The intermodulation distortion would be**
18 **less of a problem.**

19 Q. And when you say intermodulation
20 distortion, are you referring to the mixing of
21 signals?

22 **A. Yes, I'm using those synonymously or**

1 interchangeably, but the mixing of those signals
2 produced the IMD.

3 Q. Are you aware of any RF switches with
4 improved RF switch linearity?

5 A. Well, Huang and Seshimo referenced
6 described methods to improve switch linearity
7 specifically with DC biasing.

8 Q. And so if Huang has a more linear switch,
9 what does that mean for the mixing of signals in
10 Huang?

11 A. If the switch is more linear, then that
12 means for the, for a given amount of blocker signal
13 and fundamental signal, the IMD would be lower. So
14 a more linear switch implies that your switch
15 circuit could tolerate higher amplitude blocker
16 signals going through it because higher amplitude
17 blocker signals and fundamentals through a more
18 linear switch would produce smaller IMD terms.

19 Q. And so then if you could tolerate higher
20 amplitude blocker signals how would a POSITA be
21 motivated to size the capacitors in Huang?

22 A. Huang teaches improving the linearity of

1 the switch as well as improving insertion loss and
2 includes DC blocking capacitors in order to apply
3 different DC voltages to the switches to improve
4 their linearity.

5 So a POSITA implementing Huang based on
6 those teachings would be motivated to use the
7 largest possible value for that DC blocking
8 capacitor with ideally the highest quality factor as
9 well.

10 Q. And would a POSITA be motivated to size
11 the capacitors in Huang to inhibit a low frequency
12 blocker signal from mixing with a fundamental
13 frequency signal?

14 A. No. There is no mention of low frequency
15 blockers or interact modulation distortion that I
16 saw in Huang.

17 Q. Dr. Wentzloff, I'd like you to also turn
18 to Deposition Exhibit 13.

19 A. Okay.

20 Q. Do you recall being asked questions about
21 this article?

22 A. Yes.

1 Q. And if you could turn to figure 4,
2 please. I believe it's on Bates number 004.

3 A. **Okay.**

4 Q. Do you recall being asked the questions
5 about the switch topology shown in figure 4?

6 A. **Yes.**

7 Q. And in particular, you were asked about
8 the 10 pico farad capacitor between the antenna node
9 and the transmit mode, right?

10 A. **Yes.**

11 Q. Does Deposition Exhibit 13 teach or
12 suggest that that 10 pico farad capacitor was
13 selected to inhibit a low frequency blocker signal?

14 A. **No. From reading this paper, I don't**
15 **believe there is any mention of low frequency**
16 **blockers or intermodulation distortion.**

17 Q. If a POSITA is motivated to may ache
18 capacitor as large as possible with the highest Q
19 factor as possible, where would it be motivated to
20 place the capacitor?

21 A. **A POSITA especially at the time in 2012**
22 **would be motivated to put that capacitor off-chip**

1 **because those provide the highest capacitor density**
2 **and the highest quality factor of capacitance.**

3 MR. PERRY: I have no other questions.

4 MR. TYSON: We are good. All good.

5 (Whereupon, the deposition included at
6 4:43 p.m.)

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1 CERTIFICATE OF NOTARY PUBLIC

2 I, SUSAN L. CIMINELLI, the officer before whom
3 the foregoing deposition was taken, do hereby
4 certify that the witness whose testimony appears in
5 the foregoing deposition was duly sworn by me; that
6 the testimony of said witness was taken by me in
7 stenotype and thereafter reduced to typewriting
8 under my direction; that said deposition is a true
9 record of the testimony given by said witness; that
10 I am neither counsel for, related to, nor employed
11 by and of the parties to the action in which this
12 deposition was taken; and, further, that I am not a
13 relative or employee of any counsel or attorney
14 employed by the parties hereto, nor financially or
15 otherwise interested in the outcome of this action.

16 

17 SUSAN L. CIMINELLI

18 Notary Public in and for the
19 District of Columbia

20 My commission expires:

21

22 November 30, 2026

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