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|-----------------------|---|----------------|
| SILICON LABORATORIES, | § |                |
| INC.,                 | § |                |
|                       | § |                |
| Petitioner,           | § |                |
|                       | § | IPR 2014-00881 |
|                       | § | IPR 2014-00728 |
| VS.                   | § | IPR 2014-00809 |
|                       | § |                |
|                       | § |                |
|                       | § |                |
| CRESTA TECHNOLOGY     | § |                |
| CORPORATION,          | § |                |
|                       | § |                |
| Patent Owner.         | § |                |

ORAL DEPOSITION OF DOUGLAS R. HOLBERG, PH.D.  
DECEMBER 18, 2014  
VOLUME 2 OF 2

ORAL DEPOSITION OF DOUGLAS R. HOLBERG, PH.D.,  
produced as a witness at the instance of the Patent Holder  
and duly sworn, was taken in the above styled and numbered  
cause on Thursday, December 18, 2014, from 9:11 a.m. to  
3:46 p.m., before Tamara Chapman, CSR, RPR, CCR (LA) in  
and for the State of Texas, reported by computerized  
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pursuant to the 37 CFR Section 42.53.

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A P P E A R A N C E S

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\* \* \*

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1 DOUGLAS HOLBERG, Ph.D. - 12/18/14

2 DOUGLAS R. HOLBERG, Ph.D.,  
3 having been first duly sworn, testified as follows:

4 EXAMINATION

5 BY MR. FLEMING:

6 Q. Dr. Holberg, you had mentioned, when we first  
7 arrived, that you would like to restate something as far  
8 as how -- what was actually written?

9 A. No, clarify.

10 Q. Clarify. I thought I'd let you do that.

11 A. Yeah. When you asked if I had written the claim  
12 chart, I thought that I had already answered that. So  
13 then I decided that maybe -- as I thought about it last  
14 night, maybe I need to maybe state it again in the most  
15 clear and concise terms.

16 First of all, I own those documents. I mean,  
17 when I signed them, I take full responsibility for all the  
18 arguments, the whole thing. That's clear. And I have, as  
19 I said, over 200 hours invested in the analysis and all  
20 that stuff.

21 But it was a collaborative effort to create the  
22 document. The term "write" in its strictest  
23 interpretation would imply doing it in a vacuum, and I  
24 didn't. So it was a collaborative effort, but I was  
25 always adding input, new -- new art and responding to

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2 questions. And when the final -- I made the final edits  
3 and had a final copy, I signed it and I owned it  
4 completely.

5 Does that add more clarity to it? I don't know  
6 if I confused things.

7 Q. Just to follow up just a bit. And you were the  
8 one that found the references?

9 A. The -- the references -- the first two  
10 references, the Thomson and Harris, those were done prior  
11 to these coming on board. Subsequent to that I found more  
12 references. And then the references were introduced to me  
13 for consideration, and then I found, again, more  
14 references. So some of the references post the  
15 Thomson/Harris were introduced to me and asked -- I gave  
16 an opinion and -- whether or not they were useful and  
17 developed arguments around them through the process.

18 So any other question? I want to get it all  
19 clear, make it absolutely...

20 Q. And I think you've done that.

21 A. Okay. All right. Good.

22 Q. Thank you, sir.

23 A. You introduced an exhibit yesterday. It was  
24 the --

25 Q. Well, let me get to what I --

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A. Sure.

Q. I want to turn to IPR 2014-00881, and I want to introduce Exhibit 1011.

A. Is this a new one?

Q. Yeah. I've just given you Exhibit 1011. Do you recognize the document?

A. Yes, I do.

Q. What is the document?

A. This is the -- my declaration on the 7,251,466 patent.

Q. Can we turn to Page 19 and note Paragraph 32.

A. Okay. I'm there.

Q. I also would like to introduce Exhibit 1001.

I think I also would like to introduce Exhibit 1004.

A. All right. So I'm on Page 19.

Q. I'd also like to introduce into the record Exhibit 1005.

I handed you Exhibit 1001. Do you recognize that document?

A. Yes.

Q. What is that document --

A. This is the patent "Television Receiver Including an Integrated Band Selection Filter," Patent

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No. 7,251,466.

Q. And that's the subject of the petition --

A. Yes.

Q. -- as the patent being reviewed?

Also I handed you Exhibit 1004. Do you recognize that document?

A. Yes. This is the Gomez reference, Patent No. 7,336,939.

Q. I also handed you Exhibit 1005. Do you recognize that document?

A. Yes. This is the Waight reference, I believe. Yes. Patent No. 7,095,454.

Q. So if we could, turn to Claim 35 of the Exhibit 1001, Patent '466. If we could, turn to Figure 4 of Gomez Exhibit 1004, Patent 7,336,939. And if we could, turn to Figure 2 of 1005, U.S. Patent 7,095,454, Exhibit 1005. And if we could also turn to Paragraph 19 of your declaration.

MR. AYERS: Paragraph 19 or Page 19?

MR. FLEMING: Yeah, Page 19.

Q. (BY MR. FLEMING) Paragraph 32. Could you explain to me what you're -- how you're combining these references to read on Claim 35?

MR. AYERS: Objection; form.

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A. This is Claim 20 -- oh, are you doing Claim 35?

Q. (BY MR. FLEMING) Yeah.

A. This is in the section where I give Claim 20.

Are you asking me to provide -- let me say. I'm confused.

Q. Why don't we back up to Paragraph 20 -- or Paragraph 19 before I jump all the way to...

So if you could, read on Paragraph 19.

A. So this is under -- just to get oriented, this is under the Ground 1, Claim 35 obvious over Gomez. And I think this is an error in the document, and I think this should be Waight. Let me check real quick.

Okay. Now that I'm oriented, which paragraph, again?

Q. Can you point out the error that you just --

A. Yeah. It says Ground 1 --

Q. What page are you --

A. On Page 8. I think it's just a title error. It says Ground 1, Claim 35 is obvious over Gomez in view of Shen. I think that would be over Waight.

Q. Okay.

A. Just another clerical error, which I take full ownership of.

So now that we're oriented and -- you wanted me to go to Paragraph 19?

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Q. Correct.

A. Okay.

Q. And you have in quotes -- can you read those quotes right at the beginning of 19?

A. Okay. It says: The 466 patent discloses switches characterized "as enable switches SA and SZ."

Q. If you could just back up, Dr. Holberg, to the quote above --

A. Oh.

Q. -- so we can get oriented here.

A. Got it.

[READING]: The bandpass filter comprising: A first switch coupled between the output node of the first variable amplifier and a second node.

Q. And that is a quote from Claim 35?

(Witness reviews document.)

A. It doesn't look like it.

This looks like from Claim 20.

Q. (BY MR. FLEMING) So that's not Claim 35, but from Claim 20?

A. It looks like it.

Q. So then it is not Ground 1 related to Claim 35?

A. It can't be.

(Witness reviews document.)

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2 A. No, that appears to be an error. It's hard for  
3 me to figure out how this -- how this --

4 MR. AYERS: Take your time.

5 (Witness reviews document.)

6 A. It looks like it was pieces of 20 and 35,  
7 although I can't find that phrase.

8 MR. AYERS: Would it help if we took a break  
9 to try to get oriented here?

10 A. Do you know, I mean, or --

11 Q. (BY MR. FLEMING) It's totally confusing to me.

12 A. Yeah, I'm confused as well.

13 (Witness reviews document.)

14 A. Okay. There is the "bandpass filter  
15 comprising" -- okay. That's from 35.

16 That's from 35.

17 That's from 35.

18 This is from 35.

19 It appears to me that the error -- this is from  
20 35.

21 Okay. Wait. This is all coming together.

22 Okay. So that's 35: A bandpass filter for  
23 filtering an RF signal.

24 [READING]: A first variable amplifier -- input  
25 node.

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2 Yadda, yadda, yadda. That's right.

3 [READING]: A bandpass filter connected between  
4 the output node of the first variable amplifier --

5 That's correct.

6 [READING]: The bandpass filter comprising --

7 That's correct.

8 [READING]: A plurality of --

9 Okay. I think -- let me take it all the way to  
10 the end just so I don't get surprised.

11 [READING]: The inductor being an integrated  
12 planar spiral inductor.

13 All right. So it's actually -- it looked pretty  
14 bad there for a second. I think the only error is -- it's  
15 not really an error. It's still Gomez and -- the error in  
16 this title, I think. But it's Claim 35, starts with: A  
17 bandpass filter for filtering an input RF signal.

18 That's what that says.

19 [READING]: A first variable amplifier having an  
20 input node coupled to receive the RF input signal -- the  
21 input RF signal and an output node providing a first  
22 output signal.

23 That's correct.

24 [READING]: A bandpass filter connected between  
25 the output node of the first variable amplifier and a

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first node providing the filtered output signal.

A bandpass filter --

This is the thing that looks like it might be --  
okay.

(Witness reviews document.)

A. Okay.

No, I found that awhile ago.

Yeah, "the bandpass filter comprising" -- that's  
in 35.

[READING]: A plurality of switchably connected  
capacitors...

(Witness reviews document.)

A. It's all correct. I don't know why it looked  
like it was wrong.

Q. (BY MR. FLEMING) Okay. So then we can go to  
Paragraph 19.

A. Yeah. A plurality --

Q. So you're saying, then, the quote above  
Paragraph 19 is from Claim 35?

A. No. Hold on. I'm not sure I'm saying that.

(Witness reviews document.)

A. No, that's from Claim 20.

Okay. This -- this is correct. That's from  
Claim 20.

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2 Q. (BY MR. FLEMING) We're talking about Claim 35 in  
3 this section?

4 A. Well, no, we're -- I'm under Ground -- B,  
5 Ground 1, Claim 20 is "obvious over Gomez in view of  
6 Waight and further view of Shen" on Page 18.

7 Q. I'm on Page 11. Page 11, Paragraph 19.

8 A. That's Claim 35.

9 Q. So then the quote above Paragraph 19 is Claim 35?

10 A. Yeah. It says -- I'm looking at 35 here. It  
11 says "deep" and in Line 8 it says "the bandpass filter  
12 comprising."

13 Line 9: A first switch coupled between the  
14 output node of the first variable amplifier and a second  
15 node.

16 Q. Okay.

17 A. Does that comport with what you see now?

18 Q. I was just asking the question.

19 A. Oh.

20 Q. So if we go to the body of 19. I'm sorry,  
21 Paragraph 19.

22 A. Okay.

23 Q. And the third full sentence, not including the  
24 parentheses, where it says "Gomez further describes." Can  
25 you read that sentence for me?

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2 A. Okay. Down near the bottom?

3 Q. Yes.

4 A. [READING]: Gomez further describes the  
5 arrangement of the "impedances 401" at the inputs to the  
6 bandpass filters as "essentially a frequency multiplexor"  
7 and indicates that the impedances 401 "prevent interaction  
8 between the tuned circuits."

9 Q. What figure are you referring to when you are  
10 referring to Element 1 -- 401 in Gomez?

11 A. That would be Figure 4.

12 Q. So it's the element that is labelled Z?

13 A. Yes.

14 Q. Can we turn to Page 12. Can you read the second  
15 full sentence of Paragraph 20?

16 A. Starting with "Waight"?

17 Q. Uh-huh.

18 A. [READING]: Waight, for example, describes  
19 switches "238" at the input to the tracking filter,  
20 precisely as shown as claimed in the '466 patent.

21 Q. So you're looking -- are you looking to the '466  
22 patent there?

23 A. Am I looking at -- what are you --

24 Q. What diagram are you looking at in '466?

25 A. Well, you can use Figure 4.

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2 Q. Figure 4. So you were looking at Figure 4 for  
3 that finding?

4 A. Let me make sure.

5 (Witness reviews document.)

6 A. So you're asking me: The use of switches to  
7 selectively -- to selectively route signals to circuit  
8 elements was notoriously well known in the time of the  
9 '466 patent.

10 Are you asking me -- oh, as precisely claimed --  
11 shown and claimed in the '466 patent. Okay.

12 Q. (BY MR. FLEMING) So you're looking at --

13 A. Right. I see what you're saying.

14 Q. You're looking at the '466 patent. Right?

15 A. Yeah.

16 Q. And what element are you looking at in the '466  
17 patent?

18 A. Well, I believe it's the SA and SB in the  
19 Figure 4.

20 Q. So turning to Waight. What figure are you  
21 relying on? Are you looking at?

22 A. Switches 238 in Figure 2.

23 Q. And on Paragraph 25 -- well, before I leave.

24 What is the DC voltage? Looking at the -- I'm  
25 sorry -- looking at the Gomez reference, Figure 4 that you

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2 were pointing to, what is the DC voltage at the -- at the  
3 node between Element 401 a and -- and -- and node -- shows  
4 it as a node at the top of the inductor L406a?

5 A. Okay. So I see the top of L406a. So you asked  
6 about the voltage.

7 Q. What would be the DC voltage at that node?

8 MR. AYERS: Objection; form.

9 A. It's -- I don't know. I'd have to analyze it.  
10 You're looking for like a number, like 2 volts, 3 volts,  
11 7 volts or something?

12 Q. (BY MR. FLEMING) If you look at -- on the other  
13 side of the inductor L406a, it's going to ground.  
14 Correct?

15 A. That is correct, yeah.

16 So, yeah, the --

17 Q. So the steady state --

18 A. -- steady state, it would be 0 volts.

19 Q. If we could turn to Paragraph 25 -- I'm sorry,  
20 Paragraph 47, Page 25. And can you read the first  
21 sentence.

22 A. [READING]: In light of this teaching, it was  
23 obvious to use NMOS transistors elsewhere in the  
24 Gomez/Waight/Shen tuner where a switch was necessary, such  
25 as a -- as the "first switch" before the LC resonator...

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2 Q. Can you draw me a NMOS transistor?

3 MR. AYERS: Objection; form.

4 A. Draw? Yeah. I mean, how do you mean, the  
5 symbol?

6 Q. (BY MR. FLEMING) Uh-huh. You know, how it --  
7 how it works.

8 A. Well, here's one right here. M407a.

9 Q. In the patent number?

10 A. In -- in the Patent No. 7,336,939.

11 Q. What exhibit is that?

12 A. This is 1004. Oh. What is this? Yeah, this is  
13 Gomez, I think. Yeah.

14 Q. So you're pointing to M407a?

15 A. Yes.

16 Q. Okay. Great.

17 So your suggestion then would be -- how would the  
18 arrangement be for that NMOS? Would -- would the -- can  
19 we -- can we use some nomenclature? Looking at Gomez can  
20 we label the inputs and outputs? For instance, I would  
21 say that the symbol where the A2 is, that would be the  
22 gate?

23 A. Yeah.

24 Q. Okay. And then which one would be the drain and  
25 which one would be the source?

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2 A. The drain would be where it connects to C403a,  
3 and the source would be the other terminal.

4 Q. And how would you connect the drain and the  
5 source and the gate to replace -- I'm assuming you're  
6 replacing the Z for 001a?

7 A. Replacing the what? The Z?

8 Q. I thought you were saying that --

9 Can you explain to me, then, the modification  
10 you're proposing with your -- going back to what you just  
11 read with where you're going to put this NMOS at?

12 A. Okay. I'm struggling to understand the question,  
13 but I'm going to -- I'm going to answer the question that  
14 I think is the question. And then if it's not, let's, you  
15 know, iterate.

16 Q. Uh-huh.

17 A. Looking at the diagrams, the '466 patent,  
18 Figure 4 --

19 Let me just make sure that this -- I mean, I  
20 know -- this is part of claim -- Claims 8, 21 and 36:  
21 Wherein the first switch and the switch in each of the  
22 plurality of switchably connected capacitor. Each  
23 comprises an NMOS or PMOS transistor.

24 That's -- that's what we're discussing. Right?

25 Q. Yes.

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2 A. So these switches S1a, S2a, et cetera, in the  
3 '466 on Figure 4 are represented by these MOSFETs 407a,  
4 408a, et cetera in the Gomez, which is the 1004.

5 Q. So to clarify for me, my understanding, which  
6 might not be correct, is I thought you were arguing that  
7 you would replace the Waight switches of 2, 3 -- or  
8 implement the Waight switches of 2, 3, 8 with NMOS  
9 switches and then those Waight switches would be used to  
10 replace Element 401a in Gomez. Am I not reading this  
11 right?

12 A. No, I don't think you are. I think that's in a  
13 different location. That's in a different claim. This --  
14 this Paragraph 47 -- let me just read it.

15 (Witness reviews document.)

16 A. So, yes, you're correct. But I mean, it covers  
17 both of those elements. That Paragraph 47 is speaking to  
18 these transistors as well as using a switch, an NMOS  
19 switch here.

20 Q. (BY MR. FLEMING) Okay. Can you -- so to  
21 clarify, then, the end modified circuit for just  
22 Element 401a in Gomez would be an NMOS transistor?

23 A. Yes, you could put an NMOS transistor there.

24 Q. That's your argument?

25 A. That's my argument.

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2 Q. So now we're on the same page?

3 A. Yeah. Finally.

4 Q. All right. Now that -- and we have our symbol,  
5 which we agreed on as far as how it's labeled. How would  
6 you -- where is the drain --

7 A. Let me -- let me offer --

8 Q. What node do you want the drain to be connected  
9 to?

10 A. Okay. For NMOS transistors, there's two basic  
11 types of symbols. One is a three terminal symbol, one is  
12 a four terminal symbol. The fourth terminal is the bulk  
13 terminal for a p-well process. It's the -- for an n-well  
14 process, it is the well connect -- well -- it's -- it's  
15 the fourth terminal of the substrate underneath the end  
16 channel -- of the channel.

17 So the understanding of drain and source for a  
18 transistor is a function of the terminal conditions. It's  
19 really not a physical definition.

20 The -- the diagrams themselves can be misleading  
21 in terms of calling this a source and drain in terms of  
22 electrical activity. That's how it operates. So we have  
23 to be on -- I'm just warning you, we have to be careful  
24 about using -- talking about the voltage difference  
25 between terminals and getting locked into just calling

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2 something a drainer of sorts. And I can explain it more  
3 further, but...

4 Q. But can we at least get to the point of showing  
5 how the -- how we agreed upon the nomenclature?

6 A. Let's try that, and if there is any problem with  
7 that, I can help with it.

8 Q. Can you tell me where the drain would be  
9 connected, to what node?

10 A. All right. You would connect the drain to Vin at  
11 node --

12 Q. Yeah, the Vin node.

13 A. The Vin node.

14 Q. Yes.

15 A. And then the source, you would connect it to the  
16 VOUTA node.

17 Q. Okay. Which is the node that's on -- also on top  
18 of the inductor L406a. Correct?

19 A. That is correct.

20 Q. Okay. And then the gate?

21 A. The gate would be connected to VA1. No, not VA1  
22 but it would be connected to some control node.

23 Q. That would be the control node?

24 A. Some control node. It wouldn't necessarily be a  
25 VA1 it would be some other control node.

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2 Q. I understand. So --

3 A. Can I draw that on here so that we don't lose  
4 track of...

5 Q. Yeah.

6 MR. FLEMING: It will be 2046. It's going  
7 to be Figure 4 of Gomez, Patent No. 7,336,939, and it will  
8 show -- it has Dr. Holberg's drawings on that figure.

9 Q. (BY MR. FLEMING) So then of your drawing there,  
10 can we label the drain and source?

11 A. With a D and an S?

12 Q. Yeah, that would be great.

13 A. (Complies. )

14 Now, again, I understand transistor operation  
15 incredibly well, and there's some pitfalls here. But I'm  
16 going to go along with the labeling here because I just  
17 want to make sure later on, if I have to give you some  
18 understanding of what happens.

19 Q. So then the source is going to be connected to  
20 ground essentially, as far as a DC voltage looks?

21 A. Yeah, the -- we've agreed -- or I've agreed that  
22 the voltage here in -- at DC is going to be ground.

23 Q. Okay. So would you agree, then, that that would  
24 mean that there could be a forward biassing of the  
25 substrate's junction because that is ground?

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2 MR. AYERS: Objection; form.

3 A. It would be -- the only way you could forward  
4 bias the substrate -- well, you didn't identify where the  
5 substrate was connected, or you didn't ask me to identify  
6 it either.

7 Q. (BY MR. FLEMING) Okay. Do you want to identify  
8 the substrate junction?

9 A. Okay. So this is the fourth terminal of the  
10 device, and it is most likely connected to ground. And --

11 Q. So then the source is also connected to ground?

12 A. No, it's not. The source is connected -- oh,  
13 it's connected to this node, which is at a DC value of  
14 ground.

15 Q. Yes, that is correct.

16 A. That's what you're saying.

17 Q. That's exactly what I'm saying.

18 A. So this -- actually, there is a parasitic diode  
19 there and a parasitic diode here. And you're asking if  
20 one of these gets forward biassed?

21 Q. I'm asking would the source, because it's  
22 connected to a DC ground, result in a forward biassing of  
23 the substrate junction?

24 MR. AYERS: Objection; form.

25 A. No.

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2 (Witness reviews document.)

3 Q. (BY MR. FLEMING) So when would there be a swing  
4 at the input?

5 MR. AYERS: Objection; form.

6 A. Well, the -- I don't know how to answer the  
7 "when" part, but there is a signal here. Okay.

8 Q. (BY MR. FLEMING) Right. So then when that sine  
9 waves -- for the record, he drew a sine wave at the input  
10 of Vin.

11 So when the sine wave goes negative, what  
12 happens, if that is connected to ground?

13 A. If the sine wave goes below the cutting voltage  
14 of this diode, then current flows in this diode, and it's  
15 shunted. It's limited, if you will. And that would be on  
16 the order of 600 millivolts.

17 Q. So you don't see a problem with linearity of that  
18 when it goes to a negative swing?

19 A. I didn't analyze the linearity, but if it forward  
20 biassed the diode, it would be a problem.

21 Q. And having that connected to a DC ground,  
22 wouldn't that be a forward biassing?

23 MR. AYERS: Objection; form.

24 A. Yeah, it would have to be -- I would have to  
25 understand the signal levels at the output of 301. If

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2 this -- if the signal levels were 100 millivolts, it  
3 wouldn't be a problem. But if the signal level there was  
4 plus or minus 600 millivolts, it would be a linearity  
5 problem.

6 Q. (BY MR. FLEMING) Okay. Thank you.

7 Let's move on. If we can, go to Page 20 of your  
8 declaration, Paragraph 33.

9 MR. FLEMING: Do you want to take a break?  
10 I'm going to move on to something else.

11 THE WITNESS: No, I'm good.

12 MR. FLEMING: We have gone an hour.

13 Q. (BY MR. FLEMING) Okay. If we go to  
14 Paragraph 33 -- I'm sorry. Yeah, if we go to  
15 Paragraph 33 --

16 A. I'm there.

17 Q. -- can you read the first two sentences of your  
18 Paragraph 33?

19 A. [READING]: Gomez teaches that "each tank  
20 circuit-430 covers a particular range of the TV spectrum."  
21 (Ex. 1004, 4:33-35). One skilled in the art would  
22 understand this teaching to mean that each bandpass filter  
23 covers a portion of the TV spectrum, that, taken together,  
24 cover the entire TV spectrum, i.e., "50-860 megahertz."  
25 (Ex. 1004, 4:4-5 and 4:33-35.) In my opinion, Gomez

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2 teaches this element. Because the combination of Gomez,  
3 Waight, and Shen teaches each of the elements of Claim 20,  
4 and it was obvious to combine the teachings of each to  
5 form the claimed "bandpass filter bank," Claim 20 is  
6 obvious over Gomez in view of Waight and Shen.

7 Q. In Paragraph 32, are you contending that the  
8 bandpass filter of Claim 20 are the bandpass filters of  
9 Gomez as shown in Figure 4?

10 MR. AYERS: Objection; form.

11 Q. (BY MR. FLEMING) I'm looking at 32. You are  
12 referencing the bandpass filters, and it's confusing on  
13 what you're saying there.

14 A. Okay. Let me try to read it and try to  
15 unconfuse -- deconfuse.

16 But you started over here in 33.

17 Q. Yeah.

18 A. I guess I can ignore 33 for now and go to 32.

19 Q. Yeah.

20 A. The Claim 20 that we're looking at is: A  
21 "plurality of bandpass filters connected in parallel"  
22 between the output node of the first variable amplifier  
23 and the first node -- the first node providing the band  
24 selected output signal to the bandpass filter.

25 So if I look at the '466 patent, I think that's

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illustrated in Figure 4.

So now Gomez, e.g., Figure 4, depicts: A "plurality of bandpass filters connected in parallel" as shown in Figure 3 and described in 15 through 18 above. These are connected between the output node and the low-noise amplifier 301 and a first node that drives a mixer stage 325.

302?

Oh, the mixer stage 325, not the node at 325.

And then Figure 4 referencing Column 5 -- 5 through 8 --

(Witness reviews document.)

A. Column 4. Figure 4, Column 5, 5 through 8.

(Sotto voce.)

Well, I'm not sure -- there may be -- I can't find that there, but I'll just read it.

[READING]: The output of a low-noise amplifier 301 is stated into a bank of programmable filters.

Q. (BY MR. FLEMING) So, Dr. Holberg, if I may, I mean, we can break this down a little bit.

A. Okay.

Q. Are you reading on the bank of Gomez filters being shown as, for instance, 430 with a dotted line on Figure 4, and then there is a corresponding bank

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2 underneath as being the bank of filters that's reading on  
3 the claim language --

4 A. Yes.

5 Q. -- of 20?

6 A. Yes.

7 Q. Okay. And if you look at our Claim 20, if you  
8 look at Column 15 of the '466 patent, Lines 1 through 3,  
9 can you read that?

10 A. Which column, again?

11 Q. Column 15. First three lines.

12 A. [READING]: Plurality of bandpass filters is  
13 disposed to select the entire frequency range of the first  
14 transmission spectrum.

15 Q. So the entire range?

16 A. Yeah.

17 Q. Can we turn to Gomez, Column 5, Line 12. Could  
18 you read that sentence that starts "as noted above."

19 A. [READING]: As noted above, no filtering is  
20 necessary for frequencies greater than the maximum input  
21 frequency divided by the order of the lowest significant  
22 harmonic response.

23 Q. So Gomez is not filtering the entire frequency  
24 range. Is that not right?

25 MR. AYERS: Objection; form.

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2 A. Well, let me...

3 Q. (BY MR. FLEMING) You might want to look at the  
4 whole paragraph. I just was pointing out that --

5 A. Yeah, that's what --

6 Q. I was just pointing out the line that...

7 (Witness reviews document.)

8 A. It looks like Gomez should have said "multiplied  
9 by," but let me -- because that's not consistent with the  
10 earlier part of the paragraph.

11 (Witness reviews document.)

12 A. Yeah, it's -- reading the whole paragraph.

13 [READING]: If the tank circuits 430 are being  
14 used for image-rejection, they must provide sufficient  
15 attenuation at an offset from the desired frequency equal  
16 to twice the I frequency for all input frequencies.

17 That's like case 1, case 2. If they're used  
18 for -- okay. So -- let me back up to an earlier  
19 paragraph, even.

20 (Witness reviews document.)

21 A. All right. So it says at the Line 1 of Column 5:  
22 Generally, the tank circuits 430 are tunable over  
23 overlapping rangers covering the entire input range.

24 All right. So let's see what the "entire input  
25 range" is. I think the entire input range would be the --

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the TV spectrum range.

(Witness reviews document.)

A. Well, I would interpret that to mean -- I'm -- I'm looking for a word that says "input range," but I don't see it, but --

Q. (BY MR. FLEMING) Well, the example clearly shows that it's not a drain over the entire range.

A. Well, that's one example. It says -- are you talking about the 62-megahertz example?

Q. Exactly. Right.

A. But -- okay. If they're us- -- there is several examples they're talking about. One of them is: If the tank circuits 430 are being used for image-rejection, they must provide sufficient attenuation offset from the desired frequency equal to twice the IF frequency for all input frequencies.

All right. That's one case.

Another case: If they're being used for rejection of harmonic responses, they need only provide sufficient attenuation of the unwanted harmonic of the input frequency. For instance...

And it goes on.

So he's describing, I think, two ways of using the bank.

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2 Claim 20, a plurality of bandpass filters. What  
3 is the first transmission spectrum?

4 So Claim 20, I'm reading this more broadly --

5 Q. Can we -- before we go to Claim 20, can we -- we  
6 were focused on whether it -- Gomez is able to provide a  
7 filtering for the entire spectrum. Correct?

8 A. (Nods.)

9 Q. If you look at -- may I point you to Gomez,  
10 Column 4, Lines 49 to 50.

11 A. Yeah.

12 Q. So they're not going to filter above  
13 300 megahertz?

14 A. He says there is usually no need for filters  
15 above approximately 280 to 300 megahertz.

16 Q. So it's not filtering the entire range?

17 MR. AYERS: Objection; form.

18 A. Well, if you just -- I mean, I don't want -- I  
19 want to first go back to make sure I understand that we're  
20 reading Claim 20 right because it doesn't specify a range.  
21 It just says "a first transmission spectrum."

22 Q. (BY MR. FLEMING) Keep reading.

23 (Witness reviews document.)

24 Q. (BY MR. FLEMING) Can you read that --

25 MR. AYERS: Can you just let him --

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2 A. Okay. Sorry.

3 [READING]: A bandpass filter bank for television  
4 tuner for tuning an RF input signal having a first  
5 transmission spectrum. The bandpass filter bank  
6 comprising...

7 And then it goes and does the comprising.

8 So the question --

9 Q. (BY MR. FLEMING) Read on to where it says the  
10 "the plurality of bandpass filters."

11 A. Well, maybe I'll just read the whole thing.

12 [READING]: A first variable amplifier having an  
13 input node coupled to receive the input RF signal and an  
14 output node providing a first output signal, a plurality  
15 of bandpass filters connected in parallel between the  
16 output node of the first variable amplifier and a first  
17 node, the first node providing the band selected output  
18 signal for the bandpass filter bank, each bandpass filter  
19 being disposed to select a different portion of the first  
20 transmission spectrum so that the plurality of band  
21 filters is disposed to select the entire range of the  
22 first transmission spectrum.

23 And I think -- the way I'm reading that is I'm  
24 not limiting the first transmission spectrum to the TV  
25 spectrum. I'm just saying the first -- a first

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transmission spectrum.

Q. So you're not giving any weight that it's going to be a television tuner?

MR. AYERS: Objection; form.

A. Well, the --

(Witness reviews document.)

A. I didn't read that as limiting. That's -- I didn't.

Q. (BY MR. FLEMING) Okay. Can we turn to the purpose of Gomez. Can we go to Column 4, Lines 8 through 10. Can you read that? It starts with "the purpose of."

A. Yeah.

[READING]: The purpose of the programmable filter bank is to suppress RF at harmonics of the phase-lock loop 305 so that the overall circuit has no response at those frequencies.

Q. Okay. So if we can turn to Figure 4. It shows that the output goes to mixer 302?

A. Yes, it does.

Q. The mixers typically provide harmonics. Correct?

A. Yes, they do.

Q. And they can back flow?

A. And what?

Q. And -- so then wouldn't the purpose of the -- the

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impedance 401a prevent those harmonics from going back into that circuit?

A. Yeah, I think they say -- let me see what they say about that.

(Witness reviews document.)

A. Yeah, it's Column 4, Line 63 and following.

Q. (BY MR. FLEMING) Can you read that for us?

A. Yeah. I am.

[READING]: The inputs of the tank circuits 430 are connected to a common input through impedances 401 (e.g., inductors). This prevents interaction between the tuned circuits. This arrangement is essentially a frequency multiplexor with one common Vin with multiple outputs VOUTA, B and C.

So what those impedances are doing in Gomez are reducing the -- the impedance effect of the LC tank back on the LNA that's driving it.

Let me read that sentence again so that we can look back at the figure.

(Witness reviews document.)

A. Yes. So what it's doing, as I understand, is if this impedance were not here and here and here, 401 a through n, as you were changing one of the banks of filters, it would be -- or not changing -- just each bank

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2 of filters would be connected to the next bank, and so the  
3 effect of all the banks on each other would be undesired.  
4 It would be difficult to design, to -- to make that work.  
5 So they put the impedances there to isolate each of these  
6 tanks from the other tank.

7 Q. (BY MR. FLEMING) If you could look at Column 3,  
8 Lines 59 through 61. Could you read that.

9 A. [READING]: In particular, this invention  
10 discloses a technique for implementing tunable tracking  
11 filters suitable for image and LO harmonic response  
12 rejection in integrated broadband tuners.

13 Q. So there are -- the purpose, then, is to reject  
14 these LO harmonics. Is that consistent with what you just  
15 said earlier?

16 MR. AYERS: Objection; form.

17 (Witness reviews document.)

18 A. So I don't remember where we read earlier, but I  
19 think it's up here in Column 4.

20 [READING]: The purpose of the programmable  
21 filter bank 311 is to suppress RF at harmonics of the  
22 phase-lock loop 305 so that the overall circuit has no  
23 response to these frequencies.

24 Q. (BY MR. FLEMING) And also you were pointing to  
25 Column 4, Line 63 on.

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(Witness reviews document.)

A. Okay. So then what's the question, given that?

Q. (BY MR. FLEMING) My question is that those impedance shown as 401a, the purpose is to suppress those harmonics?

MR. AYERS: Objection; form.

A. Well, it -- it is indicated in 63 and following the purpose is to isolate the -- the tuned circuits.

Q. (BY MR. FLEMING) Uh-huh.

A. The entire -- it says here: The purpose of the programmable filter bank is to suppress RF at harmonics of the phase-lock loop.

Not calling out specifically the impedance.

(Witness reviews document.)

Q. (BY MR. FLEMING) Turning back to Figure 4 and your knowledge of circuitry, the mixer 302 would be the source of those kind of harmonics, wouldn't it not?

A. Yes.

Q. And then that mixer 302 would be connected to the very inputs of the Z 401a?

A. Via a switch, of course.

Q. Uh-huh.

A. So you're proposing that the impedances are what's doing the rejecting of the harmonics?

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2 Q. That's what impedance do, is filter out  
3 harmonics?

4 A. Well, the whole filter is --

5 Q. The tracking filter purpose is -- also has a  
6 different purpose, doesn't it not? It's the center of  
7 the -- that one particular filter. Correct?

8 A. Right.

9 Q. Not suppress -- it's not going to be used to  
10 suppress these harmonics that it's talking about?

11 A. Well, for that one -- when you enable a filter  
12 bank, then that allows that filter bank to pass the signal  
13 according to the transfer function of that filter.

14 Q. That's true.

15 But the Z is clearly there for suppressing  
16 harmonics?

17 A. Wouldn't the --

18 MR. AYERS: Objection; form.

19 A. -- the other impedances in the -- in the --

20 Q. (BY MR. FLEMING) Well, the other impedances are  
21 connected to the input. The impedance 41a -- 401a, that's  
22 doing the work.

23 A. Well, if I just take what is said without  
24 additional analysis, it says that the resistors are there  
25 for isolating the interaction between the -- or preventing

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2 interaction between the tuned circuit --

3 Q. "The resistors," can you clarify what you mean by  
4 "resistors"?

5 A. The impedances 401. Sorry. The -- sorry. I  
6 call those resistors.

7 (Witness reviews document.)

8 A. So that -- those impedances -- see, it says:  
9 This arrangement is essentially a frequency multiplexor  
10 with one common Vin, the multiple outputs VOUTA/B to IN such  
11 that each output passes a different frequency band.

12 Q. (BY MR. FLEMING) Yes. That's true. That's what  
13 each of those track filters' banks are for.

14 A. Right.

15 Q. So my question for you is, removing the Z,  
16 wouldn't that have serious impact on its ability to filter  
17 out the harmonics?

18 A. I think if you removed the Z --

19 MR. AYERS: Objection; form.

20 A. -- it wouldn't work, for other reasons, whether  
21 or not it would filter -- not filter out harmonics, I  
22 could only speculate.

23 MR. FLEMING: Okay. I think we do need to  
24 take a break.

25 (Break.)

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2 Q. (BY MR. FLEMING) Can we turn to Page 19,  
3 Paragraph 32 of your declaration.

4 A. Okay.

5 Q. And can we look at -- let's see -- I think it's  
6 the third sentence which begins with "while the low noise  
7 amplifier 301," can you read that sentence?

8 A. Yeah.

9 [READING]: While the low noise amplifier 301 is  
10 not explicitly described as a "variable amplifier," such  
11 an implementation of the low noise amplifier is disclosed  
12 by Waight as discussed above and was obvious to one of  
13 skill in the art.

14 Q. Turning to Waight. Does Waight disclose a  
15 variable amplifier? And I'm a little confused on where in  
16 Waight are you relying on.

17 A. 204 is a variable amplifier.

18 Q. So you're relying on 204 in Figure 2?

19 A. Let me get calibrated here.

20 Q. Yeah, that's fine.

21 (Witness reviews document.)

22 A. Yeah, that's the one.

23 Q. (BY MR. FLEMING) Okay. So -- so can -- can you  
24 tell me what "the one" means? "That's the one."

25 A. Oh, sorry. Yeah.

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2 [READING]: The variable amplifier, while the low  
3 noise amplifier 301 is not explicitly described as a  
4 "variable amplifier," such an implementation of the low  
5 noise -- of the low noise amplifier is disclosed by  
6 Waight.

7 So "the low noise amplifier disclosed by Waight"  
8 is 204.

9 Q. Is 204 a low noise amplifier or just an  
10 amplifier?

11 A. It's a low noise amplifier. It says in Column 2  
12 of Waight, Line 40 -- or Line 39: Power level of the  
13 received RF signal at the input of the first LNA 204.

14 So yes.

15 Q. So what noise level of Gomez would qualify as a  
16 low noise amplifier?

17 MR. AYERS: Objection; form.

18 A. I don't know. When I'm reading the claims on to  
19 a -- something, if it says low noise amplifier here and  
20 the claim reads low noise amplifier, if it's of the other  
21 constraint, then it --

22 Q. (BY MR. FLEMING) So you don't consider the  
23 characteristics of the Gomez require -- requirements for  
24 the ampl- -- the low noise amplifier?

25 A. No, I just read "low noise amplifier."

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2 Q. Okay. Can we turn to Paragraph 39. That's on  
3 Page 22.

4 I'm sorry. I want to go to Paragraph 40, not 39.

5 A. Okay.

6 Q. And that's dependent Claim 2 that depends on  
7 Claim 1 that you're quoting. Is that correct?

8 A. Let me make sure.

9 (Witness reviews document.)

10 A. Yes.

11 Q. (BY MR. FLEMING) Okay. So can you read the  
12 first two sentences.

13 A. [READING]: Gomez, Waight, and Shen all describe  
14 this element separately. Gomez, for example, teaches that  
15 "the present invention permits the use of a filter bank  
16 with a switched tuning implemented on-chip." As a result,  
17 one of the advantages of Gomez is that "the present  
18 invention permits reducing the number of external  
19 components." Waight also teaches that a tuner can be  
20 formed as a single integrated circuit. "By way of  
21 example, the entire receiver may be on a single integrated  
22 circuit."

23 Q. So are -- are you identifying the tuner from  
24 Claim 2 with the Gomez tuner of his abstract?

25 (Witness reviews document.)

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2 A. Yes.

3 Q. (BY MR. FLEMING) If we go back to Paragraph 40,  
4 Page 22 of your declaration, your -- the quote you quoted  
5 is that it permits the filter bank from -- with the switch  
6 tuning implemented on the chip.

7 A. Well, it's -- Claim 2 is saying the tuner circuit  
8 of Claim 1 -- okay. I see your question.

9 (Witness reviews document.)

10 A. Claim 1 recites: A tuner circuit receiving an  
11 input RF signal having a first transmission spectrum, the  
12 tuner circuit comprising...

13 A number of elements. A band selection filter, a  
14 frequency conversion circuit, a variable amplifier, a  
15 plurality of bandpass filters.

16 So all of those things are the tuner circuit.  
17 Not just -- let's see.

18 Gomez says the present invention permits --

19 You referred me back to the abstract.

20 Yeah, okay.

21 Q. (BY MR. FLEMING) Your quote was actually on  
22 Column 7, Lines 22 through 24.

23 A. Yeah.

24 (Witness reviews document.)

25 A. It's my understanding that Gomez is describing

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2 what's in Figure 1, which includes -- let's see. Let  
3 me -- let me see which figure.

4 I'm sorry.

5 Figure 6 which includes the tuner --

6 Q. (BY MR. FLEMING) Figure 6?

7 A. In Gomez.

8 Q. The quote that you have on Column 7, Lines 22  
9 through 24 is Figure 7.

10 A. Okay. Hold on.

11 (Witness reviews document.)

12 A. The present invention is, I believe, everything  
13 in Figure 6, which includes the elements of Figure 7.

14 Q. (BY MR. FLEMING) But, again, can you go back to  
15 your declaration, Paragraph 40 on Page 22 and read just  
16 the first sentence.

17 A. Yeah.

18 [READING]: Gomez, for example, teaches "the  
19 present invention permits the use of a filter bank with  
20 switched tuning implemented on-chip."

21 Q. So if -- if you look at Column 7, lines -- you  
22 quoted 22 through 24, it's talking about integration of  
23 Figure 7. And then if you look at Column 3, Lines 45 and  
24 46, Column 7 is an embodiment of a splitter and tunable  
25 filter bank only?

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2 A. No, don't agree because it says on Column 7, the  
3 present -- it starts off with: This discussed above, the  
4 present invention.

5 So what is the present invention?

6 Q. Can you tell me what line that is?

7 A. That's Line 21, the beginning of that paragraph.

8 Q. 21? Okay.

9 (Witness reviews document.)

10 A. In Column 2, line 29: There is provided a  
11 radiofrequency tuner (RF) including a programmable  
12 tracking filter bank receiving an RF input and outputting  
13 a filtered RF signal. A mixer stage receives the filtered  
14 RF signal and outputs a first quadrature component --

15 And it goes along. I don't need the rest of it,  
16 I don't think.

17 So I think the tuner -- actually, I may have  
18 misspoken. I think it's probably -- if you read that  
19 section that I just read on to Figure 3. Let's see.

20 [READING]: A radio frequency tuner including a  
21 programmable tracking filter --

22 Which is shown in 311.

23 A mixer stage -- an RF input and outputting an RF  
24 signal. A mixer stage receives the RF signal and outputs  
25 a first quadrature component. Two variable amplifiers --

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2 Those are shown 308 A and B. So --

3 Q. (BY MR. FLEMING) Where do you rely on that  
4 Figure 3 is all on one single chip?

5 A. Well, I inferred that because all they're saying  
6 is that -- in that Column 7, which I quoted, is that the  
7 way they implement this filter allows it -- the whole  
8 thing. That was the limiting issue with integrating the  
9 entire solution. That's the way I read that.

10 Q. So you're inferring?

11 A. That may be a legal --

12 MR. AYERS: Objection; form.

13 A. -- term. It seems --

14 Q. (BY MR. FLEMING) There is not an explicit  
15 statement in there.

16 A. It's an inference.

17 Well, let me look, make sure there is not any  
18 corroborating evidence here.

19 (Witness reviews document.)

20 A. Yeah. Yep. That's an inference.

21 Q. (BY MR. FLEMING) Okay. Can we look at Column 4,  
22 Lines 39 through 41? Can you read that to me?

23 A. In Gomez?

24 Q. Uh-huh.

25 A. [READING]: A typical conventional single

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conversion tuner as illustrated in Figure 1 as shown in Figure 1, the conversion --

Q. I'm sorry. Are we on the same page? Column 4 of Gomez.

A. Oh, I was Column 1.

Q. Column 4.

A. Okay. Sorry.

Q. Line 39 through 41.

A. [READING]: Note that in a typical circuit, the inductor L406 is usually an on-board inductor, whereas the rest of the tank circuit can be manufactured as an integrated circuit. Generally, however, the inductors L406 may be discrete, or printed.

Q. Can we also go to Column 7, Lines 8 through 12. Could you read that?

A. [READING]: The filter bank 311 shown in Figure 7 functions similarly to the filter bank of Figure 4, except that it does not use an extra inductor and may be made more compact and better integrated into a single IC.

Do you want me to keep reading?

Q. No. That's fine.

MR. AYERS: Is there a question?

Q. (BY MR. FLEMING) From those two columns that we just read, how do you reconcile what you have said that it

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would be -- one of ordinary skill in the art would want to integrate the inductor?

A. Well, it said -- what was the first, Column 4?

Q. Yeah. Let's go back. Column 4, Lines 39 --

A. Okay. Yeah, I see it.

Q. -- through 41.

A. The typical --

[READING]: The inductor L406 is usually an on-board inductor, whereas the rest of the tank circuit can be manufactured as an integrated circuit.

So --

Q. Then read Column 7.

A. Let me look at the inductor.

(Witness reviews document.)

A. Column 7, lines what, again?

Q. (BY MR. FLEMING) It looks like, to me, it starts at 8 and goes to 11, I think.

A. I see.

(Witness reviews document.)

A. Okay. Figure 7 is a little bit different architecture, as you see. And he says it functions similarly, "except that it does not use an extra inductor and may be made more compact."

Q. (BY MR. FLEMING) Maybe we should clarify what

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they mean by the "extra inductor."

A. Yeah, that's the L --

Q. L --

A. -- 406.

Q. In Figure 4?

A. In Figure 4.

So I think -- all I'm trying to find is, tuner circuit formed as a single integrated circuit, and the hard parts of that are the reactive elements. It says there in that Line 8 -- Column 7, Line 8, following that -- it talks about making it "more compact and better integrated into a single IC."

Which that's the claim element I'm trying to address.

Q. Doesn't it also teach, though, to one of ordinary skill that if you're going to integrate, you're going to have to eliminate that inductor?

MR. AYERS: Objection; form.

A. Well, it says, though -- well, yeah, it says that. It says functions similarly to the circuit in Figure 4.

(Witness reviews document.)

A. Here I rely on -- well...

(Witness reviews document.)

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2 A. Well, as it pertains to Gomez, I certainly don't  
3 agree with those two passages.

4 Q. (BY MR. FLEMING) Okay. Let's move on.

5 Let's turn to Claim 11.

6 A. Okay.

7 Q. And turn to Paragraph 52 which is on Page 28 of  
8 your declaration.

9 A. Okay.

10 Q. The quote there is from Claim 11. Right?

11 A. It mentions the other claim, I believe so. Let  
12 me just make sure.

13 [READING]: The tuner circuit of Claim 1 wherein  
14 the integrated circuit planar -- integrated planar spiral  
15 comprises a single-spiral inductor having an outer  
16 terminal.

17 [READING]: The single-metal spiral inductor  
18 having an outer end as a first terminal and an inner end  
19 being coupled to form a second terminal of the inductor,  
20 the metal spiral being formed --

21 Yes. Yes, it is.

22 Q. So the spiral inductor that -- just for the  
23 record, so that all of us understand, if we turn to Gomez  
24 on Figure 4, the modification is to the -- which inductor  
25 shown in that figure?

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A. What do you mean by "modification"?

Q. Aren't you going to modify Gomez in some way to get a spiral inductor?

A. Oh. Oh. Yeah, the Gomez reference is -- is...

(Witness reviews document.)

A. I know where it is, but I don't know why I don't see it. I'm looking for it.

Q. (BY MR. FLEMING) Okay.

(Witness reviews document.)

A. And this is Claim 11.

(Witness reviews document.)

A. Yeah, I focused on Liou there. Gomez specifies a printed inductor.

Q. (BY MR. FLEMING) What inductor are we talking about in figure --

A. L406.

Q. Okay. Looking at the Gomez reference, in what frequency range are we working with for that inductor? Would it be fair to say somewhere around -- centered around 50 megahertz?

A. Well, it says the tuner occupies 50 to 860 megahertz spectral range.

Q. Uh-huh. Where are you reading there?

A. I'm reading at Column 4, Line 4.

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Q. So in that high-end frequency range, what kind of inductance are we talking about in that inductor?

A. I don't know. It depends on the other components.

Q. Wouldn't it be quite big, like a hundred NH?

A. Are you seeing that in the Gomez reference or are you just offering that as a possibility? I'm looking to see. He does have some calculations.

(Witness reviews document.)

A. Yeah, I don't see a value offhand in Gomez.

Q. (BY MR. FLEMING) One of ordinary skill in the art, though, would be able to figure out --

A. How to integrate a hundred nanoampere?

Q. Well, it would be in that kind of range. Right?

A. No, well, I can't tell --

MR. AYERS: Objection; form.

A. -- that.

Q. (BY MR. FLEMING) I mean, one of ordinary skill in the art would be able to figure that out, what it would be?

A. One of ordinary skill in the art -- yes, a POSITA would be able to figure out what inductor value he needed.

Q. Right.

A. Certainly.

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Q. Right.

A. But I don't know what that value is. And I haven't tried to figure it out.

Q. Okay.

A. I don't think Gomez gives me an answer.

Q. So does Shen talk about how to -- I'm sorry.

A. Yeah.

(Discussion off the written record.)

Q. (BY MR. FLEMING) I want to introduce Exhibit 1007.

We've given you Exhibit 1007. Are you familiar with this document?

A. Yes.

Q. And --

A. It is Patent No. 7,299,020. And it's entitled "Tunable Multi-Band Receiver by On-Chip Selectable Filtering."

Q. And it's -- Shen is the --

A. Yes, David Shen.

Q. I believe that your expertise has to do with integration from yesterday?

A. Yes, it does.

Q. Is inductance value critical to integration? Does it make it harder or easier for high inductance?

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A. Yes, it certainly has an impact.

Q. When looking at Shen, does it teach a person of ordinary skill in the art to be able to integrate any value of inductance?

MR. AYERS: Objection; form.

A. Certainly not in the -- in the figures. Let me look and see. I remember using Shen for the buffer amplifier, so -- which Claim 11, the switching buffer is switched.

Q. (BY MR. FLEMING) Okay. So maybe I misspoke. You're not using Shen for the integration of an inductor?

A. Yeah. Hold on a second. Let me look at Claim 11. Claim 11 feeds back to Claim 1.

(Witness reviews document.)

A. That's correct. I'm not using it for the inductor.

Q. (BY MR. FLEMING) Okay. So can you remind me again which reference you're relying on for the inductor?

A. I believe it's Liou.

Q. Okay.

A. L-I-O-U.

Q. Uh-huh. I need to introduce, then, Exhibit 1006. I just handed you Exhibit 1006. Are you familiar with this document?

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A. Yes, I am.

Q. Can you tell me what the document is?

A. It's Patent No. 6,420,773 entitled "Multi-Level Spiral Inductor Structure Having High Inductance (L) and High Quality Factor (Q)."

Q. Can you point me to where in the reference it leads one of ordinary skill in the art to be able to integrate high inductance?

A. Well, I'm not going to use the adjective here. Let's just first show the -- the adjective "high" --

Q. Well, I should clarify. The inductance that would be required for the Gomez inductor.

A. Well --

(Witness reviews document.)

Q. (BY MR. FLEMING) If we turn to Page 29, which is Paragraph 52 and if you want, you can look at 52, it starts on 28. There I believe you're talking about Liou and the inductance.

A. Page 29 what?

Q. 29 in your declaration.

A. Okay.

Q. You might want to start with Page 28 just to get oriented, because that's the beginning of Paragraph 52.

A. [READING]: Four years before the '466 patent was

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2 filed, Liou anticipated that "excellent inductor design  
3 and process" was needed "to achieve [system-on-chip] SOC  
4 RF IC circuits." To address the need, Liou proposed a  
5 "Multi-Level Spiral Inductor Structure having a High  
6 Impedance -- High Inductance (L) and High Quality Factor  
7 (Q)." Liou described a "conventional spiral inductor"  
8 that has a "first metal layer...used...as a cross-under to  
9 make connection to one end terminal" and a "spiral metal  
10 layer."

11 Do you want me to keep reading?

12 Q. No. My question goes to exactly what in Liou  
13 would teach an inductance that would be suitable for  
14 replacing the Gomez inductor L406a?

15 A. Well, I don't know -- I think I said I don't know  
16 what inductor L in Gomez, the value is.

17 Q. So you didn't consider these values?

18 A. I didn't look at the values. I just looked at  
19 the -- and also I was considering Waight which also has  
20 inductors, I believe, that are integrated, the resonator  
21 filter.

22 Q. But you didn't consider what the --

23 A. Yeah.

24 Q. -- what the values would be?

25 MR. AYERS: Objection; form.

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A. I did not consider implementing 100 nanoampere type inductor of an integrated form.

Q. Okay.

MR. AYERS: Do you want to break for lunch?

MR. FLEMING: I do.

MR. AYERS: Okay. Me too. Thank you.

(Break.)

Q. (BY MR. FLEMING) I just handed you Exhibit 1013, Dr. Holberg. Do you recognize the publication?

A. Yes. And it is Patent No. 5,559,360 and the name of it is "Inductor for High Frequency Circuits."

Q. And it's Chiu?

A. Chiu.

Q. Can we go to Paragraph 60 which starts on 33.

A. Okay.

Q. The quote there that you -- are you quoting Claim 13 on the very beginning?

(Witness reviews document.)

A. Yes.

Q. (BY MR. FLEMING) Okay. Can we turn to Figure 4A. What would you characterize the shape of the inductor on 4A?

A. I would say -- I would characterize it as octagonal.

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Q. Okay. What would you characterize the figure in 4B?

A. Octagonal as well.

Q. And 5B?

A. Make sure.

(Witness reviews document.)

A. Well, it has octagonal shape in that -- insomuch as it's got one, two, three, four, five, six, seven, eight sides. So I think it's fair to say you could categorize -- you could say it's octagonal.

Q. (BY MR. FLEMING) On Paragraph 60 on Page 34. The second sentence under the figure, could you read that? It starts "A POSITA."

A. [READING]: A POSITA would have been motivated to combine Chiu and Liou because both Liou and Chiu are directed to high-Q inductors suitable for RF applications.

Q. What -- what is your underlying factual reason for that statement?

A. At least -- one thing would be the title calling out for high frequency circuits where you would need high-Qs. Talks about, in the summary: The present invention provides an inductor fabricated for semiconductor use which displays a self-inductance and increased Q not realizable with conventional...integrated

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circuits.

Q. Can we turn to Figure 4 through 6. Are these considered stack structures?

A. I don't see 6.

Q. Oh, I'm sorry.

Yeah, there is 6.

A. In which patent?

Q. In Liou.

A. Oh. I'm in Chiu.

Q. I'm sorry.

(Witness reviews document.)

A. Yes.

Q. (BY MR. FLEMING) So doesn't Figure 5B and 5 -- 3B show how they're interconnected, the stacks?

A. Of which, again? Liou? Are you in Liou?

Q. No, I'm sorry.

A. I don't see a 5B.

Q. Chiu.

A. Okay. So I'm having a hard time following you. You're kind of going back and forth.

Q. I know. I apologize. It's after lunch. I'll be clearer.

A. Okay.

Q. I'm looking at Figure 3B and 5B.

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2 A. Of?

3 Q. Chiu.

4 A. Okay.

5 Q. And what do those figures show?

6 A. These figures illustrate -- let me just make  
7 sure -- 3B is a side view of the inductive structure of  
8 Figure 3A.

9 Q. Okay.

10 A. Okay.

11 Q. So then it's showing how Figure 3A is being  
12 interconnected with the layers?

13 A. It is showing that -- let me refresh my memory  
14 and make sure they're not just symbolically showing  
15 interconnect, but actually showing function.

16 (Witness reviews document.)

17 A. Yes, I believe so.

18 Q. (BY MR. FLEMING) Okay. So the -- the stacks are  
19 vertically connected. Correct? They're not rotated?

20 A. That's not a limitation.

21 Q. I'm just asking.

22 A. They are vertically --

23 Well, there is a connection between Layer A and  
24 Layer B and --

25 Q. The layers are right on top of each other.

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2 Right, they're not rotated?

3 MR. AYERS: Objection; form.

4 A. They are -- you know, "rotated" has to be  
5 conveyed to me -- are you asking in a relative form,  
6 rotated with respect to the page or with respect to the --

7 Q. (BY MR. FLEMING) If you looked at the top layer  
8 of Layer B, it would be the same orientation as --

9 I'm sorry.

10 If you look at the top layer of A and if you look  
11 at the bottom layer of B, the structure is aligned?

12 A. Okay. Yes, I agree with that. That's -- I  
13 understand that. But I didn't know rotated with respect  
14 to what.

15 Q. So now going back to Liou, there -- the top layer  
16 and the bottom layer are rotated?

17 A. They are.

18 Q. So explain to me, then, what is your combination  
19 of Liou and Chiu.

20 A. Well, the -- first of all, Liou shows -- the  
21 requirement of Claim 13 is the first metal spiral and  
22 second metal spiral each has a circular or an octagonal  
23 shape. And so the circuit inductor in Liou shows first  
24 and second metal spirals.

25 Q. What figure are you looking at in Liou?

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A. 4.

Q. Okay.

A. But they're not -- nothing is octagonal. So you need Chiu for the octagonal component. So you look at -- you want to build it and you say, "Well, there is the two spirals. I can just use -- how do I need to -- if I need some help with the octagonal piece, Chiu teaches that." Like Figure 4A.

Q. So you're doing this to meet the claim language, but other than looking at the claim, why would you make that modification?

A. Well, Claim 13 depends off of 12. All I need is -- I've already -- the other -- you know, Waight, for example, has the tuner component. So I need -- I need the inductors and so Claim 12 depends on Claim 1, which has all of the tuner elements. And so I need the structure described in Claim 12 with the added limitation of Claim 13. So Claim 12 just recites a spiral formed in a first set of metal layers and a spiral formed as a second set of metal layers and a dielectric in between.

I'm -- I'm reading -- summarizing it.

And then you need -- from that, you need to achieve the octagonal component. Okay. So this circuit -- this inductor here, which is in Liou, is high

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inductance L and high quality factor. And so if you wanted an octagonal inductor and it needed to be high-Q, you would start with Liou and you would say "Okay, I've got it." But if you needed the added limitation for whatever reason of the octagonal shape, then all you need is Chiu and so --

Q. Why wouldn't functionally you just stick with Liou since it's high impedance already?

A. High -- high quality.

Q. High -- yeah. High inductance.

A. Well, I didn't make a judgment as to why you would stop there. That's just one thing you could do. You could stop there, and you wouldn't necessarily. But I was trying to meet the claim limitation of -- of 13.

Q. So there is no reason why you would want it to be octagonal other than you want to meet the claim?

A. No --

MR. AYERS: Objection; form.

A. -- actually, I --

THE WITNESS: Sorry.

A. No. Octagonal might yield better space efficiency. I haven't done the geometry but --

Q. (BY MR. FLEMING) Did you mention that in --

A. I did somewhere.

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2 (Witness reviews document.)

3 A. Yeah, I mention -- I say it's largely a matter of  
4 design choice.

5 Q. (BY MR. FLEMING) Right.

6 A. I think somewhere else I mention the space or  
7 area efficiency.

8 Q. So is the design choice functional or just you  
9 want to look like that?

10 A. I think if you're trying to -- one of the -- one  
11 of the issues with square corners is accuracy of the etch  
12 at the corners.

13 Q. Did you say that anywhere in your declaration?

14 A. No. But I didn't need to. It was a design  
15 choice.

16 Q. So is there anything in these two references that  
17 suggest that one shape is better than the other shape?

18 A. Offhand, I don't think so. But, like I say, I  
19 was just showing that the Chiu reference meets the claim  
20 language, and you -- and I said, as you just read, or I  
21 just read, it's a matter of design choice.

22 And I think as a part of this whole process, I'm  
23 allowed to introduce additional knowledge. In fact,  
24 you've asked me to on numerous occasions.

25 But one of the reasons, again, the circular

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2 shape, you have fewer inaccuracies due to turning corners  
3 as a result of the etch profiles and such. So that may  
4 be -- that's one of the reasons why oftentimes you -- for  
5 these types of structures, you asymptotically approach a  
6 circle by adding more edges. You know, you start with a  
7 square, you go to a hexagon, and you go to octagon.  
8 Ultimately, you become a circle.

9 Q. So let me just understand the geometry. In Liou,  
10 the metals must be rotated with respect to one another;  
11 while Chiu they're on top of each other.

12 How are you going to modify these two to meet  
13 those structural differences?

14 A. Well, all you have to do is -- Chiu just teaches  
15 the octagonal shape and it can be done. All you would  
16 need to do is add more edges to these two, and you get it.

17 Q. But Chiu was talking about the two layers need to  
18 be on top of each other on line, not rotated?

19 A. Yes, he does.

20 But if you were motivated for whatever design  
21 choice, and I didn't have to -- then you could look at --  
22 you already got the stacked metal conductors in Liou, and  
23 then you could extend that to Chiu, and you could play  
24 with the geometries. You would say, "Well, he did it in  
25 an octagonal format. Why did he do it? Maybe it's a

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design choice. Maybe I get better performance. And so why don't I try that, but I will use the Liou stack structure in lieu of the Chiu stack structure and combine those two concepts into one solution."

I just said it's a matter of design choice, and I'll just leave it at that.

Q. So as a matter of design choice, then all sorts of different geometries could be used.

A. That's true. And I think '466 recites more --

Q. Why would you just come up with this one now?

A. It's just one.

Q. Of very many. There could be an infinite number of different --

A. We don't know what the limitations -- a design choice is based upon a set of limitations. So there might be some limitation. Maybe it's area. Maybe -- I'm not sure what it might be in this particular case. But one design choice might motivate a certain shape, whether it's a location on the integrated circuit.

Q. Again, though --

A. Maybe it's the desire to achieve a close-to-circular shape. Sorry. I didn't mean to talk over you.

Q. I just want to make the record clear, though,

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2 that there could be a whole number, large number of  
3 different geometries in your design choice spectrum.  
4 Right?

5 A. I agree.

6 Q. I would like to go back to your declaration on  
7 Page 17, Paragraph 30, and I would like us to look again  
8 at Shen and Gomez. So maybe we ought to get those out.

9 MR. FLEMING: Let's take a quick break.

10 (Break.)

11 Q. (BY MR. FLEMING) So to orient both of us, let's  
12 turn to Page 8 and look at the title on -- above  
13 Paragraph 14. Can you read just the title?

14 A. [READING]: Ground 1: Claim 35 is obvious over  
15 Gomez in view of Shen.

16 Q. Right. So I believe that's the combination we're  
17 going to be talking about.

18 A. Okay.

19 Q. And just to make sure, I believe that  
20 Paragraph 30 is in that same section, so we're talking  
21 about that combination. That's all I'm trying to  
22 establish.

23 A. All right. Let me make sure.

24 (Witness reviews document.)

25 A. Correct.

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2 Q. (BY MR. FLEMING) So if you read the first two  
3 sentences of Paragraph 30.

4 A. [READING]: Gomez does not explicitly disclose  
5 that its switching can be accomplished with a unity gain  
6 buffer. However, Shen teaches a unity gain buffer exactly  
7 as described in the '466 patent.

8 Q. Thank you.

9 And then you quote a quote to Figure 4 of Shen, I  
10 believe. Is that correct? The next page on 18.

11 A. Let me go back.

12 (Witness reviews document.)

13 A. Yes.

14 Q. (BY MR. FLEMING) Okay. So let me try to  
15 understand. How -- maybe you can just explain it to me.

16 Figure 4 shows this circuit, and how is that  
17 going to be connected to Figure 4 in Gomez? Figure 4 of  
18 Shen, how is that circuit connected into Figure 4 of  
19 Gomez?

20 A. Okay. Let me get...

21 (Witness reviews document.)

22 A. So we're dealing with Claim 35? I just want to  
23 make sure I --

24 Q. (BY MR. FLEMING) That's what I was trying to  
25 establish earlier.

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2 A. Yeah.

3 Q. I think you are, because on Page 8 it's under the  
4 section of that -- section A. So I assume that's what  
5 this is all about.

6 A. So let's see if that makes sense.

7 (Witness reviews document.)

8 A. Okay. So what you have to do -- I don't know  
9 that I can just drop right in here because in the '466 --  
10 that's why I believe there is so many combinations. In  
11 '466 you have the switch -- in Figure 4 of the '466, you  
12 have the switches SA, SB that do the controlling.

13 Q. (BY MR. FLEMING) You're on figure --

14 A. Figure 4 of the '466 patent.

15 Yeah, it would be best if we just walked through  
16 this to get to the page because it's a long way. I can  
17 give you the answer --

18 Q. My question is you're trying to -- are you saying  
19 that the 2048 is the unity -- if we looked at Claim 34,  
20 that's the unity gain buffer being claimed? Claim 35, I  
21 mean.

22 A. I'm going to have to follow this through just so  
23 I don't make a mistake.

24 Q. Okay.

25 A. I believe I know what's happening here, but I'm

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2 going to -- I'm going to check.

3 This is Waight.

4 (Witness reviews document.)

5 A. Well, let's just follow it through, and I'll  
6 follow the directives.

7 Starting on Page 8, we have a bandpass filter,  
8 first variable amplifier having an input node coupled to  
9 receive the RF signal.

10 Let me read through and maybe I can make it a  
11 little faster.

12 (Witness reviews document.)

13 A. First switch SA and SZ.

14 (Witness reviews document.)

15 A. Okay. So if you go to Page 11 --

16 Q. (BY MR. FLEMING) Of your declaration?

17 A. Of my declaration which -- which cites a portion  
18 of Claim 35: The bandpass filter comprising a first  
19 switch coupled between the output node of the first  
20 variable amplifier and a second node.

21 And those switches in the '466 patent as shown on  
22 Figure 4, SA and SB. These enable switches selectively  
23 feed the output of the variable gain amplifier to only one  
24 of the bandpass filters at a time. So the output signal  
25 is only filtered by one of the bandpass filters.

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2 [READING]: Gomez accomplishes the same thing  
3 with a slightly different circuit configuration. Gomez  
4 provides the output of the amplifier -- Gomez provides the  
5 output of the amplifier to all of the bandpass filters but  
6 then provides an enable switch on each of the bandpass  
7 filters to selectively feed the output of only one of the  
8 bandpass filters to the output.

9 And the reference there is Exhibit 1004,  
10 Column 5, 17 through 21, which I believe reads: ("Each  
11 tank circuit may be connected or disconnected from the  
12 first mixing stage 302a and b using, e.g., an integrated  
13 transistor switch.")

14 Q. I'm trying to get to the unity gain amplifier.

15 A. I know, but I -- in order to show you where it  
16 is, I'm certain there will be a follow-up question, if I'm  
17 able to -- because we're moving where the switches are  
18 selectively.

19 And so that's -- you're on -- on 16 was the --

20 Q. I'm on 17.

21 A. 17.

22 Q. And if you read Paragraph 30 you say "Gomez" --  
23 you read that first.

24 A. Yeah.

25 [READING]: Does not explicitly disclose that its

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2 switching can be accomplished with a unity gain buffer.

3 However, Shen teaches a unity gain buffer...

4 Q. Right. So then you quote -- you point to  
5 Figure 4 on the top of 18. Correct, of Shen?

6 A. Correct.

7 Q. So --

8 A. Your question was: Where do you put it?

9 Q. So my question is, the circuit that is shown on  
10 Figure 4, how is it connected to -- in -- into Figure 4 of  
11 Gomez?

12 A. Okay.

13 (Witness reviews document.)

14 A. Well, I believe -- I was looking for -- I thought  
15 that I had written how -- how it's connected.

16 But look at Figure 4 of Gomez --

17 Q. (BY MR. FLEMING) Uh-huh.

18 A. -- and switch S1a.

19 Q. Yes.

20 A. And the signal on the left side of S1a --

21 Q. Yeah.

22 A. -- we would -- that would go to the signal IN of  
23 Figure 4 of Shen.

24 Q. Okay.

25 A. The signal on the right side of S1a would go to

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2 the output node of Figure 4, labeled "out." And it  
3 would -- most likely it would be, unless this was a BiCMOS  
4 process, they would be, you know, MOS equivalents.

5 Q. We need to probably make another exhibit. Can  
6 we -- can you put -- label that onto the Gomez just so  
7 that would make it clear where you're saying.

8 A. (Complies.)

9 MR. FLEMING: Off the record.

10 (Break.)

11 (Exhibits 2046 and 2047 were marked.)

12 Q. (BY MR. FLEMING) I'm handing you a copy which  
13 you're going to hand back to me. This is what we did  
14 earlier in the day. That's Exhibit 2046, and that's what  
15 you drew. Right?

16 A. That is correct.

17 Q. Okay. Thank you, sir.

18 And then I handed you Exhibit 2047, which you  
19 have a copy of.

20 A. I have a copy of, yes.

21 Q. And that is what you just drew.

22 A. That is correct.

23 Q. So if we look at Exhibit 2047 where it connects,  
24 where the input...

25 Where you look at transistor 105 and if you look

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2 at the gate, it's connecting to -- you pointed, it  
3 connects to that node to the left of switch Sa1?

4 A. Yes. Let me make a correction. That's not the  
5 gate of the transistor. It's the base.

6 Q. I'm sorry. The base. I should know that.

7 What is the voltage -- DC voltage at that point?

8 MR. AYERS: Objection; form.

9 A. As we discussed earlier, that's 0 volts.

10 Q. (BY MR. FLEMING) And then where -- is 105 now  
11 biased properly?

12 A. Not in the -- not in the way it's connected  
13 there. However, you know, POSITA would -- if he were  
14 going to implement this, he would simply take the inductor  
15 L406a to a different voltage, the one he wanted to use for  
16 his biasing for 105, and the output that results.

17 Q. But it wouldn't be a unity gain amplifier, then,  
18 the way it's connected?

19 A. It wouldn't be -- if I -- in its current  
20 situation?

21 Q. Yes.

22 A. That is correct. That's what I said. You would  
23 have to make the further change of the inductor voltage.

24 Q. Okay. Turning to your claim charts. I'm going  
25 to ask you a similar question I asked yesterday and which

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you clarified this morning. Did you create these claim charts?

A. No, I didn't create these charts.

Q. Okay. Did you have the input for these charts?

A. These charts reflect the information that's in the body of this, and it's just in a different format.

Q. So someone else created that format but you created the --

A. Yeah. Like I said, my input for all of these was a collaborative effort in terms of identifying this reads on that or the POSITA would do this or that and the other.

So I was very much driving this piece, but then this was -- that information we used to generate this information.

Q. So have you adopted these claim charts in total as --

A. Yes, I have. As I said.

Q. Is there anything in there that you disagree with?

A. I don't know. I think -- you know, I reviewed it. Apart from any errors, clerical errors, I think that I would agree with it. But I'm happy to discuss any particular one.

Q. Are there any assumptions that you've made in

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2 forming your opinion that you haven't put into this  
3 declaration?

4 I'm talking about all three of them at this  
5 point, in total. Just a general question.

6 A. That's a big question to just answer yes or no.  
7 I think whatever I've said up to this point reflects my  
8 beliefs, including the fact that I said that one way to  
9 solve the biasing problem here is just tie the L406a to a  
10 different point. Which I think the '466 patent talks  
11 about different voltage levels. It's a matter of design  
12 choice.

13 Q. Are there any opinions that you have formed after  
14 further review that you have --

15 A. On any of them?

16 Q. Have a -- you know -- other than what we've  
17 already discussed, anything different?

18 A. For all three cases?

19 Q. Yes.

20 A. Yes. Am I free to add that?

21 Q. Yes.

22 A. Okay. You have to help me find the -- the Boie  
23 reference, not the -- not the Thomson reference, but the  
24 Boie reference.

25 Q. You're going to have to help us out on what IPR

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you're talking about.

A. This would be --

Q. Thomson.

A. This would be either -- it was either in the -- you introduced it yesterday, that show the symbols of a triangle as an amplifier. I don't remember if that was the '585 case or the '792.

Q. So we're talking about the Thomson reference. Is that the one you're worried about?

A. I need the Thomson reference, plus I need the new exhibit you submitted which was by the same inventor, Boie, Werner Boie.

Boie.

(Discussion off the written record.)

MR. FLEMING: Before we jump into that, let me just take care of this one matter. Peter, I want to present Exhibit 2043. And I also want to introduce Exhibit 2031, Exhibit 2032 and Exhibit 2008.

MR. AYERS: For the record, we object to Exhibit 2043.

Likewise, we object to 2031.

MR. FLEMING: I've given you Exhibit 2043. Right, Peter?

MR. AYERS: 2043, yes.

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MR. FLEMING: And then I've given you 2031.  
Right?

MR. AYERS: Correct.

MR. FLEMING: And then I've given you 2032.  
Right?

MR. AYERS: Correct.

MR. FLEMING: And I want to give you 2008.

MR. AYERS: Okay. So we object to 2032.

(Discussion off the written record.)

MR. AYERS: We object to 2008 as well.

Q. (BY MR. FLEMING) And then you were talking about  
1004. Right?

A. When you introduced it, I don't remember if it  
was 1004 of the '585 or -- I don't know if it matters.

Q. It applies to both.

A. Okay.

MR. FLEMING: Just for the record, we have  
Exhibit 1004, which is the Thomson reference, which is the  
same exhibit number for both IPR 2014-00728 and 00809.

A. Okay. So you introduced this yesterday in the  
process of trying to show -- make the point that this  
triangle 5 in Thomson, which is -- has an AGC input and  
has the letters BP inside, is not representative of a  
bandpass filter because it's the wrong -- it doesn't have

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2 the right symbols that you've illustrated with several  
3 other exhibits.

4 And you pointed to Block 6 and -- in this  
5 exhibit -- the Patent No. 5,831,689, and said that it's  
6 not a filter. And I think you drew the equivalence that  
7 these are the same blocks.

8 In Exhibit 1004, Column 2 at the bottom, it says:  
9 The down-converted IF signal then goes into AGC  
10 amplifier 5 with an internal bandpass limitation.

11 This is Werner Boie's inventor on Exhibit 1004.  
12 He's with Thomson Multimedia, SA. As noted yesterday,  
13 this is Werner -- the Patent No. 5,831,689 is also Werner  
14 Boie, and he is with Thomson Multimedia, SA.

15 The date of filing, just as -- as reference for  
16 Exhibit 1004 is 29.07.1995, which, I think, is the  
17 European way of saying July 29th, 1995.

18 The date that 5,831,689 was filed was May 14,  
19 1996, less than a year later, but claims foreign  
20 application priority to June 12th, 1999 -- 1995, pardon  
21 me -- in France.

22 So I believe it's reasonable to believe that this  
23 block is a subset of the Thomson invention here for  
24 several reasons. He talks about -- in the background of  
25 the invention, Column 1, the invention relates to a method

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2 of digitization of a media frequency IF video signals. So  
3 it's certainly video that's being digitized.

4 The Thomson reference of 1004 is also video  
5 that's -- video IF that's being digitized.

6 And so it's useful because we're able to see,  
7 then, that -- two things that are useful: 1004 reference  
8 says that the -- the exact words are: An AGC amplifier 5  
9 with an internal bandpass limitation.

10 I believe the internal bandpass limitation is  
11 shown in Block 2 of 5,831,689 with a filter transfer  
12 function in the frequency domain illustrated in Figure 2B.

13 Moreover, he calls a block, the rectangle, a  
14 bandpass filter because it has none of the symbols that  
15 were presented yesterday to support the position that  
16 bandpass filters have to have certain symbols. He simply  
17 just says "filter." So I just submit that for the record.

18 Q. (BY MR. FLEMING) Okay.

19 A. Secondly -- let me find -- I'm looking for --  
20 '585 will do. This is Exhibit 1001. Let me also find  
21 1001.

22 (Witness reviews document.)

23 A. So I'll refer you --

24 Q. (BY MR. FLEMING) So are we moving on from what  
25 you just made --

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2 A. No, I'm done with that one. I'm simply showing  
3 that there is support for that being -- if you accept that  
4 they are the same, which obviously I can't prove, but I'm  
5 showing an illustration of a filter without --

6 Q. But they could be the same?

7 A. They could be, yeah.

8 Q. Yeah. So, you know, it just shows that he's  
9 pretty inconsistent with his symbols. Did you want it --

10 A. It certainly --

11 MR. AYERS: Objection; form.

12 A. -- shows that he's inconsistent with his filter  
13 diagrams.

14 Q. (BY MR. FLEMING) Yeah.

15 A. So there is lots of ways to illustrate a bandpass  
16 filter other than -- at least two others.

17 Q. So where are we at now?

18 A. So we're done with that one.

19 Now, I'm looking at Exhibit 1001 of the '585  
20 patent and 1001 of the '792.

21 Q. We're looking at the patents?

22 A. We're looking at the patents, yes.

23 Q. Okay.

24 A. And, you know, I was going to offer -- I don't  
25 know the proper procedure because I haven't talked to

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2 these guys about this. They have no idea what I'm doing.

3 MR. AYERS: And it makes me extremely  
4 nervous. I'll put that for the record.

5 A. I was looking at the ATSC standard the other day,  
6 and I was curious about the raised re (phonetic) cosign  
7 filter that is cited in these two patents. And so I  
8 finally found the ATSC standard, it wasn't easy, from  
9 1995. And, sure enough, it gives the specifications at  
10 the same level of detail that's shown in -- certainly in  
11 the '792, a slightly different number in the '585. And  
12 they describe it as a linear phase filter.

13 So I -- whatever motivated the inventors for the  
14 '792 and '585 by looking at the standards that were  
15 available to them, they -- I speculate that they were  
16 motivated to use a FIR filter. And if someone else were  
17 designing the same function, as we've talked about with  
18 Thomson, and motivation to --

19 Q. (BY MR. FLEMING) Isn't that an awful lot of  
20 speculation on your part?

21 MR. AYERS: Objection; form.

22 You can go ahead and finish your answer.

23 THE WITNESS: Yeah.

24 A. So it would -- I think it would be obvious to  
25 combine the information available in the standards in the

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2 arena where you're designing to motivate you to use the  
3 type of filter that's described, the linear phase, which,  
4 I think I said in my declaration, linear phase filters are  
5 implemented with FIR filters. So those are the two things  
6 that I wanted to share.

7 Q. (BY MR. FLEMING) Going back to '466. For the  
8 person of ordinary skill in the art, you had testified  
9 that the skill level has to do with digital and mixed  
10 signals, I believe. This is IPR 881. And we're looking  
11 at your declaration. Paragraph 10.

12 A. Is this 809?

13 Q. 881.

14 (Discussion off the written record.)

15 A. This is 1011. Okay. All right.

16 What page?

17 Q. (BY MR. FLEMING) Page 7, Paragraph 10.

18 A. Okay.

19 Q. You mentioned that a skill set is mixed-signal  
20 system design. For this patent, why would you say that?

21 A. Well, what I'm -- what I'm having a --

22 Q. Why do you need digital mixed-signal experience?

23 A. Well, you don't. You don't need it for  
24 inductors.

25 Q. Okay.

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2 A. I agree.

3 Q. Talking about the tracking filter again in --

4 A. Boie?

5 Q. -- '466 patent. We were talking about IPR 881.

6 And the -- the invention is directed to a tracking filter.

7 Correct?

8 MR. AYERS: Objection; form.

9 A. In the '466?

10 Q. (BY MR. FLEMING) Yes.

11 (Witness reviews document.)

12 A. Yeah, it is.

13 Q. (BY MR. FLEMING) Okay. Besides -- in the field  
14 of wireless RF, besides television, what requires a  
15 tracking filter?

16 MR. AYERS: Requires a what?

17 MR. FLEMING: Tracking filter.

18 MR. AYERS: Objection; form.

19 A. You might use one in rechannel front-end,  
20 rechannel through a disk drive, rotated disk drive.  
21 I'm -- just off the top of my head. Because as you're  
22 moving from track to track, you're changing the  
23 frequencies, so you might have to change the frequency of  
24 the filters. You have a -- for a PRML front-end for a  
25 disk drive, you have to match -- you have to -- the

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magnetic transition result in asymmetric pulses coming off the disk, off the read head. And so you have to match those. And so you might have to adjust those as you're changing the -- as -- as you're changing from the inside of the drive to the outside of the drive.

Q. (BY MR. FLEMING) My -- my question, though, was, in the field of wireless RF.

A. Okay. Complete the question, then, because I've forgotten the whole thing.

Q. Do you know of any field within the wireless RF field, besides television, which requires a tracking filter?

MR. AYERS: Objection; form.

A. Offhand, I can't think of any.

MR. FLEMING: I think I'm ready to conclude.

MR. AYERS: Okay. You pass the witness?

MR. FLEMING: Yeah, I'll pass the witness.

(Break.)

(Exhibits 1044 and 1045 were marked.)

#### EXAMINATION

BY MR. AYERS:

Q. Good afternoon, Dr. Holberg. As you know, my name is Peter Ayers. I represent Silicon Labs in this case, and I have a few follow-up questions for you.

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Yesterday you were asked some questions about your background. Do you recall that?

A. Yes.

Q. And in particular about your experience working with RF. Correct?

A. Correct.

Q. Let me hand you what's been marked as Exhibit 1044 for purposes of identification.

MR. AYERS: I believe you have a copy as well.

Q. (BY MR. AYERS) Do you recognize this, Dr. Holberg?

A. Yes, I do.

Q. What is it?

A. It's a recommendation letter from my high school teacher, vocational radio and TV class teacher.

Q. And is it dated?

A. It's dated May 25th, 1973.

Q. And does that accurately represent the date on which it was written?

A. Yes, I believe so.

Q. And did you receive it around that time?

A. I did.

Q. And it says here that: He --

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2 Meaning, I guess, you. Is that right?

3 A. That would be me.

4 Q. -- had more than 180 hours of direct current and  
5 alternating current theory, and 1,080 hours of shop  
6 practice in the diagnosis, repair and testing of radios,  
7 black and white and color TVs and other types of  
8 electronic equipment?

9 A. That's correct.

10 Q. And is that an accurate description of your  
11 experience that you gained in that class?

12 A. Yes.

13 Q. And you also mentioned that you had experience in  
14 college designing a radio. Is that correct?

15 A. That's correct.

16 Q. And how long have you been a -- an engineer?

17 A. Since 1978. That would be 36 years.

18 Q. And you have a Ph.D. degree in electrical  
19 engineering?

20 A. Yes.

21 Q. And you've held high levels within technology  
22 companies during that time?

23 A. Yes.

24 Q. Supervised many engineers over the course of your  
25 experience?

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A. Yes.

Q. Do you feel qualified based on your education and experience to render the opinions reflected in your declarations in these cases?

A. Yes.

Q. With respect to the RF portion in particular, did you have any difficulty comprehending the RF circuits that are described in the patents at issue in these cases?

A. No.

Q. So you feel qualified then to give the opinions that you did?

A. Yes.

Q. Let me also hand you --

MR. AYERS: We would move for the admission of 1044. Do you have any objection of that? That was the letter.

MR. FLEMING: No objections.

MR. AYERS: Thank you.

Q. (BY MR. AYERS) Let me hand you what's been marked as 1045 for purposes of identification. Do you recognize this document?

A. I do.

Q. What is it?

A. It's a mixed-signal microcontroller.

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Q. And who published this document, to your knowledge?

A. Company, Cygnal Integrated Products.

Q. And is that the company that you cofounded?

A. Yes.

Q. And are you familiar with this document?

A. Yes.

Q. And what is it?

A. It's a microcontroller with analog and digital peripheral components integrated with a nonvolatile memory which is implemented in Flash.

Q. So this is a -- a data sheet that describes that product?

A. That's correct.

Q. And is that a product that Cygnal, your company, produced and sold in the marketplace?

A. Correct.

Q. Do you know if this document was made available to the consuming public?

A. Yes.

Q. And do you have some idea about when it was made available to the public?

A. I believe it was made public sometime between July of 2000 and the end of 2000. But it certainly was

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made public by April of 2001.

Q. And why do you say that?

A. Because of this date at the bottom.

Q. Which date are you referring to?

A. It says 4.2001 REV 1.3.

Q. And what does "4.2001" represent to you?

A. I believe that's the year 2001.

Q. And what does the 4 represent?

A. I believe it stands for the month of April.

Q. And were you familiar with the process of preparing data sheets at Cygnal?

A. Yes.

Q. And you believe that this data sheet accurately describes this mixed signal product that was offered for sale by Cygnal?

A. A lot of pages here but I believe it's accurate.

Q. And if I could have you turn to a -- Figure 1.2 on Page 10 of Exhibit 1045. Do you see that?

A. Yes.

Q. What's shown in that figure?

A. It's showing an 8051 core, which is an 8051 microcontroller. It's showing the flash memory, it's showing the on-board RAM. It shows an A/D converter. It shows two digital/analog converters. It shows a number of

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digital peripherals that are useful.

Q. And so is it fair to characterize this figure as a block diagram of this part?

A. Yes.

Q. And all these blocks that you mentioned, were those actually integrated on this part?

A. Yes, they were all integrated.

Q. And so you mentioned the 8051 core. What is that?

A. That's a microcontroller, 8-bit microcontroller.

Q. Okay. And flash, what is that?

A. That's a nonvolatile memory.

Q. Okay. And you mentioned that -- that this part also included an analog-to-digital converter?

A. Yes.

Q. And what's an analog-to-digital converter?

A. An analog-to-digital converter converts analog signals to digital signals.

Q. And so did this part actually receive analog input signals?

A. Yes.

Q. And it converted those to digital signals?

A. Yes.

Q. And those digital signals could then be processed

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2 by the 8051 microcontroller?

3 A. Yes.

4 Q. And you mentioned that this included a  
5 digital-to-analog converter as well?

6 A. Two of them.

7 Q. And so this component actually output analog  
8 signals as well as -- as input analog signals?

9 A. Yes.

10 Q. And those digital-to-analog converters could  
11 convert digital signals to analog signals?

12 A. Yes.

13 Q. And did you oversee the design of this part?

14 A. Yes.

15 MR. AYERS: We would move for the admission  
16 of this. Do you have any objection to it?

17 MR. FLEMING: I do.

18 MR. AYERS: What's the basis for your  
19 objection?

20 MR. FLEMING: I'm -- I'm not sure that you  
21 have established that it's self-authenticating.

22 MR. AYERS: Okay.

23 Q. (BY MR. AYERS) Dr. Holberg, do you have any  
24 reason to believe that this document is not a fair and  
25 accurate reproduction of the Cygnal preliminary data sheet

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2 for this part that was published on or around April of  
3 2001?

4 A. No. I think we released this part a year --  
5 almost a year earlier, if I remember correctly. So  
6 this...

7 MR. FLEMING: I still maintain my objection  
8 because I'm not sure of the date.

9 MR. AYERS: Sure.

10 Q. (BY MR. AYERS) Now, I'd like to turn to the '792  
11 patent, which is in IPR 2014-00809, Exhibit 1001. Do you  
12 have that in front of you?

13 A. I do.

14 Q. Okay. And I'd also like to draw your attention  
15 to the Thomson reference as well, which I believe is  
16 Exhibit No. 1004. Do you have that in front of you?

17 A. I do.

18 Q. And what I would like you to do is to turn to  
19 Claim 1 of the '792 patent which begins on Column 10,  
20 Line 50, approximately. Do you see that?

21 A. I do.

22 Q. Okay. In the first element of that claim is a  
23 frequency conversion circuit. Correct?

24 A. Correct.

25 Q. Now, in your opinion, does the mixer 2 and local

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oscillator, LO, shown in the Thomson reference satisfy the frequency conversion circuit element of Claim 1?

A. Yes.

Q. Does that -- does that mixer 2 receive an input RF signal?

A. Yes.

Q. And does that mixer, in combination with the local oscillator, convert the input RF signal to an intermediate frequency signal having an intermediate frequency?

A. Yes.

Q. And does the input RF signal received by that mixer 2 encode information in one of a plurality of television signal formats?

A. Yes.

Q. Now, I'd like to have you turn to Claim No. 3 of the '792 patent on Column 11. Are you there?

A. Yes.

Q. Okay. Now, it says in Claim 3: The television receiver of Claim 1 wherein the television -- television receiver is formed as a monolithic integrated circuit.

Correct?

A. Correct.

Q. Is it your opinion, Dr. Holberg, that the Thomson

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2 reference could be -- let me strike that.

3 Is it your opinion that the television receiver  
4 of Claim 1, as disclosed in the Thomson reference, could  
5 be formed as a monolithic integrated circuit?

6 A. Yes.

7 Q. And that circuit, that television receiver would  
8 only need to include the mixer 2 and the local  
9 oscillator 3 to -- for purposes of the frequency  
10 conversion circuit. Is that right?

11 A. Correct.

12 Q. The SAW filter is not necessary, in your opinion,  
13 to satisfy the frequency conversion circuit of Claim 1 of  
14 the '792 patent. Correct?

15 A. Correct.

16 Q. And whether or not the SAW filter could be formed  
17 on a monolithic integrated circuit is really irrelevant to  
18 your opinion that Claim 3 is unpatentable in light of  
19 Thomson. True?

20 A. Correct.

21 (Discussion off the written record.)

22 Q. (BY MR. AYERS) Now, I'd like to turn to the  
23 Harris reference, which is Exhibit 1005. Do you have  
24 that?

25 A. Okay.

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2 Q. Do you recall yesterday you were asked some  
3 questions about the digital decimation filter that's  
4 described in Harris?

5 A. Yes, I do recall that.

6 Q. And in particular you were asked some questions  
7 about its programmability. Do you recall that?

8 A. I do.

9 Q. Now, does the Harris reference describe that the  
10 digital decimation filter can be --

11 (Telephone interruption.)

12 Q. (BY MR. AYERS) Okay. I'll rephrase that.

13 Does the Harris reference describe the digital  
14 decimation filter can be refigured via a standard  
15 microprocessor interface?

16 A. Yes, it does.

17 Q. And where do you -- where do you see that?

18 A. On Page 5, Column 2, first -- end of the first  
19 full paragraph.

20 Q. And what does it say there?

21 A. [READING]: As with the NCOM and the DD -- as  
22 with the NCOM, the DDF can be rapidly refigured via a  
23 standard microprocessor interface.

24 Q. And what would a person of ordinary skill in the  
25 art at the time of the '585 patent understand that to

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mean?

A. And the '585 patent date is?

Q. September of 2001 for purposes of this discussion.

A. That would be micro- -- microcontroller similar to what I produced at Cygnal. Or Cygnal produced.

Q. So is it your understanding that the Harris reference teaches a person of ordinary skill in the art that these products could and would be used in combination with the standard microprocessor?

A. Yes. I'll correct what I said. That's an 8-bit controller you might -- I don't recall exactly if Harris was -- had a 16-bit controller interface. But, nevertheless, a standard microprocessor available during that period of time, yes.

Q. Okay. And did you rely in part on that standard microprocessor as part of the structure that you relied on in forming your opinions in this case?

A. Yes.

Q. And that would be part of the adaptive filter, as you've described it in your declaration?

A. Correct.

Q. If I could have you turn to the '466 patent, which I believe is exhibit --

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A. I think I have it here.

Q. It's the one -- probably 1001 in the 881 case.

A. Yeah.

Q. Okay. Could I have you turn to Claim 20 in this case. And do you recall you were asked some questions about this first transmission spectrum limitation?

A. Yes.

Q. And I think the suggestion was that that first transmission spectrum must include the entire television frequency domain. Do you recall that?

A. I recall that.

Q. And is that consistent with your understanding of the broadest reasonable construction of that term?

A. No. My understanding, that it could be just -- it just has to be a first transmission spectrum.

Q. So it could be a subset of that entire television spectrum?

A. It could be.

Q. Okay. And it was that understanding that you used in formulating your opinions in that case?

A. Correct.

Q. Okay. You were also asked some questions today about the biassing of certain transistors. Do you recall that?

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2 A. I do.

3 Q. And you were asked to draw some circuits and sort  
4 of annotate some of the prior art references that you  
5 relied on. Do you recall that?

6 A. I do.

7 Q. And I think the implication was made that the  
8 combinations that you were making were somehow inoperative  
9 because those transistors would be improperly biased. Is  
10 that true?

11 A. That's correct.

12 Q. Now, in your opinion, would a person of ordinary  
13 skill in the art be able to make the combinations that you  
14 suggested in your declaration in an operative  
15 configuration?

16 A. Yes.

17 Q. And would that, in your opinion, require any  
18 level of undue experimentation in order to get those  
19 configurations to work properly?

20 A. No.

21 Q. And what would a person of ordinary skill in the  
22 art for the '466 simply have to do in order to get those  
23 transistors to operate correctly?

24 A. Well, in the case of the buffer, you'd just have  
25 to bias it differently.

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2 Q. And would that be well within the skill of a  
3 person of ordinary skill in the art at the time?

4 A. Yes.

5 Q. You were also asked whether you had any  
6 additional opinions in this case. Do you recall that?

7 A. Yes.

8 Q. Now, you're aware that after you rendered your  
9 opinions in this case that the board issued institution  
10 decisions. Correct?

11 A. I am aware of that.

12 Q. And in the course of those opinions provided some  
13 claim constructions of various terms. Do you recall that?

14 A. I do.

15 Q. And is it -- do you still stand by your opinions,  
16 even in light of those opinion -- those constructions of  
17 the Court?

18 A. Yes.

19 Q. Okay. And in particular, the board construed the  
20 term "signal processor." Do you recall that?

21 A. I do.

22 Q. And do you stand by your opinion that Thomson  
23 anticipates certain claims even in light of the board's  
24 construction of "signal processor"?

25 A. I do.

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2 Q. And is that because even though you didn't  
3 require the term "signal processor" to be limited to a  
4 digital signal processor, that the element itself requires  
5 that signal processor to perform digital processing?

6 A. Yes.

7 Q. And, likewise, you rendered certain opinions that  
8 certain claims were obvious in light of the combination of  
9 Thomson and Harris. True?

10 A. True.

11 Q. And you used the particular digital signal  
12 processor described in Harris for making that combination.  
13 Do you recall?

14 A. I do.

15 Q. And do you stand by your opinion that those  
16 claims, which you said were obvious in light of the  
17 combination of -- of Thomson and Harris under a means-plus  
18 function analysis, are nonetheless obvious in light of the  
19 board's construction of "signal processor"?

20 A. That was a lot.

21 Q. Sorry.

22 A. Yeah.

23 Q. Let me just back up.

24 Is it still your opinion that the claims, which  
25 you said were obvious in the '585 and '792, in light of

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2 the combination of Thomson and Harris under a means-plus  
3 function analysis, are likewise obvious in light of the  
4 board's construction of "signal processor"?

5 MR. FLEMING: I do object as beyond what was  
6 the means-plus function being used there. I object to  
7 that question.

8 MR. AYERS: Okay.

9 A. My understanding of a means-plus function  
10 requires that I can identify the structure in the spec. I  
11 don't think I'm able to do that.

12 Q. (BY MR. AYERS) But you stand by your opinion  
13 that those claims, which you said were obvious in light of  
14 that combination, are, nonetheless, obvious in light of  
15 the board's construction?

16 A. Of a dig- -- absolutely, yeah.

17 Q. Okay. That's all I was trying to establish.

18 MR. AYERS: Let me just check my notes here.  
19 I think that's all the questions I have,  
20 Dr. Holberg. Thank you very much.

21 I pass the witness.

22 (Break.)

23 EXAMINATION

24 BY MR. FLEMING:

25 Q. If I could turn to Exhibit 1014, and going back

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2 to -- I mean, 1045. And we went to Page 10.

3 A. Uh-huh.

4 Q. Did you actually invent this circuit?

5 A. The A/D converter, I did.

6 Q. Was this part of a patent?

7 A. I believe this was, yeah. We filed a patent on  
8 the whole thing.

9 Q. And who were the inventors named?

10 A. A whole bunch of people.

11 Q. Were you one of the named inventors?

12 A. I believe I was, yes.

13 Q. And do you happen to have that patent number? Is  
14 it one of the patents that you provided?

15 A. I'm trying to remember if it was ever granted. I  
16 know...

17 (Witness reviews document.)

18 A. I don't know -- I don't know that it was ever  
19 granted. It may still be a pending application, because  
20 it's huge.

21 Q. (BY MR. FLEMING) So was there -- it should have  
22 been a published application, then.

23 A. Yeah. I think we did publish it, yeah. Not  
24 immediately, I don't think. I think, as I recall --

25 Q. So it's not listed on your résumé?

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2 A. Well, I don't list pending applications.

3 Q. I thought I had one on there, but I may have been  
4 mistaken.

5 A. I think -- you may have downloaded one.

6 Q. That must have been provided by your counsel. So  
7 that wasn't the one that was provided by counsel. That  
8 was the pending application?

9 MR. AYERS: (Hands document to witness.)

10 A. Yeah, this is it.

11 Q. (BY MR. FLEMING) What exhibit is that?

12 A. 2030.

13 Q. 2030.

14 Can you tell me what the publication number is  
15 that's listed there?

16 A. 2006/0212679.

17 Q. And you're the last person listed on the -- as  
18 the inventor?

19 A. That is correct.

20 Q. So when you go to Column 1, and it's paragraph  
21 labeled 0002, can you read that for me?

22 A. [READING]: The invention pertains in general to  
23 configurable integrated circuits (ICs) and more  
24 particularly to ICs which are board processors, ADCs and  
25 DACs.

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Q. So this is directed to integration of mixed analog devices and digital devices?

A. Yes.

Q. It doesn't mention television?

A. No.

Q. It doesn't mention RF?

A. No.

Q. Does anything in here have a mention of RF?

A. No, I don't think so.

Q. Or television?

A. Or television.

Q. Okay. And the figure that's shown on Page 10 of 1045, does that correspond to a figure in the publication of the application, patent application?

A. On which page?

Q. I don't know. I'm asking you. Sorry. I thought there was -- would be something corresponding to it.

I'm trying to say at Page 10 of the Exhibit 1045, that figure, is there a corresponding drawing that's shown in the patent application publication?

A. Yeah. So help me understand "corresponding." Does every element have to be in the other one, perfect one to one?

Q. Most representative, I would say.

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2 A. Yeah, it is. I believe it's most representative.

3 Q. Of which figure?

4 A. I'm trying to figure out what the difference was  
5 between Figure 9 -- or Figure 1.1 and Figure 1.2.

6 Oh, it's probably the number of pins. Yeah,  
7 yeah. Okay.

8 So we need -- it would have to be -- the most  
9 representative would be the figure on Page 9. The  
10 difference in those figures is we had different pinouts  
11 for the different variations. It was all the same die,  
12 but you could choose a smaller footprint on fewer pins.  
13 And so on the patent, we show from Port 0 all the way  
14 through Port 3 as shown in that figure on Page 9.

15 Q. And what was the figure number listed on Page 9?

16 A. Oh, it's Figure 1.1.

17 Q. So Figure 1.1 corresponds to what figure in the  
18 patent application?

19 A. Well, it's at least the picture on the face page.  
20 I'm trying to find out where that is, though.

21 Q. We can go with that. So it's the one on the  
22 front?

23 A. Yeah.

24 Q. And that also is representative of 1.2 that's on  
25 Page 10?

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2 A. No, 1.1.

3 Q. How about 1.2?

4 A. No, because I said that it was a different number  
5 of pins. In the patent, we --

6 Q. I got you.

7 A. -- did the full port.

8 Q. So the only difference to determine is just the  
9 number of ports?

10 A. Just the number of ports.

11 Q. Okay. I understand now. Does the figure on  
12 Page 10 of Exhibit 1045 process RF signals?

13 A. It runs at 24 megahertz, and the A-to-D converter  
14 works at 100 -- 100 kilosamples per second, which is like  
15 100 kilohertz. And under the board's construction, I  
16 think that's an RF signal.

17 Q. Would it be an RF signal that you would find in  
18 television signals?

19 A. Yes. If you -- if the correct -- the particular  
20 IF that might exist. If you down-sample --

21 Q. And you would use this in a television receiver?

22 A. I didn't say that I would. I just answered the  
23 question it's possible.

24 Q. But you -- it's not something you would use in a  
25 television receiver?

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2 A. I don't -- you know, it's hard for me to answer  
3 that question. If this is all I had, I would. But, you  
4 know, probably not.

5 Q. Thank you.

6 Turning to what you were asked about as far as  
7 the IPR 809, Claim 1 in Patent '792 requires a television  
8 receiver. Is that not correct?

9 (Witness reviews document.)

10 A. Yes.

11 Q. (BY MR. FLEMING) And the --

12 A. Well, assuming the preamble is limiting, which is  
13 a -- you know, outside of my pay grade.

14 Q. Okay. And then it is to integrate the  
15 television's receiver on a monolithic integrated circuit?

16 A. Yes. So I guess it would be part of the  
17 preamble, yeah.

18 Q. So to integrate, to meet that claim, you would  
19 have to have integration of putting both the tuner and the  
20 channel filter onto a chip?

21 MR. AYERS: Objection; form.

22 A. I think that -- my read is that the television  
23 signal is at the input -- at the input of the mixer 2. It  
24 is a television signal.

25 Q. (BY MR. FLEMING) So would that be where you

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would plug in a cable from the cable service to cause you to be able to see the TV?

A. No.

Q. So it has -- then the receiver has to require a tuner to download that RF signal that's being transmitted over the airwaves or through the cable to an IF?

MR. AYERS: Objection; form.

Q. (BY MR. FLEMING) Intermediate frequency?

MR. AYERS: Objection; form.

A. Well, I think that if...

(Witness reviews document.)

Q. (BY MR. FLEMING) So if you went on the street and asked a person on the street, says, "I want a television with a television tuner -- a television receiver in there," they would expect to be able to plug a cable to that port and turn the TV on and see a picture and hear sound?

A. They would.

Q. So Claim 3 is asking to have a television receiver being on one chip?

MR. AYERS: Objection; form.

(Witness reviews document.)

A. Well, my construction was based upon receiving television signals at the input of mixer 2.

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Q. (BY MR. FLEMING) So the term "television receiver" has a different meaning, you think --

MR. AYERS: Objection; form.

Q. (BY MR. FLEMING) -- than the common meaning that we just talked about where the man on the street would expect to be able to plug in the cable to and receive?

A. I -- I suppose that you'd have to use the common and ordinary meaning.

Q. Yes. So it would have to include the complete tuner?

MR. AYERS: Objection; form.

A. Yes.

Q. (BY MR. FLEMING) Thank you.

One last -- one last set of questions and then we'll be done. Turning to the Harris Exhibit 1005.

A. Yeah.

Q. You -- you were asked about what the last sentence on Page 5 meant.

A. Page 5 or column?

Q. Yeah, Page 5, column --

A. Oh, oh, oh.

Q. It's in the second column, first full paragraph, last sentence. I believe you were questioned about that.

A. The "DDF rapidly reconfigured" sentence?

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Q. Yes.

A. Okay.

Q. Earlier I showed you the data sheet for that part.

A. Right.

Q. And earlier you had testified that that data sheet really didn't show the ability to be able to operate, while it's filtering, to upload those coefficients?

A. That is correct. If it's filtering the coefficients, it can't be loaded simultaneously.

Q. So -- so this sentence could mean that it's just rapidly able to update those coefficients when it's offline?

A. It could mean that, yes.

Q. Okay.

MR. FLEMING: Thank you so much,  
Dr. Holberg.

MR. AYERS: I have no further questions.

(THE DEPOSITION CONCLUDED AT 3:46 P.M.)

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## CORRECTION PAGE

WITNESS NAME: DOUGLAS R. HOLBERG, Ph.D. DATE: 12/18/2014

| PAGE | LINE | CHANGE | REASON |
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SIGNATURE PAGE

I, DOUGLAS R. HOLBERG, Ph.D., have read the foregoing deposition and hereby affix my signature that same is true and correct, except as noted on the correction page.

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DOUGLAS R. HOLBERG, Ph.D.

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

|                       |   |                |
|-----------------------|---|----------------|
| SILICON LABORATORIES, | § |                |
| INC.,                 | § |                |
|                       | § |                |
| Petitioner,           | § |                |
|                       | § | IPR 2014-00881 |
|                       | § | IPR 2014-00728 |
| VS.                   | § | IPR 2014-00809 |
|                       | § |                |
|                       | § |                |
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| CORPORATION,          | § |                |
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| Patent Owner.         | § |                |

REPORTER'S CERTIFICATION  
DEPOSITION OF DOUGLAS R. HOLBERG, Ph.D.  
TAKEN DECEMBER 18, 2014

I, Tamara Chapman, Certified Shorthand Reporter in  
and for the State of Texas, hereby certify to the  
following:

That the witness, DOUGLAS R. HOLBERG, Ph.D., was duly  
sworn by the officer and that the transcript of the oral  
deposition is a true record of the testimony given by the  
witness;

That the original deposition was delivered to  
Mr. Peter Ayers;

That a copy of this certificate was served on all  
parties and/or the witness shown herein on

1 12/31/2014.

2 I further certify that I am neither counsel for,  
3 related to, nor employed by any of the parties in the  
4 action in which this proceeding was taken, and further  
5 that I am not financially or otherwise interested in the  
6 outcome of the action.

7 Certified to by me this 19th day of December, 2014.  
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