

EXHIBIT 1040

1 UNITED STATES OF AMERICA
 2 BEFORE THE
 3 INTERNATIONAL TRADE COMMISSION
 4

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6 IN THE MATTER OF: : Investigation Number
 7 CERTAIN TELEVISION SETS, : 337-TA-910
 8 TELEVISION RECEIVERS, :
 9 TELEVISION TUNERS, :
 10 AND COMPONENTS THEREOF :
 11 - - - - - x

12

13 HEARING, VOLUME 5

14

15 Friday, December 5, 2014
 16 Courtroom C
 17 U.S. International Trade
 18 Commission
 19 500 E Street SW
 20 Washington, DC
 21

22 The hearing commenced, pursuant to notice of the Judge, at
 23 9:30 a.m., before the Honorable Sandra (Dee) Lord,
 24 Administrative Law Judge for the United States
 25 International Trade Commission.

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1 statement true and correct?

2 A Yes, it is.

3 Q Does it contain the answers to the questions
4 that were asked of you by counsel?

5 A Yes, it does.

6 MR. PORTERA: Your Honor, at this time
7 Complainants would tender Dr. Caloyannides as an expert in
8 RF receiver design, and we would offer his witness
9 statement, CX-1981C, for admission into evidence.

10 JUDGE LORD: Any objection?

11 MR. ERICKSON: No objection, your Honor.

12 JUDGE LORD: All right. Then the testimony of
13 Dr. Caloyannides will be accepted as that of an expert in
14 RF receiver design, and his witness statement, Exhibit
15 1981C, will be admitted into evidence.

16 MR. PORTERA: I have no further questions at
17 this time.

18 JUDGE LORD: Thank you.

19 MR. ERICKSON: Good morning, your Honor, Brian
20 Erickson representing Silicon Labs and Samsung Respondents.

21 JUDGE LORD: Good morning.

22 MR. ERICKSON: My cross-examination should be
23 entirely on the public record. Like many of the witness
24 statements in this case, the statements themselves contain
25 CBI, and so the entire document is marked CBI. We had the

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1 situation earlier in the hearing where a CBI document was
2 put on the screen but they were just discussing public
3 prior art. So we'll probably have that situation again
4 today.

5 But all of the questions will be directed to
6 information in the public record.

7 JUDGE LORD: All right. Any objection to
8 remaining on the public record at this time?

9 MR. PORTERA: Not at this time, your Honor.

10 JUDGE LORD: All right. Just let me know if you
11 have any concern at any point.

12 MR. PORTERA: Thank you. I will.

13 CROSS-EXAMINATION

14 BY MR. ERICKSON:

15 Q Good morning, Dr. Caloyannides.

16 A Good morning, sir.

17 Q A binder is being brought to you or should be --
18 okay. A binder should be next to you that contains a copy
19 of your witness statement, your deposition transcript and
20 some exhibits that we'll be examining together. Can you
21 open that up, please, and turn to what's been tabbed RX-30.

22 A Yes, sir.

23 Q RX-30 is the prior art reference that has been
24 referred to as VDP in this investigation; correct?

25 A That is correct.

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1 Q And if you could turn to figure 5 of VDP.

2 A Yes.

3 Q And the embodiment shown in figure 5 of VDP, the

4 input signal is SRF, which is shown in the upper left-hand

5 corner; correct?

6 A That is correct.

7 Q And VDP discloses that SRF is a television

8 signal; correct?

9 A I believe so. I don't remember the exact place

10 where that's disclosed, but I believe so, yes.

11 Q And VDP discloses that SRF is a radio frequency

12 signal; correct?

13 A That is correct.

14 Q Now, in figure 5 of VDP, SRF is input to the

15 tuner marked TUN and is output as an intermediate frequency

16 signal Sif; correct?

17 A That is correct.

18 Q And Sif is input to antialiasing filter AAF;

19 correct?

20 A That's correct.

21 Q And then the filtered Sif signal is digitized by

22 the analog-to-digital converter ADC; correct?

23 A That is correct.

24 Q And the output of the ADC in figure 5 of VDP is

25 the digital representation of the intermediate frequency

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1 signal; correct?

2 A That is correct.

3 Q I'd like you to turn your attention to your --
4 we'll come back to VDP in a moment. But in your witness
5 statement, CX-1981C at page 202, question 877 -- and it
6 will come up on the screen as well if that's easier for
7 you.

8 A I would prefer to see it in context here. Where
9 would I look for it?

10 Q Sure. It's the tab 1981C. It's your rebuttal
11 witness statement. It's page 202, and it's question 877.

12 A I don't see a tab 1981C here.

13 Q My apologies. The tab for this particular
14 exhibit may be labeled "witness statement" at the very
15 front.

16 A Okay. And what question was that, I'm sorry?

17 Q That's fine. If you'll look down to the fourth
18 paragraph of your answer to question 877.

19 A Yes.

20 Q And starting in the second sentence, your answer
21 states, "McNair identifies FIL as the claimed signal
22 processor, but the filters in FIL do not process the
23 digital representation of the intermediate frequency signal
24 (Sif); FIL processes the signal produced by AFRC (Sin)."

25 Then you cite figure 5, column 3, line 15, and

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1 the following sentence reads, "Thus, the filters in FIL are
2 not applied to the digital representation of the
3 intermediate frequency signal."

4 Is that your testimony?

5 A Yes. However, to put it in perspective, in
6 context, the primary consideration here is whether or not
7 the demodulator, which is the synchronous demodulator SDM
8 that is referenced on that same paragraph you just read, is
9 not preceded by format-specific block diagrams or
10 functions. That was the main concern.

11 Now, while addressing that concern, I tried to
12 find any other differences that I could identify,
13 regardless of their relative importance.

14 The one that you pointed out is one that I would
15 not consider anywhere near as important as the fact that
16 SDM, the synchronized demodulator, is not preceded by
17 format-specific processing as required in the asserted
18 patents.

19 Q Well, let's go back to figure 5 of VDP. Now,
20 you agree that because of the down conversion by AFRC, the
21 digital Sin output by AFRC is no longer the digital
22 representation of the IF signal; correct?

23 A Not entirely. I'm not a claim construction
24 person, neither do I offer any opinions that depend on
25 claim construction.

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1 The extent to which the signal is or is not
2 changed by AFRC is something which is something for a claim
3 construction expert to opine on.

4 So in answer to your question, I do not agree
5 with what you're saying.

6 Q Okay. Well, you recall when I asked you that
7 question at your deposition; correct?

8 A If you can point me to where you asked the
9 question.

10 Q Can we play deposition RX-1701 at page 198,
11 lines 7 to 14, please.

12 MR. PORTERA: Objection, your Honor. If this is
13 being offered for proposed impeachment, I believe we're
14 entitled to look at what he's going to play before he plays
15 it so that we can make an objection if we believe one is
16 appropriate.

17 JUDGE LORD: What would be the objection?

18 MR. PORTERA: That it's not arguably
19 inconsistent with his testimony.

20 JUDGE LORD: No. The witness has said if you
21 can show me my testimony, I'll tell you whether I can
22 answer your question. So this is to refresh the witness's
23 recollection, not impeachment.

24 MR. PORTERA: Very well, your Honor.

25 (From Video.)

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1 Q So what's the difference between Sin and the
2 digital representation of Sif as output by the ADC?

3 A The additional down conversion involved with the
4 AFRC. That changes things.

5 Q So because of that down conversion, it's no
6 longer the digital representation of the IF?

7 A That's correct.

8 (Video Stopped.)

9 BY MR. ERICKSON:

10 Q So, Dr. Caloyannides, you agree that because of
11 the down conversion by AFRC, the signal Sin output by AFRC
12 is no longer the digital representation of the IF signal;
13 correct?

14 A Well, again, that is a matter of claim
15 construction. It is not precisely the same signal. It is
16 a version of it.

17 So whether it's the exact same signal or not,
18 that's a matter of claim construction on which I have no
19 opinion.

20 Q The digital representation of the IF signal
21 output by the ADC is input to filter DF 1 and the output of
22 DF 1 is a variant of the digital representation of the IF;
23 correct?

24 A I'm sorry, you said the output of DF 1 is what?

25 Q Is a variant of the digital representation of

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1 the IF; correct?

2 A Depends how you define variant, but it is based
3 on the input.

4 Q Well, when I asked you this question at your
5 deposition, you described it as the variant of the digital
6 representation of the IF; correct?

7 A Well, that may be. But the term "variant" has a
8 lot of latitude. It is based on the input signal, and it
9 is not the same as the input signal. I'm not a
10 semanticist. It's a variant. It's related to.

11 Q It's related to, but not the same as input to DF
12 1; correct?

13 A Well, it's not identical and the same.
14 Otherwise, it would have been a wire instead of having a
15 box called DF 1.

16 Q It's not literally the same signal as applied --
17 strike that.

18 The output of DF 1 is not literally the same
19 signal as applied to the input of DF 1; correct?

20 A It is not an identical signal. It is based on
21 it.

22 Q So there's some difference between the signal
23 output from DF 1 and the signal input to DF 1; correct?

24 A There is a difference, which may be substantive
25 or may be cosmetic only.

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1 Q The output of the sample rate reducer SRD1 is
2 not literally the same as the input to the sample rate
3 reducer SRD1; correct?

4 A Well, again, the same comment as I made before.
5 It is not identical. Otherwise, it would have been a wire
6 rather than a functional box. But the output is obviously
7 related one to one to the input.

8 Q Now, the output of tuner Sif is not literally
9 the same as the input to the tuner SRF; correct?

10 A The output Sif is not literally the same as SRF.
11 SRF is the radio frequency input. Sif is an intermediate
12 frequency signal.

13 Q But there's a one-to-one correspondence between
14 those signals; correct?

15 A There is a correspondence between them. But as
16 I indicated in answer to your previous question, one is a
17 radio frequency and the other one is a downconverted
18 version, which is an intermediate frequency.

19 Q And the only thing -- the only difference
20 between those signals is the frequency version; correct?

21 A That was the intended main difference. There
22 may be other artifacts introduced by the tuner, but that is
23 the intended difference.

24 Q Now, VDP teaches that the filters labeled DF in
25 figure 5 could be implemented as finite impulse response

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1 filters; correct?

2 A I believe so. I have not memorized the VDP, but
3 I believe so.

4 Q And VDP discloses a modified embodiment where
5 the ADC is moved behind AFRC; correct?

6 A I do not recall. If you point me to VDP and
7 I'll see it in context then be able to answer you.

8 Q Why don't you point to VDP at column 9, lines 13
9 to 16.

10 A Where would I find that?

11 Q I'm sorry. It's in your binder marked RX-30.

12 A Yes.

13 Q So VDP discloses a modified embodiment where the
14 ADC is moved behind AFRC?

15 A Can you point me to where VDP does this?

16 Q Column 9, line 13 to 16. It's also on the
17 screen if you want to reference it there.

18 A Yes, it does disclose that.

19 Q Now, in that modified embodiment where the ADC
20 is moved behind AFRC, the ADC is going to output a digital
21 representation of the signal Sin; correct?

22 A I'm sorry, could you repeat the question?

23 Q In the modified embodiment where the ADC is
24 moved behind AFRC, the ADC is going to output a digital
25 representation of the Sin signal; correct?

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1 A Well, I wouldn't use exactly those words. If
2 the analog-to-digital converter is moved after the AFRC,
3 then the signal that comes out of the A-to-D converter will
4 be essentially a digitized version of the intermediate
5 frequency generated by the tuner.

6 Q Let's move on to the '585 patent. If I could
7 have JX-1, please, at claim 16.

8 A I'm sorry, where do I look for it here, JX-1?

9 Q Yes, it would be tab JX-1 in your binder. It's
10 the '585 patent.

11 A Yes.

12 Q If you could turn to claim 16, please.

13 A You said claim 16; right?

14 Q Yes.

15 A Yes.

16 Q Now, claim 16 of the '585 patent claims that the
17 input RF signals are from "one of terrestrial broadcast,
18 from satelllite broadcast, and from cable transmission."

19 Correct?

20 A That is correct.

21 Q Now, if we could show figure 2 of the '585
22 patent, please.

23 The '585 patent in figure 2 does not illustrate
24 any different circuitry for receiving terrestrial as
25 compared to satelllite input RF signals; correct?

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1 A Well, figure 2 is a very top-level, generic
2 functional block diagram which does not go to the level of
3 detail that would have required it to make the distinctions
4 that you just articulated.

5 Q In fact, nothing in the text of the '585 patent
6 makes that distinction either, does it?

7 A Well, again, at the top level that figure 2 is
8 intended to present things, the functional elements -- and
9 I emphasize functional, as opposed to detailed schematics
10 or block functions -- are fundamentally the same.

11 But issues such as bandwidth and filtering and
12 ancillary-related functions are not expected to be at that
13 level. So to that extent, I'm not surprised that there is
14 no distinction made for different kinds of inputs at that
15 level.

16 Q And there's no distinction made in the text of
17 the '585 patent between receiving satellite signals or
18 terrestrial signals; correct?

19 A Well, as I indicated already, the text and the
20 figure 2 match or jive together. And at that level, there
21 is no distinction made or expected at that top level.

22 Q Okay. Could I have RDX-0054, please.

23 Now, Dr. Caloyannides, I'd like to start on the
24 right of this figure. And you see there's a TV with a
25 graphic there receiving an input from a hybrid cable

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1 system. Is that a fair description?

2 A Let me see. That may be the first time I'm
3 seeing this, this particular graphic here. Let me take a
4 minute to absorb what it says here.

5 Q Certainly.

6 A Well, there's a lot of information here which in
7 the absence of any verbiage to explain what the various
8 functional elements do or don't do, you know, one is -- I
9 would only be speculating as to what is or is not included
10 here.

11 Q Okay. Well, you're aware that when you receive
12 the -- I'm sorry, strike that.

13 When a person receives an input RF signal over a
14 cable network, sometimes that cable network has previously
15 done conversions to that signal; correct?

16 A Well, it all depends on the cable network. I
17 suppose there may well exist cable networks which have
18 received some of their signals through conversions from
19 whichever other original sources.

20 Q And some cable networks are in part fiber-optic
21 networks; correct?

22 A Some cable networks are indeed fiber-optic
23 networks.

24 Q So in the example shown in RDX-0054, the RF
25 signal received at the TV was -- before it was an RF

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1 signal, it was transmitted over the fiber-optic connection
2 between the fiber nodes; correct?

3 A I'm not quite sure I agree with you to say
4 before it was an RF signal. The only place I see an RF
5 signal here is between the antenna shown on the left and
6 whatever it's pointed to.

7 Q Okay. So the transmission over the -- between
8 the fiber nodes, that would be an RF signal; correct?

9 A That is not necessarily correct at all.

10 Q Okay. When you referred to the antenna, what
11 were you referring to?

12 A I'm referring to the presumably parabolic
13 Cassegrain dish shown on the top on the left which is
14 pointed towards the sky, and that is definitely receiving
15 an RF signal.

16 Let me interject a comment if I may here which
17 may clarify and eliminate a lot of the discussion on that
18 topic.

19 RF refers to radio frequency. It has multiple
20 meanings, like many words in the English language, has
21 multiple meanings depending on the context.

22 And if one takes context -- the meaning in one
23 context and puts it in a different context, then what
24 results is confusion and errors.

25 Every frequency, electromagnetic signal, is RF.

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1 60 hertz, a mere 60 cycles per second, which is feeding the
2 light bulbs above our heads in the fluorescent lights, is
3 RF, in fact.

4 You say how could you call that signal RF?
5 Because, as an example, when you go to your medical doctor
6 to get electrocardiogram, they filter out 60 hertz from out
7 of the signal collected by the EKG machine precisely
8 because it receives 60 hertz RF.

9 Now, 60 hertz was never intended to be RF, but
10 from basic physics, it has no choice but to be RF.

11 So the frequency in and by itself does not
12 determine whether something is or is not RF. What
13 determines if it's RF or not is the channel through which
14 it's coming through.

15 And in this case, I call RF, not only me, but
16 every person that I know of who is knowledgeable in the
17 art, the communications path between the transmitting end,
18 by radio, and the receiving end, by radio receiver.

19 From that point on, once the radio receiver
20 picks up that signal, it ceases being RF and becomes
21 whatever else is internal to the receiver. Hopefully this
22 clarifies the issue so we don't play games with the words
23 here.

24 Q Okay. So in the example in RDX-0054, as you
25 said, the only input RF signal is the input RF signal

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1 received by the antenna on the left of the diagram;

2 correct?

3 A That is correct. Now, it depends now what is
4 the antenna doing? If the antenna is just a cable without
5 any conversion, without any preamplifier, without anything
6 else, then the signal continues being RF.

7 But in actual practice, for valid engineering
8 reasons, which I would be delighted to detail if you want
9 me to, one puts a down converter to change the frequency of
10 the signal coming at the antenna right at the antenna.

11 Once that is done, the signal coming out of the
12 antenna in your diagram is no longer RF. Now it is IF,
13 intermediate frequency.

14 Q So the television in this example, as you
15 clarified, is not receiving an input RF signal; correct?

16 A Let me see if I can find the TV in this diagram.
17 Oh, way on the right there a TV screen. Is that the one
18 you're alluding to?

19 Q Correct.

20 A That is correct.

21 Q So if I use a Samsung TV with a Silicon Labs
22 tuner to watch Monday night football on my Time Warner
23 cable network, where the signal was originally captured by
24 a video camera at the football game, converted to IF, sent
25 up to a satellite, brought back down to a headend,

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1 converted to an IF at that point and eventually made it
2 through the cable network to my TV, my TV would not be
3 receiving an input RF signal as claimed in the asserted
4 claims; correct?

5 A For the particular connectivity that you
6 described, where the signal has been down-converted and
7 then eventually passed to the television receiver, you are
8 correct that the signal on that TV has been down-converted,
9 it would not be RF anymore.

10 Q Let's go to the Boie reference, which should be
11 in your binder marked RX-10.

12 A Yes, sir.

13 Q You recognize this as the reference -- the prior
14 art reference that is referred to as Boie in this
15 investigation; correct?

16 A That is correct.

17 Q And you're aware that the patent office has
18 instituted inter partes review on both of the patents in
19 suit; correct?

20 A I have heard something to that effect but I have
21 not focused on that at all.

22 Q Well, are you aware that the patent office
23 refers to Boie as Thompson because it's assigned to
24 Thompson? Are you aware of that?

25 A No, I'm not.

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1 Q Well, we'll refer to it as Boie in this
2 examination, okay?

3 A Thank you.

4 Q Now, Boie discloses a television satellite
5 receiver; correct?

6 A No. Boie discloses the back end of a satellite
7 receiver that starts at the IF as shown on the top left of
8 the figure which is not on the screen there.

9 But on Boie's figure 1, which you may want to
10 put on the screen, it shows explicitly that the signal
11 coming into the Boie receiver is an IF, which has been
12 presumably down-converted from something which is not
13 showing in the Boie receiver.

14 Q The input at IF SAT in figure 1, that is a
15 television input signal; correct?

16 A Well, the term "TV input signal," it is an input
17 signal at IF to the receiver shown in that figure, which
18 contains television content, that is correct.

19 Q And it's your testimony that because there was
20 at least one frequency conversion prior to its arrival at
21 the input IF SAT, it cannot be an input RF signal as
22 claimed in the claims; correct?

23 A That is correct.

24 Q And is it your understanding that the claims
25 should be applied in the same manner to the accused

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1 products for purposes of infringement as they are to the
2 prior art for purposes of validity?

3 MR. PORTERA: I would object to that question,
4 your Honor. He's not been proffered as an infringement
5 expert and has no opinions with respect to infringement.
6 And it's outside the scope of his direct.

7 JUDGE LORD: Counsel?

8 MR. ERICKSON: I just want to know whether the
9 witness is aware of whether the Court should apply the
10 claims in the same way to the prior art as it does to the
11 accused products.

12 MR. PORTERA: Again, your Honor, I don't think
13 that's relevant to his opinions, which only pertain to
14 validity.

15 JUDGE LORD: I'm going to permit the question.
16 Go ahead.

17 THE WITNESS: I'm sorry, could you ask the
18 question again?

19 BY MR. ERICKSON:

20 Q Are you aware that this Court will apply the
21 claims in the same way to the prior art as it does to the
22 accused products?

23 A I have no legal background and no basis on which
24 to say that.

25 Q And you've -- you've been here for most of this

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1 hearing, correct, with the exception of yesterday?

2 A No, that's not correct. I've been here for, I
3 would say, less than a fourth of all the proceedings.

4 Q Okay. And did you hear Dr. Snelgrove testify on
5 Monday regarding infringement?

6 A I attended part of his testimony, but by no
7 means all of it.

8 Q We'll move on. The 140 megahertz input at IF
9 SAT is a radio frequency signal; correct?

10 A No. As I indicated before, radio frequency is
11 what's actually transmitted over the communications
12 channel, the air in this case, and that signal entering
13 that filter in figure 1 is definitely not coming through a
14 radio channel, but it's coming through a cable and denoted
15 as such as being IF. So that is not an RF signal.

16 Q Can we play the deposition at page 164, lines 6
17 to 9, please.

18 MR. PORTERA: Your Honor, I don't think he was
19 asked to have his recollection refreshed, so I'd like to
20 look at the testimony before it's proffered for
21 impeachment.

22 JUDGE LORD: With all due respect, you were at
23 the deposition, you've already had an opportunity to look
24 at the testimony.

25 MR. PORTERA: That's true, your Honor. I don't

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1 have these particular pages and lines committed to memory.

2 JUDGE LORD: You'll see them now. If they're
3 not inconsistent, then I'll strike them.

4 MR. PORTERA: Thank you, your Honor.

5 (From Video.)

6 Q And 140 megahertz is an RF signal; correct?

7 A It's in the frequency range which is usually
8 considered RF, yes.

9 (Video Stopped.)

10 BY MR. ERICKSON:

11 Q If we could go back to figure 1 of Boie, please.
12 Boie discloses that the AGC amplifier number 5 in figure 1
13 has an internal bandpass limitation; correct?

14 A That is correct. By the way, on the item that
15 you played back, I emphasized the fact that it says it's in
16 the frequency range, which is generally considered RF.
17 That is quite different from saying this is RF. And I
18 stand by my statement which I made about five minutes
19 earlier as to what is and what is not RF.

20 Now, coming to the AGC, what is your question
21 again?

22 Q I'm saying Boie discloses that AGC that is
23 numbered 5 in figure 1 has an internal bandpass limitation;
24 correct?

25 A Yes, that is correct.

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1 Q And one of ordinary skill in the art would
2 understand that to mean there's a bandpass filter
3 immediately prior to the amplifier; correct?

4 A No, not necessarily. All that is shown here is
5 that the amplifier prior to the A to D, whose obvious
6 function is given by the dotted line feeding into it, is to
7 control the level of the signal which is being fed into the
8 A to D, so it would be within the dynamic range of the
9 A-to-D converter, has some bandpassing function embedded in
10 it in addition. It doesn't say if it's before, after or
11 during, but there is a bandpassing function associated with
12 it, that's correct.

13 Q Okay. So there's a bandpass filter before,
14 after or simultaneously with the amplifier designated AGC 5
15 in figure 1; correct?

16 A It is alluded to. Again, only with the initials
17 BP inside the bandpass filter. There's not a whole lot
18 mentioned in the specification about that.

19 Q Well, I want the record clear on this. One of
20 the ordinary skill in the art would understand that what
21 Boie discloses as the AGC 5 with an internal bandpass
22 limitation means that there is a bandpass filter between
23 the mixer 2 and the ADC 7; correct?

24 A I would not use the word "disclose." I would
25 say "hints" or "alludes," but given the fact that there is

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1 no indication in the verbiage here in the specification of
2 the patent that that is what is intended or done, the only
3 indication of that are the initials "BP" inside that
4 filter.

5 So a person of skill in the art would kind of
6 get a hint that maybe there is a bandpassing limitation.
7 However, I hasten to add that every amplifier inherently
8 has a bandpassing characteristic. There is no amplifier in
9 the world that accepts anything from 0.001 hertz all the
10 way to terahertz. They all inherently have a bandpassing
11 limitation.

12 Now, the extent of the particular bandpassing
13 implied here by the initials BP is never spelled out in the
14 Boie patent.

15 Q So the extent the bandpass is not -- excuse me.
16 I understand your testimony to mean the extent of the
17 bandpass filter is not described, but one of ordinary skill
18 would understand that there is some kind of bandpass
19 filtering being performed; correct?

20 A Well, again, every amplifier, as I just
21 indicated, automatically performs a bandpassing function,
22 because there is no amplifier which amplifies all
23 frequencies that can be possibly entered into it.

24 Q The output of the analog-to-digital converter 7
25 is the digital representation of the IF signal; correct?

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1 A That is correct.

2 Q You would agree that the internal bandpass
3 limitation of AGC 5 shown in figure 1 cleans up and removes
4 any spectral components that have no business getting
5 converted by analog-to-digital converter; correct?

6 A No.

7 MR. ERICKSON: Can we play the deposition at
8 172, page 172, lines 1 to 14, please.

9 (From Video.)

10 Q Now, the bandpass filter in 5 will reduce to
11 some degree any aliasing that may occur with the
12 analog-to-digital converter 7; correct?

13 A Well, not entirely. The bandpass filter 5 is an
14 input to the A-to-D converter 7 so it cannot do anything on
15 what the A-to-D converter does or does not do. It only
16 takes the output from the mixer 2 and cleans it up to
17 remove any spectral components which have no business
18 getting A to D converted.

19 Q So that will help reduce, somewhat, any
20 aliasing; correct?

21 A If it's properly designed, it should help reduce
22 aliasing, yes.

23 (Video Stopped.)

24 THE WITNESS: I emphasize that it says there if
25 properly designed, it should. There is no indication that

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1 it does.

2 BY MR. ERICKSON:

3 Q Let's look back at figure 1 of Boie, please.

4 Now, mixer 2 is a real mixer, correct, as opposed to a
5 complex mixer?

6 A That appears to be the case. Unless the symbol
7 as used here is for notational convenience shown to
8 incorporate -- to include the complex mixer. But it
9 appears to be a real mixer, yes.

10 Q And because mixer 2 is a real mixer, mixer 2
11 will output two images, a first image at the input
12 frequency minus the local oscillator frequency and a second
13 image at the input frequency plus the local oscillator
14 image; correct?

15 A That is correct.

16 Q Were you at the tutorial last week here?

17 A No, I was not.

18 Q Can I have Exhibit CDX-0016.0033, please.

19 I can represent to you that this was a diagram
20 used by Dr. Snelgrove in his tutorial to the Court.

21 And this illustrates what we were just talking
22 about, correct, that a real mixer will create two images at
23 its output, one at the input frequency plus the local
24 oscillator frequency and a second at the input frequency
25 minus the local oscillator frequency; correct?

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1 A That's correct.

2 Q And no filter, no matter how perfect, prior to
3 the mixer can stop those two images from being corrected;
4 correct? I think I may have misspoke so let me ask the
5 question again.

6 No filter, no matter how perfect, prior to the
7 mixer can prevent both images from being created by the
8 mixer; correct?

9 A That is correct.

10 Q All right. Let's go back to figure 1 of Boie.

11 So the SAW filter number 1 in figure 1, no
12 matter how perfect, cannot prevent mixer 2 from generating
13 two images; correct?

14 A That is correct.

15 Q Let's go to figure 2 of Boie, please.

16 A All right.

17 Q Now, figure 2 at line (c), that shows the input
18 to mixer 2, and the input is a 27-megahertz wide input
19 signal centered at approximately 140 megahertz; correct?

20 A That is correct.

21 Q And figure 2 at line (d) shows that mixer 2 is
22 using a local oscillator at 65 megahertz; correct?

23 A That's correct also.

24 Q So mixer 2 is going to output a lower image at
25 75 megahertz, which is 140 megahertz minus 65 megahertz;

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1 correct?

2 A That's right.

3 Q And that's indicated here in figure 2 by the
4 dashed line starting at the input signal on line (c) and
5 going down to the left to the image shown on line (e) at
6 approximately 75 megahertz; correct?

7 A That is correct.

8 Q And that's labeled as the input signal of the
9 DAC; correct?

10 A That's correct.

11 Q And that's -- one of ordinary skill would
12 recognize that as a typo, correct, that it should be the
13 input of the ADC?

14 A That is correct.

15 Q Now, the real mixer 2 will also output a higher
16 image at approximately 205 megahertz, which is 140
17 megahertz plus 65 megahertz; correct?

18 A That is correct.

19 Q And that's illustrated in figure 2 by the dashed
20 line starting at the 140 megahertz input signal and
21 extending off to the right and disappearing off to the
22 right before it reaches line (e); correct?

23 A That is correct.

24 Q Now, as shown on line (f) of figure 2, the
25 analog-to-digital converter is sampling at a rate of 100

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1 megahertz; correct?

2 A That is correct.

3 Q Now, I just want to talk about what will happen
4 with the lower image right now. Sampling the image that is
5 centered at 75 megahertz at a 100 megahertz sampling rate
6 is a type of subsampling known as bandpass sampling;
7 correct?

8 A Well, it's subsampling. The term "bandpass
9 sampling" is unfortunate. But it is not -- I would never
10 use it. But it's -- it is subsampling, yes.

11 Q How would you describe it? Is there a
12 particular type of subsampling you'd use to describe it?

13 A Well, it is sampled at a rate below the Nyquist
14 frequency, which is the frequency that it has to be sampled
15 at, which is twice the highest frequency component present.
16 It is a means of data reduction or essentially reducing the
17 amount of data that's going out of the A-to-D converter.

18 Q And it's my understanding there may be different
19 types of subsampling, and I just didn't know if there was a
20 terminology you would prefer to use to refer to this type
21 of subsampling.

22 A We can agree to call it subsampling.

23 Q Okay. Very good. So in the subsampling shown
24 in figure 2, there are various periodic spectra created
25 that are shown on line (f) of signal 2; correct?

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1 A That is correct. There are spectra created at
2 integer multiples and submultiples of 25 megahertz, 75 and
3 so on, yes.

4 Q And all of those spectra indicated on line (f)
5 correspond to the lower image that was input to the ADC at
6 75 megahertz; correct?

7 A That is correct.

8 Q Line (f) does not show any periodic spectra
9 corresponding to the higher frequency -- I'm sorry, the
10 higher image at approximately 205 megahertz; correct?

11 A No, line (f) does not show such things. It
12 doesn't mean they are not there. It just doesn't show
13 them.

14 Q Well, if the ADC generated periodic spectra
15 corresponding to the higher image, there would be aliasing
16 problems; correct?

17 A There would be aliasing problems, that's
18 correct.

19 Q So to avoid aliasing problems, something has to
20 get rid of the higher image at 205 megahertz; correct?

21 A That is correct.

22 Q Let's go back to figure 1, please. The only
23 thing shown in figure 1 between the output of mixer 2 and
24 the input of ADC 7 is the AGC 5 with the internal bandpass
25 limitation; correct?

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1 A That is all that is shown, that is correct.

2 Q So that's the only structure shown here that one
3 of ordinary skill in the art would understand could
4 possibly be responsible for getting rid of that upper image
5 at 205 megahertz; correct?

6 A Well, now, when you're saying "could possibly
7 be," you're asking me to give the benefit of the doubt to
8 the person who drew the figure or who designed the figure.

9 All I can go by is by what is shown here and
10 what is not shown. And there's nothing shown here or
11 detailed in the specification that says we are implementing
12 an antialiasing function with filter such-and-such.
13 Nothing like that stated.

14 Q Could we have column 3, lines 9 to 11 of Boie,
15 please.

16 Column 3, lines 9 to 11 read, "the A-to-D
17 converter 7 is operated in the subsampling mode, but this
18 does not cause any aliasing problems because of the
19 bandlimited input signal."

20 Correct?

21 A That is what it says, yes.

22 Q And the only thing that the patent describes --
23 I'm sorry.

24 The only thing Boie describes is bandlimiting
25 the input signal between the mixer and the A-to-D converter

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1 is the internal bandpass limitation in the AGC marked 5 on
2 figure 1; correct?

3 A Well, again, you say "describes." He does not
4 describe it at all. He just casually puts the initials BP
5 on the amplifier 5, which is an amplifier again, not a
6 filter, and one is led to infer, without any specific
7 indication in the patent, that this amplifier, by the way,
8 performs some kind of unspecified bandpass function.

9 But you are correct that the only thing that is
10 shown here that could conceivably have performed that
11 function could be, not is, could be item 5.

12 Q And one of ordinary skill in the art would know
13 that; correct?

14 A With all the "could bes" and "might bes," that
15 is correct.

16 Q They would know that that's the only possibility
17 of what's described here; correct?

18 A Based on what is described, one would think that
19 that would be the only way to do it. Again -- but that
20 would give the benefit of the doubt to the patent and to
21 the diagram, neither of which state that.

22 Q Well, and let's look at column 2, line -- bring
23 up the bottom of column 2 of Boie, please. And let's go
24 down to the last three lines.

25 We see here at lines 57 to 59 it states, "the

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1 down-converted IF signal then goes into AGC amplifier 5
2 with an internal bandpass limitation before the IF signal
3 enters the input of A-to-D converter," and it continues
4 onto the next page.

5 This is -- and then in column 3 -- go ahead.

6 In column 3, you look down at line 9, and this
7 is the other passage we just looked at that said "the
8 A-to-D converter 7 is operated in the subsampling mode, but
9 this does not cause any aliasing problems because of the
10 bandlimited input signal."

11 Correct?

12 A That is what it states, yes.

13 Q So one of ordinary skill in the art would know
14 the only thing that might be bandlimiting the signal to
15 remove the upper image that would otherwise cause aliasing
16 problems is the internal bandpass limitation in the AGC 5;
17 correct?

18 A With the emphasis on "might be" as you pointed
19 out, yes. But there's no indication that is happening.
20 That is what could be happening, correct.

21 Q And it is the only structure disclosed that
22 could do that; correct?

23 A The only structure shown in this diagram that
24 could do that, and yet amazingly it is not stated to be
25 doing that in the patent or the diagram.

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1 Q Let's go back to figure 1, please.

2 The digital representation of the IF that's
3 output from ADC 7 is input to bandpass filter 8; correct?

4 A That is correct.

5 Q And you agree that one of ordinary skill would
6 understand the symbol used to illustrate bandpass filter 8
7 in figure 1 means a bandpass filter; correct?

8 A That's correct.

9 Q And one of ordinary skill would understand that
10 the diagonal arrow going across symbol 8 means the
11 parameters are adjustable; correct?

12 A That is correct.

13 Q And the bottom of the diagonal arrow across
14 symbol 8 has a line going down to the words "TV standard."
15 And that would teach a person of ordinary skill that the
16 variability of the specification of filter number 8 is TV
17 standard-dependent; correct?

18 A Well, that is a very broad statement you are
19 making. What that is teaching is that the -- that one of
20 the parameters of the filter, namely the bandwidth and
21 nothing but the bandwidth, is TV standard-dependent. And a
22 person of skill in the art would say well, why do we just
23 change the bandwidth and nothing else? That is never
24 answered.

25 If you do change the bandwidth of the filter,

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1 all you're doing is maximizing the signal-to-noise ratio
2 that goes out of that filter 8, in other words, minimize
3 external noise that would have come out of the A-to-D
4 converter, from contaminating any subsequent circuitry.

5 So it seems like a means of maximizing the
6 signal-to-noise ratio based on bandwidth considerations
7 alone, I'll agree to that.

8 Q Can we play the deposition at page 175, lines 15
9 to 19, please.

10 MR. PORTERA: Your Honor, I do have these lines
11 committed to memory, and I don't believe they're
12 inconsistent with anything he just stated. So I'd object
13 on that basis.

14 JUDGE LORD: Your objection will be noted for
15 the record.

16 (From Video.)

17 Q And then the bottom of the diagonal arrow is an
18 arrow going down to TV standard. What does that teach to
19 one of ordinary skill?

20 A That the variability in the specification of
21 filter number 8 is TV standard-dependent.

22 (Video Stopped.)

23 BY MR. ERICKSON:

24 Q It would have been obvious to a person of
25 ordinary skill in the art to use a FIR filter to implement

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1 the filter 8 in Boie; correct?

2 JUDGE LORD: Let me interrupt you there,
3 Counsel. Let's go back to the deposition testimony. How
4 is that inconsistent with Dr. Caloyannides's previous
5 testimony?

6 MR. ERICKSON: If we could put the text of the
7 answer back up, and I can read my prior question. My prior
8 question was -- can we display the question and answer,
9 please? Display the complete question and answer, please.

10 (From Video.)

11 Q And then the bottom of the diagonal arrow has an
12 arrow going down to TV standard. What does that teach to
13 one of ordinary skill?

14 (Video Stopped.)

15 MR. ERICKSON: My question was the bottom of the
16 diagonal arrow across symbol 8 has a line going down to TV
17 standard. And that would teach a person of ordinary skill
18 that the variability of the specification of filter number
19 8 is TV standard-dependent; correct?

20 And he answered in the narrative, which I
21 understand is helpful to the Court, but it was not the
22 direct admission that we got in the deposition.

23 JUDGE LORD: Right, I see. Your question
24 actually incorporates the witness's answer in his
25 deposition.

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1 MR. ERICKSON: Correct, your Honor.

2 JUDGE LORD: Thank you. I'll overrule the
3 objection.

4 BY MR. ERICKSON:

5 Q It would have been obvious to a person of
6 ordinary skill in the art to use a FIR filter to implement
7 filter 8 in Boie; correct?

8 A It's a digital filter, and there are different
9 ways of implementing digital filters, one of which is a FIR
10 filter. Whether or not it would have been obvious, that is
11 something that one can debate at length.

12 But one of the possibilities would have been a
13 FIR filter, that is correct.

14 Q You would agree that a person of ordinary skill
15 would, by default, use a FIR filter to implement filter 8
16 in Boie because a FIR filter is simpler conceptually,
17 mathematically and analytically; correct?

18 A That is correct that it would be the simpler
19 filter to implement for the reasons you stated.

20 Q And because of those reasons, a person of
21 ordinary skill would by default use a FIR filter; correct?

22 A Well, a person of ordinary skill at the time of
23 the patent would be inclined to use a FIR filter. I think
24 that's a better term, more accurate term.

25 JUDGE LORD: Counsel, let me interrupt you here

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1 for a second. I don't know whether this has been updated,
2 but as of yesterday, your cross-examination was anticipated
3 to take 40 minutes. It's gone about five or 10 minutes
4 longer. I wonder how much more you have or if you're
5 prepared to cut short any of your other examination.

6 MR. ERICKSON: I do have -- I don't know how
7 much time we have remaining, Aaron, but I do have probably
8 at least 20 more minutes.

9 JUDGE LORD: I don't know if you're prepared to
10 give up some recross so that you can complete your
11 examination now. It's up to you. But we need to adhere to
12 the timetable that we have in place.

13 MR. FOWLER: Yes, your Honor, we're prepared to
14 cede any time that Mr. Erickson uses going forward from our
15 cross-examination of Mr. Button, who is coming up.

16 JUDGE LORD: All right, very well. Then please
17 proceed.

18 BY MR. ERICKSON:

19 Q The output of filter 8 is a digital signal;
20 correct?

21 A That is correct, there is no indication to the
22 contrary. Yes.

23 Q Now, in figure 1, the output of filter 8 is
24 provided to block 9; correct?

25 A I'm sorry, I didn't hear your question.

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1 Q The output of filter 8 is provided to block 9;
2 correct?

3 A It is provided to block 9, and blocks 11, 12 and
4 13.

5 Q And block 9 is a demodulator; correct?

6 A Well, it's partial -- partial demodulator, yes.

7 Q Block 9 is part of an analog television
8 demodulator; correct?

9 A Again, filter 9 is a portion of an analog
10 demodulator. The reason I say portion is because the
11 output of a demodulator is expected to be, for example,
12 CVBS, and block 9 does not generate CVBS until it goes
13 through block 10 first.

14 Q So block 9 in combination with block 10 and the
15 sound selection filters below block 10 is an analog
16 television demodulator that generates video and audio
17 baseband signals; correct?

18 A Again, partial. I qualify this because there is
19 an input indicated going to block 10, the SRC block, coming
20 from some unspecified things as F sub-S out, going to that
21 filter.

22 So that input going to the SRC is part of the
23 demodulation process. So to that extent, it's a partial
24 demodulator, but I'll agree that it's -- has most of the
25 functional elements of an analog-only demodulator.

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1 Q And blocks 12 and 13 perform a digital TV
2 demodulation function; correct?

3 A No.

4 Q Play deposition at page 180, lines 9 to 13,
5 please.

6 (From Video.)

7 Q What are blocks 12 and 13?

8 A They are basically mixers, multipliers, to
9 generate the in-phasing quadrature components of the
10 signal, and essentially it's a digital TV demodulation
11 function.

12 (Video Stopped.)

13 THE WITNESS: Emphasize what intent was meant
14 there, it is part of a digital TV demodulation function.
15 Because a demodulator for digital does not generate I&Q.
16 So it's quite evident to any person of skill in the art
17 that an output that is I&Q is not an output of a
18 demodulator. Just as a background reference for your help.

19 BY MR. ERICKSON:

20 Q If we could display figure 1 again, please. The
21 mixers 12 and 13 has their input for the local oscillators
22 provided by the picture carrier regeneration circuitry;
23 correct?

24 A That is correct.

25 Q And so these mixers will remove the picture

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1 carrier modulation; correct?

2 A Well, when you say "remove," they are part of
3 the complex demodulation function. They don't remove
4 anything in and by themselves. They are part of a whole
5 digital demodulation function, which includes blocks 14,
6 15, plus the signal coming into the picture carrier
7 regeneration from the upper right.

8 Q Figure 1 teaches this is all part of a digital
9 QPSK demodulator; correct?

10 A Figure 1 shows -- I don't know what you mean by
11 "this," but blocks 11, 12, 13, 14 are part -- and I
12 emphasize "part" -- of a digital demodulation function for
13 digital television, that is correct.

14 Q Let's go to the '792 patent, claim 1. It's
15 marked JX-2 in your binder if you want to see it. But it
16 should come up here.

17 A Yes, please.

18 Q And I want to discuss the signal output circuit
19 limitation that's at the end of claim 1. Are you there?

20 A I'm looking at claim 1. Which element of that
21 is it?

22 Q The last element, and it reads, "a signal output
23 circuit for receiving the digital output signals from the
24 signal processor and for providing one or more output
25 signals corresponding to the digital output signals."

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1 Do you see that?

2 A I do.

3 Q Now, you understand that Professor McNair and
4 the Respondents contend that this limitation can be
5 satisfied by demodulators; correct?

6 A I understand that that's what they claim and I
7 emphatically disagree with it.

8 Q And let's turn to your witness statement to page
9 126, questions 532 to 538.

10 A If you want to give me a minute to read those
11 questions.

12 Q My question to you is, you don't expressly apply
13 the language proposed by the parties for the constructions
14 of this limitation to demodulators, do you?

15 A Well, for me to answer if I expressly apply the
16 language, I have to read the language. So if you give me a
17 few minutes to read it, then I'll be able to answer your
18 question.

19 Q Well, I can point you if you scroll down,
20 please, down to 535. I'm sorry, go all the way down to the
21 end, 538, please. I'm sorry, 537.

22 You state in answer to question 537, "Does your
23 opinion differ depending on which parties' claim
24 construction is applied?" And you answer "No"; correct?

25 A That is correct. But again, this is almost a

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1 content-free sentence without the context that it is
2 referring to. So that is what the words say, but the
3 context, I really need the time to read it. Would you like
4 me to read the preceding questions?

5 Q Let's look at the parties instructions directly.
6 1863, scrolling down to item 19, which is the signal output
7 circuit limitation.

8 And do you recognize line 19 of CX-1863?

9 A I do.

10 Q Okay. And if you'll notice, Cresta's proposed
11 construction in the fifth column and Silicon Labs's
12 construction in the seventh column are identical; correct?

13 A Yes, that is correct.

14 Q All right. Now, if I could have figure 2 of the
15 '585 patent displayed underneath this, please.

16 I want to walk through Cresta's proposed
17 construction of this claim with respect to demodulator 66a
18 to c where the disagreement lies, okay?

19 A All right.

20 Q So demodulator 66a as shown in figure 2 is
21 literally a circuit; correct?

22 A I'm sorry, say your question again.

23 Q You would agree that demodulator 66a is a
24 circuit; correct?

25 A Well, depends how you define a circuit. It

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1 could be implemented in software, could be implemented in
2 hardware. To the extent it's implemented in hardware,
3 hardware consists of circuits, that is correct.

4 Q One of ordinary skill would understand that the
5 disclosure of the demodulator 66a in figure 2 of the '585
6 patent would include a circuit; correct?

7 A The term "circuit" is very nebulous. All it
8 means is a wire which has a beginning and an end.

9 It will include some circuitry, and it also may
10 well include some digital -- digital functionality
11 performed by digital components.

12 Q And one of ordinary skill would understand that
13 demodulator 66a receives the digital output signals from
14 the signal processor, specifically DSP 64; correct?

15 A That is correct.

16 Q And one of ordinary skill in the art would
17 understand the demodulator 66a provides one or more output
18 signals corresponding to those digital output signals,
19 namely the video and audio baseband signals; correct?

20 A Where is this figure 2 from again?

21 Q Figure 2 is from the '585 patent.

22 A Okay. Yes, that is correct.

23 Q So -- okay. I'll move on. And in the interest
24 of time, your Honor, I'm going to jump ahead.

25 Could I have JX-1, the '585 patent, at claim 13.

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1 Now, claim 13 is lengthy, but part of it is
2 directed to a standard selection circuit; correct?

3 A That is correct.

4 Q And there's a similar claim, claim 26, of the
5 '792 patent; correct?

6 A I don't have it in front of me, but I'll take
7 your word for it.

8 Q You know there's a similar claim in the '792
9 patent; right?

10 A Yes. I don't know the number of the claim, but
11 I'll take your word for it.

12 Q Are you aware that claim 13 of the '585 and
13 claim 26 of the '792 patent are two asserted claims that
14 are not in the interparties review? Are you aware of that?

15 A No, I'm not.

16 Q Okay. Now, you're aware that Respondents and
17 Dr. McNair -- I'm sorry, Professor McNair contend that
18 Boie, in view of Micronas, makes this claim obvious;
19 correct?

20 A I'm aware that Respondents have claimed that. I
21 disagree with that, yes.

22 Q Could I have RDX-2005C, 35.

23 In fact, you were here for the opening
24 statements by Mr. Fowler. Do you recall seeing this slide?

25 A I was not here for the opening statements.

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1 Q Oh, you were not, I'm sorry. I thought you
2 were. Okay. I withdraw that.

3 Could I have RX-1677C, Professor McNair's
4 opening witness statement.

5 And you recognize this as Professor McNair's
6 opening witness statement?

7 A I recognize the title page, yes.

8 Q Okay. Let's go to question 310, please. Now,
9 you understand that one of the opinions Professor McNair
10 has testified to is that Boie in combination with Micronas
11 renders claim 13 of the '585 patent obvious; correct?

12 A That is his claim, yes.

13 Q And let's go to question 311. You understand
14 that Professor McNair has opined that Boie in combination
15 with Balaban renders claim 13 obvious; correct?

16 A That is what he claims.

17 Q And going to question 313, one last one.

18 You understand that Professor McNair opines that
19 Boie in combination with Robbins renders claim 13 obvious;
20 correct?

21 A Again, that's what he claims.

22 Q So let's go to your witness statement, and I'd
23 like to show questions 271 and 273. Let me know when
24 you're there.

25 A Let me read 272 then if you give me a second.

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1 Q 271 to 273. Are you there?

2 A I'm there but I want to read it.

3 Q Now, nowhere in your answers to questions 271 to
4 273 do you discuss Micronas, do you?

5 A Again, not having read it -- I asked you to give
6 me some time to read it and you won't give me that time.

7 So without having read it, I cannot answer the question.

8 So if you give me the time to read it, I can answer it.

9 Q Go ahead.

10 (Witness reviewed document.)

11 THE WITNESS: Yes, I see it.

12 Q So nowhere in your answers to questions 271 to
13 273 do you discuss Micronas; correct?

14 A That is correct.

15 Q And nowhere in your answers to questions 271 to
16 273 do you discuss Balaban; correct?

17 A That is correct.

18 Q And nowhere in your answers to questions 271 to
19 273 do you discuss Robbins; correct?

20 A That is correct. But allow me to add here that
21 I saw my role as not doing research to see whether
22 Mr. McNair and Dr. Hashemi were correct or not, but to --
23 my role, I saw it as seeing whether they provided
24 sufficient substantiation for the claim that it would have
25 been obvious to a person of ordinary skill in the art to

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1 combine Boie with the references you articulated.

2 And I did not find that information, so as a
3 result of that, I did not feel that I was required to go
4 and do my independent research to prove or disprove them.

5 MR. ERICKSON: No further questions, your Honor.

6 JUDGE LORD: All right. Thank you. Why don't
7 we take our morning break here. We'll reconvene at 10
8 minutes till noon.

9 MR. SCHODDE: Your Honor, we do have about five
10 to 10 minutes directed to two claims that are only asserted
11 against MaxLinear. After that, I'll be done, and then
12 we'll be passing the witness.

13 JUDGE LORD: Okay. Thank you.

14 (Recess.)

15 JUDGE LORD: Please be seated.

16 Mr. Schodde.

17 MR. SCHODDE: Thank you, your Honor. Greg
18 Schodde for MaxLinear. And we can remain on the public
19 record for this portion of our examination.

20 CROSS-EXAMINATION

21 BY MR. SCHODDE:

22 Q Dr. Caloyannides, isn't it true that you can use
23 a complex filter to operate on a single real signal?

24 A Yes, it is true that you can do that. There
25 would be no good reason for doing that, but it's true you

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