

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

CISCO SYSTEMS, INC.,

Petitioner,

vs.

XR COMMUNICATIONS,  
LLC d/b/a VIVATO  
TECHNOLOGIES,

Patent Owner.

-----)

Case IPR2018-00762  
Patent No. 6,611,231  
Case IPR2018-00763  
Patent No. 7,729,728  
Case IPR2018-00764  
Patent No. 7,062,296

DEPOSITION OF JACK H. WINTERS, Ph.D.

New York, New York

Friday, November 9, 2018

Reported by:

Shauna Stoltz-Laurie, RPR, CLR

JOB NO. 23541

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November 9, 2018

9:23 a.m.

Deposition of JACK H. WINTERS,  
Ph.D., held at the offices of Haynes &  
Boone, 30 Rockefeller Plaza, New York,  
New York, pursuant to Notice, before  
Shauna Stoltz-Laurie, a Certified  
Realtime Reporter and Notary Public of  
the State of New York.

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J A C K   H .   W I N T E R S ,   P h . D . ,  
called as a witness, having been duly sworn  
by a Notary Public, was examined and  
testified as follows:

EXAMINATION BY

MR. NOROOZI:

Q.    Good morning, Dr. Winters.

A.    Good morning.

Q.    Let me start by asking you about  
the '728 patent.

A.    Okay.

Q.    And I'm just going to give you a  
copy of your declaration, the petition, and  
the patent so that you have those available  
to you.    Here you go.

A.    Okay.    Thank you.

Q.    Did you have a chance to prepare  
for your depo?

A.    Yes, I did.

Q.    And what did you do?

A.    I reread my declaration, and looked  
over the patent and the references.

Q.    And was there anything that you  
thought you needed to correct?

1 Winters

2 A. No, there was not.

3 Q. You're familiar with the concept of  
4 active probing as it's taught in the '728  
5 patent?

6 A. Yes.

7 Q. And if you would turn to column 7,  
8 starting at line 11?

9 MR. EMERSON: Do we have copies of  
10 -- I would like to follow along with the  
11 witness, so do we have extra copies of  
12 the --

13 MR. NOROOZI: We can get them  
14 printed for you. I did not --

15 MR. EMERSON: You didn't bring  
16 them?

17 MR. NOROOZI: No.

18 I asked you guys to print them,  
19 actually.

20 (Discussion off the record.)

21 MR. EMERSON: And you guys may want  
22 to follow along as well.

23 MR. EMERSON: Let's take a break  
24 real quick. Let's go off the record.

25 MR. NOROOZI: Sure.

1 Winters

2 (Recess taken.)

3 Q. Okay. So, Dr. Winters, you are  
4 looking at column 7, starting at line 11.  
5 Did you have a chance to look over that  
6 section?

7 A. Yes, I did.

8 Q. And you've seen that discussion in  
9 the '728 patent before, right?

10 A. Correct.

11 Q. It's discussing active probing,  
12 right?

13 A. Yes.

14 Q. Can you just read out loud starting  
15 at line 11 through line 22 of column 7,  
16 please?

17 A. Okay. (Reading:) Act 204 may  
18 instead or in addition employ an active  
19 client device location monitoring scheme.  
20 Here, the beam switching logic 110 may be  
21 configured to cause transceiver 112 to  
22 periodically send out probe information over  
23 one or more selected main beams that elicit  
24 some form of acknowledgment in return if  
25 received by client device 104. In this

Winters

manner, beam switching logic 110 actively probes the coverage areas for each main beam 116 and based on the acknowledging response -- response(s) or lack thereof from client device 104, can monitor or otherwise estimate the likely relative location of client device 104 within the coverage area of access point 102 at a given time or over a period of time."

Q. And do you understand that passage in the '728 patent to define what active probing is?

A. That passage is -- has a definition of Active Probing, yes.

Q. And so can you summarize for me your understanding of what that definition is?

A. That def -- that definition is, for Active Probing, it sends out a probing signal to the clients, and asks for a response from those clients, and the clients would respond therein.

Q. In response to the probing signal, right?

1 Winters

2 A. The client would respond in  
3 response to receiving the -- the probing  
4 signal, yes.

5 Q. Now, in your declaration, you  
6 describe your opinion that Antonio teachings  
7 meet the active probing requirement, based on  
8 Antonio's BMM and PSMM messages, true?

9 A. Shall I read out of my declaration  
10 where I'm talking about that?

11 Q. Well, I don't know if you need to  
12 read it out loud, but if you need to look  
13 over the relevant portions, I believe they  
14 begin in paragraph 104 and go through  
15 paragraph 111.

16 A. Okay. That's going by paragraphs  
17 numbers in here. (Perusing document).

18 Q. You might be looking at the  
19 petition.

20 MR. EMERSON: Yeah, you're looking  
21 at the petition.

22 A. Oh, oh. Sorry about that.

23 Ah. (Perusing document).

24 Okay. I'm at paragraph 104.

25 Q. Okay, great. So let me just



1 Winters

2 clarify for the record what we're doing.  
3 You're looking at paragraphs 104 through 111  
4 of your declaration to respond to my question  
5 as to whether it was your opinion in your  
6 declaration that Antonio meets the active  
7 probing requirement of the '728 patent claims  
8 based on Antonio's BMM and PSMM messages.

9 A. Yes, I'm looking at those sections  
10 there in order to make a -- to verify my  
11 statements in the declaration. Okay?

12 (Reading)

13 Yeah, so that section there  
14 describes how the base-station or the main  
15 communication node or access point sends a  
16 probing signal out using the Beam Mask  
17 Message, yes.

18 Q. Okay. And then the Antonio  
19 reference teaches sending out the Beam Mask  
20 Message on some periodic schedule, right?

21 A. Periodically sending the Beam Mask  
22 Message, yes.

23 Q. And it also describes sending back  
24 a PSMM signal on some periodic schedule,  
25 right?

1 Winters

2 A. I need to find where that's at.  
3 That would be after -- (perusing document)  
4 Right.

5 So going to paragraph 115, "the  
6 user terminal transmits a Pilot Strength  
7 Measurement Message to the gateway."

8 Q. On a periodic schedule, right?

9 A. It just states that the process  
10 progresses to the next step, where the  
11 terminal transmits a PSM Message to the  
12 gateway, and if it's being probed  
13 periodically, then you would assume or I --  
14 my opinion is that it would be transmitting  
15 it back on a periodic set schedule as well.

16 Q. Well, right there in paragraph 115  
17 you have a quote from Antonio where it says  
18 "It should be noted that steps 506 to 510 are  
19 performed periodically by the user terminal."  
20 Do you see that?

21 A. Correct. Yes.

22 Q. And that's referring to the sending  
23 of the Pilot Strength Measurement Message,  
24 right?

25 A. Yes.

1 Winters

2 Q. Okay. So are you familiar with  
3 these teachings in Antonio yourself beyond  
4 simply what's stated verbatim in your  
5 declaration?

6 A. I have read Antonio's and I am  
7 familiar with those concepts being used in  
8 wireless communication systems.

9 Q. But within Antonio itself and  
10 exactly how it works, are you familiar with  
11 it, as you sit here, beyond simply what's  
12 stated verbatim in your declaration?

13 A. I am familiar with additional  
14 information in Antonio beyond what's stated  
15 in my declaration, yes.

16 Q. All right. So do you remember how  
17 the process of sending back of the PSMM in  
18 Antonio is set up?

19 A. I would have to look at that  
20 document again to recall exactly how that was  
21 done.

22 Q. In Antonio, if a PSMM is set to be  
23 sent out on a periodic schedule but no BMM is  
24 set to be -- let me just withdraw that.

25 The PSMM is sent by the user

1 Winters

2 terminal to the gateway, right?

3 A. Yes.

4 Q. And the BMM is sent by the gateway  
5 to the user terminal, right?

6 A. BMM is sent from the gateway to the  
7 user terminal.

8 Q. So you agree with that I said.

9 A. That's -- I'm stating the same  
10 thing.

11 Yes.

12 Q. In Antonio, if a PSMM is set to be  
13 sent out from the user terminal to the  
14 gateway but no BMM is set to be sent from the  
15 gateway to the user terminal, the PSMM will  
16 still be sent out, right?

17 A. That I'd have to look at. I  
18 believe that's in the Figure -- (Reading)  
19 Just looking at Figure 5(a).

20 So when I look at Figure 5(a), at  
21 least reading that flow chart there, the BMM  
22 is first sent out from the gateway to the  
23 user terminal, and in response to that  
24 message, the user terminal measures the beam  
25 strength and -- and then transmits a PSM from

1 Winters

2 the user terminal to the gateway.

3 Q. Well --

4 A. So if the gateway is transmitting  
5 these BMMs periodically, then the user  
6 terminal is going to be responding  
7 periodically to the P -- with the PSMM.

8 Q. So Figure 5(a) shows a scenario in  
9 which a BMM was sent from the gateway to the  
10 user terminal, right?

11 A. Yes.

12 Q. Figure 5(a) doesn't tell us what  
13 happens if there's no BMM sent from the  
14 gateway to the user terminal, right?

15 A. That's right. It's only describing  
16 what it does in response to a BMM Message.

17 Q. So back to my question of whether  
18 in Antonio, a PSMM that has been set to sent  
19 out would still be sent out if no BMM was  
20 received, can you address that question?

21 MR. EMERSON: Objection to form.

22 A. So your question then is would the  
23 user terminal send out a PSMM if it did not  
24 receive a message from the gateway, and I do  
25 not see that addressed in this figure here.

1 Winters

2 Q. And do you have an answer to that  
3 question based on your knowledge of Antonio?

4 A. I do not -- let's see. I do not  
5 recall what happened, why a terminal would  
6 send out a PSM if it did not receive a  
7 request from the base-station.

8 Q. So let's turn to paragraph 47 of  
9 your declaration, please. In paragraph 47 of  
10 your declaration, you state that "If the  
11 antenna weights in Alastalo are not updated  
12 frequently enough, a problem could arise  
13 theoretically," right?

14 A. Yes. If the weights are not  
15 updated frequently enough, then you may lose  
16 or drop a call, yes.

17 Q. In Alastalo, there's a teaching  
18 that the weights can be updated as frequently  
19 as every packet, right?

20 A. Alastalo indeed states that the  
21 weights can be updated as fast as every  
22 packet.

23 Q. And in your declaration, you don't  
24 explain why updating the weights every packet  
25 would not be fast enough, do you?

1 Winters

2 A. The declaration itself just states  
3 that the weights could be updated as fast as  
4 every packet.

5 Q. In paragraph 47 of your  
6 declaration, where you're talking -- when  
7 you're talking about the scenario, the  
8 hypothetical scenario where the antenna  
9 weights are not updated frequently enough in  
10 Alastalo, you don't actually describe a  
11 situation in which Alastalo would fail to  
12 update the antenna weights quickly enough,  
13 right?

14 A. Could you restate that question?

15 Q. Sure.

16 In paragraph 47, you describe a  
17 hypothetical situation in which Alastalo  
18 could fail to update its antenna weights  
19 quickly enough, right?

20 A. I am simply making the statement  
21 that if the weights were not updated  
22 frequently enough, then the system could  
23 fail.

24 Q. Correct.

25 But you don't actually demonstrate

1 Winters

2 that Alastalo would ever fail to update its  
3 antenna weights quickly enough, do you?

4 A. In there, I just simply state that  
5 Alastalo, as he states, may have to adjust  
6 the weights as frequently as every packet to  
7 handle a fast-moving user.

8 Q. Well, but in your declaration, you  
9 never describe or explain why updating the  
10 weights as frequently as every packet would  
11 not be updating the weights quickly enough,  
12 right?

13 MR. EMERSON: Object to the form.

14 A. The weights -- I'm just trying to  
15 rephrase the question there.

16 I'm describing here that you would  
17 have to, in fast-moving cases, update the  
18 weights at least on a packet-by-packet basis,  
19 and, however, that there's no statement here  
20 that states that that would be indeed fast  
21 enough, and that the channel couldn't  
22 actually change during the packet itself.

23 Q. But you also don't describe a  
24 situation in which Alastalo would fail to  
25 update the weights quickly enough, in your



1 Winters

2 declaration, right?

3 MR. EMERSON: Object to form.

4 A. In response to that, I would say  
5 that a POSITA would realize that there could  
6 possibly be situations where the weights  
7 would not be updated frequently enough or  
8 they would not be adequately updated.

9 Q. I'm speaking specifically about  
10 what's in your declaration. Do you follow me  
11 so far?

12 A. I do.

13 Q. Okay. And what you just told me  
14 is not specifically in your declaration,  
15 right?

16 A. What I simply -- what I said was  
17 what a POSITA would have stated there (sic),  
18 and some of those statements may not be  
19 explicitly stated in the declaration.

20 Q. Okay. So sticking to what's in  
21 your declaration, in your declaration, you  
22 don't give any explanation of a situation in  
23 which Alastalo would not be able to update  
24 its weights frequently enough, true?

25 MR. EMERSON: Object to the form.

1 Winters

2 A. Again, I have put in what was the  
3 necessary amount of information that a POSITA  
4 would be able to understand the different  
5 situations that could arise, and that if  
6 you're moving very quickly, you would have to  
7 or would be required to update those weights  
8 as frequently as every packet.

9 Q. "As frequently as every packet."

10 MR. EMERSON: Is there a question?

11 I'm sorry. Wait for the question.

12 Q. (Continuing) I'm just confirming  
13 what you said. You said "as frequently at  
14 every packet"?

15 A. That there -- as stated in the  
16 declaration, the weights could be needed to  
17 be updated at least as frequently as every  
18 packet.

19 Q. How quickly is every packet for  
20 purposes of Alastalo?

21 MR. EMERSON: Object to the form.

22 A. Alastalo does not specifically list  
23 a data rate that we would use, but the  
24 typical types of numbers would be a packet  
25 size on the order of, say, milliseconds.

1 Winters

2 Q. How many milliseconds?

3 A. That would depend. Looking back at  
4 2002 versus here or today, today we have  
5 systems that operate in the megabit up to the  
6 gigabit per second data rates, and there  
7 those packets can be much shorter. Those  
8 packets -- if you aggregate packets, those  
9 packets can be much longer than a few  
10 milliseconds.

11 Q. Okay. So what's the date of  
12 Alastalo; do you recall?

13 A. I do not recall the date exactly.  
14 It's approximately around 2000.

15 Q. Let me pull it up from your  
16 declaration.

17 Take a quick look at paragraph 32,  
18 please?

19 A. (Reading).

20 Q. Do you see it says that Alastalo  
21 was originally filed as a PCT application in  
22 February of 2002?

23 A. Yes.

24 Q. And as of February 2002 roughly how  
25 frequently would every packet have been sent,

1 Winters

2 in Alastalo's world?

3 A. If you look at current -- or if you  
4 look at communication systems that were in  
5 operation around 2002, you may expect that in  
6 some cases, packets could be sent as  
7 frequently at every few milliseconds.

8 Q. Can you give me any sense of how  
9 few milliseconds?

10 MR. EMERSON: Object to the form;  
11 beyond the scope.

12 A. We would be talking about  
13 communications systems in operation around  
14 2002, which would be referring to wireless  
15 LAN systems at that time were operating on  
16 the order of ten megabits per second or so,  
17 and so --

18 But, again, these systems were  
19 operating -- the wireless LANS were operating  
20 in -- as they are today, in time division  
21 duplex manner, where they're responding with  
22 different packet lengths and different times  
23 between those packets, so at ten megabits per  
24 second you could have in one millisecond up  
25 to 10,000 bits being transmitted then.

1 Winters

2 Q. Does that mean 10,000 packets?

3 A. No.

4 That would mean that you would have  
5 on the order of 10,000 bits, as an example,  
6 in a packet that was transmitted if it was  
7 being continuously transmitted every  
8 millisecond.

9 Q. So back in 2002 it was part of the  
10 existing technology to be able to send a  
11 packet each millisecond, every one  
12 millisecond.

13 MR. EMERSON: Object to the form.

14 A. Back in 2002 there was an  
15 understanding that packets could be sent as  
16 frequently as once every millisecond if not  
17 in the current systems, or not in the systems  
18 at that time, in systems that were planned at  
19 that time.

20 Q. One millisecond is a thousandth of  
21 a second?

22 A. One millisecond is one-thousandth  
23 of a second.

24 Q. In your declaration, do you have  
25 any explanation of why being able to update

1 Winters

2 the weights in Alastalo every one  
3 one-thousandth of a second would not be quick  
4 enough?

5 A. A POSITA would be able to  
6 understand what that update rate needed to be  
7 there.

8 And as an example, if you are in a  
9 mobile communication system, and you're  
10 moving at, say as an example, 60 miles an  
11 hour in your car, you're going to have at  
12 approximately 900 megahertz on the order of  
13 maybe a couple hundred hertz of Doppler; you  
14 would be need to be adjusting the weights at  
15 least an order of magnitude faster than that,  
16 and that would be on the order of at least  
17 every millisecond.

18 Q. I want to make sure that I followed  
19 what you said.

20 Were you saying that if you're in a  
21 car moving at 60 miles an hour -- first of  
22 all --

23 MR. NOROOZI: Withdrawn.

24 Q. Let me back up.

25 What you just described is not

1 Winters

2 something that's laid out in your  
3 declaration, right?

4 A. This is -- what I just described is  
5 -- would -- would be knowledge that a POSITA  
6 would have at that time.

7 Q. I'm not asking whether it's true or  
8 false that a POSITA wouldn't know what you  
9 described. I'm asking whether it's something  
10 that you've said in your declaration. Do you  
11 follow me?

12 A. I've not explicitly talked about  
13 the case of what the Doppler or weight --  
14 update weights need to be as a numerical  
15 answer. I was just using that as an example.

16 Q. You don't have any example talking  
17 about Doppler weights at all or a  
18 60-mile-an-hour-driving car or any of those  
19 things, right?

20 A. Because those statements as to how  
21 fast you are moving in terms of specific  
22 numbers were not placed in my declaration, as  
23 a POSITA would understand that these were  
24 typical cases.

25 Q. When you say were not placed in

1 Winters

2 your declaration, you mean by counsel?

3 A. No.

4 I simply did not place them in  
5 there because I did not believe that that was  
6 -- it was my opinion that that was additional  
7 information that was not needed to explain a  
8 well-known problem.

9 Q. All right. So let's go back to  
10 your hypothetical of a car driving 60 miles  
11 an hour with a telecommunications  
12 infrastructure of 2002. Are you with me so  
13 far?

14 A. Yes.

15 Q. You were saying that in that  
16 situation, you kind of did some mental math,  
17 and you came up with a frequency at which you  
18 thought, based on that scenario, the weights  
19 would have to be updated with respect to the  
20 communications so that the person in the  
21 60-mile-an-hour car could still have adequate  
22 communications, right?

23 A. That's -- I was looking at -- I was  
24 explaining a typical case where you would  
25 have to adjust the weights more often than



1 Winters

2 once per packet, or during the packet itself.

3 Q. What is the frequency with which  
4 you would have to adjust the weights in that  
5 hypothetical you were describing, according  
6 to your mental math?

7 A. Adjusting them at least at once --  
8 according to my mental math, you would have  
9 to adjust the weights at least once every  
10 millisecond.

11 Q. But you also just said that back at  
12 that time packets were being sent at least  
13 once every millisecond, right?

14 A. Yes.

15 Q. And Alastalo says that you can  
16 adjust the weights once every packet, right?

17 A. Alastalo talks about systems that  
18 you may have to adjust the weights as  
19 frequently as once every millisecond or --  
20 I'm sorry, as frequently as once every  
21 packet.

22 As an example, in the TDMA system  
23 that was used in North America at that time,  
24 IS136, which I worked on at AT&T on looking  
25 at the use of adaptive antenna arrays there,

1 Winters

2 we were using training sequences within a  
3 TDMA frame, within a packet, and it was found  
4 that if you adjusted the weights using that  
5 training sequence, by the end of the packet  
6 the weights would have actually changed, so  
7 you would have actually had to track the  
8 weights over that entire packet in order to  
9 adequately adjust the weights of an adaptive  
10 array.

11 Q. So this is a new different  
12 hypothetical you're telling me about, right?

13 A. I'm just talking about -- I'm just  
14 referring to work that I did when I was at  
15 AT&T, along with others, to look at how fast  
16 the weights needed to be adjusted in some  
17 scenarios.

18 Q. Okay. But was that scenario a  
19 real life deployment scenario in 2002 using  
20 that existing telecommunications (sic)?

21 A. Yes, it was.

22 Q. And in that scenario, what is it  
23 that was causing the situation that you  
24 described where the frequency of the weight  
25 changes necessary was faster than the

1 Winters

2 frequency at which a packet could be sent?

3 A. And this -- so in my published  
4 papers, I describe the scenario where the  
5 channel itself is changing enough over the  
6 duration of a packet such that calculating  
7 the weights at one point in the packet would  
8 not give you the adequate rate -- weights at  
9 another time within that packet.

10 Q. All right. So does Alastalo  
11 describe calculating the weights at one point  
12 in the packet compared to another point in  
13 the packet?

14 A. Alastalo simply states that if the  
15 channel is moving fast enough, you would have  
16 to adjust the weights as frequently as once  
17 per packet.

18 Q. Okay. And you described a  
19 scenario where someone is this a  
20 60-mile-an-hour-driving car, right?

21 A. I described a scenario where  
22 somebody was moving at 60 miles an hour,  
23 talking on their phone, yes.

24 Q. And in that scenario, your mental  
25 math was that you might need to update the

1 Winters

2 weights once every millisecond, right?

3 A. In that scenario, which has been  
4 described in published papers that I had at  
5 that time, the weights would need to be  
6 adjusted more frequently than once per  
7 packet.

8 Q. Okay. Well, that wasn't my  
9 question. I was asking you about once per  
10 millisecond.

11 But I also think what you said is  
12 inconsistent with what you said before, so  
13 let me see if I can clear it up.

14 I believe you said earlier that in  
15 your scenario with the 60-mile-an-hour car,  
16 that the weights would need to get updated  
17 once per millisecond. True?

18 A. In some scenarios, that would be  
19 the case, that you would have to adjust the  
20 weights at least at one -- at the one  
21 millisecond rate.

22 Q. And you also said that at that time  
23 packets could be sent every one millisecond,  
24 right?

25 A. In some systems, those packets were

1 Winters

2 sent every one millisecond, yes.

3 Q. Okay. Therefore you would need to  
4 update the weights with each packet every one  
5 millisecond, right?

6 A. I was describing scenarios where  
7 you would have to adjust the weights at least  
8 as often as the packet if not faster or if  
9 not sooner than the difference between the  
10 packets.

11 Q. Well, you haven't told me how the  
12 60-mile-an-hour car gets you to faster than a  
13 packet so far, right?

14 MR. EMERSON: Object to the form.

15 A. I'm describing different scenarios,  
16 and, as I say in my published papers, I talk  
17 about specific scenarios where you would have  
18 to adjust the weights more often than once  
19 per packet.

20 Q. Okay. You keep referring to your  
21 published papers, right?

22 A. I'm referring to my published  
23 papers, yes.

24 Q. Do you expect that I've read them?

25 A. I'm bringing that up as some

1 Winters

2 material that a POSITA would have been aware  
3 of at that time.

4 Q. Do you understand that whatever it  
5 is that the POSITA is supposed to know, that  
6 for purposes of this legal proceeding is  
7 supposed to be described with some level of  
8 detail in your declaration?

9 MR. EMERSON: Object to the form.

10 A. I have described in -- in here what  
11 I would believe a POSITA would be able to,  
12 after reading this, understand all the  
13 details, would be able to obtain all the  
14 details for.

15 Q. If you tell me that it's your  
16 opinion that someone would do something, full  
17 stop, how am I supposed to know on what basis  
18 you've put forth that opinion?

19 MR. EMERSON: Object to the form.

20 A. I've stated in here -- I was simply  
21 referring to the fact in here that Alastalo  
22 was saying you may have to adjust the weights  
23 as often as once per packet.

24 Q. How is that responsive to what I  
25 just asked you?

1 Winters

2 A. Can you rephrase the question then?

3 Q. If you just state your opinion that  
4 somebody of ordinary skill would know how to  
5 do something, full stop, period, with no  
6 other detail, how can I determine the basis  
7 for your opinion?

8 MR. EMERSON: Again, objection to  
9 form.

10 A. I gave a description of what a  
11 POSITA would be aware of, what a POSITA would  
12 be able to use as references there.

13 In this statement here, I was  
14 simply referring to the fact that Alastalo  
15 was saying you needed to adjust the weights  
16 at least once per -- you may need to adjust  
17 the weights as often as once per second.

18 And following your line of  
19 questioning, I was also responding to the  
20 fact that that may not necessarily be often  
21 enough, and a POSITA would be able to  
22 recognize that although Alastalo was stating  
23 that you would have to adjust it as often as  
24 once every packet to track a fast-moving  
25 mobile, again, a POSITA would realize that

1 Winters

2 although that was mitigating the problem,  
3 that may not completely mitigate the problem  
4 under all circumstances.

5 Q. You have not so far described for  
6 me any circumstance in which adjusting the  
7 weights once every packet would not be  
8 enough, right?

9 A. I have --

10 MR. EMERSON: Object to the form.

11 A. (Continuing) I described to you a  
12 scenario which has been described in the  
13 literature at that time, where adjusting the  
14 weights once per packet was not adequate or  
15 would be -- would be required in some cases  
16 and would have to be faster than that in  
17 other cases.

18 Q. Okay. Well, if it's adequate,  
19 then it's adequate, right?

20 You're only trying to tell me about  
21 the ones, I think, where it would not be  
22 adequate. Am I -- am I following you?

23 MR. EMERSON: Object to the form.

24 A. Wireless communications is a  
25 statistical in nature. There's a wide



Winters

variety of different cases that one needs to take into account when they design systems. No system is going to be able to handle all situations all the time. So in many situations, adjusting the weights less than once every packet is adequate. In some cases you need to adjust it as much as once per packet. But in other cases, that may not be adequate enough or that may not solve every conceivable scenario that would be out there, and a POSITA would understand that.

Q. Can we ever solve every possible scenario that's out there?

A. Again, a wireless communications system being statistical in nature means all you can do is give probabilities as to how -- what the performance of the system is going to be.

Q. Okay. So in your declaration, you don't describe any probability of failure with Alastalo's system based on its capability of updating weights once every packet, true?

A. In Alastalo, I do not -- I do not

1 Winters

2 discuss the scenario where it's not adequate.

3 I simply state that Alastalo states that you  
4 may have to adjust the weights as often as  
5 once per packet.

6 Q. In your declaration, you never set  
7 forth any estimate of the probability of  
8 Alastalo failing or being inadequate with its  
9 capability of updating weights once every  
10 packet, true?

11 A. Again, a POSITA would be -- would  
12 understand that when I talk about ways to  
13 mitigate the fast-moving user by adjusting  
14 once per packet, that because the wireless  
15 channel is statistical, that that may not  
16 handle all conceivable situations.

17 Q. I asked you I think a different  
18 question about what's in your declaration,  
19 and about a specific probability, even if  
20 it's an estimated probability. Do you follow  
21 me so far?

22 A. I did not state in my declaration  
23 any specific probabilities for the occurrence  
24 of the event that I am describing right now.

25 Q. In your declaration, you also did

1 Winters

2 not describe any improvement in the expected  
3 probability of successful or unsuccessful  
4 performance with the modification to Alastalo  
5 that you propose, right?

6 A. That gets -- so any POSITA that  
7 would be looking at Alastalo would realize  
8 that his system is not going to solve the  
9 fast-moving user problem in all scenarios.

10 Q. I think I --

11 MR. EMERSON: Wait. Let him finish  
12 his answer.

13 Q. Go ahead. I didn't know you were  
14 not done.

15 A. Well, proceed there.

16 Q. Okay.

17 So I think I asked you about  
18 whether you have set forth in your  
19 declaration a specific sort of probability  
20 improvement delta measurement estimate of any  
21 amount by which Alastalo's probability of  
22 success or even adequate performance would  
23 improve in light of the proposed modification  
24 based on Antonio. Do you follow my question?

25 A. The issue that I was looking at

1 Winters

2 here was that Alastalo has a technique that a  
3 POSITA would understand is going to solve the  
4 situation, the problem of fast-moving  
5 mobiles, in many situations but would also  
6 understand that it may not solve it in other  
7 situations, and therefore the POSITA would  
8 look for alternative techniques that might be  
9 used to improve Alastalo in some situations.

10 Q. Okay. So I asked you if you  
11 followed my question. That was my last  
12 question. Do you remember that?

13 A. Yes.

14 Q. And did you give me a yes or no  
15 answer?

16 MR. EMERSON: Object to the form.

17 A. Please ask the question again then.

18 Q. In your declaration, do you ever  
19 set forth any percentage value  
20 probabilistically by which Alastalo's system  
21 would purportedly, in your opinion, improve  
22 in its ability to provide adequate  
23 telecommunications after having been modified  
24 in the way that you propose based on the  
25 teachings of Antonio?

1 Winters

2 A. In my declaration, I do not give  
3 any specific percentages improvement.

4 I simply state that a POSITA would  
5 understand that there is a reasonable  
6 likelihood that there would be improvement or  
7 the potential for improvement by implementing  
8 the technique in Antonio in combination with  
9 Alastalo.

10 Q. You've mentioned a few times that  
11 there would be some scenarios in which being  
12 able to update the weight every one  
13 millisecond with each packet may not be  
14 adequate. Is that true, that you've stated  
15 that?

16 A. I stated that you may not -- it may  
17 not be -- completely mitigate the problem of  
18 a fast-moving user if you update the weights  
19 once per packet.

20 Q. Okay. And then you described only  
21 one actual specific example, which was a  
22 60-mile-an-hour car, right?

23 A. I was just -- I used one example  
24 where I was aware of the situation where  
25 adjusting the weights once per packet was not

1 Winters

2 adequate.

3 Q. Well, you said that with a  
4 60-mile-an-hour car, you only need to adjust  
5 the weights once every millisecond, didn't  
6 you?

7 MR. EMERSON: Objection to form.

8 A. I was referring to a specific  
9 example there. Okay?

10 And sometimes I also referred to a  
11 specific operating frequency, and I was  
12 referring to specific packet lengths. There  
13 are other scenarios of longer packet lengths.  
14 There's other scenarios of faster mobile  
15 speeds. There's other scenarios of higher  
16 frequencies or carrier frequencies other than  
17 900 megahertz where you would have changes in  
18 the channel that were faster than the  
19 specific scenario we first looked at.

20 Q. Well, you have not described any of  
21 those scenarios in any detail in your  
22 declaration, right?

23 A. Those types of scenarios were --  
24 was well-known art at that time, and a POSITA  
25 would be well aware of that, and I saw no

1 Winters

2 reason why to put that in there.

3 I'm simply stating that Alastalo  
4 needed to update the weights at least a  
5 packet and on a packet-by-packet basis in  
6 order to track changes in the channel. I --  
7 I did not state in my declaration that that  
8 would completely mitigate all problems.

9 And a POSITA could would be well  
10 aware that there could still be and would  
11 likely still be problems that would need to  
12 be mitigated by other techniques, and  
13 therefore would be motivated to look at other  
14 techniques to try to solve the worst case  
15 scenarios.

16 Q. Sir, in fairness, in your  
17 declaration, there is not a single specific  
18 example that you walk through where you show  
19 that Alastalo modified based on Antonio in  
20 the way that you propose would statistically  
21 or probabilistically expected to end up with  
22 a better performance than Alastalo  
23 unmodified, right?

24 MR. EMERSON: Objection, asked and  
25 answered.

1 Winters

2 A. In there I have described the  
3 combination, and that it would have been  
4 obvious to combine the two techniques there.

5 It would have been obvious to  
6 combine the techniques because people working  
7 in the wireless area would want to see  
8 improvement in the -- in their wireless  
9 communication systems.

10 Q. Well, they may or may not want to  
11 see improvement, but you have not  
12 demonstrated any improvement in your  
13 declaration based on an actual example and a  
14 numerical or any kind of quantification of  
15 any expected improvement, true?

16 MR. EMERSON: Objection, form;  
17 asked and answered.

18 A. I have not in here provided a  
19 specific percentage improvement, again,  
20 because I would assume that a POSITA would be  
21 well aware of the fact that there could  
22 potentially be an improvement by combining  
23 different techniques together.

24 Q. Well, maybe there wouldn't be an  
25 improvement, right?



1 Winters

2 A. And that would require analysis to  
3 go through and show exactly what that  
4 improvement would be.

5 But both these types of systems  
6 existed at that time, and therefore people  
7 would be aware of the fact that you might  
8 want to look at the advantages and  
9 disadvantages of each one and therefore  
10 combine the positive aspects of each one to  
11 improve the overall performance.

12 We do see drop call rates and other  
13 performance measures such as that, and  
14 without in my declaration giving any specific  
15 percentage values, giving any specific  
16 probabilities of there being an improvement.

17 Q. So you're saying that a person of  
18 skill in the art would look at the  
19 possibility of combining Antonio and  
20 Alastalo.

21 A. Yes. A person -- a POSITA would at  
22 that time have considered the technologies  
23 that were available.

24 Indeed myself, when I was looking  
25 at ways to implement smart adaptive phased

1 Winters

2 array antennas, was looking at both the  
3 implementation of phased array antennas as  
4 well as adaptive antennas as well as fixed  
5 beam antennas to see which one would give the  
6 best improvement under which -- under  
7 different scenarios, and how to perhaps  
8 combine those together to get an overall  
9 system that would perform better than any one  
10 of them would have done by themselves.

11 Q. And if a person of skill in the art  
12 had done actual analysis of the relevance and  
13 disadvantages of combining Alastalo with  
14 Antonio, they may have concluded that they  
15 don't want to combine them, right?

16 A. I do not know what the results of  
17 their analysis would be.

18 But I know when we looked at it at  
19 these different cases at this time we could  
20 see some advantages of one type of system  
21 over the other and vice versa.

22 Q. When you say "we looked at it," who  
23 is "we"?

24 A. I was at AT&T at that time.

25 Q. Okay. And --

1 Winters

2 A. -- I was involved in the AT --  
3 well, I was in AT&T Wireless Research. We  
4 were doing research mainly for AT&T Wireless,  
5 AT&T lab research, AT&T lab's research. I  
6 was head of the Wireless Systems Research  
7 department there. So that would include  
8 people that I was working with, my  
9 colleagues, as well as people in my  
10 department.

11 Q. You yourself are a Ph.D. right?

12 A. I do have a Ph.D.

13 Q. And how many people are you working  
14 with at AT&T?

15 A. I was leading a department that had  
16 as many as 32 people in it at a given time.  
17 The number varied, but I think -- I believe  
18 the maximum was about 32 people.

19 Q. And how many people were involved  
20 in this specific research that you were just  
21 referring to?

22 A. Most of the people in my department  
23 were involved in wireless communications, as  
24 we talked about there.

25 I was heavily involved in looking

1 Winters

2 at the advantages and disadvantages of  
3 different adaptive antenna techniques along  
4 with other types of wireless communications  
5 technologies.

6 Q. Okay. But how many people at AT&T  
7 at the time that you were describing were  
8 involved in the analysis that you were  
9 talking about regarding the possible benefit  
10 of being able to change the antenna weights  
11 or the communication path more than once  
12 every millisecond?

13 A. I was involved in the research area  
14 -- okay? -- and so it was myself plus a  
15 couple of my colleagues that did the research  
16 in that area. We then transferred that  
17 technology over to Advanced Development, and  
18 from Advanced Development it went in to  
19 Development, and they were looking at how to  
20 implement these technologies on AT&T wireless  
21 base-stations.

22 I do not know the exact number, but  
23 there were many people involved in looking at  
24 the possibility of using and implementing  
25 these -- these techniques.

1 Winters

2 Q. Okay. So you and two of your  
3 colleagues, though, did the primary research,  
4 right?

5 A. Yes.

6 Well, I was doing the primary  
7 research, and there were other people that I  
8 was collaborating with.

9 Q. Two other people?

10 A. I don't recall the exact number of  
11 people that I was collaborating with at that  
12 time.

13 But I was talking to everyone in my  
14 department, as department head, and so  
15 everyone there was well aware of what work I  
16 was doing, as we had frequently symposia to  
17 discuss our research, and were actively  
18 seeking input from other personnel.

19 Q. Were those other people you were  
20 working with -- do you remember their names?

21 A. I remember some of their names,  
22 yes.

23 Q. And I'm only asking about the ones  
24 who were involved in this specific research  
25 that you're talking about that then was

1 Winters

2 handed off to other members of AT&T. I'm not  
3 talking about people later on down the chain.

4 A. Um-hm.

5 Q. Are you with me so far?

6 A. Yes.

7 Q. Okay. So what kinds of people  
8 were in your group that you were doing this  
9 work with? What were their backgrounds?

10 A. Some had Ph.D.s. Some had master's  
11 degrees. We had people all the way from  
12 Ph.D.s that were doing pretty much basic  
13 research, but we also had people that were  
14 more involved in the technician side of  
15 building the systems up.

16 At that time, for example, we built  
17 both phased arrays and an adaptive array, and  
18 did multiple measurements doing that, and I  
19 was involved in that project, I was helping  
20 coordinate that project, but we were -- but  
21 there were other people that were involved in  
22 actually doing the experiments themselves.

23 Q. And as of the time that you were  
24 doing this research you were coming up with  
25 something that was new and didn't already

1 Winters

2 exist in the field, right?

3 A. The purpose of doing the research  
4 was to come up with novel solutions.

5 Q. Let me ask you quickly, before we  
6 take a break, about an aspect of Alastalo.

7 Alastalo itself, as it's already  
8 built, does not have BMM signals, right?

9 A. Right.

10 Q. It also does not have PSMM signals,  
11 right?

12 A. Alastalo does not have specifically  
13 -- it does not specifically mention the use  
14 of those types of signals.

15 Q. In fact, Alastalo does not mention  
16 any kind of hand-off mechanism at all, right?

17 A. I'd have to go back and look  
18 further at the algorithm, but basically he's  
19 talking about how you would adjust the  
20 weights.

21 Q. So for purposes of the judges on  
22 the Board in this proceeding who may not  
23 understand this information as well as you  
24 do, can you expand on what you mean by that?

25 Can you simplify that a little bit,

1 Winters

2 in terms of how that relates to an approach  
3 of hand-off versus a non-hand-off approach?

4 MR. EMERSON: Objection to the  
5 form.

6 A. At that time in wireless 802.11,  
7 they were not -- the original systems were  
8 not adequately designed to very rapidly hand  
9 off from one system to another as they were  
10 in cellular communication systems. So when  
11 you go from one base-station or one access  
12 point to another you need to hand the signal  
13 off from one base-station or access so that  
14 you're now coordinating with or associated  
15 with a different base-station or access  
16 point.

17 Q. Antonio is not an 802.11 reference,  
18 right?

19 A. Antonio is -- no.

20 He's talking about the  
21 base-stations going with the satellite disk.

22 Q. And Alastalo is not an 802.11  
23 reference, right?

24 A. I don't recall Alastalo mentioning  
25 802.11.



1 Winters

2 Q. It's cellular, isn't it?

3 A. (Reading) Specifically talking  
4 about -- (Perusing document).

5 Just looking at Figure 2, it's got  
6 a bunch of nodes in there.

7 Q. Well, if I may, without  
8 interrupting you, if this isn't helpful, go  
9 back to what you were doing, but if it's  
10 helpful, paragraph 39, you have a summary of  
11 Antonio?

12 A. (Perusing document) Paragraph 39  
13 summarizes some pieces of Antonio.

14 Q. And so you see, based on paragraph  
15 39, that Antonio has a "cellular  
16 telecommunications" reference?

17 A. He referred -- he uses that as an  
18 example, using cellular.

19 Q. Are you aware of anything in  
20 Antonio that talks about 802.11 type  
21 communications?

22 A. (Reading) I don't recall Antonio  
23 referring to 802.11.

24 Q. In order for Alastalo to be able to  
25 implement the BMM, PSMM and other add beam

1 Winters

2 set, drop beam set and new active beam set  
3 teachings that you take from Alastalo, some  
4 modifications would have to be made to  
5 Antonio -- to Alastalo, right?

6 You take the teachings from -- let  
7 me --

8 MR. NOROOZI: Withdrawn.

9 A. Yes.

10 Q. In order for one of skill in the  
11 art to implement in Alastalo, the BMM, PSMM,  
12 add beam set, drop beam set and other  
13 teachings that you take from Antonio, they  
14 would have to make some modifications to  
15 Alastalo, right?

16 A. Alastalo would have to be modified  
17 in order to take into account the techniques  
18 that Antonio is talking about, yes.

19 Q. In your declaration, you don't  
20 specifically explain how one of skill in the  
21 art would have to go about making that  
22 happen, do you?

23 A. A POSITA would be able to  
24 understand how to take the technology from  
25 one paper or one patent and put that into the

1 Winters

2 technology from other patent.

3 Q. In your declaration, you don't  
4 specifically explain how the POSITA could go  
5 about doing that, right?

6 A. Because a POSITA would be able to  
7 understand how to do that without any  
8 additional explanation that would be required  
9 in the declaration.

10 Q. So it's your testimony that because  
11 a POSITA, according to you, would already  
12 know how to do that, you didn't need to say  
13 anything about how to do it in your  
14 declaration.

15 MR. EMERSON: Object to the form.

16 A. It's my belief that a POSITA would  
17 be able to understand how to take the  
18 technology in one patent and apply it in  
19 another patent.

20 Q. If I want to decide whether I agree  
21 with your belief, what can I look to in your  
22 declaration to see if I also believe that a  
23 POSITA could make those modifications to  
24 Alastalo based on Antonio or not?

25 MR. EMERSON: Object to the form.

1 Winters

2 A. The two -- the two proposal -- or  
3 the two patents are in the same general area  
4 of wireless communications. In that area,  
5 there are a wide variety of known techniques  
6 as well as understanding the different  
7 techniques that are explained in those  
8 patents, and no explanation would be needed  
9 to a POSITA as to how to go to one to the  
10 other, as they would be able to figure out  
11 that by themselves.

12 Q. When you did the research you did  
13 at AT&T, as a part of the conclusion of that  
14 research you gave that information to people  
15 at AT&T so they could implement the ideas you  
16 came up with?

17 A. The purpose of the research was to  
18 show novel approaches, fill in the gaps so  
19 that Advanced Development could take those  
20 ideas and develop them and put them into  
21 products.

22 Q. So did Advanced Development have to  
23 do some more work before the ideas that you  
24 came up with could be implemented?

25 A. At each step in going from research

1 Winters

2 to Advanced Development to Development there  
3 were additional levels of work that needed to  
4 be done to take the general concepts, expand  
5 them to include how it would be integrated  
6 into these existing systems, and what  
7 modifications would be needed in order to be  
8 able to do that.

9 MR. NOROOZI: Okay. Let's take a  
10 break.

11 THE WITNESS: Okay.

12 (Recess taken.)

13 Q. All right. Dr. Winters, let's talk  
14 about the '231 patent. Let me give you your  
15 declaration, the petition and the patent.

16 A. Thank you.

17 Q. With respect to the '231 patent,  
18 you rely on Kuwahara as the primary  
19 reference, right?

20 A. I rely on Kuwahara, yes.

21 Q. And with respect to what you call  
22 Limitation 1.5.2 starting on page 60 of your  
23 declaration, you rely on Kuwahara, right?

24 A. 1.5.2 I rely on Kuwahara.

25 Q. And then also for 1.5.3, you rely

1 Winters

2 on Kuwahara, right?

3 A. 1.5.3 I rely on Kuwahara.

4 Q. And from both 1.5.2 and 1.5.3, you  
5 only rely on Kuwahara, right?

6 A. Those two points, I only rely on  
7 Kuwahara.

8 Q. 1.5.2 and 1.5.3 together require  
9 that the cross-correlated signal information  
10 be used to update the routing information,  
11 right?

12 A. Yes. Those two, those require that  
13 the cross-correlated signal information is  
14 used to update, or the routing information.

15 Q. And it's your theory that the  
16 information that comes out of the correlation  
17 matrix 106 in Kuwahara is the  
18 cross-correlated signal information that is  
19 used to update the routing information for  
20 purposes of the patent claims, right?

21 A. It was my opinion that the  
22 cross-correlated signal information that they  
23 were referring to in the claim referred to  
24 the information coming out of the element 106  
25 in the -- in -- in that document, yes.

1 Winters

2 Q. You're talking about element 106 in  
3 Kuwahara, right?

4 A. Yes.

5 Q. Which is also called the  
6 correlation matrix, right?

7 A. (Perusing document) Element 106 is  
8 referred to as the correlation matrix  
9 estimation.

10 Q. So it's your opinion that the  
11 information that comes out of the correlation  
12 matrix estimation 106 in Kuwahara meets  
13 limitations 1.5.2 and 1.5.3 of the '231  
14 patent.

15 A. It was my understanding when I  
16 wrote the declaration that indeed the  
17 information that was in element 106 met the  
18 criteria of being cross-correlated signal  
19 information, as described in the patent.

20 Q. That is used to update the routing  
21 information, right?

22 A. And that information is used to  
23 update the routing information.

24 Q. And the alleged cross-correlation  
25 that you're relying on happens at the

1 Winters

2 correlation matrix 106 in Kuwahara, in your  
3 opinion, right?

4 A. The correlation -- 106 is the  
5 correlation matrix estimation, and part of  
6 that information comes from the despread  
7 box 102.

8 Q. Let me be more specific.

9 What you identify as the  
10 cross-correlated signal information for  
11 purposes of your opinion in your  
12 declaration --

13 A. Um-hm?

14 Q. -- is signal information that is,  
15 according to you, allegedly cross-correlated  
16 at correlation matrix 106 and then output  
17 from there, right?

18 A. That's where the estimate -- in box  
19 106, the estimation of the correlation is  
20 mate.

21 Q. And you contend that that is what  
22 constitutes cross-correlating the signal  
23 information for purposes of matching onto the  
24 challenged claims, right?

25 A. That's what I -- in my opinion, the



1 Winters

2 cross-correlation information was the  
3 information that's contained in box six oh --  
4 or 106.

5 Q. When you say "contained in," you  
6 mean actually created in, right?

7 A. Cross-correlation information is  
8 created in box 106.

9 Q. You have some different colors in  
10 your figure, annotated Figure 3 on page 67.

11 A. (Perusing document).

12 Q. I think you have a black and white  
13 copy there.

14 But do you recall that you have  
15 some different colors in that diagram?

16 A. Yes. That diagram uses different  
17 colors to refer to different pieces.

18 Q. Do you recall that some of it has  
19 been colored in teal and some of it has been  
20 colored in purple?

21 A. I do not recall the exact colors,  
22 but they use different colors.

23 And I can see in the document that  
24 I have, there are different shades of grey,  
25 so (speaking simultaneously) --

1 Winters

2 Q. Okay. Well, I think your counsel  
3 might have a color version that you could  
4 glance over at, if you don't mind.

5 A. Yes.

6 MR. EMERSON: (Sharing laptop  
7 screen.)

8 Q. Do you now see the portions that  
9 are shaded in teal and the ones that are  
10 shaded in purple?

11 A. You'll have to explain. Teal is  
12 green?

13 Q. Yes.

14 A. Yes, I see the one part is shaded  
15 in purple, referred to as the "Adaptive  
16 antenna," and "Signal information using set  
17 adaptive antennas" is shaded in green, or  
18 teal, as you refer to it.

19 Q. And then there's another part  
20 that's shaded in what's closest to blue  
21 maybe?

22 A. Yes.

23 And there's a third piece, entitled  
24 "Search receiver logic element 106 to update  
25 the routing information," and that is shaded

1 Winters

2 in blue.

3 Q. And so what delineates the  
4 difference between what has been shaded in  
5 blue and what's been shaded in green?

6 How did you decide which one to  
7 color which?

8 A. The part that's in blue contains  
9 some of the elements that update the routing  
10 information, and what's shaded in green  
11 includes the despreading process, the  
12 beamforming for the uplink, and the receiver  
13 itself.

14 Q. Well, you see that back at step  
15 115, at the bottom, that that box is in blue?

16 A. 115 box entitled "Comparing to  
17 threshold" is also located in blue, yes.

18 Q. But then you've got some arrows  
19 going from the despreader at 102 into the  
20 correlation matrix 106, and those arrows are  
21 still green, right?

22 A. There's arrows going from 102 to  
23 106, and those arrows are green.

24 Q. And then there are arrows going  
25 back from 110 to 103 that are in blue, right?

1 Winters

2 A. Yes, the arrows going from 110 to  
3 103 are in blue.

4 Q. So what is the decision basis for  
5 whether something was colored in blue or  
6 green?

7 What are you trying to connote by  
8 the fact that you very specifically colored  
9 some things in green and some things in blue?

10 MR. EMERSON: Object to the form.

11 A. The purpose of creating the  
12 different colors was simply to explain in  
13 part what the different pieces were doing,  
14 what their functions were.

15 Q. So what is -- well, what is the  
16 reason that the arrows that go into box 106  
17 from box 102 are in green, whereas the arrows  
18 that come back from box 110 to box 103 are in  
19 blue?

20 A. Box 110 is the array control for  
21 uplink, and you need to update the routing  
22 information. That routing information  
23 includes the beamforming for the uplink. And  
24 therefore routing information that comes out  
25 of the correlation matrix is used to combine

1 Winters

2 the signals from the various antenna elements  
3 together, so that can be considered as  
4 routing information, and therefore those  
5 arrows were colored in blue because that was  
6 transferring information concerning the  
7 routing information.

8 Q. Did you decide what to color green  
9 and what to color blue?

10 A. I decided what colors should be  
11 placed on here in collaboration or in -- you  
12 know, it was an iterative approach to  
13 determining what colors or what boxes to  
14 include in different pieces.

15 Q. So you also have a copy of the '231  
16 petition in front of you. Could you turn to  
17 page 54, please?

18 A. (Perusing document) Okay.

19 Q. I'm sorry. Page 57.

20 A. (Perusing document).

21 Q. If you look at the paragraph that  
22 starts with "Therefore" in the top third of  
23 the page. Please let me know when you're  
24 there.

25 A. (Perusing document) I am there,

1 Winters

2 that paragraph on page 57.

3 Q. And it states "Therefore Kuwahara's  
4 updates to routing information based on the  
5 correlation matrix estimator's output, which  
6 is in turn based on signals received by the  
7 adaptive antenna renders obvious updating  
8 routing information," and then it recites the  
9 claim limitation of the '231 patent, right?

10 A. That's reciting based on at least a  
11 part -- in part on the "cross-correlation  
12 information that is received by said receiver  
13 using said adaptive antenna."

14 Q. Okay. And that paragraph there in  
15 the petition is consistent with your opinion  
16 that the cross-correlated signal information  
17 is the information that comes out of  
18 correlation matrix estimator 106 and is used  
19 to then update the alleged routing  
20 information, right?

21 MR. EMERSON: Objection to the  
22 form. I object to questions about the  
23 petition itself is beyond the scope of  
24 the direct testimony.

25 A. I can describe what's in my

1 Winters

2 declaration, which shows that the routing  
3 information is obtained by the correlation  
4 matrix estimation, and passed to both the  
5 beamforming for the uplink as well as for the  
6 downlink.

7 Q. Do you see any inconsistency  
8 between the paragraph that I had you look at  
9 in the petition and the opinions to your  
10 declaration?

11 MR. EMERSON: Object to the form.

12 I object to questions -- these questions  
13 are beyond the scope of the direct  
14 testimony.

15 A. Again, I have not read the petition  
16 in detail, so let me just take a second to  
17 read that again. (Reading).

18 That paragraph agrees with my  
19 declaration.

20 Q. And do you see that at the end of  
21 the paragraph they're citing to paragraph 139  
22 of your declaration?

23 A. Yes.

24 Q. Do you see that?

25 A. That, yes, it refers to my

1 Winters

2 declaration paragraph 139.

3 Q. And so you agree with the citation  
4 in the petition, that the theory that's  
5 described there is consistent with what's in  
6 your declaration, right?

7 MR. EMERSON: Objection. Form  
8 objection; beyond the scope.

9 A. The statement that is there is  
10 basically restating what I said in  
11 paragraph 139.

12 Q. And paragraph 139 of your  
13 declaration in turn is effectively just  
14 summarizing what you said about how, in your  
15 opinion, Kuwahara allegedly meets limitation  
16 1.5.3, correct?

17 A. Paragraph 139 is my opinion of how  
18 it meets 1.5.3.

19 MR. NOROOZI: We've got to take a  
20 short break for a call by counsel, so  
21 we'll do that now.

22 MR. EMERSON: Thanks.

23 (Recess taken.)

24 Q. Dr. Winters, would you turn to  
25 paragraph 92 of your declaration for the '231



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patent, please?

A. (Perusing document).

Q. Are you there?

A. Yes.

Q. Okay. Could you read it out loud please just that one paragraph?

A. "A POSITA would have understood that by transmitting up-converted composite signals by directing simultaneously a beam towards multiple mobile stations Kuwahara is describing that the adaptive array provides corresponding outgoing multi-beam signals as claimed."

Q. Okay. So in the first half of that sentence, before the comma in paragraph 92, you are describing what Kuwahara teaches, right?

A. I'm describing what he teaches.

Q. And you state that Kuwahara teaches transmitting up-converted composite signals by directing simultaneously a beam toward multiple phone stations, multiple mobile stations?

A. By directing simultaneously a beam

1 Winters

2 towards multiple mobile stations.

3 Q. So in Kuwahara, there's a directed  
4 beam that's going out, and is intended to  
5 simultaneously serve multiple mobile users,  
6 right?

7 A. The question gets into what you  
8 mean by "a beam." So if you're directing it  
9 towards multiple users, you could have a beam  
10 shape or beam pattern that is directed  
11 towards the multiple mobile stations and is  
12 not necessarily a beam with a main beam  
13 pointing towards a particular mobile station.

14 Q. So can you elaborate a little bit  
15 on the distinction that you're drawing there?

16 A. The typical beam shape that you  
17 would get out of a phased array antenna is a  
18 main beam with side loads. When we start  
19 talking about adaptive arrays, you can shape  
20 the beam in other than just a main load or  
21 side loads, and you can actually shape it to  
22 have nulls or beams pointing in multiple  
23 directions.

24 Q. You were saying that with an  
25 adaptive array beam approach, you can shape

1 Winters

2 the beam, right?

3 A. Adaptive arrays can shape the beam.

4 Q. And that's the approach that  
5 Kuwahara teaches?

6 A. Kuwahara teaches adjusting the  
7 weights in order to optimize performance, as  
8 an adaptive array would do.

9 Q. In your paragraph 92, you refer to  
10 "directing simultaneously a beam," right?

11 A. The statement is it "directs  
12 simultaneously a beam towards multiple mobile  
13 stations."

14 Q. And you see that "a beam" refers to  
15 a singular beam, right?

16 MR. EMERSON: Object to the form.

17 A. Again, this gets into what the  
18 definition of "a beam" is, whether it is a  
19 main beam as you would see in a phased array  
20 or it's a particular pattern that may have  
21 certain shapes associated with it other than  
22 what would be typical of a phased array.

23 Q. So I think we agree that in a  
24 phased array approach, "a beam" would  
25 definitely mean a single beam, right?

1 Winters

2 A. A phased array approach, generally  
3 you're only producing a single beam in a --  
4 that's pointing in one direction.

5 Q. And so are you suggesting now that  
6 in an adaptive array approach, "a beam" could  
7 actually constitute more than one beam?

8 A. That could form it -- "a beam"  
9 refers to a beam pattern, and that beam  
10 pattern may not have exactly the same shape  
11 as you would have in a phased array.

12 Q. Well, but is it still "a beam," or  
13 is it more than one beam?

14 A. Again, this gets into the  
15 definition of what "a beam" is, and there's  
16 various definitions on that.

17 Again, it's clear what "a beam" is  
18 in a phased array, but in an adaptive array,  
19 it's not always clear what you're referring  
20 to as "a beam."

21 Q. In an adaptive array approach, it's  
22 possible to put out multiple adaptive array  
23 beams, shaped beams at the same time, right?

24 A. Yes, it's possible in an adaptive  
25 array to simultaneously have multiple beams

1                   Winters  
2       coming out of that array.

3           Q.     Kuwahara never teaches that, right?

4           A.     Kuwahara is teaching based on the  
5       receive signals, calculating what that beam  
6       shape should be.

7           Q.     A single adaptive array beam,  
8       right?

9           A.     He's talking about generating a  
10      beam depending on how the signal is coming  
11      in. There's different approaches to what we  
12      -- what is actually meant by "a beam."

13                   For example, in a multi-path  
14      environment, there's not really what you  
15      would refer to as "a beam" there, as it's  
16      creating a beam pattern which by itself may  
17      not even been directed anywhere close to  
18      where the desired signal is located at, and  
19      instead it is shaped in such a way that the  
20      different components in the paths, the  
21      multi-path signals will arrive in phase at  
22      the mobile itself. So that definition of "a  
23      beam" is not the same as having a main lobe  
24      of the beam pointing in a particular  
25      direction.

1 Winters

2 Q. Let me be specific about my last  
3 question.

4 Although it is possible to have an  
5 adaptive array system that simultaneously  
6 outputs multiple adaptive beams, Kuwahara's  
7 approach is to output a single adaptive beam  
8 at a given time, right?

9 A. Kuwahara's approach is to output a  
10 particular certain beam pattern at a given  
11 time.

12 Q. Okay. So it's possible in an  
13 adaptive array system to output multiple beam  
14 patterns simultaneously, true?

15 A. At -- you could output multiple  
16 simultaneous beams. In that case, you would  
17 be referring to having different signals in  
18 each one of those beams. Yes.

19 Q. In an adaptive array approach.

20 A. In an adaptive array.

21 Q. In Kuwahara, there is no teaching  
22 of that multi-signal or multi-beam pattern  
23 approach to an adaptive array communication  
24 system, right?

25 A. Kuwahara is emphasizing the issue

1 Winters

2 of receiving a signal from a single mobile.

3 Q. Okay. But can you just more  
4 directly address the question that I asked,  
5 please?

6 A. Could you rephrase the question  
7 then?

8 Q. In Kuwahara, there's no teaching of  
9 simultaneously transmitting multiple beam  
10 patterns or beam signals using an adaptive  
11 array approach.

12 MR. EMERSON: Object to form.

13 A. I'm trying to recall exactly what  
14 Kuwahara states there, but the focus of that  
15 paper is on how you would focus a beam on a  
16 particular user.

17 Q. Okay. So Kuwahara's focus is on  
18 transmitting a signal or a beam to a singular  
19 user, right?

20 A. That's the focus --

21 MR. EMERSON: Object to the form.

22 If we are going to talk about  
23 Kuwahara in detail, can we maybe have  
24 the reference to the witness?

25 MR. NOROOZI: If that's something

1 Winters

2 that Dr. Winters wants, we can take a  
3 break and print it out.

4 I mean I think what we are talking  
5 right now about is what's been put in  
6 his declaration, and I'm asking about  
7 what's been stated in his declaration.

8 Q. (Continuing) But I had a question  
9 pending, so maybe we can have the question  
10 read back, and give me your answer, and then  
11 we can take it from there.

12 A. Okay.

13 (Record read, as follows:

14 "Question: So Kuwahara's focus is  
15 on transmitting a signal or a beam to a  
16 singular user, right?

17 "Answer: That's the focus" --)

18 Q. Did you need to add anything else  
19 to your answer?

20 A. I don't think so. No.

21 Q. In your declaration, you have a  
22 claim construction section, right?

23 A. Yes, I do.

24 Q. I see it starts at page 13. Will  
25 you let me know when you are there, please?



1 Winters

2 A. (Perusing document) I am on page  
3 13.

4 Q. Okay. In your Claim Construction  
5 section of your declaration, do you ever  
6 propose a construction of anything to do with  
7 beam multi-beam, adaptive array beam, or any  
8 other variation like that?

9 A. In Claim Construction, I talk about  
10 adaptive antennas and the definition of an  
11 adaptive antenna. And that definition is "an  
12 arrangement that includes an antenna array  
13 having a plurality of antenna elements and  
14 operatively sporting mechanisms that are part  
15 of the wireless routing device." That would  
16 include the ability to adjust the weights of  
17 those elements in order to produce basically  
18 any -- or a wide variety of the beam patterns  
19 that could be created.

20 And, again, those beam patterns  
21 could be a -- the results of a phased array,  
22 putting a main beam in a given direction, and  
23 nulls, or having side lobes in the other  
24 directions.

25 It could also be putting different

1 Winters

2 beam shapes in there, and in particular, in a  
3 multi-path environment, as I explained in  
4 many of my papers prior to the 2000; that in  
5 the case of a multi-path environment, the  
6 antenna pattern itself is not what's of  
7 interest. What's of interest is what the  
8 signals will be at the receiver.

9 Q. Okay. So let me follow up on the  
10 last part of your statement.

11 In your Claim Construction section  
12 in your declaration, you don't talk about a  
13 construction or a meaning for, quote, "a  
14 beam," right?

15 A. The term beam is not used in my  
16 claim construction, correct.

17 Q. Let me just clarify.

18 You don't propose a specific  
19 construction for, quote, "a beam," right?

20 A. I do not propose what "a beam" is,  
21 how "a beam" is sub-defined.

22 Q. You also do not propose a  
23 construction for, quote, "multi-beam," right?

24 A. Not in -- in the claim  
25 constructions, there is no definition of

1 Winters

2 "multi-beam."

3 Q. And in your discussion of Kuwahara,  
4 going back to paragraph 92, you also don't  
5 propose any explicit definition for either "a  
6 beam" or "multi-beam," right?

7 A. Paragraph 92 simply discusses the  
8 use of a beam.

9 Q. It does not provide a proposed  
10 definition for either "a beam" or  
11 "multi-beam," right?

12 MR. EMERSON: Object to form.

13 A. That paragraph there is talking  
14 about what a POSITA would understand, and is  
15 referring to the fact that you would be  
16 creating a beam, and it would use the  
17 definition that a POSITA would assume for  
18 that beam.

19 Q. But you don't say in your  
20 declaration what that definition is, right?

21 A. I do not in my declaration have an  
22 instruction of explicitly what "a beam" is.

23 Q. Does the concept of single beam  
24 versus multi-beam have meaning and relevance  
25 to those of skilled in the art -- skill in

1 Winters

2 the art in the context of adaptive array  
3 antenna approaches?

4 MR. EMERSON: Object to the form.

5 A. A POSITA would understand the  
6 difference between -- or what a multi-beam  
7 antenna was referring to --

8 Q. Well -- sorry.

9 A. -- and the ability to form multiple  
10 peaks and nulls in the beam pattern.

11 Q. We're specifically talking about an  
12 adaptive array antenna environment, right?

13 A. Correct.

14 Q. Okay. And we talked about the  
15 fact that in an adaptive array antenna  
16 approach, it is possible to simultaneously  
17 put out multiple beam patterns; is that  
18 correct?

19 A. Yes. An adaptive array can put out  
20 multiple beam patterns, that's correct.

21 Q. Some of them can, right?

22 A. Some adaptive arrays have the  
23 capability of producing multiple -- multiple  
24 antenna patterns.

25 Q. Not all of them, though, right?

1 Winters

2 A. It depends upon the -- yes. It  
3 depends upon the design of the hardware  
4 itself.

5 Q. How so?

6 A. If you talk about multiple beams  
7 operating at, say, different frequencies,  
8 then you would have to have different  
9 frequency channels.

10 In some cases, if you want to  
11 simultaneously put one beam out at one  
12 direction and another beam out in the other  
13 direction, you have to have different signal  
14 channels that go out to the elements such  
15 that if you had two signals, one signal would  
16 be adjusted in phase amplitude perhaps  
17 differently on one set of elements, and  
18 another signal coming in would have a  
19 different set of phase in amplitudes put out  
20 on those same antenna elements. That  
21 requires certain hardware modifications that  
22 are not always possible in every array.

23 Q. Such as what?

24 A. Such as duplicating the weights,  
25 duplicating the electronics, the logic

1 Winters

2 elements that require -- that are required in  
3 the adaptive array.

4 Q. What else?

5 A. The -- the requirement basically is  
6 to have two separate channels through your  
7 adaptive array in order that you can send one  
8 signal through one channel and another signal  
9 through another channel, or there's always  
10 going to be a limitation in terms of how many  
11 signals you can send out of that adaptive  
12 array simultaneously based on the circuitry  
13 for that.

14 Q. Now, in Swales, there are multiple  
15 adaptive array beams that are transmitted  
16 simultaneously, right?

17 A. Yes. Swales talks about a  
18 multi-beam antenna that is simultaneously  
19 sending different signals, in some cases at  
20 the same frequency at the same time, in the  
21 same channel.

22 Q. In your declaration, you don't  
23 discuss whether the adaptive array in  
24 Kuwahara is capable of simultaneously  
25 transmitting multiple adaptive array beam

1 Winters

2 signals, right?

3 A. I do not discuss Kuwahara --  
4 whether Kuwahara could indeed produce  
5 multiple signals simultaneously.

6 Although a POSITA would see -- be  
7 able to see, based on work that -- for  
8 example, I and others have done prior to  
9 that, how you would actually have multiple  
10 signals coming out at the same time.

11 Q. Of what?

12 A. Multiple signals -- how you could  
13 use Kuwahara to actually transmit multiple  
14 signals.

15 Q. By multiple signals, do you mean  
16 sending out one formed beam that is directed  
17 to a multi-path environment, or do you mean  
18 simultaneously putting out different adaptive  
19 array formed beams that are meant to serve  
20 different clients?

21 A. I was referring to the fact that  
22 you would have multiple clients, and you  
23 would be forming a beam for the signal for  
24 one client, and that beam would be different  
25 than the beam that's formed for the signal

1 Winters

2 that goes out to a second client.

3 Q. And your testimony was that based  
4 on papers that you had written in the past,  
5 someone of skill supposedly allegedly would  
6 know how to implement Kuwahara in a way that  
7 it could do multiple adaptive array beams  
8 serving different clients?

9 A. My papers discuss the use of  
10 multiple clients being served by the same  
11 platform, the same adaptive array, but that  
12 array developed in such a way that you're  
13 sending two different or more signals through  
14 that adaptive array to different users with  
15 different beam patterns for each user on the  
16 transmit side, as well as how you would do  
17 this in separate multiple users on the  
18 receive side.

19 Q. In your declaration, you do not  
20 discuss whether Kuwahara, as it already is  
21 built and defined in its own teachings, has  
22 the capability to simultaneously transmit  
23 multiple adaptive array beams to different  
24 clients, do you?

25 A. A POSITA would understand how to



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take Kuwahara and -- and change that into a multi -- to send multiple signals to multiple users.

Q. So you're saying that Kuwahara, as it already comes, can't do that, right?

MR. EMERSON: Object to the form.

A. Kuwahara, as it comes, does not describe that option, but a POSITA would understand how to duplicate the hardware or software in Kuwahara in order to be able to do that.

Q. In your declaration, you don't propose any such modification to Kuwahara explicitly, right?

A. I do not explicitly talk about what a POSITA would do in order to be able to modify it for a multiple-beam antenna without -- by itself, without referring to Swales as talking about multiple-beam antennas.

Q. In your declaration, you don't even state that a person of skill in the art would need to modify the antenna hardware of Kuwahara in any way in order to be able to simultaneously transmit multiple adaptive

1 Winters

2 array signals to different clients, right?

3 MR. EMERSON: Object to the form.

4 A. Your statement is that I would have  
5 to modify -- that modification to the  
6 hardware would be necessary. The processing  
7 could be done either in hardware or software,  
8 but some modification could be done, for  
9 example, in software as well as possibly in  
10 hardware, because there are multiple  
11 approaches to that, which would take Kuwahara  
12 and be able to transmit multiple beams,  
13 receive multiple -- transmit multiple user  
14 signals and receive multiple user signals.

15 Q. In your declaration, you don't  
16 state that a person of skill in the art would  
17 have to modify Kuwahara either in software or  
18 in hardware to be able to simultaneously  
19 transmit multiple adaptive array beams or  
20 signals to different clients, right?

21 MR. EMERSON: Object to form.

22 A. A POSITA would understand how to  
23 make those modifications, because those  
24 modifications were very well known at the  
25 time and had been implemented as well.

1 Winters

2 Q. Well, I'm just asking you whether  
3 that's something that you even refer to in  
4 your declaration much less discuss. Do you  
5 follow my question?

6 A. The -- again, the -- my response is  
7 that a POSITA would understand how to go  
8 about doing that.

9 Q. Well, I'd like to know whether you  
10 contend that you discuss that issue in your  
11 declaration or not.

12 MR. EMERSON: Wait for the  
13 question.

14 Q. (Continuing) Could you please --

15 A. Oh, sorry.

16 Q. (Continuing) Could you please tell  
17 me the answer to that question?

18 MR. EMERSON: Object to the form.

19 A. Can you repeat the question again?

20 Q. I'd like to know whether you  
21 contend that your declaration already  
22 discusses any need for a POSITA to modify  
23 Kuwahara's adaptive antenna in order to be  
24 able to transmit multiple adaptive array  
25 signals simultaneously to different client

1 Winters

2 devices.

3 MR. EMERSON: Form.

4 A. I discuss in my declaration that,  
5 as I state here, Swales supplements Kuwahara,  
6 and teaches that adaptive antenna arrays in  
7 cellular base-stations were known to transmit  
8 multiple-beam signals. Therefore, anyone  
9 reading the declaration could see that  
10 Kuwahara could indeed be modified in order to  
11 handle multiple transmit beams.

12 Q. Well, because Swales says that it's  
13 possible for such a thing to exist; is that  
14 why?

15 A. Swales is just teaching that it is  
16 possible to do that, but a POSITA would know  
17 that that had been done, and how to go about  
18 doing that.

19 Q. Based on Swales, or something else?

20 A. It would be based on something  
21 else, but Swales is just one in -- one  
22 reference that teaches the ability to do  
23 that.

24 Q. Swales itself assumes that to  
25 implement its teachings, you already have to

1 Winters

2 be able to transmit multiple adaptive array  
3 beams simultaneously to different client  
4 devices, right?

5 A. Swales assumes that you need to be  
6 able to transmit multiple simultaneous beams,  
7 because he's -- he's reusing -- he's doing  
8 spacial research -- spacial -- sorry, spacial  
9 reuse.

10 Q. And Kuwahara, as it already comes  
11 in its own teachings, does not describe how  
12 to do that, right?

13 A. Again, a POSITA would understand  
14 how to just duplicate some of the software or  
15 hardware in Kuwahara in order to be able to  
16 achieve that functionality.

17 Q. So a POSITA would need some  
18 knowledge based on some teachings that are  
19 not in Kuwahara and that are not in Swales in  
20 order to make the proposed combination that  
21 you have between Kuwahara and Swales, right?

22 A. A POSITA would have to use  
23 well-known techniques in order to combine  
24 Swales and Kuwahara.

25 Q. You don't show in your declaration

1 Winters

2 what these techniques would have been, right?

3 A. Those techniques were well known at  
4 that time.

5 Q. You don't demonstrate that in your  
6 declaration, true?

7 A. Again, this was well-known  
8 technology to do that, and it's not necessary  
9 to go through the details on how to do that.

10 Q. Whether it's necessary or not, you  
11 did not include any such information in your  
12 declaration, right?

13 MR. EMERSON: Object to the form;  
14 asked and answered.

15 A. Again, the declaration states or it  
16 says that a POSITA would understand how to do  
17 that.

18 Q. Well, it just says that a POSITA  
19 would know how to do that, period. It  
20 doesn't explain the basis for the statement.  
21 Right?

22 A. Again, how to combine the two  
23 together would be well known, is well known  
24 in the art.

25 Q. Where in your declaration did you

1 Winters

2 show and explain what someone would have to  
3 do and why it is that you contend it was well  
4 known?

5 MR. EMERSON: Object to the form.

6 A. The declar -- Swales, for example,  
7 talks about the use of a multiple-beam  
8 antenna. At the time that Swales had  
9 published that, there were other papers that  
10 were -- described how to create adaptive  
11 arrays that -- that had multiple beams being  
12 transmitted at the same time.

13 Q. Other papers that are not discussed  
14 in your declaration, right?

15 A. Yes. The declaration does not  
16 contain all the references to techniques that  
17 were available at that time.

18 Q. Let me put it this way. Your  
19 declaration does not expressly discuss any  
20 specific piece of prior art -- prior art  
21 reference that would have allowed someone of  
22 skill in the art to modify Kuwahara so that  
23 it could simultaneously transmit multiple  
24 adaptive array signals to different clients,  
25 true?

1 Winters

2 A. A POSITA would be able to  
3 understand exactly how to make those  
4 modifications.

5 Q. Okay. So we know about something  
6 called Swales in your declaration, right?

7 A. Yes.

8 Q. You've named, you describe it, you  
9 talk about it, right?

10 A. Yes.

11 Q. We know about something called  
12 Kuwahara in your declaration, right?

13 A. Yes.

14 Q. We know about something called  
15 Patel in your declaration, right?

16 A. Patel? Yes.

17 Q. Okay. We don't know of any  
18 specific reference in your declaration that  
19 contains a teaching of how to modify Kuwahara  
20 so that it can simultaneously transmit  
21 multiple adaptive beam signals to different  
22 client devices, right?

23 A. The techniques for being able to  
24 transmit to multiple client devices were  
25 well-known technique, well-known in the art



1 Winters

2 at that time.

3 Q. You don't have a name of a  
4 reference from your declaration that you can  
5 give me to prove that, right?

6 A. I would have to look in details  
7 through those references to see what was  
8 mentioned in those references, as far as the  
9 creation of multiple simultaneous beams using  
10 adaptive arrays.

11 Again, Swales talks about the fact  
12 that you have a multi-beam antenna under the  
13 assumption that it would -- a POSITA would  
14 easily be able to see how to implement  
15 something like that.

16 Q. Well, Swales assumes that you  
17 already have that capability before you start  
18 trying to implement what Swales is about to  
19 teach, true?

20 A. Swales assumes that you have  
21 multiple beam -- or the ability to transmit  
22 multiple signals simultaneously on the same  
23 channels.

24 Q. So if someone is starting with  
25 Kuwahara, and they want to be able to

1 Winters

2 transmit multiple adaptive beam signals  
3 simultaneously to different clients, they  
4 can't find out how to do that by just looking  
5 at Swales, right?

6 MR. EMERSON: Object to the form.

7 A. By looking at Swales, they would  
8 understand that that was the capability, and  
9 would be able to find out how to modify  
10 Kuwahara in order to have multiple beams.

11 Q. Would be able to find out how; by  
12 going and doing some other research?

13 A. A POSITA at that time would be  
14 aware of the techniques for taking a single  
15 user system and making it a multiple user  
16 system.

17 Q. Where in your declaration do you  
18 explain that?

19 A. Again, Swales makes the assumption  
20 that you would be able to have multiple beam  
21 antennas. Kuwahara talks about how you do a  
22 single beam. And the steps from going from a  
23 single beam to a multiple beam antenna were  
24 well known in the art.

25 Q. Well, you keep reciting that

1 Winters

2 phrase, but you haven't demonstrated to me  
3 anything that's in your declaration that says  
4 that, right?

5 A. Again, a POSITA would know how to  
6 go about doing that.

7 Q. Based on something that's stated in  
8 your declaration?

9 A. Based on reading the references of  
10 Swales and Kuwahara.

11 Q. Well, Swales doesn't teach how to  
12 do it, right?

13 A. Swales refers to how you would use  
14 a multiple beam antenna.

15 Q. Swales just says you would use a  
16 multiple beam antenna, right?

17 A. Swales talks about the use of a  
18 multiple beam antenna.

19 Q. Okay. But it doesn't tell you how  
20 to make one, right?

21 A. Swales does not go into detail on  
22 how to do that.

23 Q. Neither does Kuwahara, true?

24 A. Kuwahara is talking about a single  
25 user system. However, as with any of these

1 Winters

2 publications, they have prior references. I  
3 have not looked in details at those to see if  
4 somebody reading those patents would not be  
5 able to go to those other references and see  
6 how to go about doing that.

7 Q. Well, it's certainly not part of  
8 your opinion in your declaration that they  
9 would be able to, right?

10 MR. EMERSON: Object to form.

11 A. It's my opinion that they would be  
12 able to do that.

13 Q. What I mean is in your declaration,  
14 you don't say that someone would look at some  
15 cited reference in either Kuwahara or Swales  
16 and learn information that is pertinent to  
17 this entire line of questioning that I've  
18 been asking you. Right?

19 MR. EMERSON: Objection to the  
20 form.

21 A. Again, all I can do is repeat the  
22 fact that a POSITA would know how to go from  
23 one reference to the other.

24 Q. Why is that all you can do? Why is  
25 that all you can do?

1 Winters

2 Because I've been asking you  
3 whether something in your declaration or not,  
4 and indeed all you've been telling me is what  
5 you think someone could have done, but you  
6 haven't been telling me what's in your  
7 declaration or what is not in your  
8 declaration.

9 So why is that?

10 MR. EMERSON: Object to the form.

11 A. Swales by itself, talking about  
12 multi-user types of systems, could  
13 incorporate Kuwahara, and the incorporation  
14 of Kuwahara is simply duplicating the  
15 hardware and software that Kuwahara has  
16 proposed. Therefore someone reading this  
17 would understand that it was -- particularly  
18 a POSITA would understand it was  
19 straightforward to go from one to the other,  
20 and, as such, a description of exactly step  
21 by step how you would do that was not  
22 necessary.

23 Q. So, Dr. Winters, you're here to  
24 give truthful and honest testimony, right?

25 A. Yes.

1 Winters

2 Q. All right. And if you don't  
3 understand one of my questions, you'll ask  
4 me, right?

5 A. Yes.

6 Q. Okay. So your name is in your  
7 declaration, right?

8 A. Yes.

9 Q. Is your wife's name in your  
10 declaration?

11 A. No.

12 Q. Okay. You know the difference  
13 between something being in your declaration  
14 and not being in your declaration, right?

15 A. Whether the exact words are in  
16 there or not.

17 Q. Is your family life described in  
18 your declaration?

19 A. No.

20 Q. Okay. So you also understand that  
21 there are certain concepts that are not in  
22 your declaration, right?

23 A. Certain concepts that are not  
24 explicitly explained are in my declaration.

25 Q. Are not in your declaration.

1 Winters

2 A. Are not -- yeah. There are certain  
3 concepts that are not explicitly explained in  
4 my declaration.

5 Q. Okay. The concept of how to take  
6 Kuwahara and modify it so that it can  
7 simultaneously transmit multiple adaptive  
8 array beam signals to different client  
9 devices is not explained in your declaration,  
10 right?

11 MR. EMERSON: Object to the form.

12 A. I've referred to Swales, I have  
13 referred to Kuwahara, and a POSITA reading  
14 that would be able to see how to do that, so  
15 the declaration does have the information  
16 that's necessary to go from Kuwahara to  
17 Swales if read by a POSITA.

18 Q. Show me what is the information  
19 that is in your declaration that is the  
20 information necessary to allow someone of  
21 skill in the art to go from Kuwahara to a  
22 system that simultaneously transmits multiple  
23 adaptive array beam signals to different  
24 clients. Where is that?

25 A. So if I look after -- on page 42, I

1 Winters

2 look at paragraph 94, "Part B, Adaptive  
3 Arrays For Cellular Base-Stations, it says  
4 "Multiple beam adaptive" arrays -- "antenna  
5 arrays have been considered by Davies,"  
6 reference 16, "for enhancing the number of  
7 simultaneous users accessing future  
8 generation cellular networks." Okay? Now, I  
9 have not explicitly looked at Davies, but I  
10 would -- it's my opinion that Davies would  
11 include in there that what you are doing to  
12 create multiple beams is to duplicate the  
13 hardware and software of an adaptive array to  
14 handle more than one user.

15 Q. So you're saying that the fact that  
16 Swales says that there's another document,  
17 Davies, that indicates that such a thing --  
18 that considered -- that considered such a  
19 thing would have been enough to tell someone  
20 of skill in the art how to go about turning  
21 Kuwahara from a system that only transmits  
22 one adaptive array signal for one user at a  
23 time to one that can transmit multiple  
24 adaptive array signals to multiple users at a  
25 time?



1 Winters

2 A. A POSITA in reading that would be  
3 able to, in my opinion, be able to go from  
4 the single user system to a multiple user  
5 system.

6 Q. Even though you've never read  
7 Davies?

8 MR. EMERSON: Object to the form.

9 A. Davies states, or in Davies, it  
10 talks about using multiple beam adaptive  
11 antennas for enhancing the number of  
12 simultaneous users, and that means he's going  
13 from one user to multiple users. So this is  
14 one way, or this is the way to go from having  
15 a system that only transmitted with a better  
16 signal, as Kuwahara is talking about, to one  
17 user to how you would now take that and  
18 basically duplicate the process to go to  
19 multiple users.

20 Q. Have you read Davies?

21 A. I may have. I can't recall whether  
22 or not. I can't recall that reference.

23 Q. You don't remember anything  
24 specific about what's in Davies as you sit  
25 here today, right?

1 Winters

2 A. I cannot recall any specific  
3 details that's in Davies.

4 But if you talk about having  
5 simultaneous users out there, you would --  
6 it's my opinion you would have to have put in  
7 there how you go from a single user system to  
8 a multiple user system.

9 Q. Well, Swales talks about that, and  
10 it doesn't tell you how to do it, right?

11 A. Swales simply mentions that you  
12 would have that capability.

13 Q. Okay. And you don't know if  
14 Davies teaches anything more than that or if  
15 Davies teaches something that would have been  
16 enough, right?

17 A. Again, I'm not -- I don't have  
18 Davies's reference, so I -- it would be my  
19 opinion that he would be saying you duplicate  
20 certain things, but I have not -- I can't  
21 verify that.

22 Q. Okay. So you have an opinion  
23 based on what may be in Davies even though  
24 you don't remember anything about what's in  
25 Davies --

1 Winters

2 MR. EMERSON: Objection;

3 mischaracterizes --

4 Q. -- right?

5 MR. EMERSON: -- the witness'

6 testimony.

7 A. Again, a POSITA would be able to  
8 figure out how to do from a single user  
9 system to a multiple user system. There were  
10 numerous papers at that time that discussed  
11 how to go about doing that by duplicating  
12 software and/or hardware.

13 And I was just referring to Davies  
14 as one article where that information may be  
15 contained.

16 Q. Or may not be contained.

17 A. It's possible that he does not  
18 mention that, but there would be other  
19 references that -- Davies, for example, may  
20 reference that a POSITA would find that would  
21 discuss the details on how to go from a  
22 single user to a multiple user system.

23 Q. Does your declaration discuss any  
24 potential impacts to Kuwahara, whether in  
25 terms of cost, latency, performance or

1 Winters

2 anything else, from any specific modification  
3 to Kuwahara so that Kuwahara would go from  
4 being a system that can only transmit one  
5 multi -- excuse me, one adaptive array beam  
6 signal to one that can simultaneously  
7 transmit multiple adaptive array signals for  
8 different users?

9 A. Could you repeat? It's a long  
10 question. Could you repeat that question  
11 again?

12 Q. Sure.

13 MR. NOROOZI: We can have it read  
14 back, please.

15 (Record read, as follows:

16 "Does your declaration discuss any  
17 potential impacts to Kuwahara, whether  
18 in terms of cost, latency, performance  
19 or anything else, from any specific  
20 modification to Kuwahara so that  
21 Kuwahara would go from being a system  
22 that can only transmit one multi --  
23 excuse me, one adaptive array beam  
24 signal to one that can simultaneously  
25 transmit multiple adaptive array signals

1 Winters

2 for different users?")

3 MR. EMERSON: I object to the form.

4 A. I have references that I wrote  
5 myself or have papers that I wrote myself  
6 that discuss how to go from a single user  
7 system to a multiple user or multi-beam  
8 system, as discussed here.

9 Q. Okay. But I'm talking about  
10 what's in your declaration. You follow me?

11 A. Yes.

12 So what specifically is stated in  
13 there is, as it states here, it would have  
14 been obvious to a POSITA to take the -- to  
15 have Kuwahara's adaptive antenna output  
16 multiple beams be simultaneous, as Swales  
17 teaches, because it would allow for enhancing  
18 the number of simultaneous users and  
19 increasing the efficiency of the system.

20 Q. Okay. So that's just a sentence  
21 that says it would have been obvious, right?

22 A. It would have been obvious that it  
23 would give you an improved -- an improvement  
24 in performance.

25 Q. Maybe, maybe not.

1 Winters

2 But do you talk in your declaration  
3 about the impact, any consequence, any  
4 negative downsides from such a modification?

5 MR. EMERSON: Objection to form.

6 A. The declaration itself is talking  
7 about trying to look at the motivation for  
8 doing such a thing, and that motivation is  
9 based upon a reasonable expectation of  
10 improvement, and here I'm talking about what  
11 kind of improvements that would be obtained  
12 by doing that.

13 Q. You're a -- sorry.

14 A. There always can be negative  
15 consequences or costs or trades that one  
16 would have to consider when they went through  
17 the design of making these modifications.

18 Q. In your declaration, did you  
19 consider those negative consequences and even  
20 if there are any such consequences expressly?

21 MR. EMERSON: Object to form.

22 A. I have simply talked about how you  
23 would add that feature to using Kuwahara,  
24 which a POSITA would understand was  
25 duplicating hardware, and any duplication of

1 Winters

2 hardware would or potentially result in an  
3 increase in cost.

4 Q. What other consequences would a  
5 duplication in hardware have to our system?

6 A. In terms of?

7 Q. In terms of disadvantages, costs,  
8 decreases in performance, any downsides.  
9 What other downsides would it have?

10 MR. EMERSON: Object to the form.

11 A. Potentially such -- if you have to  
12 duplicate the hardware, that's doubling --  
13 that could potentially increase the cost.

14 It could also increase the size of  
15 the device.

16 It could increase the weight.

17 It could potentially increase the  
18 amount of power that such a device requires.

19 Q. What else?

20 A. Any time you have multiple beams  
21 coming out of one device there's the  
22 potential for co-channel interference, and in  
23 that case, there could be increased signal  
24 level or -- sorry, increased interference  
25 level.

1 Winters

2 Q. That would degrade the quality of  
3 the communications?

4 A. That's the trade that you would  
5 look at, is the increase in spectral  
6 efficiency by having multiple simultaneous  
7 users versus the potential to have the system  
8 cost more and potentially have co-channel  
9 interference, which could potentially degrade  
10 the performance as well.

11 Q. How would you go about evaluating  
12 that trade-off if you wanted to do it in the  
13 real world as a real engineer?

14 A. Um-hm.

15 Q. Like when you were at AT&T, how do  
16 you go about determining and evaluating that  
17 trade-off?

18 A. When I was at AT&T I evaluated  
19 exactly the same trade by taking a system  
20 that was designed for a single user using an  
21 adaptive array, and then took that so that  
22 you had multiple users using that adaptive  
23 array there, and looked at the performance  
24 improvements as well as any penalties or  
25 potential degradations that would occur



1 Winters

2 there.

3 Q. How did you do that analysis?

4 What did you go through in order to  
5 make those determinations?

6 A. The approach we take is a  
7 theoretical analysis, doing approximations in  
8 your theory, and then based upon under  
9 certain assumptions. We followed that with  
10 computer simulation results. I then  
11 implemented this in hardware and software,  
12 and tested to see what the advantages and  
13 disadvantages of using these techniques were.

14 Q. And only after that analysis did  
15 you draw a conclusion about whether you would  
16 want to make the modification or not?

17 A. After that analysis, at each step  
18 -- you proceed from step to step based on  
19 seeing that things improve with one step, the  
20 first step, with theory. So first -- at  
21 least from my point of view, the first thing  
22 to do is to go and see theoretically does it  
23 make sense.

24 The next step after that is to run  
25 through computer simulations, which doesn't

1 Winters

2 have a lot of the assumptions made in the  
3 theoretical analysis there, and based upon  
4 positive performance there, you go -- or  
5 positive trade there, take the next step, and  
6 implement it in a prototype system.

7 And then we would -- if it still  
8 was positive at that time, which it was, we  
9 then hand that off to the Advanced  
10 Development and Development teams that again  
11 go through similar times of processes to see  
12 whether or not there's improvement there.

13 Q. How long did that process take when  
14 you did it at AT&T?

15 MR. EMERSON: Object to the form.

16 A. The process itself at AT&T, because  
17 we were the first ones to actually do  
18 something like that, we were pioneering in  
19 that area, that research itself was done over  
20 a period of many months to go through the  
21 theory, many months to go through the  
22 computer simulation, many months to implement  
23 that in software and hardware.

24 And those results were published in  
25 papers that were widely available.

1 Winters

2 Q. Your analysis at AT&T was with  
3 respect to a specific system and a specific  
4 architecture and specific use cases and  
5 environment assumptions for the -- for the  
6 propagation of the signals that ultimately  
7 impacted your final conclusions about the --  
8 the costs and benefits of the modification  
9 that you were evaluating, right?

10 MR. EMERSON: Object to the form.

11 A. In my research, I like to first do  
12 a theoretical calculation that's based on a  
13 broad range of systems, and as we go through  
14 the research and development process we look  
15 at a solution that would apply to many  
16 different types of systems, and slowly focus  
17 it down on a specific product. Again, that  
18 would be the Advanced Development and  
19 Development groups' implementation in  
20 specific products.

21 Q. You don't talk about the details of  
22 any of that research in your declaration,  
23 right?

24 A. A POSITA would understand that  
25 that's the process that you would go through

1 Winters

2 for coming up with new knowledge, and a  
3 POSITA would also be able to look at those  
4 previous results and determine how you would  
5 go from one system to another.

6 Q. Are you giving me a reason why you  
7 didn't need to put something in your  
8 declaration?

9 MR. EMERSON: Object to the form.

10 A. Information that I felt a POSITA  
11 would be able to -- it would be obvious to a  
12 POSITA how to do that, some of those types of  
13 -- that type of information was not placed  
14 into the declaration, again, because it would  
15 be well known, or from reading the  
16 declaration, a POSITA would be able to figure  
17 out how to do that.

18 MR. EMERSON: Good time for a  
19 break? We've been going for a little  
20 over an hour.

21 MR. NOROOZI: Yeah.

22 (Luncheon recess taken 12:17 p.m.)  
23  
24  
25

Winters

A F T E R N O O N     S E S S I O N

(Time noted: 12:41 p.m.)

J A C K   H .   W I N T E R S   ,   resumed  
and testified as follows:

CONTINUED EXAMINATION

BY MR. NOROOZI:

Q. All right, Dr. Winters, let me ask  
you a bit about your '296 patent opinions,  
and I'm going to hand over the patent, the  
petition and your declaration.

A. Okay.

Q. So, with respect to your opinions  
regarding the '296 patent, you again rely on  
Antonio as a secondary reference, but instead  
you rely on Chang as a primary reference in  
place of Alastalo; is that correct?

A. That's correct.

Q. Now, in your '296 declaration, you  
propose that a person of skill would have  
modified Chang in certain respects in light  
of Antonio, correct?

A. Correct.

Q. And specifically, similar to your  
'728 patent opinions, you propose that

1 Winters

2 someone of ordinary skill would have added in  
3 the teachings of BMM messages, PSMM messages,  
4 add beam sets, drop beam sets, and  
5 specifically the soft hand-off teaching of  
6 Antonio into Chang; is that right?

7 A. Based on my -- what I stated in my  
8 declaration, is somebody could potentially --  
9 or they would consider the implementations of  
10 the techniques that Antonio has into Chang.

11 Q. Okay. So they would consider it?

12 A. They would be motivated to consider  
13 this as a possible inclusion.

14 Q. What would they have to do from  
15 there to decide whether they would actually  
16 implement it or not?

17 A. Look at what the cost was and what  
18 the performance improvement, what the benefit  
19 was, the trade between performance  
20 improvement and additional cost.

21 Q. And how would they determine the  
22 performance improvement or lack thereof?

23 How would they evaluate whether  
24 there was a performance improvement and, if  
25 there was, how much, and if it were

1 Winters

2 worthwhile?

3 A. Go through the techniques that I've  
4 used in the past, that a POSITA would use as  
5 well would be to, for example, run commuter  
6 simulation programs to analyze what these two  
7 different systems and what the performance  
8 improvement would be by taking Chang and  
9 adding to that Antonio.

10 Q. You certainly did not discuss those  
11 specific types of commuter simulations in  
12 your declaration, did you?

13 A. A POSITA would be aware what types  
14 of computer simulations could be done there.

15 Q. The testing and analysis that you  
16 described would have to be performed before  
17 someone would know what its answer would be,  
18 right?

19 A. Testing would be done after a  
20 POSITA would look and say, hey, there's the  
21 potential for improvement, but to actually  
22 know with certainty that there was an  
23 improvement generally requires the use of  
24 computer simulation.

25 Q. They don't know the answer to the

1 Winters

2 analysis before they run the analysis, right?

3 A. Sometimes you would have an  
4 approximate answer from theory as to what  
5 expected results would be, so you have an  
6 expectation of what the improvement is, but  
7 generally you use the simulation to refined  
8 -- to refine what that improvement is.

9 Q. In your declaration, you did not  
10 talk about whether the person of skill would  
11 in fact have known whether the proposed  
12 modification to Chang based on Antonio would  
13 have net-net yielded a positive impact or a  
14 negative impact, and whether any positive  
15 benefit would have been worth it in light of  
16 the relevant considerations, true?

17 A. Somebody looking at -- that was  
18 involved with Chang and was looking at the  
19 implementation of Antonio would be looking --  
20 would be saying here's some techniques that  
21 potentially could provide improvement, but as  
22 to any potential improvement, until you  
23 actually go through the entire process, even  
24 if you have a reasonable expectation that  
25 there would be an improvement, you are never



1 Winters

2 a hundred percent certain until you actually  
3 go through the entire process.

4 Q. In your declaration, you don't  
5 discuss the steps that a person of skill in  
6 the art would have to take to modify Chang to  
7 incorporate the teachings from Antonio that  
8 you propose, true?

9 A. In my declaration, I simply state  
10 that a POSITA would be able to understand  
11 what was necessary to take Antonio's  
12 potential improvement and incorporate it into  
13 Chang.

14 Q. How do you know that?

15 A. How do I know that a POSITA would  
16 be able to incorporate those changes?

17 Q. Yes.

18 A. Because the -- the techniques that  
19 Antonio has proposed, he describes in detail  
20 how he implements those techniques, so the  
21 only -- the POSITA would be able to see how  
22 those techniques were implemented in Antonio,  
23 and look at Chang and say, hey, I can put  
24 those types of messages into the processing  
25 that Chang is doing there.

1 Winters

2 Q. Is it your testimony that anything  
3 from one system can just be incorporated into  
4 any other system in the world of wireless  
5 communications?

6 A. My testimony is not that it could  
7 always be done, but in certain areas where  
8 the techniques have been well explained, it's  
9 possible to take those techniques and apply  
10 them to another system. Particularly that  
11 would be done if there's the potential for  
12 improvement, and the trade would then be how  
13 many -- how much modification needs to be  
14 done to one system to incorporate it into  
15 another.

16 Q. Well, your declaration doesn't  
17 describe the amount of modification that  
18 would need to be done to Chang to incorporate  
19 the teachings from Antonio, right?

20 A. My declaration does not state the  
21 particular level of research or development  
22 that would be required in order to go from  
23 Antonio into Chang.

24 Q. Antonio is about satellites, right?

25 A. Antonio discusses satellite

1 Winters

2 communications.

3 Q. And Chang is about cell towers,  
4 right?

5 A. Chang discusses cell towers.

6 Q. Neither Antonio nor Chang is about  
7 802.11 communications, right?

8 A. They are both talking about  
9 wireless communications, but they're not  
10 talking specifically about 802.11.

11 Q. You mentioned earlier in your  
12 deposition that there were certain issues  
13 that were not problematic in the cellular  
14 telecommunications world but that were still  
15 challenges, even unsolved ones, in the 802.11  
16 world as of the early 2000s. Do you recall  
17 that?

18 A. That I don't recall.

19 Which specific instance are you  
20 talking about?

21 Q. I believe in that context, you were  
22 talking about rapid hand-offs. Does that  
23 sound familiar?

24 A. Well, one of the things I was  
25 talking about were rapid fading events, and

1 Winters

2 you would expect to have more rapid fading  
3 occurring in cellular systems than you would  
4 in WiFi systems, and that's why the systems  
5 were developed differently and came to  
6 different solutions, because the applications  
7 and the channels and the users are different.

8 Q. When you say "rapid fading," can  
9 you just elaborate on what you mean?

10 A. How fast the channel changes is  
11 dependent upon -- in part, on how fast a user  
12 is moving there.

13 In a WiFi 802.11 system, those were  
14 initially designed for mobile or fixed --  
15 reasonably fixed users, whereas cellular  
16 systems were originally intended to be placed  
17 in automobiles, which, of course, move much  
18 more rapidly than pedestrians. Therefore the  
19 fading that you typically get in cellular  
20 systems will be higher than what you would  
21 expect to obtain in most cases in 802.11  
22 systems.

23 Although that's not always the  
24 case. You could be stationary and have, for  
25 example, a truck drive by, and that would

1 Winters

2 create an environment that would change  
3 rapidly even though you weren't moving  
4 yourself.

5 Q. I want to go back to one topic  
6 regarding your '231 patent opinions.

7 A. Okay.

8 Q. Sorry to jump around.

9 In your declaration, you did not  
10 discuss whether any of the operation of  
11 Kuwahara as described in Figure 3 which you  
12 included in your declaration would need to be  
13 modified in any way if Kuwahara were to be  
14 modified to be able to emit multiple adaptive  
15 beam signals for multiple users  
16 simultaneously, true?

17 MR. EMERSON: Objection to form.

18 A. I have stated that to go from  
19 Kuwahara to a multi -- multi-user system was  
20 something that a POSITA would understand, and  
21 enough detail was given in that declaration  
22 that a POSITA would be able to see how to go  
23 from Kuwahara to a multi-user system.

24 Q. So what I'm specifically asking is  
25 in your declaration, you did not discuss

1 Winters

2 whether as a part of that effort a POSITA  
3 would have to change anything about Figure 3  
4 of Kuwahara. Right?

5 MR. EMERSON: Object to form.

6 A. In that declaration, I state that  
7 Kuwahara could be modified to be a multiple  
8 beam system there, and a POSITA would be able  
9 to figure out what changes to make in order  
10 to go from a single user to a multiple user  
11 system, because, as I stated before, that's  
12 something that I myself have done as well as  
13 other people.

14 Q. Take a look at page 67 of your '231  
15 declaration, please?

16 A. (Perusing document) Ah. Okay.

17 Q. Did you consider whether any aspect  
18 of the correlation matrix estimation 106  
19 would have to be changed if a POSITA wanted  
20 to somehow modify Kuwahara to simultaneously  
21 transmit multiple adaptive beam signals to  
22 multiple users?

23 A. To incorporate multiple users, the  
24 software, if that was how it was being done,  
25 and the equations involved would need to be

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2 modified to handle multiple users.

3 Q. How do you know that?

4 A. Because I've done similar  
5 techniques before in changing from single  
6 user to a multiple user system, and changed  
7 the equations and the software when that was  
8 implemented.

9 Q. Why wouldn't the existing equations  
10 in Kuwahara be adequate as they are?

11 A. The existing equations in Kuwahara  
12 refer to a single user system, and, for  
13 example, when you go to multiple user systems  
14 you might want to use a technique such as  
15 successive interference cancellation, which  
16 takes into account that rather than having a  
17 single user coming in, you have multiple  
18 users coming in, and you would want to  
19 subtract the interference from one user from  
20 another user.

21 And these were in papers that were  
22 written in the 1990s.

23 Q. And then what about the process of  
24 updating the routing information based on the  
25 output of correlation estimation matrix 106;

1 Winters

2 would that need to be modified as well?

3 A. You'd be changing the software, and  
4 so the routing information would potentially  
5 be different in that case.

6 Q. How so?

7 A. In that case, when you go from a  
8 single user to a multiple user system you may  
9 be -- it's potentially you could change --  
10 have different weights than you would have  
11 for the single user system, but that's not  
12 necessarily the case.

13 Q. So maybe, maybe not?

14 A. Depending upon the implementation,  
15 the complexity, trade of complexity versus  
16 performance, one could consider modifying  
17 that correlation matrix estimation or  
18 potential improvement in performance with  
19 multiple users, or one could simply try to  
20 repeat the process, the same software, but  
21 now handle multiple users.

22 Q. What about any of the steps in  
23 Figure 3 of Kuwahara before step 106  
24 correlation matrix estimation; would any of  
25 those steps need to be modified if Kuwahara



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2 were modified somehow to simultaneously  
3 transmit multiple adaptive beams to multiple  
4 users?

5 A. If you look at block 102, which is  
6 the despreading process, that's using -- a  
7 despreading process is doing a correlation  
8 with the spread spectrums code that's on the  
9 transmitted signals. That code is different  
10 for different users, so you can separate one  
11 user from another, and therefore that  
12 despreading box would have to be doing  
13 despreading not just of one user but doing  
14 despreading on more than one user, which  
15 would require correlating the received signal  
16 not just with one spread spectrum code but  
17 with a second or third spread spectrum code  
18 as well to get the corresponding weights that  
19 would be used in the correlation matrix or  
20 the values that would be used in the  
21 correlation matrix estimation, which, again,  
22 would result in different beamforming weights  
23 for the two different users.

24 Q. Do you see any other aspects of  
25 Kuwahara's Figure 3 that would also have to

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2 be modified?

3 A. (Reading) Well, as I said  
4 previously, there's a duplication of the  
5 hardware or, if this is implemented in  
6 software, the software to incorporate another  
7 user.

8 Now, in terms of the adaptive  
9 antenna, the same adaptive antenna can be  
10 used for the multiple users. However, when  
11 we look at beamforming for the downlink, that  
12 beamforming for the downlink obviously would  
13 need to be different for one user than it  
14 would be for a second user, so, again, there  
15 would have to be more -- a multiplicative  
16 number of weights coming out of there, again,  
17 one set for each user that you're trying to  
18 communicate to.

19 Q. You're talking about box 114,  
20 "Beamforming for downlink"?

21 A. Yes.

22 Q. And what would you have to do  
23 there?

24 A. Again, the beamforming for the  
25 downlink, if you were to form multiple beams

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2 or communication with multiple users, you'd  
3 have to be forming a different set of weights  
4 to do beamforming for one user and then a  
5 different set of weights for a second user.

6 Q. How do you do that?

7 A. You use the same processing that  
8 you would use for a single user but now you  
9 come up with a different set of weights for a  
10 second user by looking at what comes out of  
11 the correlation matrix estimation, which  
12 comes about from, as we said, the array  
13 control for the downlink, which comes from  
14 the interference subspace estimation, which  
15 comes from the correlation matrix estimation,  
16 and ultimately comes from the despreading,  
17 which is done differently for the different  
18 users. That is, you're despreading with  
19 different spread spectrum signals for --  
20 spread spectrum code for one user versus the  
21 second user.

22 Q. So Swales comes in 1990, right?

23 A. Swales does come in 1990.

24 Q. And Kuwahara comes in 1999, in  
25 terms of its filing date, right?

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2 A. I'd have to check, but I believe  
3 that's about the timeframe.

4 Q. You can look at paragraph 38 of  
5 your declaration if you want to be sure.

6 A. Okay. (Reading).

7 Yes, 1999.

8 Q. Do you think that Kuwahara himself  
9 was at least a person of ordinary skill in  
10 the art, based on your definition?

11 A. I believe Kuwahara was a POSITA.

12 Q. Do you think he was more than a  
13 POSITA?

14 MR. EMERSON: Objection to form.

15 A. It would be my opinion he seems to  
16 have -- again, I do not know Kuwahara, so  
17 what I see in the patent is certainly  
18 something a POSITA would be able to do, and  
19 how much beyond that, I'm not -- I really  
20 don't have an opinion on that.

21 Q. Do you think that Kuwahara knew  
22 whether it was possible to create an adaptive  
23 antenna approach that simultaneously  
24 transmitted multiple signals to different  
25 users as of the time he wrote this reference

1 Winters

2 in 1999?

3 MR. EMERSON: Objection; calls for  
4 speculation.

5 A. Yes, again, I would not know  
6 whether or not he was aware of that.

7 What I am aware of is the fact that  
8 I had published papers back in nineteen  
9 ninety -- nineteen -- sorry, 1987 that showed  
10 how to take a single system like Kuwahara  
11 has, and convert it into a multiple user  
12 system.

13 Q. Well, and Swales itself is from  
14 1990, right?

15 A. Swales is from 1990.

16 Q. And Swales presumes that there are  
17 such systems out there, right?

18 A. And there were such systems out  
19 there, because I had worked on such systems,  
20 along with other people as well.

21 Q. So why does Kuwahara set itself up  
22 in a way where it can only transmit one  
23 adaptive array signal to a user at a time?

24 MR. EMERSON: Object to the form;  
25 calls for speculation.

1 Winters

2 A. Again, I don't know why he only put  
3 this into his patent, but that may -- that  
4 may have been the -- any time you write a  
5 patent, you're focused on solving one  
6 particular type of problem, and that  
7 apparently is why he -- well, again, I'd just  
8 be speculating as to why he did not  
9 incorporate a well-known art at that time, as  
10 to the fact that you could have taken this  
11 and now applied it to a multiple user system.

12 Q. Kuwahara is trying to address a  
13 situation where there is just only one user,  
14 right?

15 A. That's the problem that he was  
16 attempting to solve, yes.

17 Q. So in Kuwahara's world, there's no  
18 benefit to have an antenna array that puts  
19 out multiple adaptive array signals  
20 simultaneously, true?

21 A. That is not true.

22 But the specific problem that he is  
23 addressing, which is improving the  
24 performance of a single user that has  
25 interference, for that system, he's

1 Winters

2 interested only in having a single user out  
3 there, and his patent is focused on the  
4 performance improvement with that single  
5 user.

6 Q. What I meant when I said in  
7 Kuwahara's world in my last question was  
8 within the scenario that is discussed in the  
9 Kuwahara patent and that the Kuwahara patent  
10 is addressed towards. Do you follow me so  
11 far?

12 A. I follow your statement, yes.

13 Q. Okay. So you stated that going  
14 from an approach that can put out only one  
15 adaptive beam signal to one that can put out  
16 multiple simultaneously can create co-channel  
17 interference, right?

18 A. Can increase the level. Putting  
19 out more than one signal has the potential to  
20 increase the level of co-channel  
21 interference.

22 Q. And in the scenario that Kuwahara  
23 was concerned with, which is just sending a  
24 communication to a single user, that kind of  
25 increased co-channel interference would be a

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2 detriment, right?

3 A. Yes.

4 And, actually, you are creating in  
5 such a system, as he described, co-channel  
6 interference, but now you have co-channel  
7 interference that would be going into other  
8 cells, that other users out there that aren't  
9 necessarily communicating with your  
10 base-station.

11 Q. And at the same time you would not  
12 be benefiting the one user that Kuwahara is  
13 concerned with, right?

14 A. At the same time that you're  
15 putting out the signal to yourself you're  
16 trying to minimize in -- on the transmit side  
17 the amount of -- the amount of interference  
18 you're causing into the other users that  
19 would be in other base-stations or other  
20 cells.

21 And if the other users similarly  
22 use the same technique, they would be  
23 reducing the amount of co-channel  
24 interference that they were causing into the  
25 desired user there, and therefore although



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2 putting nulls in your pattern towards other  
3 users actually reduces the amount of signal  
4 power that you have relative to the noise in  
5 the interference, if everybody plays fair and  
6 uses similar techniques, you will see an  
7 overall improvement in the performance of  
8 such a system, as was well known in the -- in  
9 the art at that time.

10 Q. I didn't follow what exact scenario  
11 you were describing there.

12 What is Kuwahara's system doing in  
13 the scenario you were describing?

14 A. Kuwahara, in a scenario here, he's  
15 forming a matrix and looking at a  
16 cross-correlated signal information that  
17 tried to maximize the signal power on the  
18 desired -- towards the desired user. At the  
19 same time that he's doing that, any  
20 interfering users will have nulls pointing at  
21 them. And now when he does that, he's  
22 improving the performance of his -- his  
23 receiver.

24 Q. Compared to what?

25 A. Compared to had he just combined

1 Winters

2 the signals trying to maximize his own power,  
3 which is called maximum ratio combining, in  
4 which case you get a nice strong signal or  
5 even stronger signal than you would with his  
6 technique. However, the interference level  
7 would be higher with using maximum ratio  
8 combining as opposed to the technique that  
9 Kuwahara proposes here.

10 Q. So you're just comparing a scenario  
11 where Kuwahara is not using nulls versus a  
12 scenario where Kuwahara is using nulls?

13 A. Comparing a system that does not  
14 have nulls in it to Kuwahara that does have  
15 nulls in it.

16 Q. Okay. But if Kuwahara were  
17 modified to simultaneously transmit multiple  
18 adaptive beam signals for multiple users  
19 simultaneously, that would not benefit the  
20 specific use case that Kuwahara was concerned  
21 with, which is a single user use case, true?

22 A. The single user use case that  
23 Kuwahara is looking at is one scenario.

24 But, of course, for cellular  
25 systems, that's not the primary scenario that

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2 most operators are interested in. They are  
3 interested in increasing the overall capacity  
4 of the system, which is to have as many users  
5 at high data rates as possible there, so --  
6 and -- yes.

7 Q. Well, if someone of skill in the  
8 art were primarily interested in a multi-user  
9 use case environment, does your declaration  
10 explain why that person would start with  
11 Kuwahara as their primary reference?

12 A. In the declaration, I explain how  
13 Kuwahara could be used to reduce interference  
14 by placing nulls in particular directions,  
15 and a POSITA would understand that that means  
16 that improves the performance whether or not  
17 those other users are in your cell or in an  
18 adjacent cell.

19 Q. Improves the performance over a  
20 system that doesn't use nulls?

21 A. Yes. By putting in -- by putting  
22 in the nulls, Kuwahara's system is improving  
23 the performance of that particular user.

24 Q. What aspect of Figure 3 in Kuwahara  
25 is responsible for generating the nulls?

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2 A. In Figure 3, we see the Search  
3 receiver logic element 106 correlation matrix  
4 estimation. Once you have that correlation  
5 matrix estimation, you can go through and do  
6 an interference subspace estimation. And as  
7 we said, as is known in box 107, box 108 has  
8 the signal subspace estimation, and so from  
9 the interference subspace and the signal  
10 subspace, one can calculate, as is done in  
11 the array control for downlink box 109, what  
12 -- how to put nulls and beams towards the  
13 desired user, nulls towards the interference.

14 Q. If Kuwahara were to be adapted to  
15 simultaneously transmit multiple adaptive  
16 beams for multiple users, then the  
17 null-forming aspect of boxes 106, 107, 108  
18 and 109 would all have to be modified?

19 A. Those boxes would have to -- to  
20 accommodate multiple users, there are various  
21 options that can be done there.

22 One of the options, potential  
23 changes that would be, would simply be to  
24 duplicate the software or hardware, the  
25 processing that's done by those boxes.

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2 There are -- there were subsequent  
3 -- there were other -- there are other  
4 techniques that can actually improve the  
5 performance further over just doing those  
6 independently, and in that case, modification  
7 of those individual boxes could be done to  
8 provide even further enhancement of the  
9 performance.

10 Q. So there are a bunch of different  
11 options out there, right?

12 A. There are -- there are a number of  
13 different approaches to improving the -- or  
14 to take a single user system and take it into  
15 a multi-user system.

16 For example, the approach that I'm  
17 talking about here, which is just duplicating  
18 the processing that's done for each one, is  
19 the process that I looked at in a paper that  
20 I wrote in 1987. So just this as an example  
21 of how you would go from a single user to a  
22 multiple user system.

23 Papers subsequent to that,  
24 particularly papers written in the 1990s,  
25 showed how you could even better performance

Winters

(sic) by adding additional enhancements,  
which require modifications of those boxes,  
other than just duplicating the process.

MR. NOROOZI: I have no further  
questions at this time.

MR. EMERSON: Okay. We'll take a  
quick break, and we'll be back.

MR. NOROOZI: Sure.

(Recess taken.)

MR. EMERSON: Sorry about that.

We're done. We'll read and sign,  
and that's all.

(Time noted: 1:44 p.m.)

---

JACK H. WINTERS, Ph.D.

Subscribed and sworn to before me  
this \_\_\_\_ day of \_\_\_\_\_, 2018.

C E R T I F I C A T E

STATE OF NEW YORK )

: ss.

COUNTY OF NEW YORK )

I, SHAUNA STOLTZ-LAURIE, a  
Shorthand Reporter and Notary Public  
within and for the State of New York, do  
hereby certify:

That JACK H. WINTERS, Ph.D., the  
witness whose deposition is hereinbefore  
set forth, was duly sworn and that such  
deposition is a true record of the  
testimony of such witness.

I further certify that I am not  
related to any of the parties to this  
action by blood or marriage, and that I  
am in no way interested in the outcome  
of this matter.

IN WITNESS WHEREOF, I have hereunto  
set my hand this 12th day of November,  
2018.

---

SHAUNA STOLTZ-LAURIE

\*\*\* ERRATA SHEET \*\*\*  
TRANSPERFECT LEGAL SERVICES

NAME OF CASE: CISCO v XR COMMUNICATIONS  
DATE OF DEPOSITION: NOVEMBER 9, 2018  
NAME OF WITNESS: JACK H. WINTERS, Ph.D.

Reason codes:

1. To clarify the record.
2. To conform to the facts.
3. To correct transcription errors.

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JACK H. WINTERS, Ph.D.



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