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2 UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 Case No. IPR2023-00601
Case No. IPR2023-00602
4 ----------x
SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG
5 ELECTRONICS AMERICA, INC.,
Petitioners,
6
- against -
7
APEX BEAM TECHNOLOGIES, LLC,,
8 Patent Owner.
9 Patent No. 10,568,113
Filing Date: August 9, 2018
10 Issue Date: February 18, 2020
Inventor: Xiaobo Zhang
11 Title: METHOD AND DEVICE IN UE AND BASE
STATION USED FOR WIRELESS COMMUNICATION
12 ----------x
December 13, 2023
13 10: 19 a.m.
14 Remote video-teleconference
15 deposition via Zoom of DR. HARRY V. BIMS,
16 before Jineen Pavesi, a Registered
17 Professional Reporter, Registered Merit
18 Reporter, Certified Realtime Reporter and
19 Notary Public of the State of New York.
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23
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2 A P P E A R A N C E S :

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1

2 D R. H A R R Y V. B I M S,

3 having first been duly sworn by a Notary

4 Public of the State of New York, was

5 examined and testified as follows:

6 EXAMINATION BY

7 MR. PYMENTO:

8 Q. Good morning, Dr. Bims.

9 Could you please state your

10 full name for the record.

11 A. Harry von Bims.

12 Q. I am Julian Pymento, counsel

13 for Apex Beam Technologies, LLC, in this

14 proceeding, I will be taking your

15 deposition today.

16 Just to go quick, the same

17 ground rules are going to apply as the

18 deposition I took of you on November 21st,

19 does that make sense?

20 A. Yes.

21 Q. Dr. Bims, is there any reason

22 that you can't testify truthfully today?

23 A. No.

24 Q. Have you taken any drugs or

25 alcohol that could impair your ability to

BIMS

think today?

A. No.

Q. Where are you located right now physically?

A. In the law offices of Finnegan.

Q. Where is that location?

A. In Washington, D.C.

Q. Is there anyone in the room with you?

A. Yes.

Q. Who is it?

A. Attorneys Nick Cerulli and Josh Goldberg.

Q. If that changes, would you please let me know?

A. Yes.

Q. Dr. Bims, what programs do you currently have running on your computer, aside from this Zoom meeting?

A. So this is not my computer that I'm using, it's a computer supplied by Finnegan, and from what I can see, it's running Windows and I believe that Adobe Acrobat is running to view pdfs.

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Q. Okay.

Do you have any communications programs open, such as Outlook or any e-mail program or chat program?

A. No.

MR. PYMENTO: Just for the record, the exhibits have already been premarked, but I will just note what each exhibit is on the record.

Exhibit 1 is U.S. Patent No. 10,568,113, that's the subject matter in this proceeding.

(Bims Exhibit 1, U.S. Patent No. 10,568,113, was marked for identification, as of this date.)

MR. PYMENTO: Exhibit 2, Dr. Bims, is your declaration that was submitted in IPR2023-00601.

(Bims Exhibit 2, Dr. Bims' declaration submitted in IPR2023-00601, was marked for identification, as of this date.)

MR. PYMENTO: Exhibit 3 is your declaration that was submitted in

1 BIMS
2 IPR2023-00602.
3 (Bims Exhibit 3, Dr. Bims'
4 declaration submitted in IPR2023-00602,
5 was marked for identification, as of this
6 date.)
7 MR. PYMENTO: Exhibit 4 is U.S.
8 Patent Application Publication No.
9 2019-0053294 to Xia.
10 (Bims Exhibit 4, Patent
11 Application Publication No. 2019-0053294
12 to Xia, was marked for identification, as
13 of this date.)
14 MR. PYMENTO: Exhibit 5 is U.S.
15 Patent Application Publication No.
16 2015-0141026 to Jover.
17 (Bims Exhibit 5, Patent
18 Application Publication No. 2015-0141026
19 to Jover, was marked for identification,
20 as of this date.)
21 MR. PYMENTO: Exhibit 6 is U.S.
22 Patent Publication No. 2018-0367374 to
23 Liu.
24 (Bims Exhibit 6, U.S. Patent
25 Publication No. 2018-0367374 to Liu, was

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marked for identification, as of this date.)

MR. PYMENTO: Exhibit 7 is the Institution Decision in IPR2023-00601.

(Bims Exhibit 7, Institution Decision in IPR2023-00601, was marked for identification, as of this date.)

MR. PYMENTO: Finally, Exhibit 8 is the Institution Decision in IPR2023-00602.

(Bims Exhibit 8, Institution Decision in IPR2023-00602, was marked for identification, as of this date.)

Q. Dr. Bims, I would like you to open your declaration in IPR2023-00601, which is Exhibit 2, let me know when you have it open.

(Witness complying.)

A. It's open.

Q. Sitting here today, do you believe that you considered any other materials aside from the documents cited in this declaration?

A. You mean in the creation of the

1 BIMS
2 declaration?
3 Q. Right, or cited inside the
4 declaration itself.
5 A. So as part of the declaration
6 itself...
7 (Witness perusing document.)
8 A. So Section 4 of the declaration
9 itself has a list of exhibits that I
10 considered in writing the declaration.
11 Q. Did you consider any other
12 materials other than those listed there?
13 A. No.
14 Q. Is the same answer true for the
15 other declaration that's Exhibit 3?
16 (Witness perusing document.)
17 A. In my declaration to
18 IPR2023-00602, from what I see here, that
19 declaration is Exhibit 1002.
20 MR. CERULLI: This is just a
21 point of clarification.
22 The exhibit numbers that we
23 have are the actual filed exhibit numbers
24 and I think, counsel, you renamed them
25 Exhibits 1 through 6, so I think what

BIMS

counsel is referring to is Exhibit 3 of the renumbered exhibit.

MR. PYMENTO: That's right.

I am only renumbering it because I think that's just the procedure with Veritext, I had to do that last time as well, I am not trying to make it more difficult.

MR. CERULLI: I think just periodic clarifications throughout, referring to Exhibit 6, this refers to Exhibit, you know, 100 whatever, would be helpful.

MR. PYMENTO: I will try to do that where I can.

Q. Dr. Bims, did you consider any other materials aside from the documents cited in your declaration, Exhibit 1002 in IPR2023-602?

A. No.

Q. What I have marked as Exhibit 7 and 8 are the decisions granting institution in both of these cases; these are documents created by the Patent Office

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after you submitted your declarations in these proceedings.

Have you reviewed these decisions?

A. I have seen a copy of those decisions, yes.

Q. Have you read them, reviewed them?

A. I did look through it, I didn't spend a lot of time analyzing it, but I did look through it.

Q. About how much time did you spend analyzing them?

A. Maybe an hour each.

Q. About how much time did you spend preparing for this deposition?

A. So I arrived in D.C. on Sunday and spent Monday and Tuesday with the attorneys preparing for today's deposition.

Q. So how much time during those two days did you spend preparing for this deposition?

A. I don't know if I have a

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precise number, but I spent at least two full days working on preparing for today's deposition.

Q. Would you say that's approximately 20 hours?

A. As a general ballpark, maybe.

Q. Just for clarification, that's maybe 20 hours?

A. It may be around that time, I haven't double-checked, but it may be around that number of hours.

Q. What's the ballpark?

A. It may be around 20 hours, I'd have to double-check for sure.

Q. About how much time did you spend preparing each of the declarations in these proceedings?

A. So I began preparing for the declarations when I received the '113 patent about a year ago and during the course of that year I've been working towards creating the declaration.

Q. Could you give me a ballpark number of hours that you worked on each

BIMS

declaration?

A. That's kind of hard to do because they were worked on jointly; as you know, the prior art references that I relied on in both declarations have significant overlap, so I don't know that I can divide out hours specifically for one versus the other over the course of the past year.

It's hard sitting here without my records to be able to give you a firm answer.

Q. How about an approximate collective number for both declarations then.

A. It's hard to say; like I said, I have been working on the declarations for about a year and I'd have to go back and look at my records to see how many hours I actually spent in the past year collectively working on both declarations.

Q. Would it be approximately 50 hours, closer to 50 hours or a hundred hours?

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MR. CERULLI: Objection, form.

A. It's hard to put a firm number on it, but it did take a fair amount of work.

I just don't know that I have a firm answer for you on that.

Q. Dr. Bims, all I'm asking is an approximate number of hours.

You can give a pretty wide range, I won't mind.

MR. CERULLI: Objection, form.

A. It was certainly more than, you know, 20 or 30 hours, but it's hard to say how many I actually worked.

Q. Aside from your counsel at Finnegan, did you communicate with anyone else about your deposition today in preparation for it?

A. No.

Q. Did you communicate with anyone at Samsung directly about your deposition today?

A. No.

Q. Have you corresponded with

BIMS

Samsung prior to today, notwithstanding the preparation for this deposition?

A. No.

Q. Aside from your attorneys at Finnegan, was anyone else involved in the preparation of your declarations in these actions?

A. No.

Q. Aside from the '113 patent, which is the patent owned by Apex Beam in these proceedings, can you tell me how the prior art documents were located in this case, in these cases?

A. No.

Q. Just to clarify, the prior art documents were provided to you or did you do the searching for the prior art documents?

A. I was provided with the prior art documents.

Q. And they were provided to you by your attorneys, correct?

A. Yes.

Q. Did you personally conduct a

BIMS

search for any other prior art documents?

A. No.

Q. Just to quickly go through this, because I know we've talked about this in the last deposition, but could you take a look at your CVs in each of the declarations, that would be Exhibit 1002 in each of the proceedings, and just let me know if each of those CVs are still accurate.

(Witness complying.)

A. Both of these CVs are listed as last update December 23rd, 2022, which is about a year ago, so there have been updates to my current CV since then.

Q. Just briefly could you provide a summary of what those updates would be.

A. The updates would be additional patent litigations in which I've been retained as a testifying expert.

Q. Is that the only addition that would be made to each of these declarations with respect to the CV?

A. Yes.

1 BIMS
2 Q. Could you please turn to page
3 30 of your declaration in IP R 601, that's
4 Exhibit 1002 or IPR2023-00601.
5 (Witness complying.)
6 A. Okay.
7 Q. In paragraph 77 you say that "A
8 person of ordinary skill in the art would
9 have had at least a master's degree in
10 electrical engineering or similar field
11 and at least two years of experience
12 working with telecommunications systems,
13 including multiple-input, multiple-output,
14 MIMO, technology. Additional relevant
15 work experience would compensate for less
16 education and vice versa," correct?
17 A. Yes.
18 Q. Can you confirm that this
19 description of the person of skill in the
20 art in your other declaration, which I
21 marked as Exhibit 3, is the same.
22 (Witness perusing document.)
23 A. Yes, it's the same.
24 Q. Do you have experience working
25 with MIMO telecommunications systems?

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A. Yes, I have experience with MIMO technology.

Q. About how many years?

A. So that experience began when I was a Ph.D. student at Stanford working in the information systems laboratory and interacting with professors there, such as Professor Paul Raj, who is one of the pioneers in MIMO technology.

Q. Approximately when was that?

A. This was starting in the early 1990s, between 1990 and 1993.

Q. And working with Mr. Paul Raj, is that the only experience you've had working with MIMO telecommunications systems?

A. No.

Q. Could you describe others.

A. So my Ph.D. advisor invented DSL technology while I was one of his Ph.D. students, and in DSL technology they used a form of MIMO technology over the digital subscriber line or the telephone line.

1 BIMS
2 Q. Are there any other experiences
3 related to MIMO telecommunications
4 systems?
5 A. On page A-2 of my CV it lists
6 as a work experience a time in which I was
7 a member of technical staff at --
8 (Witness perusing document.)
9 A. -- sorry, that's page A-4 of
10 my CV, I list work experience at a company
11 called Gigabit Wireless.
12 Gigabit Wireless is a company
13 founded by Professor Paul Raj to implement
14 his ideas about wireless technology,
15 including MIMO technology, and that
16 company not only developed a complete
17 product, including MIMO technology, but
18 was eventually sold to Intel.
19 Q. Are there any other experiences
20 listed under your employment history
21 related to MIMO telecommunications
22 systems.
23 (Witness perusing document.)
24 A. On page A-3 of my CV it lists
25 my involvement in the IEEE 802.16 working

1 BIMS
2 group, which developed the WiMAX standard;
3 the WiMAX standard is a version of
4 cellular communications that includes
5 within it MIMO technology.
6 And while I was participating
7 in that working group I also participated
8 in the IEEE 802.11 working group on WiFi
9 technology standards that also include
10 MIMO technology.
11 Q. Was the work on MIMO technology
12 telecommunications systems both with
13 respect to WiMAX and WiFi done over this
14 continuous length of time, October 2009 to
15 January 2017, or were there certain
16 durations of time in which you focused on
17 that?
18 A. Well, I'm still currently a
19 voting member of the IEEE 802.11 standard
20 as we continue to work on updates to that
21 technology, which includes MIMO
22 technology.
23 I'm also still participating in
24 future developments of the IEEE 802.16
25 standard as the technical editor and as a

BIMS

person listed on the website as an expert in WiMAX technology.

So even though in my CV it lists particular roles that I played from October 2009 until January of 2017, I've continued to be actively involved in the development of both standards until the present.

Q. Is there a reason you mentioned the IEEE 802.16 working group but not the IEEE 802.11 working group on your CV in this?

A. As of the time of this CV I did not have a working group officer role in IEEE 802.11 working group.

What I've listed here were the officer roles that I've had in the IEEE 802.16 working group.

Q. So if you were to give a current version of your CV, would you include the IEEE 802.11 working group and any officer roles therein?

A. So currently I am a voting member of both the IEEE 802.11 working

1 BIMS
2 group as well as a voting member of the
3 IEEE 802.15 working group, which has
4 assumed the role for development of future
5 IEEE 802.16 standards.
6 As I mentioned earlier, I have
7 assumed the role of technical editor for
8 development of future 802.16 standards,
9 but do not have an officer role in the
10 development of 802.11 standards, though I
11 am a voting member in both working groups.
12 Q. Could you just describe to me
13 what being a voting member of either the
14 802.16 or 802.11 working groups entails.
15 A. So that involves establishing
16 and maintaining voting rights in both
17 working groups; to do that one must attend
18 several meetings sequentially.
19 At each meeting you have to
20 participate in at least 80 percent --
21 sorry -- 75 percent of the meetings in
22 order to establish enough credit for
23 attendance at that particular meeting and
24 the rules are quite complicated because
25 they are two different types of meetings,

1 BIMS
2 they are plenary meetings and then there
3 are interim meetings.
4 The rules on qualifying as a
5 voting member vary depending on whether
6 you've attended an interim meeting or have
7 attended a plenary meeting, with
8 attendance of at least 75 percent of the
9 sessions.
10 In addition to that, voting
11 members are required to vote on any
12 amendment to the standard in what's called
13 a letter ballot and if one does not
14 respond to the call for a vote on a letter
15 ballot on an amendment, then you can lose
16 your voting rights even though you've
17 attended prior meetings.
18 Q. Could you describe your role --
19 strike that.
20 In this description of the IEEE
21 802.16 working group, you note under one
22 of the positions that you're task group
23 secretary; what does that entail?
24 A. The task group secretary is
25 responsible for recording the minutes of

BIMS

each meeting that takes place during a particular meeting session for that week.

The minutes that are recorded have to meet certain documentation criteria because the meeting itself cannot take place unless the secretary is in the room to record proper minutes, including the motions brought to the floor and the voting results on those motions.

Q. What does the position of task -- what are the responsibilities of the position of task group vice-chair?

A. A task group vice-chair fills in for the chair in that person's absence when it comes to running -- conducting the meetings; so everything from creating the agenda or organizing the sequence of presentations that are performed, making sure that proper meeting rules are adhere to, et cetera.

Q. Likewise, what are the responsibilities of the role of task group chair, you touched on it briefly just now?

A. Yes, so the task group chair is

1 BIMS
2 responsible for organizing and conducting
3 each of the meetings that take place,
4 which can be face-to-face and/or virtual,
5 in a hybrid meeting situation, as well as
6 teleconferences that happen in between
7 those meetings and those meetings take
8 place six times per year, every two
9 months.
10 The teleconferences happen in
11 between those meetings.
12 The working group chair is
13 responsible for organizing all of those
14 things, scheduling all of those things, is
15 responsible for making announcements to
16 the group concerning essential patent
17 claims as well as rules governing the
18 conduct of members in the meeting and as
19 well the chair is responsible for
20 organizing letter ballots as well as
21 sponsor ballots as well as reporting to
22 the executive committee on the status of
23 the working group and its progress towards
24 adopting an amendment.
25 The working group chair is also

1 BIMS
2 responsible for creating the project
3 authorization request, or what we call the
4 PAR, as well as the five criteria document
5 that's required in order to launch a
6 project to create an amendment to the
7 standard.
8 Q. What are the responsibilities
9 of the working group vice-chair and
10 secretary of the IEEE 802.16 working
11 group?
12 A. As I mentioned before, the
13 vice-chair supports the chair in the
14 duties of the chair, including acting in
15 place of the chair when the chair is not
16 present in the meeting to conduct the
17 meetings.
18 The secretary is responsible
19 for recording the minutes of the meeting
20 and presenting those minutes to the
21 working group for working group approval.
22 And the secretary is also
23 required to be in attendance at every
24 meeting, because a meeting is not allowed
25 to proceed without the presence of the

1 BIMS
2 secretary.
3 Q. Is there a difference between
4 the terms task group and working group
5 under these positions?
6 A. Yes.
7 So a working group consists of
8 one or more task groups; each of these
9 task groups is responsible for developing
10 an amendment to the base standard.
11 Q. Under the positions you note
12 IEEE 802.16 expert under the IEEE 802.16
13 working group; what does that entail?
14 A. That's simply noting that on
15 the IEEE 802.16 website they list roughly
16 half a dozen individuals who are points of
17 contact for anyone in the general public
18 who has any questions about the technology
19 included in the IEEE 802.16 standard.
20 So on an ongoing basis I'm
21 listed as one of the experts in IEEE
22 802.16 on that website.
23 Q. Did you draft the person of
24 skill in the art sections in these
25 declarations yourself?

BIMS

A. The level of person of ordinary skill in the art is a level that I discussed with the attorneys and based on that discussion I finalized the definition that you see in this declaration.

Q. Did you provide the first draft of this section and there was a back and forth?

MR. CERULLI: I just caution the witness not to divulge attorney-client privileged information.

I think you can answer that yes, no, or I don't know.

A. What was the question again?

Q. Did you provide a first draft of this section, level of ordinary skill in the art, and then there was a back and forth with your attorneys to reach the final draft?

A. I don't know exactly how that happened.

Q. Just so we're straight, you're not sure who provided the first draft of this section?

BIMS

A. I'm not sure how I can fully answer that question without getting into the issues brought up by my attorney.

Q. You don't need to disclose what exactly was said between you and your counsel, but all I'm asking is who provided the first draft for this section, that's all I'm asking.

A. So as I mentioned, there was a discussion that preceded the creation of the declaration.

So with respect to particularly the level of ordinary skill in the art, there was a discussion about what that level should be prior to the creation of the declaration and, from what I recall, that discussion took place prior to the first draft.

Q. Right, and the first draft was ultimately written by who?

A. Well, the content in the first draft is a result of discussions that I had with attorneys.

I think I submitted the first

BIMS

draft to the attorneys, from what I recall, but either way the content in the first draft was a result of my discussions with the attorneys.

Q. Is that also true for the remainder of the declaration?

A. From what I recall, the first draft was not a complete draft with every single word in the final declaration present in the original draft.

But over time the declaration was improved to include everything you now see in the final version.

Q. Can you point me to sections in the declaration where you did not provide the first draft.

A. I would say that would be Section 4 and 5.

Q. Just for the record, what are those section titles?

A. Section 4, the title is "Materials Considered," and for Section 5, the title is "Legal Standard."

Q. I think before we move on,

BIMS

maybe it's worth taking a break.

How's ten minutes sound?

A. That's fine.

(Recess taken.)

BY MR. PYMENTO:

Q. Dr. Bims, could you please turn to claim 1 of the '113 patent, that's I believe Exhibit 1001 in either of the proceedings.

(Witness complying.)

A. Okay.

Q. You're at claim 1.

Do you see the claim limitations, there is a few of them, transmitting a first radio signal, transmitting a second radio signal and monitoring a third radio signal, do you see that?

A. Yes.

Q. Does the third radio signal have the same content as the first radio signal?

A. In claim 1, for the first radio signal, the second radio signal, and the

1 BIMS
2 third radio signal, there is no
3 description of the content.
4 Q. Based on your understanding as
5 a person of skill in the art, would a
6 person of skill in the art reading that
7 interpret first radio signal and the third
8 radio signal to have the same content?
9 MR. CERULLI: Objection, scope.
10 A. No, I don't see any description
11 in claim 1 that says the first radio
12 signal has the same content as the third
13 radio signal.
14 Q. That's not exactly my question.
15 My question is, would a person
16 of ordinary skill in the art reading the
17 claim, although the claim doesn't say
18 anything about the content, would a person
19 of ordinary skill in the art interpret the
20 first radio signal and the third radio
21 signal to have the same or different
22 content?
23 MR. CERULLI: Objection, scope.
24 A. So a person of ordinary skill
25 reading claim 1 would not reach a

BIMS

conclusion about the content of any of the radio signals listed in claim 1.

Q. Based on your vast experience of MIMO telecommunications systems, have you seen systems where the content was the same between what would be the equivalent of a first radio signal and third radio signal?

MR. CERULLI: Objection, form, scope.

A. So in my experience, I have not seen a system, a wireless system, that has the particular radio signals described in claim 1.

Q. Is it possible in your experience that a system would have a first radio signal and third radio signal with the same content?

A. Depending on the system, there could be a system in which a base station transmits content that is the same as the content transmitted by a UE, depending on the circumstance.

And then there could be other

1 BIMS
2 systems in which a base station transmits
3 different content than the UE has
4 transmitted, depending on circumstances.
5 Q. Could you describe those
6 circumstances?
7 A. So, for example, if a user
8 equipment were to transmit an identifying
9 address of the user equipment in certain
10 prior art systems, the base station might
11 transmit to that user equipment
12 information or content that includes the
13 identifying address of the user equipment.
14 Or, in other circumstances, the
15 content might be different depending on
16 the overall procedures that are being
17 performed, such as the UE may request
18 information from the base station that was
19 not transmitted to the base station.
20 Q. Similar question for the second
21 radio signal and the first radio signal;
22 what circumstances would enable the first
23 radio signal to be the same or different
24 from the second radio signal?
25 MR. CERULLI: Objection, form.

1 BIMS
2 (Witness perusing document.)
3 A. So in column 5, for example, in
4 the '113 patent, starting at line 57, it
5 says, "In one embodiment, the first radio
6 signal and the second radio signal both
7 carry second information and the second
8 information is used for determining the
9 multi-antenna related transmitting of the
10 third signal. In that embodiment, the
11 first radio signal and the second radio
12 signal both carry the same content,
13 meaning second information."
14 In column 10, starting at line
15 17, it says, "In one embodiment, the first
16 radio signal is used for determining a
17 first antenna port group."
18 Starting at line 29, it says,
19 "In one embodiment, the second radio
20 signal is used for determining a second
21 antenna port group."
22 Those two statements suggest
23 that the first radio signal and the second
24 radio signal could have different content.
25 Q. What was the first citation

BIMS

that you noted just now?

A. In column 5 of the '113 patent, starting at line 57.

Q. Thank you.

Is it usually your experience that in such a system where the first radio signal and second radio signal both carry second information, that the second information would be expressed in the same way between both the first radio signal and the second radio signal?

A. It's possible a person of ordinary skill would understand that there are systems in which the same information is repeated and there are systems in which slightly different information is repeated.

Q. In other words, you're saying that certain systems can carry redundancies on purpose, correct?

A. My answer to the previous question is that a person of ordinary skill would understand that there are certain prior art systems in which the

BIMS

same information is repeated and there are other prior art systems in which the information that is repeated is different.

Q. Could you tell from reading that section of column 5 of the '113 patent which of those two possibilities this is?

MR. CERULLI: Objection, form.

A. No; claim 1 does not make a distinction about the content of the first and second radio signals.

Q. Could you please go to column 8, lines 1 through 6.

(Witness complying.)

A. Okay.

Q. I will just represent that this paragraph reads, "In one subembodiment, the first radio signal and second radio signal are used for determining the values of different bit positions in a first bit block respectively, and the value of the first bit block is equal to the index value of the fourth antenna port group in K antenna port groups, wherein K is

BIMS

positive integer greater than 1."

In this subembodiment, would you be able to make a conclusion regarding the content of the first and second radio signal?

A. No.

Q. If two signals each determine different bit positions, does that mean the signals indicate different content?

A. As an initial matter, this paragraph in column 8, from lines 1 through 6, has a logical inconsistency in it that is confusing.

Q. Could you describe that.

A. In this paragraph it concludes by saying "The value of the first bit block is equal to the index value of the fourth antenna port group in K antenna port groups wherein K is a positive integer greater than 1. So, for example, the value of K could be the value 2 or even the value 3. In such a case it would not make sense that there would be a fourth antenna port group when there are

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only two or three antenna port groups."

Q. But doesn't the fourth antenna port group in K antenna port groups, at least for the subembodiment, assume that there are at least four antenna port groups?

A. In reading this paragraph in column 8 from lines 1 through 6, the paragraph makes clear that the value K is a positive integer greater than 1.

Q. In any case, just going back to my previous question, if two signals each determine different bit positions, as this language says, right, the first radio signal and the second radio signal are used for determining the values of different bit positions in a first bit block respectively, does that mean that the first and second radio signals indicate different content, at least in this subembodiment?

A. Not necessarily.

Q. Could you describe that.

A. As a person of ordinary skill

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would understand that this paragraph is describing using a first and second radio signal to determine values in different bit positions.

But this paragraph does not describe the content in the first and the second radio signals that is used for determining the values of different bit positions.

Q. As a person of ordinary skill in the art, how does a radio signal determine the value of different bit positions?

A. This paragraph does not say that a radio signal determines the value of different bit positions in a first bit block respectively.

Q. How is a first radio signal used for determining the values of a bit position, as a person of ordinary skill in the art?

A. This paragraph does not describe how that determining is performed, so a person of ordinary skill

1 BIMS
2 in the art would have to consult the
3 entire specification to see if other parts
4 in the specification provide more
5 information about how the determining is
6 performed.
7 Q. This paragraph shows that the
8 first radio signal and second radio signal
9 are used for determining different values,
10 correct?
11 A. That's not what the paragraph
12 says.
13 It says that the first radio
14 signal and the second radio signal are
15 used for determining the values of
16 different bit positions; it does not say
17 that the first and second radio signals
18 are used for determining different values.
19 Q. In your testimony, then,
20 different bit values are not different
21 values?
22 A. Again, as I've said, this
23 paragraph states that the first and second
24 radio signals are used for determining the
25 values of different bit positions, which

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is different than determining different values.

Q. Is a value of one bit position different than the value of another bit position?

A. One can't say categorically, because it depends on the values in those bit positions.

Q. It is a pretty simple question. There are different bit positions, right, so if I take the value of one bit position and the value of a different bit position, those could possibly be the same values, in your opinion?

A. In my opinion, the values stored in different bit positions can be the same or different.

Q. Can you provide me an example of where they're the same.

A. For example, if there are two bit positions and in position 1 the value zero is stored and in position 2 the value zero is stored, then in that example the

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values of different bit positions are the same.

Q. And what would those zeros indicate?

A. In my example, the value zero is a logical value which is not tied to a particular indication.

Q. You'll have to describe that further for me, what does that mean?

A. The value zero is a logical value, meaning that it is a value that is associated with a logical system that has mathematical meaning.

It is not, in that sense in which I used my example, tied to a particular indication.

Q. Let's turn to column 7, line 42 to 48.

(Witness complying.)

Q. Specifically line 46, where it says, "In one embodiment, the above method is advantageous in making full use of aerial resources to report more information."

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As a person of ordinary skill in the art, what is your interpretation of that paragraph?

A. So as a person of ordinary skill in the art, the term aerial resources would not be understood to be a term of art.

So a person of ordinary skill in the art reading only lines 46 through 48 in column 7 would not have a clear understanding about the aerial resources described in just those lines.

Q. But a person reading it, as you are reading it, you would just not provide any interpretation of that paragraph at all during reading the specification in that portion of it?

MR. CERULLI: Objection, form.

A. Again, as I've described, if a person of ordinary skill only read lines 46 through 48 of column 7 and no other lines in the specification claims or file history, they would not understand what is meant by aerial resources, since that is

BIMS

not a term of art.

Q. For someone who has read the full specification and prosecution history and the claims, what meaning would a person of ordinary skill in the art have to that line, including the term aerial resources?

MR. CERULLI: Objection, scope.

(Witness perusing document.)

A. In my review of the specification for the '113 patent, it is not clear to me where it provides a definition of the term aerial resources.

Q. So how would you interpret aerial resources in the absence of -- what you said is the absence of clarity?

MR. CERULLI: Objection, scope.

A. Reading this as a person of ordinary skill in the art, I would not try to read into the specification things that are not described in the specification or previously understood by a person of ordinary skill.

Q. Is time an aerial resource?

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MR. CERULLI: Objection, scope.

A. As I mentioned earlier, it's not clear to me in reading the specification what is meant by aerial resources as used in column 7.

Q. In reading the patent specification, you would gloss over that section, is that your testimony?

MR. CERULLI: Objection, form.

A. I'm simply saying that a person of ordinary skill in the art reading column 7 would not have a clear understanding as to what is meant by aerial resources.

Q. That's not really my question.

My question is would you skip that portion because you don't have a clear understanding of that term or sentence?

A. That portion is in the specification, so a person of ordinary skill would read it.

Q. Yes, they would read it and I understand that you read it, too.

BIMS

What would you interpret it is or would you not interpret it at all?

MR. CERULLI: I will just say again objection, scope.

(Witness perusing document.)

A. So in my reading of the claims, I don't recall seeing the word or the term aerial resources listed in any of the claims that I analyzed in my declaration.

Q. Again, that may be the case.

I'm just asking how you would interpret this line, whether you put an opinion in the declaration or it's in the claims, what is your interpretation of this line, to the extent that you have one; or if your opinion is that you would not provide one because it's not clear.

MR. CERULLI: Objection, scope.

A. From what I recall in my declaration, I have not provided a construction for the term aerial resources.

In addition, from what I recall, none of the claims I analyzed uses

1 BIMS
2 the term aerial resources.
3 So I guess what you're asking
4 is that I perform an analysis of the
5 specification with respect to the term
6 aerial resources outside the scope of my
7 declaration.
8 Q. What I am asking is that
9 normally the specification informs your
10 understanding of the claims, and while I
11 understand that the term, the specific
12 term aerial resource, is not in the
13 claims, perhaps this part will inform your
14 understanding of the claims.
15 It seems to me that it's not,
16 but just to clarify, let's just say, it
17 says "In one embodiment the above method
18 is advantageous in making full use of
19 aerial resources to report more
20 information," what does the "report more
21 information" aspect of this line refer to?
22 MR. CERULLI: Objection, form
23 and scope.
24 (Witness perusing document.)
25 A. Column 7, lines 46 through 48,

1 BIMS
2 makes reference to "the above method."
3 A person of ordinary skill
4 reading that passage would understand that
5 lines 46 through 48 are referencing an
6 above method.
7 Above lines 46 through 48, the
8 specification describes "According to one
9 aspect of the present disclosure,"
10 starting at line 42, "the method is
11 characterized in that the first radio
12 signal and the second radio signal
13 together are used for determining the
14 multi-antenna related transmitting of the
15 third radio signal."
16 Following that passage
17 immediately is the passage that we have
18 been talking about, starting at line 46,
19 "In one embodiment, the above method is
20 advantageous in making full use of aerial
21 resources to report more information."
22 So the description of making
23 full use of aerial resources to report
24 more information is related to this above
25 method described starting in line 42, but

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how it's related is not clear.

Q. So you have no interpretation of lines 46 through 48 in view of what you just read from lines 42 to 45, is that correct?

A. So what I said before is describing what appears to be the above method referred to starting at line 46.

And based on that, it appears that lines 46 through 48 are referencing the method described starting at line 42 and saying that that method is advantageous in making full use of aerial resources to report more information.

But lines 46 through 48 do not describe what are the aerial resources that are in line 42 through 45 nor does it describe what is the, quote, more information.

Q. Is it possible that the more information relates to the fact that the first radio signal and the second radio signal together are used for determining the transmission of the third radio

1 BIMS
2 signal, is that possible?
3 MR. CERULLI: Objection, scope.
4 A. What you read is part of the,
5 quote, above method; what you read does
6 not state what are the aerial resources or
7 what is the more information.
8 Q. Well, I just described or
9 posited that perhaps using the first radio
10 signal and the second radio signal
11 together to determine the transmission of
12 a third radio signal might be referencing
13 the more information in the subsequent
14 lines, and I'm asking you a yes or no
15 question, is that a possible
16 understanding?
17 MR. CERULLI: Objection, scope.
18 A. So lines 46 through 48 don't
19 say that the more information is
20 necessarily determining multi-antenna
21 related transmitting.
22 Q. We're going to be here a long
23 time if you're not answering my question.
24 I am just saying is it a
25 possible interpretation that the first

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radio signal and the second radio signal being used together in order to determine the transmitting of third radio signal is possibly what the reporting more information in the subsequent lines is referring to, is it possible, I'm not saying necessarily, as you mentioned, I'm saying is it possible?

MR. CERULLI: Objection, form and scope.

A. I don't know how that could be possible without understanding what are aerial resources.

Q. How about the term more information, as in if a -- if two signals together, as opposed to separate, are used for determining a transmission of a third radio signal, is that togetherness possibly correlated for reporting more information?

MR. CERULLI: Objection, form and scope.

A. So what lines 46 through 48 make clear is that the aerial resources

BIMS

are what are used to report more information.

Lines 42 through 45 do not describe aerial resources and the specification as a whole does not define aerial resources, which are described in lines 46 to 48 as being used to report more information.

Q. Again, it's not answering my question.

So if I have one radio signal with some information and I have a second radio signal with additional information and I send both those two radio signals together, would I receive on the other end more information than if I sent each signal separately?

MR. CERULLI: Objection, form and scope.

A. You're asking this question generally, not necessarily tied to the '113 patent, is that the context?

Q. No, the question is the question, that's all.

1 BIMS
2 If I have one signal with one
3 information, if I have a second signal
4 with additional information, and I send
5 the two signals, do I receive more
6 information on the receiving side than I
7 would if I sent the signals separately,
8 that's the question?
9 MR. CERULLI: Same objections.
10 A. Well, again, as I'm hearing the
11 question, it sounds like a generic
12 hypothetical, not necessarily tied to the
13 '113 patent, but just as a general matter
14 what would a person of ordinary skill
15 think about the question outside even the
16 context of the '113 patent.
17 Q. You can answer it generically
18 if you insist on saying it's outside of
19 the scope of '113 patent.
20 Again, the question remains the
21 question, which is, it is a hypothetical,
22 right, and in this hypothetical, the first
23 radio signal has some information, second
24 radio signal has additional information,
25 and I send both those radio signals

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together and it's received on the other side; would I necessarily be receiving more information on the other side, on the receiving side, than if I had sent each signal separately?

MR. CERULLI: Objection, form and scope.

A. So if the content of the first and second radio signals sent together is identical to the content of the first and second radio signals sent separately, then the content would be the same; however, the timing of the transmission when the signals are separate could provide additional information not available when the two signals are sent jointly.

Q. Put a different way, if I sent the two signals, first and second radio signals, which each have different sets of information, on the receiving side would I receive more information if I only sent the first signal?

MR. CERULLI: Objection, scope.

A. If only the first signal was

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transmitted and only the first signal was received, then what is communicated to the receiver would be the content of the first signal and the time in which it was received.

Q. And therefore sending both first and second radio signals with different information would be more information than what you just described, which is just receiving the content of the first signal, correct?

MR. CERULLI: Objection, scope.

A. So what I just described is that transmitting two signals separately can provide more information than transmitting two signals jointly irrespective of the content.

Q. I guess simplifying it a little more, I'm just saying if you sent two signals separately, would that be more information than if you sent only one of those signals alone?

MR. CERULLI: Objection, scope.

A. It depends.

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Q. Depends on what?

A. It depends, for example, it depends on whether the receiver received either of those signals, both of those signals, or none of those signals as an initial matter.

And in addition to that, it depends on how the reception of those signals is processed by the receiver.

Q. Okay.

Assuming that all of the signals are received, No. 1, and are received completely, would receiving two signals report more information than receiving only one of those two signals?

MR. CERULLI: Same objection.

A. It depends.

Q. Okay, describe that, please.

A. The receiver may or may not consider the reception of two signals at different times as conveying additional information.

Q. So receiving two signals at the same time would convey more information,

BIMS

is that correct?

MR. CERULLI: Objection, form and scope.

A. Conveying two signals jointly versus conveying two signals at different times could be important information to a receiver or it may not be important information to the receiver, it depends on the receiver and how it's processing the reception of the signals.

Q. Disregarding whether the information is important or not, is it more information when it's sent joint versus separate?

MR. CERULLI: Same objections.

A. So your question now is with respect to the transmitter, not the receiver, is that the question?

Q. It is whether the receiver is receiving more information or not, is the question.

A. It depends on what the receiver has chosen to receive.

If the receiver has chosen to

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receive the signals in such a way that it understands the difference between the joint reception of two signals and the separate reception of two signals, then the receiver is taking that into account and understands that there is a distinction.

However, if the receiver does not care if the two signals are sent jointly or the signals are sent separately, then the receiver is not receiving this information about the difference and would not understand that there is a difference.

Q. Would not understand there is a difference in what?

A. Between sending two signals jointly versus two signals separately.

Q. I guess going back to my original question, if I sent two signals, each of them has different information -- assuming it is going to be fully received at the receiver -- is sending two signals reporting more information than if I sent

1 BIMS
2 only one of those two signals at the
3 receiver?
4 MR. CERULLI: Objection, scope.
5 Q. It is a pretty simple question.
6 A. Well, as I said earlier, it
7 depends on whether or not the receiver
8 understands that there is a difference
9 between receiving two signals jointly
10 versus receiving two signals separately
11 and processes what's received based on the
12 fact that it understands that there is a
13 difference.
14 Q. But that was not the
15 hypothetical I just posed.
16 The hypothetical I posed is two
17 signals versus one signal, not two signals
18 jointly versus two signals separately.
19 Do you understand my
20 hypothetical?
21 A. Okay, I now I understand your
22 hypothetical.
23 So in your hypothetical two
24 signals are transmitted jointly versus one
25 signal is transmitted?

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Q. Correct.

A. So there are many examples in which multiple signals are sent jointly, but no, quote, more information is conveyed to the receiver than simply sending one signal by itself.

Q. All right.

So I'm not necessarily referring to what is conveyed or what's actually processed by the receiver.

I'm talking more from the transmission side, whether more information is being transmitted or more information is being reported, transmitted, to the receiver side; is more information reported when I have two signals or when I have only one of those two signals transmitted?

MR. CERULLI: Objection, form and scope.

A. So in this hypothetical in which multiple signals are transmitted jointly versus one signal transmitted by itself, again, there are just numerous

1 BIMS
2 examples in which it doesn't matter if
3 multiple signals are sent jointly or a
4 single signal is sent by itself when it
5 comes to conveying information to a
6 receiver.
7 Q. I just said I'm not talking
8 about conveying or necessarily at the
9 receiver what's processed.
10 And I understand your point,
11 you know, you can take certain bits of
12 information, neglect others, and that's
13 conveying information, right, what is
14 processed by the receiver; I'm asking a
15 different question.
16 I'm asking is more information
17 provided, still on the transmission side,
18 is more information provided by two
19 signals or only one of those two signals?
20 MR. CERULLI: Objection, form
21 and scope.
22 A. So, again, when you talk about
23 providing information, what comes to mind
24 is the concept of communicating
25 information from the transmitter to a

BIMS

destination and just because the transmitter transmits multiple signals jointly doesn't mean that the transmitter is transmitting multiple signals to a particular intended receiver.

So, for example, a base station can transmit multiple signals destined for different receiving devices jointly with different encodings that can only be understood by one of the individual receivers; in that scenario, the base station is transmitting multiple signals, but is only providing, as you mentioned, one signal to a particular receiving device.

Q. I think that's perhaps complicating things a little more than I'm contemplating and I will try this one more time, we spent like an hour on this.

Is there more information in two signals or only one of those two signals, let me keep it as simple as that?

MR. CERULLI: Objection, form and scope.

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MR. PYMENTO: I will rephrase it.

Q. Is there more information in two signals or only one of those two signals, where the information in the first and second of those signals are different?

MR. CERULLI: Same objections.

A. So your question as you posed may, in how you're describing it, appear to you to be a simple question, but in actuality, from what I'm hearing, it has far-reaching implications from an information theory perspective, and as we know, information theory is the foundational principles that drives wireless communications.

And the reason I say that is because in your question you're asking about the providing information through a transmitter even if there's no receiver and that raises a profound question about whether or not information can be provided when no one is listening to it, which then

BIMS

has implications for things like integer and things like if you don't observe an event did it really happen.

So I don't know that I can really say that transmitting information when there's no listener to receive it is providing information.

Q. As an absolute value --

Let's put it this way; where A and B are positive integers, is A plus B greater than A?

A. Not necessarily.

Q. Okay.

What example is that true or is that not true, rather?

A. For example, in the binary system, if A is one and B is one, A plus B equals zero.

In that sense, A plus B is less than A or B.

Q. You're saying in the binary system, you're saying one plus one is not equal to one in the binary system, is that what you're saying?

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A. In the binary system, one plus one equals zero.

Q. In the decimal system, where A and B are positive integers, is A plus B greater than A?

A. In the decimal system, the only allowed values are zero through 9, so you run into the same problem.

Q. You see how we're just like wasting time here, right, this is a really simple question.

A plus B is greater than A, where these numbers are positive integers, right or wrong?

MR. CERULLI: Objection, form.

A. So in the domain of integers, if two integers are positive numbers, then the summation of those two integers will be greater than either -- greater than or equal to either of those integers.

Q. Why greater than or equal to, that doesn't follow mathematically if both A and B are positive integers, correct?

A. If A or B is zero, then A plus

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B equals --

Q. Yes, zero is not a positive integer; A and B are positive integers, so A plus B is necessarily greater than A, correct?

MR. CERULLI: Objection, form.

A. You're talking about integers?

Q. Yes, I'm saying A plus B is greater than A where A and B are positive integers, I'm talking about integers.

A. Yes, in that scenario, yes.

Q. I just have one more question and we can take a break.

This is another hypothetical and now I'm worried.

Suppose you have a system where the first and second radio signals of the '113 patent are transmitted on the same channel, whether that's PUCCH or PRACH; in your opinion, how would a person of ordinary skill in the art convert that system to one where the first and second radio signals are transmitted on different channels?

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MR. CERULLI: Objection, form.

A. So you're saying the PUCCH and PRACH are not different channels?

Q. No, I am saying they are different channels, they are different channels.

What I'm saying is you have a system where the first and second radio signals are transmitted on the same channel, so let's just say the first and second radio signals are transmitted on PUCCH.

How would a person of ordinary skill in the art convert that system to one where, say, the first signal is transmitted by PUCCH, but the second radio signal is transmitted by PRACH?

MR. CERULLI: Same objection.

A. In your hypothetical, both channels are available to the transmitter, both the PUCCH and the PRACH are channels available to the transmitter and in your hypothetical only one of the channels is used to send signals and the question is

BIMS

would it be obvious to convert such a system to a system that utilizes both of the available channels, the PUCCH --

Q. Not really, that's not really my question, I am not really saying it's obvious.

I am asking as a person of ordinary skill in the art and indeed as an expert how would you design or make that design improvement or whatever, the design implementation, from a system where you don't have the option, it's only sent by one channel, PUCCH or PRACH, but both the first and second radio signals are transmitted on one channel and that's the system, I want to convert that system to one where the first and second radio signals can be transmitted each on different channels; how can I design such a system?

MR. CERULLI: I will object to form and scope and note for the record that the witness was interrupted during the middle of his answer.

BIMS

MR. PYMENTO: I did not catch that, but, okay, if you say so.

A. Okay.

In such a system where the PUCCH and the PRACH channels are available for use and in that system only one of them, let's say the PUCCH, is used for transmission, a person of ordinary skill would consider it obvious to send information also using the available PRACH.

Q. Okay, you're representing that it's obvious to me and I'm saying what are the design implementations that would occur to make that a reality?

A. The way to design such a system would be to make a very tiny change in the implementation so that information sent through the PUCCH could alternatively be sent on the PRACH.

Q. What is that tiny change?

A. The tiny change would be, for example, let's say that the implementation was performed in software, although this

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example could apply in hardware as well, then what would be required is a modification to the source code that would send the information on the PUCCH to instead designate the information be sent on the PRACH, which may be something as simple as changing the function that gets called to transmit the message.

Q. I get you, but I'm wondering that's almost assuming that another function already exists, right?

I guess what I'm asking is specifically what is different function or how would one change the function or create the alternative function in the system that you're describing?

A. Again, in the system that I'm describing, both the PUCCH and the PRACH are available for use by the transmitter.

And for such a system, the change necessary to send a message over the PRACH versus the PUCCH could be as simple as sending that information to a different software function.

BIMS

Q. How about a system where those two options are not available at the outset, only one is available, one channel is available; how do I then design a system to implement the availability of both channels?

MR. CERULLI: Objection, scope.

A. Well, if both the PUCCH and PRACH are well-known channels, then a person of ordinary skill would understand how to implement both channels.

So in a system that can only support a PUCCH channel, a person of ordinary skill would understand how to add the PRACH capability since the PRACH capability would be well-known and understood to a person of ordinary skill in the art.

As such, those modifications to the original system, which is PUCCH only, would be straightforward.

Q. You mentioned that those changes could be implemented both -- could be implemented in both software or

1 BIMS
2 hardware.
3 For software you noted it would
4 be adding a function.
5 What would be the design around
6 or the design for hardware to add the
7 capability of another channel?
8 A. So I wouldn't consider this
9 necessarily to be a, quote, design around;
10 we're talking about a system that is only
11 capable of transmitting on the PUCCH
12 channel being modified to include the
13 capability of transmitting on both the
14 PUCCH and the PRACH channels.
15 And to do so in hardware, a
16 person of ordinary skill would apply known
17 techniques for implementing the PRACH
18 using hardware circuitry to add such
19 capability to the hardware.
20 And, in addition, a person of
21 ordinary skill would use well-known
22 techniques to add additional logic gates
23 that would redirect the message to the
24 PRACH circuitry that was added to the
25 system.

BIMS

Q. Could you describe those well-known techniques, I guess at a high level.

A. So, for example, the techniques could be applied in a BLSI design by adding logic gates that will receive information from a hardware component and those logic gates would direct the received signal to a portion of the hardware circuitry designed to transmit information on the PRACH and that would occur using transistor logic to redirect the message.

Q. Do you want to take a break or we could power ahead too.

THE COURT REPORTER: I would like to take a quick break, please.

MR. PYMENTO: Sure.

(Recess taken.)

BY MR. PYMENTO:

Q. Dr. Bims, let's go back to claim 1 in the '113 patent.

A. Okay.

Q. Do you see the claim limitation

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monitoring a third radio signal in a first-time window?

A. Yes.

Q. What is your understanding of the term time window?

(Witness perusing document.)

A. In reading this claim limitation, my understanding of time window is in part coming from looking at Figure 6, in the descriptions of Figure 6.

Q. I'm sorry, was that the end of the response?

A. Yes; Figure 6 and the descriptions of Figure 6 in the specification, for example, starting in column 22 at line 44.

Q. So I'm reading column 22, line 44, as you mentioned, and it does note that "Embodiment 6 illustrates example of a first time window, second time window and a third time window as shown in Figure 6."

My question is, what is your understanding of the term time window,

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what is a time window?

A. Again in the context of the claims, the specification is referring you to Figure 6.

Q. Right, and Figure 6 shows time windows; my question is what is a time window?

A. A time window as shown in Figure 6 is a period of time on the time axis.

Q. Is it your understanding that a time window can be any length of time?

A. In the claims, the first, second and third time windows have constraints on their timing.

Q. In your opinion, how would the length of each time window be determined based on the language in claim 1, Figure 6, in specification?

A. So there are a couple of places in claim 1 that provide some insight.

For example, at line 57 in column 25 it says that "A time domain resource occupied by the first radio

BIMS

signal is used for determining a second time window," and then at line 62 it says, "A time domain resource occupied by the second radio signal is used for determining a third time window and the end time of the third time window is the end time of the first time window."

So those two passages in claim 1 provide some insight about the time window when taking into account Figure 6.

Q. What is your understanding of a time domain resource?

A. A time domain resource is a structure that is used for determining a second time window as well as used for determining a third time window, depending on whether the first radio signal or the second radio signal occupies that time domain resource.

Q. Would you describe for me how a time domain resource is occupied by a radio signal.

A. The claim does not describe how it's occupied; what the claim describes is

BIMS

that the time domain resource is occupied by either a first or second radio signal.

Q. Right, and I'm asking you just to describe that technologically, what does that mean is essentially what I'm asking you.

(Witness perusing document.)

A. In column 23, starting at line 13, I believe, it says, "In one subembodiment, a time domain resource occupied by the first radio signal is the start time of the second time window."

Q. Is that your full response?

A. Yes, I simply read what the specification says about the time domain resource occupied by the first radio signal.

Q. Got it.

Could you describe what that means.

A. What it means is that the start time of the second time window can be understood from a time domain resource occupied by the first radio signal.

BIMS

Q. You kind of just restated the language there.

I guess what I am trying to understand is, I understand it says a time domain resource occupied by the first radio signal is the start time, which means that a time domain resource is a particular instant in time, is that correct?

MR. CERULLI: Objection, form.

A. Not necessarily.

In reading this passage it is clear that the start time of the second time window is an instant in time.

Q. Right.

And the language says the time domain resource occupied by the first radio signal is the start time, and I'm not trying to give you a got-you moment, I'm actually just asking what this means, what does that mean, does that mean a resource is an instant in time too, or does it mean something else, and if it's something else, describe that, please.

BIMS

MR. CERULLI: Objection, form.

A. It's simply saying that the time domain resource occupied by the first radio signal tells you the start time of the second time window.

Q. Does it mean that the time occupied by the first radio signal indicates the start time of the second time window or does it mean something else?

A. I don't know that this language is expressly saying that there is some inherent indication of the start time of the second time window.

From reading this passage, I believe that a person of ordinary skill would understand that the time domain resource occupied by the first signal tells the system what the start time is for the second time window.

Q. Sorry, could you repeat that last part.

A. The time domain resource occupied by the first radio signal, as

BIMS

stated here in column 23, is understood by a person of ordinary skill to convey the start time of the second time window.

Q. Okay.

And when the language says "a time resource occupied by the first radio signal" in claim 1, is that referring to the full duration of time of the first radio signal?

MR. CERULLI: Objection, form.

A. I don't think the claim says that, when I read the claim.

Q. I am referring to line 55 in particular, "a time resource occupied by the first radio signal is used."

What is the first radio signal occupying?

A. The first radio signal occupies a time domain resource.

Q. Right, and what is a time domain resource?

MR. CERULLI: Objection, form.

A. So what we know from reading claim 1 is that time domain resources are

BIMS

associated with the second and third time windows and the time domain resources can overlap.

We also know from reading claim 1 that time domain resources can be occupied by radio signals.

Q. So is your testimony we really don't know what the time resource is, other than what the claim is saying?

MR. CERULLI: Objection, form.

A. What was the question again?

Q. Is it your testimony that we don't actually know what a time domain resource is, other than what's in the claim?

MR. CERULLI: Objection, form.

A. Well, the claim certainly does provide constraints on what a time domain resource is and a person of ordinary skill would apply those constraints when trying to understand claim 1.

In reviewing the specification and its description of time domain resource, much of the language in the

BIMS

specification is exactly the same as the claim language, describing the time domain resources being within time windows and being occupied by radio signals.

Beyond that there's not much discussion in the specification about what is a time domain resource.

Q. In your opinion, what's the unit of measurement of a time domain resource?

MR. CERULLI: Objection, scope.

A. Figure 6 shows three time windows and what we see from the claims is that time domain resources have associated time windows or, in other words, a second and third time windows have overlapped time domain resources.

So given that second and third time domain -- time windows, rather, as shown in Figure 6, have overlapped time domain resources, that means that time domain resources can be expressed in units of time.

Q. Are time domain resources

BIMS

instants of time or durations of time?

A. Well, it's not clear from claim 1 which one it is.

However, claim 1 does describe overlapping time domain resources associated with the second and third time window.

And because of that description, it suggests that time domain resources would have a time duration associated with them.

Q. Based on your reading of claim 1, what is the distinction between the time domain resource and time window?

MR. CERULLI: Objection, scope.

A. From reading claim 1, time windows, such as the second and third time window, have overlapped time domain resources.

Claim 1 does not say whether time domain resources have overlapped time windows.

So what claim 1 says is that a time window can have a time domain

BIMS

resource and a time domain resource occupied by a first or second radio signal suggests that a time domain resource can have a time duration associated with it.

Q. Just to clarify, one of the lines, line 59, says, "A time domain resource occupied by the second radio signal is within the second time window."

In that case, the time domain resource occupied by the second radio signal is smaller than the second time window, correct?

MR. CERULLI: Objection, scope.

A. In reading this passage in the claim, that a time domain resource occupied by the second or the first radio signal is used for determining a second time window, I don't think it's clear that it excludes a radio signal or a time domain resource, rather, that spans the duration of a time window.

Q. Again, on line 66, also claim 1 of column 25, it says, "The second time window and the third time window have

BIMS

overlapped time domain resources."

Could you describe what your understanding of that means; as opposed to just saying the second time window and the third time window overlap, what is the distinction in saying the second time window and the third time window have overlapped time domain resources?

A. So the way the claim reads, the second and third time windows have overlapped time domain resource, parenthesis S, parenthesis, meaning that the second and first time windows -- rather, the first and second time windows can have one or more time domain resources within them.

These time domain resources overlap and taken in the context of the claim language along with Figure 6, that overlapping of time domain resources contained within the second and third time windows would appear in a duration of time shown in Figure 6 in which the second and third time windows overlap.

BIMS

Q. Let's go to Figure 5 in the same exhibit, the '113 patent, and I am just going to ask a series of questions based on this figure.

Let me know when you're at Figure 5.

A. I'm there.

Q. We're going to go through these based on the prospective of the UE, which is on the right side of the figure, okay?

A. Okay.

Q. So first the UE receives a target radio signal, correct?

A. Yes.

Q. Then the UE transmits the first radio signal on a first channel, correct?

A. Yes.

Q. Then the UE transmits a second radio signal on a second channel, correct?

A. Yes.

Q. The UE then monitors a third radio signal in the first time window, correct?

A. Yes.

BIMS

Q. So if the first time window expires, does the UE stop monitoring a third radio signal?

MR. CERULLI: Objection, scope.

A. When you say the first time window expires, what do you mean by that?

Q. Sure.

It means so the first time window, as you mentioned, is a certain duration of time; if that duration of time runs out, does the UE stop monitoring the third radio signal?

MR. CERULLI: Same objection.

A. So Figure 5 does affirmatively say that monitoring of third radio signal happens in a first time window.

This particular embodiment doesn't say what happens after the first time window.

Q. So is it your opinion that even after the first time window expires, the UE can continue monitoring a third radio signal?

MR. CERULLI: Objection, form.

BIMS

A. So it's my opinion that Figure 5 does not show what happens after the first -- after the end of the first time window, that's not shown in Figure 5.

Q. Based on your understanding of claim 1, would the UE monitor the third radio signal after the first time window?

MR. CERULLI: Objection, scope.

A. In the scope of claim 1, the third radio signal is monitored in a first time window.

Q. Let me put it this way.

If a UE continues monitoring the third radio signal after the first time window expires, what is the point of the first time window?

MR. CERULLI: Objection, form and scope.

A. That's not a hypothetical that I considered nor is it a hypothetical that's claimed.

What is claimed is within a first time window monitoring of a third radio signal takes place.

BIMS

Q. What is the purpose of the first time window in claim 1?

MR. CERULLI: Objection, scope and form.

A. Claim 1 describes that there are time windows, the first, second and third time windows, which is enough for a person of ordinary skill to understand the claim.

The claim does not go on further to describe or assign purposes to each one of the time windows.

Q. Let me use a different word.

What's the function of a time window in claim 1 in the '113 patent?

MR. CERULLI: Objection, form and scope.

A. In claim 1 there is not an assigned functionality to a time window, there is simply a description of a time window in which certain functions take place.

Q. In your opinion, would claim 1 function the same way if there were no

BIMS

time windows?

MR. CERULLI: Objection, scope and form.

A. So you're asking me if I were to remove all references to the first, second, and third time windows from claim 1, would it be identical?

Q. Well, not identical, but would it function in the same way?

MR. CERULLI: Same objections.

A. That's something I have not considered, removing those terms from claim 1.

It's hard to give an off-the-cuff answer, the words first, second and third time window appear repeatedly throughout claim 1, so time windows are an important part of the claim.

I don't see any claim where all three time windows are removed, so I really can't answer that question until I see a claim that has all those terms removed.

BIMS

Q. So the claim limitation, one of the claim limitations of claim 1 is monitoring a third radio signal in a first time window.

What you have represented to me before is that because claim 1 doesn't say what happens after the first time window expired, it is conceivable that the third radio signal can continue to be monitored, is that correct?

A. No, that's not correct.

Q. Okay, what is not correct about that?

A. My answer to your question was in reference to Figure 5, which is an embodiment in the specification; it was not in reference to claim 1.

In claim 1, the scope of claim 1 is limited to monitoring a third radio signal in a first time window.

Q. So in the context of claim 1, when the UE stops -- when the first time window expires, does the UE stop monitoring the third radio signal?

BIMS

MR. CERULLI: Objection, scope.

A. What's clear in claim 1 is it's limited to monitoring the third radio signal in a first time window.

Q. Let's turn to Figure 6 of Exhibit 1.

(Witness complying.)

MR. CERULLI: Dr. Bims, if you have more, you can finish your answer.

A. Well, I was going to say that claim 1 is limited to monitoring a third radio signal in a first time window, which means whatever happens outside of a first time window with respect to monitoring a third radio signal is not within the scope of claim 1, so we would be describing something that is not claimed.

Q. Okay, then let's stick with claim 1.

If the first time window does not limit the monitoring of third radio signal, despite the fact that it's not explicitly noted what happens after the first time window, why would there be a

1 BIMS
2 first time window in claim 1.
3 MR. CERULLI: Objection, scope
4 and form.
5 A. Again, I wasn't the one who
6 drafted the claims, I am not listed as an
7 inventor on the '113 patent, I can't speak
8 for why the claim was written the way it
9 is written.
10 I can only speak from the
11 perspective of a person with ordinary
12 skill who is reading the claims.
13 Q. A person of ordinary skill in
14 the art would try to ascertain why certain
15 features are present in the claim,
16 correct?
17 A. A person of ordinary skill does
18 not have to ascertain why the claims were
19 written the way they were written; a
20 person of ordinary skill only needs to
21 understand the claim.
22 Q. That's not exactly what I was
23 saying.
24 I was saying a person of
25 ordinary skill in the art reading the

1 BIMS
2 claim, in order to fully understand the
3 claim, would need to understand why
4 certain elements and limitations exist in
5 the claim, correct?
6 A. A person of ordinary skill, it
7 would be nice if the specification
8 provided information as to why the claim
9 included certain features.
10 But, again, a person of
11 ordinary skill only needs to understand
12 the claim in order to be able to practice
13 the invention or to know how the invention
14 works.
15 The why factor is not required
16 to understand what the claim scope is
17 covering.
18 Q. So are you testifying that you
19 don't need to know the purpose or the why
20 factor of a component of a system in order
21 to understand its function, is that your
22 testimony?
23 MR. CERULLI: Objection, form.
24 A. The method described in claim 1
25 is what it is whether or not you know why,

BIMS

whether --

Q. So you don't know the function of a time window in this claim limitation, right?

MR. CERULLI: Objection, form.

A. Claim 1 describes functions that take place within time windows, but it doesn't describe that the time window itself has certain functions.

Q. So what does a first time window do in this claim limitation?

MR. CERULLI: Objection, form.

A. As I've said earlier, in claim 1 it describes certain functions or operations that take place within time windows.

Q. Specifically the claim limitation says that there is monitoring a third radio signal in a first time window, correct?

A. Yes.

Q. What you're telling me is that you don't know what happens after the first time window expires, am I

1 BIMS
2 understanding that correctly?
3 MR. CERULLI: Objection, form.
4 A. What I'm saying is that the
5 monitoring function of a third radio
6 signal is within the scope of the claims
7 when it's in a first time window.
8 After a first time window the
9 scope of the claims does not cover that
10 scenario.
11 Q. As a person of ordinary skill
12 in the art, does it make sense for UE to
13 continue monitoring a third radio signal
14 in perpetuity, beyond the first time
15 window?
16 MR. CERULLI: Objection, scope.
17 A. There is no discussion in claim
18 1 or the rest of the specification about
19 third radio signals being monitored
20 outside of a first time window, so the
21 claim 1, for example, is silent on what
22 happens outside a first time window with
23 respect to monitoring a third radio
24 signal.
25 Q. Again, that's not really

BIMS

responsive to my question, which is, would a person of ordinary skill in the art assume that an UE would monitor a third radio signal in perpetuity past the first time window?

MR. CERULLI: Objection.

Q. Whether claim 1 covers it or not is sort of irrelevant to my question.

A. I guess the way I would respond is by prefacing my answer and saying the behavior of certain wireless systems not claimed by the '113 patent is irrelevant to my declaration.

There are certain systems outside the context of the '113 patent in which a mobile device has limitations on when it will listen for communications from a base station.

But given that we're talking outside the context of the '113 patent, I don't know how that relates to claim 1.

Q. So what's the answer to my question, I'm struggling throughout this whole deposition to get sort of answers

BIMS

responsive to my questions and the one that I posed here, again, is a simple one.

Would a person of ordinary skill in the art assume that a third radio signal would be monitored in perpetuity or is it usually the case that it's restricted during a certain time frame?

MR. CERULLI: Objection, scope.

A. Again, a person of ordinary skill in the art would not try to fill in various details to the claim and assume that all these details are part of the claim.

A person of ordinary skill would know how to implement a system that has time limitations on receiving various communications.

But that doesn't mean a person of ordinary skill would read in all of those constraints into a claim that doesn't require that.

Q. I just want to get this on record.

Can you clarify the function of

BIMS

the first time window as claimed in claim 1.

MR. CERULLI: Objection, form.

A. Well, as I said before, claim 1 describes functions that happen within time windows.

Claim 1 does not describe the function of a time window.

Q. So it's your testimony that the first time window does not have a function, correct?

MR. CERULLI: Objection, form.

A. It's my testimony that claim 1 does not describe time window functions; what it describes is functions that take place within time windows.

Q. It's also your testimony that a person of ordinary skill in the art would have no reason to ascertain why those functions occur during time windows, correct.

MR. CERULLI: Objection, form.

A. In reading claim 1, the person of ordinary skill would simply read what

1 BIMS
2 the method is claiming.
3 The specification, it would be
4 nice if the specification described why
5 claim 1 exists, but claim 1's scope, which
6 is a method of a user equipment, is
7 describing functionality of a user
8 equipment, but a person of ordinary skill
9 doesn't have to know why the claim claims
10 what it claims.
11 Q. Let's turn to Figure 6 of
12 Exhibit 1.
13 Let me know when you're there.
14 A. I am there.
15 Q. In Figure 6, the first time
16 window extends from the UE transmission of
17 the first radio signal to when the third
18 radio signal is received from the base
19 station, correct?
20 A. Yes.
21 Q. If the third radio signal is
22 not received, would the first time window
23 extend longer?
24 MR. CERULLI: Objection, scope.
25 A. So claim 1 says that, starting

1 BIMS
2 at line 63, "A time domain resource
3 occupied by the second radio signal is
4 used for determining a third time window
5 and the end time of the third time window
6 is the end time of the first time window,"
7 which means the time domain resource
8 occupied by the second radio signal is
9 used for determining not only the third
10 time window, but because it's determining
11 the third time window, it's determining
12 the end time of the first time window.
13 Q. So the first time window and
14 the third time window are independent of
15 the third radio signal, correct?
16 MR. CERULLI: Objection, form.
17 A. The first time window ending
18 has to be simultaneous with the ending of
19 the third time window.
20 And the third time window is
21 determined by the time domain resource
22 occupied by the second radio signal.
23 Q. Again I will repeat the
24 question.
25 Therefore the first time window

BIMS

and the third time window are independent of the third radio signal, correct?

MR. CERULLI: Objection, form.

A. I wouldn't say they're independent, because the claim says that monitoring of a third radio signal happens in a first time window.

Q. I am asking you almost a chicken or eggs situation; what comes first, the first time window or the third radio signal?

I understand the claim limitation says monitoring a third radio signal in a first time window.

Is the first time window, and also the third time window, defined, configured, sort of regardless of when the third radio signal is received?

MR. CERULLI: Objection, form and scope.

(Witness perusing document.)

A. I would say that the monitoring of a third radio signal in a first time window occurs whether or not the base

1 BIMS
2 station has transmitted the third radio
3 signal.
4 And support for that is in
5 column 22, where it says, starting at line
6 56, "The UE conducts monitoring of the
7 third radio signal in a time interval
8 between the start time of the first time
9 window and the time domain resource
10 occupied by the second signal, but does
11 not detect the third radio signal. The
12 third radio signal is transmitted after
13 the second radio signal."
14 Then it says, "In one
15 subembodiment the base station does not
16 transmit the third radio signal in the
17 time interval between the start time of
18 the first time window and the time domain
19 resource occupied by the second radio
20 signal."
21 So it's certainly possible that
22 monitoring of the third radio signal can
23 occur in a time interval in which the base
24 station does not transmit a third radio
25 signal.

BIMS

Q. In Figure 6, the second time window extends from the UE transmission of the first radio signal to the UE transmission of the second radio signal, correct?

MR. CERULLI: Objection, form.

A. From Figure 6, it looks like the second time window extends past the second radio signal.

Q. Why do you think that is?

A. Because that's how Figure 6 was drafted.

Q. Based on the specification, would a person of ordinary skill in the art expect a second radio signal to fall within the second time window?

MR. CERULLI: Objection, scope.

(Witness perusing document.)

A. In column 11, starting at line 24, it says, "According to one aspect of the present disclosure, the above method is characterized in that a time domain resource occupied by the first radio signal is used for determining a second

BIMS

time window. A time domain resource occupied by the second radio signal is within the second time window and the second time window is within the first time window."

So that passage suggests that the second radio signal is within the second time window.

MR. PYMENTO: It is 1:38 p.m. here, what do you think about a lunch break now until maybe 2:10, is 30 minutes okay?

MR. CERULLI: 35 minutes.

(Lunch recess: 1:38 p.m.)

1

2 A F T E R N O O N S E S S I O N

3 2:18 p.m.

4 D R. H A R R Y V. B I M S, resumed.

5 EXAMINATION CONTINUED

6 BY MR. PYMENTO:

7 Q. Welcome back.

8 Let's turn to Exhibit 4, which

9 is Xia, also referred to as Exhibit 1004

10 in the 601 proceeding.

11 A. Yes.

12 Q. Let's go to Figure 6B in that

13 document.

14 Please let me know when you're

15 there.

16 A. I'm there.

17 Q. The figure shows sending a

18 PUCCH-BFRQ at time t1, correct?

19 A. Yes.

20 Q. The figure also shows sending

21 BRACH-BFRQ at time t2, correct?

22 A. Yes.

23 Q. The figure also shows waiting

24 for PUCCH-BFRP until t3, correct?

25 A. Yes.

BIMS

Q. The figure also shows waiting for BRACH-BFRP until t4, correct?

A. Yes.

Q. When the system of Xia receives a PUCCH-BFRQ, must it also wait for a BRACH-BFRP?

MR. CERULLI: Objection, scope.

(Witness perusing document.)

Q. If it helps I can direct you to Xia paragraph 102 and then I will repeat the question.

So when the system of Xia receives a PUCCH-BFRP, must the system also wait for a PRACH-BFRP as well?

A. It depends; in certain embodiments of Xia it will wait for both responses if the base station and the UE have been preconfigured for that scenario.

There are other embodiments in which the UE will receive the first BFRP that's transmitted by the base station.

In either case, Xia says that the UE will search for a beam failure recovery response within a first response

BIMS

time window, so it will search within the first response time window and when it receives that response, whether it also will wait for a second response depends on which embodiment you're looking at.

Q. Do you mind pointing me to an embodiment for either scenario.

(Witness perusing document.)

A. For example, in paragraph 105 it says, "In one embodiment, the first BFRQ is sent using one of a PUCCH and a PRACH for beam failure recovery. In one other embodiment, the first response window is a PUCCH response window when the BFRQ is sent using the PUCCH and the first response window is a beam failure random access channel, PRACH, response window when the BFRQ is sent using the PRACH for beam failure recovery."

So in that situation where the UE chooses between the two requests, it will listen in a response window that is different if the request was sent on the PRACH or the PUCCH.

BIMS

Q. So in that case you're saying that the system of Xia will wait for both responses on both channels?

A. In this scenario there's one response, it's either -- there's one request on either the PUCCH or the PRACH, and depending on which request went out, there's a different response time window.

Q. Right.

What I'm talking about is the scenario which we discussed in Figure 6B where both requests were sent on both channels.

Do we have to receive under Xia responses on both channels?

(Witness perusing document.)

A. So in paragraph 103 it says, "The gNB 402 responds to the UE's 404 two BFRQs based on the aforementioned algorithm. For example, the UE 404 sends a PUCCH-BFRQ at t1 and a PRACH-BFRQ at t2. The UE 404 then waits for a PUCCH-BFRP at t3 and a PRACH-BFRP at t4."

Q. What do you make of the

BIMS

following line which says "In response," directly after what you just read, "the gNB sends out a single BFRP as follows"?

MR. CERULLI: Objection, form.

A. What's the question?

Q. What is your understanding of the line that directly follows what you just read, which is, "In response, the gNB sends out a single BFRP as follows"?

A. So the rest of that sentence describes the gNB sending out a PRACH-BFRP at time t4 and sending out a PUCCH-BFRP at time t3, so that sentence you were mentioning lines up with the UE waiting for both the PUCCH-BFRP and PRACH-BFRP.

Q. So, in other words, there are two time periods in which the UE is waiting for a response to the request sent on the two channels, correct?

MR. CERULLI: Objection, form.

A. Well, paragraph 103 doesn't talk about two time periods, it talks about two times in which it looks for response, but it doesn't say that there

BIMS

are two different time periods.

Q. Let's go directly up to paragraph 102, which reads, "As illustrated in example of Figure 6B, a single BFRP is sent in response to two BFRQs. In the example, the UE 404 sends two BFRQs, a PUCCH-BFRQ at time t1, and a PRACH-BFRQ at time t2. The UE 404 then waits for a single BFRP, a PUCCH-BFRP at time t3 or a PRACH-BFRP at t2, from the gNB 402."

So in this example, which they're saying is the example of Figure 6B, does this describe waiting for one response or two responses?

MR. CERULLI: Objection, form.

(Witness perusing document.)

A. So in this embodiment, the UE can wait for either the time t3 or it can wait for the time t4, either one is part of this particular embodiment.

Q. Just to clarify, it is waiting for the time or it's waiting for the response?

BIMS

A. It's waiting for response either at PUCCH-BFRP at time t3 or at PRACH BFRP at time t4.

Q. Referring to the same example, which is describing the figure of 6B, whichever BFRP comes first, PUCCH or PRACH, that would end what you're describing in your declaration to be the first time window, correct?

MR. CERULLI: Objection, form.

A. I don't see that language in paragraph 102.

Q. Right, I'm not saying it's described in 102, I'm really talking about your declaration, which is what you're saying is that the first time window is disclosed through Figure 6B, correct?

A. Yes.

Q. Right.

And so what you're saying is that the first time window ends when first BFRP, whether that's PUCCH or PRACH, is received, correct?

MR. CERULLI: Objection, form.

BIMS

A. I am trying to find that paragraph in my report, where it says the time window ends when the first BFRP is received.

Q. I am just questioning it; you have at least the annotated figure on paragraph 51 of your declaration in the 601 proceeding, so that one I've marked as Exhibit 2, you can take a look at that paragraph if that helps.

A. Okay, I'm looking at it.

(Witness perusing document.)

Q. So on the picture or the annotated Figure 6B, it shows the first time window extending from t1 to t4, correct?

A. Yes.

Q. So it's basically saying the first time window ends when it receives the PRACH BFRP at time t4, correct?

A. It says the first time window extend to t4, that's what it says, that's what it shows on Figure 6.

Q. And my question now is whether

BIMS

it would extend to t4 regardless of whether the PUCCH-BFRP is received prior to t4, for example, at t3?

MR. CERULLI: Objection, form.

A. In this annotated example out of Xia, the first time window would always extend from t1 to t4 regardless of where within t1 to t4 the BFRP is received.

Q. Understood.

Let's turn to Exhibit 6, which is Liu, and we'll go to Figure 5B, let me know when you reach there.

(Witness perusing document.)

A. Okay, I'm there.

Q. What does Figure 5B show?

A. Figure 5B shows two beam failure requests transmitted by the UE, each one with a time offset before an expected beam failure response occurring within an overall time duration.

Q. This Figure 5B, the first BFRR response, which underneath it says UL downlink BPL1, corresponds to the first request, which is BFRR, and underneath it

BIMS

says UL BPL1, correct?

A. Yes.

Q. And likewise, the BFRR response UL BPL2 corresponds to the second request, which is BFRR noted as UL BPL2, correct?

A. Yes.

Q. Let's turn to paragraphs 98 to 99 of Liu.

A. Okay.

(Witness complying.)

Q. These paragraphs describe Figure 5B of Liu, correct?

A. Yes.

Q. And based on these paragraphs, are the two BFRRs in Figure 5B simultaneous transmissions?

MR. CERULLI: Objection, form.

A. They may be transmitted simultaneously is what it says in paragraph 99.

Q. So really at the end of paragraph 99, the last sentence says, "Although only two simultaneous transmissions are illustrated in Figure

BIMS

5B, it is appreciated that any number of simultaneous number of transmissions may occur."

It is still your testimony that Figure 5B does not show simultaneous transmissions?

A. So it is still my testimony that paragraph 99 says the two transmissions may occur simultaneously and when you pair that with paragraph 98, which says Figure 5B illustrates an offset between the DL beam pair for a BFRR response by the base station 402 and the DL beam pair for the BFRR from the user equipment 404 for multiple transmissions, I think it's clear that Figure 5B allows for the BFRR to be sent simultaneously or as separate multiple transmissions.

Q. Despite the fact that the last sentence of paragraph 99 says that although only two simultaneous transmissions are illustrated in Figure 5B, it is your testimony that in fact Figure 5B may or may not show two

BIMS

simultaneous transmissions?

MR. CERULLI: Objection, form.

A. So it's my testimony that paragraph 99 is one embodiment described in Figure 5B, and paragraphs 97 and 98 are different embodiments illustrated in Figure 5B.

And so both are illustrated in Figure 5B; the example where the two BFRRs are transmitted simultaneously and is one embodiment, and the example where the two BFRRs are in different transmissions is a different embodiment, both reflected in Figure 5B.

Q. So specifically in Figure 5B, it is not clear from Figure 5B whether the requests are transmitted simultaneously?

MR. CERULLI: Objection, form.

Q. Just from looking at Figure 5B.

A. Right, so looking at Figure 5B and specifications description of Figure 5B, there are two embodiments reflected in Figure 5B, one embodiment where the two BFRRs are transmitted simultaneously and a

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different embodiment where the two BFRRs are transmitted in multiple transmissions.

Q. Does it describe anywhere in those paragraphs multiple nonsimultaneous transmissions, aside from the use of the word may?

A. Again, you're focused on the embodiment described in paragraph 99, which talks about Figure 5B.

And what I'm trying to highlight is paragraphs 97 and 98, which also describe Figure 5B in a separate embodiment and in that separate embodiment there can be multiple BFRR transmissions.

Q. One, I am focusing on paragraph 99, but just a quick question.

How do you ascertain that paragraph 97 is related to Figure 5B?

A. Paragraphs 97 and 98 are an embodiment; paragraph 98 specifically talks about what Figure 5B illustrates.

Q. When paragraph 98 refers to multiple transmissions, is it referring to multiple requests?

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A. It's referring to multiple transmissions of the BFRR on the uplink, so it's referring to multiple requests.

Q. Do you see there is a parenthetical 3 within paragraph 99 that says, "Indicating a preferred downlink DL beam pair in the BFRR to the base station 402 in which the user equipment 404 monitors the indicated DL beam pair according to the time offset (in this case the user equipment 404 may only monitor one downlink beam, so a recommendation is made as to the best performing beam)."

Do you see that?

A. I see that passage within paragraph 99, yes.

Q. Can you describe what it means in the context of Figure 5B to determine that the recommendation is made as to the best performing beam.

MR. CERULLI: Objection, form.

A. In paragraph 99 it does not describe how the recommendation is performed, whether the recommendation is

BIMS

an internal recommendation within the UE or it came from the base station, nor does it describe when the recommendation took place.

So, for example, the recommendation on best performing beam might have been made prior to the transmission of the BFRRs, either internally within the UE or as a communication from the base station.

Q. When that parenthetical says that the user equipment or UE may only monitor one downlink beam, is that referring to monitoring a response to the BFRR request?

A. What was the question again, sorry.

(Record read.)

(Witness perusing document.)

A. So in paragraph 99 it says that each beam pair has a corresponding SQCL DL beam pair and so when the user equipment transmits multiple BFRRs simultaneously, the user equipment can then monitor the

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SQCL downlink beam pairs for the BFRR response simultaneously, in other words, the UE can wait for multiple responses from the base station and is not limited to only waiting for one.

Q. And so the part of the parenthetical that describes a recommendation is made as to the best performing beam, is that referring to, between the two beam pairs, at least the two beam pairs in Figure 5B, which of those is the best performing beam pair?

A. For that ultimate method within paragraph 99, the UE would listen to the recommendation for the best performing beam so that it may monitor that one beam.

MR. CERULLI: Just a clarification of the transcript, I think it says "ultimate," but Dr. Bims said "alternate."

THE WITNESS: "Alternate," yes.

Q. So is it your testimony now that a recommendation is made in order to monitor the DL beams, or is it vice versa,

1 BIMS
2 that you monitor the DL beams in order to
3 come up with a recommendation?
4 MR. CERULLI: Objection, form.
5 A. The context of what you're
6 reading as a parenthetical describing a
7 recommendation made as to the best
8 performing beam, that actually is part of
9 the third alternate in paragraph 99, which
10 is indicating a preferred downlink beam
11 pair in the BFRR to the base station, in
12 which the user equipment 404 monitors the
13 indicated DL beam pair according to the
14 time offset.
15 So, in other words, the UE is
16 indicating a preferred downlink beam pair
17 in the BFRR to the base station and then
18 in parenthesis it says that a
19 recommendation is made as to the best
20 performing beam.
21 Q. Just to simplify that for the
22 record, so the recommendation is made as
23 to the best performing beam prior to
24 monitoring the one DL beam in the
25 parenthetical?

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MR. CERULLI: Objection, form.

A. It appears that No. 3 method, that the recommendation would occur prior to monitoring.

Q. Sitting here today does paragraph 99 explain how that recommendation is made?

MR. CERULLI: Objection, form.

A. As I indicated earlier, the recommendation could have been made as an internal recommendation within the UE to select the best performing beam, or it could have been made earlier by the base station and communicated from the base station to the UE.

Q. Just going back to the parenthetical, and this is more a grammatical thing than anything else, it says, "In this case the user equipment 404 may only monitor one DL beam, so a recommendation is made as to the best performing beam."

What is your understanding of the word "so" in that phrase?

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A. In the context of paragraph 99, it appears that what this number 3 option is describing is a recommendation is made as to the best performing beam so that the UE may only monitor one DL beam.

Q. Can you repeat that last part.

MR. CERULLI: Objection, form.

(Record read.)

Q. Dr. Bims, is it your testimony that the recommendation or -- strike that.

Is it your testimony in the context of the parenthetical 3 that the monitoring is not done so that a recommendation is made as to the best performing beam?

MR. CERULLI: Objection, form.

A. It appears that the recommendation is prior to monitoring, which is consistent with other paragraphs in this reference, including paragraph 101, which describes monitoring the preferred downlink beam pair or what's called the best SQCL downlink beam pair.

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Q. How does the UE determine the best SQCL downlink beam pair?

A. So what's described in paragraph 101 is one example for how the best SQCL downlink beam pair can be determined, when it says the candidate having the best channel quality.

Within the context of paragraph 101, there are multiple candidate beams and the UE can transmit multiple requests on multiple candidate beams, but the monitoring that occurs in the UE is with respect to the best SQCL downlink beam pair, which is the candidate beam having the best channel quality out of all of the candidates.

Q. Let's turn to claim 2 of the '113 patent, which is Exhibit 1.

(Witness complying.)

A. Okay.

Q. Claim 2 reads, at least in part, "Wherein at least one signal of the following set of signals, the first radio signal, the second radio signal, is used

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for determining a multi-antenna related transmitting of the third radio signal."

Do you see that?

A. Yes.

Q. What is your understanding of a multi-antenna related transmitting?

A. A multi-antenna related transmitting is a transmission that uses multiple antennas.

Q. So based on the claim language, does the transmission of the third radio signal require more than one antenna on the base station?

A. For claim 2, the transmission of the third radio signal requires multiple antennas, in other words, more than one.

Q. Let's turn back to Xia, which is Exhibit 4, and we'll go to Figure 6B again.

Let me know when you're there.

A. I'm here.

Q. In your declaration, you opined that the second of the BFRPs shown in Xia

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Figure 6B shows a third radio signal, correct?

A. Yes.

Q. How does the system of Xia determine which antenna port on the base station is used to transmit that second BRACH-BFRP signal?

A. You're asking how the UE determines that?

Q. Yes.

(Witness perusing document.)

A. As described in paragraph 103, the UE does not have to determine which transmission, whether it's PRACH or PUCCH, is made by the base station.

In this particular embodiment it is the base station that runs an aforementioned algorithm to respond to the multiple requests from the UE.

Q. Is part of that aforementioned algorithm the determination of antenna ports that would transmit the BFRP response?

(Witness perusing document.)

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A. In paragraph 50 it says that the UE can be capable of receiving a plurality of Tx beams from the base station or supporting a plurality of base station Tx user equipment Rx beam pairs.

Q. Pardon me, this is paragraph 50 you said?

A. Yes.

Q. Can you point me again to where in paragraph 50 of Xia you see the determination of antenna ports on the base station to transmit the BFRP.

(Witness perusing document.)

A. So paragraph 50 establishes that the UE can receive on a plurality of beams simultaneously.

There is another paragraph which talks about the base station selecting one of the candidate beam pairs and transmitting that to the UE.

In paragraph 69 it says that "The UE will monitor the base station 402 downlink beams SQCL'd with the base station 402 UL receive beam for BFRQ

BIMS

reception. Specifically the user equipment 404 monitors the PDCCH region of a DL beam with the assumption that the corresponding PDCCH demodulation reference signal, DMRS, is SCQL'd with the RS of the identified candidate beams by the user equipment 404. To make this determination, the user equipment 404 may be provided with the SQCL'd information between the active downlink/uplink beam pairs directly from the base station 402."

Q. Is it your testimony that indicates the antenna ports on the base station that are used to transmit the BFRP?

MR. CERULLI: Objection, form.

A. Paragraph 69 is an embodiment in the context of paragraph 68, which describes the antenna ports that may be SQCL'd and those antenna ports that may be SQCL'd form the candidate beams which can be linked to the base station through SQCL'd information provided by the base station.

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Q. Let's turn to Liu, Figure 5B again, that's Exhibit 6, also noted as Exhibit 1007 in the 602 proceedings.

(Witness complying.)

A. Okay, I'm there.

Q. Is it your testimony from your declaration that the second of the BFRR responses in Figure 5B shows the claim's third radio signal?

(Witness perusing document.)

A. You said Exhibit 6?

Q. Sorry, Figure 5B in Liu, which is Exhibit 6.

(Witness perusing document.)

A. I'm in Liu Figure 5B.

Q. Yes, I will repeat the question.

Is it your testimony that the second of the BFRR responses in Figure 5B shows the claim's third radio signal?

A. Yes.

Q. How does the UE of Liu determine which antenna port on the base station is used to transmit that second

BIMS

BFRR response?

(Witness perusing document.)

A. In paragraphs 84 through 88, it gives a description for how this is accomplished; for example, in paragraph 84, two-thirds of the way down it says, "In either case the BFRR sent by the user equipment 404 requires a response message, BFRR response, from the base station 402 if beam failure is to be recovered. However, the user equipment 404 does not know which DL beam will be used by the base station 402 to transmit a BFRR response."

It then goes on further to talk about, for example, in paragraph 88, "To determine the candidate beam, the user equipment 402 uses the spatial quasi co-located (SQCL'd) information between the base station 402 transmission (DL) and receive (UL) beams. Two antenna ports may be said to be SQCL'd if large-scale properties of a radio channel over which a symbol on one antenna port is conveyed can

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be inferred from a radio channel over which a symbol on the other antenna port is conveyed."

So in paragraph 89 it says in one embodiment the UE 110 will monitor the base statement 402 downlink beams, plural, SQCL'd with the base station 402 uplink receive beam for BFRR reception.

So it's describing how, through using the method of SQCL, the UE is able to monitor more than one beam for the response from the base station.

Q. Let's look at claim 5 of the '113 patent, let me know when you're there.

(Witness complying.)

A. Okay, I'm there.

Q. This claim uses the terms first antenna port group, second antenna port group and third antenna port group.

What is your understanding of the term antenna port group in this claim?

A. An antenna port group is a grouping of antenna ports.

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Q. And a grouping, does a grouping mean more than one antenna port?

A. A grouping means one or more antenna ports.

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

I will pass the witness.

MR. CERULLI: Can we take a ten-minute break just to review our notes.

MR. PYMENTO: Yes.

(Recess taken.)

(Continued on next page.)

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MR. CERULLI: We have no further questions at this time.

THE COURT REPORTER: Mr. Pymento, what did you want for final transcript?

MR. PYMENTO: A rough and expedited, please.

MR. CERULLI: We will just take the copy, the slowest.

THE COURT REPORTER: Okay, thank you.

(Time noted: 3:40 p.m.)

_____

DR. HARRY V. BIMS

Subscribed and sworn to before me this ____ day of _____, 20 .

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2 C E R T I F I C A T I O N
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5
6 I, Jineen Pavesi, a Registered
7 Professional Reporter, Registered Merit
8 Reporter, Certified Realtime Reporter and
9 a Notary Public, do hereby certify that
10 the foregoing witness, DR. HARRY V. BIMS,
11 was duly sworn on the date indicated, and
12 that the foregoing is a true and accurate
13 transcription of my stenographic notes.
14 I further certify that I am not employed
15 by nor related to any party to this
16 action.
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2 E X H I B I T S

3

4 Bims

5 EXHIBIT DESCRIPTION PAGE

6

7 Exhibit 1 U.S. Patent No. 5

8 10,568,113

9 Exhibit 2 Dr. Bims' 5

10 declaration

11 submitted in

12 IPR2023-00601

13 Exhibit 3 Dr. Bims' 6

14 declaration

15 submitted in

16 IPR2023-00602

17 Exhibit 4 Patent Application 6

18 Publication No.

19 2019-0053294 to Xia

20 Exhibit 5 Patent Application 6

21 Publication No.

22 2015-0141026 to

23 Jover

24 Exhibit 6 U.S. Patent 6

25 Publication No.

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	IPR2023-00601	
Exhibit 8	Institution	7
	Decision in	
	IPR2023-00602	

1 ERRATA SHEET
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