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2 UNITED STATES PATENT AND TRADEMARK OFFICE

3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 ----------x

5 SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,

6 Petitioners,

7 Case No.

8 IPR 2023-00571

9 v.

10 APEX BEAM TECHNOLOGIES, LLC.,

11 Patent Owner.

12 ----------x

13 10:00 a.m.
January 18, 2024

14

15

16 VIRTUAL DEPOSITION of APOSTOLOS KAKAES, an

17 Expert Witness in the above entitled matter,

18 pursuant to Notice, before Stephen J. Moore, a

19 Registered Professional Reporter, Certified

20 Realtime Reporter and Notary Public of the State

21 of New York.

22

23

24

25

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25

APOSTOLOS KAKAES

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A P O S T O L O S K A K A E S,
called as a witness, having been first duly sworn by the Notary Public, was examined and testified as follows:

EXAMINATION BY
MR. PYMENTO:

Q Good morning, Dr. Kakaes, could you please state your full name for the record?

A Good morning. Yes, my first name is a Apostolos and my name last name is Kakaes.

Q So I'm Julian Pymento, counsel for Apex Beam Technologies, LLC in this proceeding, I'll be taking your deposition today.

Dr. Kakaes, is there any reason that you can't testify truthfully today?

A No, there is not.

Q I won't go through all the ground rules for depositions since we have

1 APOSTOLOS KAKAES
2 been through that I think multiple times
3 now, so I think we can forego that.
4 Have you taken any drugs or
5 alcohol that could impair your ability to
6 think today?
7 A No, I have not.
8 Q Where are you located right
9 now physically?
10 A The Finnegan law offices in
11 Reston, Virginia.
12 Q Is there anyone in the room
13 with you?
14 A Yes.
15 Q Who is in the room with you?
16 A Mr. Kevin Rodkey and Mr. Josh
17 Goldberg.
18 Q If that changes, could you
19 please let me know?
20 A I will try to remember to do
21 so.
22 Q What programs do you have
23 currently running on your computer, aside
24 from this Zoom meeting?
25 A I believe that the only other

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thing that's running is PDF Acrobat.

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

A No, I don't think so.

Q Do you have physical copies of any of the papers in these proceedings?

A I have physical copies of some of them, but not all.

Q Which documents do you have physical copies of?

A I have physical copy of my declaration, the one I've been referring to as the Liu and Park declaration that's number IPR 2023000571.

I have my second declaration which is the one that I've been calling the Kim and Chan which is IPR 202300747.

I have the what we have been calling Samsung Exhibit 1001, which is the '271 Patent, or that we will be referring to the full number is 1,0951,271 Patent.

I have a copy of what we have

1 APOSTOLOS KAKAES
2 been calling Samsung Exhibit 1006, which we
3 will refer to as Liu prior art.
4 I have a Samsung Exhibit 1009
5 which you have been referring to as the Park
6 prior art.
7 I have Exhibit 1027, which is
8 what we have been referring to as the Kim
9 prior art.
10 And I have Exhibit 1029,
11 which we have been referring to as the Chen
12 prior art.
13 And in a separate binder,
14 because everything was not fitting in the
15 first binder, I also have what we have been
16 referring to as Exhibit 1014, which is
17 portions of the -- excuse me, portions of
18 the section LTE book.
19 Q Okay that's great, that's
20 most of the exhibits I have marked, so it's
21 actually great, and going along with that, I
22 have marked the exhibits already.
23 Exhibit 1 is going to be the
24 '271 Patent, which is the subject patent of
25 these proceedings, as you mentioned.

1 APOSTOLOS KAKAES
2 (The above described document was
3 marked Exhibit 1 for identification, as of
4 this date.)
5 MR. PYMENTO: I marked as
6 Exhibit 2, your declaration that was
7 submitted in IPR 202300571.
8 (The above described document was
9 marked Exhibit 2 for identification, as of
10 this date.)
11 Q Throughout this proceeding
12 I'm going to call it the 571 Declaration, is
13 that okay?
14 A That's fine.
15 MR. PYMENTO: And I marked as
16 Exhibit 3 your declaration that was
17 submitted in IPR 202300747 and I'm
18 going to call this one the '747
19 declaration.
20 (The above described document was
21 marked Exhibit 3 for identification, as of
22 this date.)
23 Q Is that okay?
24 A That's fine.
25 MR. PYMENTO: Exhibit 4 is

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the certified English translation of international publication WO2016/015307 through -- which as you mentioned we are going to just call Liu.

(The above described document was marked Exhibit 4 for identification, as of this date.)

MR. PYMENTO: Exhibit 5 is certified English translation of international publication WO2016/126099 to Park, we will call that Park.

(The above described document was marked Exhibit 5 for identification, as of this date.)

MR. PYMENTO: Exhibit 6 is U.S. patent application publication number 2015/0036612 to Kim, we will call that Kim.

(The above described document was marked Exhibit 6 for identification, as of this date.)

MR. PYMENTO: Exhibit 7 is

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certified English translation of international publication WO2015/131494 to Chen.

We will call that Chen.

(The above described document was marked Exhibit 7 for identification, as of this date.)

MR. PYMENTO: And then I also marked the institution decision in IPR 202300571 as Exhibit 8.

(The above described document was marked Exhibit 8 for identification, as of this date.)

MR. PYMENTO: I also marked the institution decision in IPR 2023-00747 which will be Exhibit 9.

(The above described document was marked Exhibit 9 for identification, as of this date.)

Q Dr. Kakaes, about how much time did you spend preparing for this deposition?

A Several hours.

Q How much is several hours,

APOSTOLOS KAKAES

approximately?

A I don't recall the approximate time, but it's as long as I needed to get ready for it, which over a span of the past few days I have spent a few hours on some of the days.

Q Is somewhere between 10 and 20 hours fair?

A More than 10, I think is accurate. I'm not sure it's less than 20.

It might be more than 20, I'm not sure.

Q When do you first recall being involved in each of these proceedings?

MR. RODKEY: I'm going to object to the extent there is privilege involved.

Dr. Kakaes, you can give a date if you recall one, but don't disclose the substance of any conversations with attorneys.

A Yeah, it's been a while, I don't remember, but it's been several months, maybe even a year.

APOSTOLOS KAKAES

I just don't remember exactly, but it's been a while.

Q About how much time did you spend preparing the 571 Declaration?

A That goes back to I guess probably more than a year ago. I don't remember, because I did -- as you well know, I did several declarations involving other patents as well, and I haven't -- I don't remember the amount of time that it took for each one of them.

So, I just don't remember.

Q Would you consider it to be -- would you consider it that you prepared --

MR. PYMENTO: Scratch that.

Q Would you consider the time you spent preparing the 571 Declaration more than 50 hours?

A Like I said, I don't remember.

Q Do you remember the time you spent preparing the 747 Declaration?

A No, I don't. Like I said, I

1 APOSTOLOS KAKAES
2 don't remember the time I spent on either
3 one of them, or jointly on both of then; I
4 just don't recall.
5 Q Aside from your -- aside from
6 counsel at Finnegan, did you communicate
7 with anyone else about your deposition
8 today?
9 A About the substance of the
10 deposition, no.
11 About the fact that I will
12 have a deposition today, I did tell my wife.
13 Q Did you communicate with
14 anyone at Samsung directly about your
15 deposition today?
16 A No, I did not.
17 Q Have you corresponded with
18 Samsung in preparing either the 571 or 747
19 Declarations?
20 A No, I have not.
21 Q Aside from you and counsel at
22 Finnegan, was anyone else involved in the
23 preparation of your declarations in these
24 actions?
25 A Not from my perspective.

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Q How were the prior art documents, the Liu, Park, Kim and Chen documents located in these proceedings, without disclosing any privileged information?

MR. RODKEY: I'm still going to object on privilege.

Dr. Kakaes, don't discuss any substance of conversations you had with counsel, but you can otherwise answer.

A Yeah, so as I often do in similar cases, some documents I become aware of by the attorneys involved in the case, and some of them I find on my own, and this is not an exception, I don't remember which documents fall into which category.

But -- yeah, so some of them I found on my own, some of them I was given by attorneys.

Q Do you remember which ones were provided to you?

A No, I don't.

Q Did you personally conduct a

1 APOSTOLOS KAKAES
2 search for any other prior art documents
3 that are not cited in the declarations?
4 MR. RODKEY: I'm going to
5 object on privilege.
6 So, Dr. Kakaes, don't
7 disclose the substance of any
8 conversations with attorneys.
9 If you can answer the
10 question without doing that, you can
11 proceed.
12 A Would you repeat the
13 question?
14 Q Sure.
15 Did you personally conduct a
16 search for any other prior art documents
17 that are not cited in the declarations?
18 MR. RODKEY: Same objection.
19 A I relied on whatever I relied
20 on, which I detail in the declarations.
21 I, to the extent that I might
22 have looked and found other documents that I
23 didn't need to rely on, I don't remember
24 specifically.
25 Q Let's turn to claim 1 of the

'271 Patent.

Let me know when you are there, on the patent itself, claim 1.

A So I do have the patent in front of me.

Q And on claim 1, which is on column 27, specifically Line 26, there is a claim limitation that says, "K is a positive integer greater than 1."

Do you see that?

A Yes, I do.

Q What is the lowest integer that K could be in this claim?

A A positive integer is greater than 1, the smallest that could be is a number 2.

Q Do you see on lines -- line 22 of the same column, 27, you are still talking about claim 1, do you see the claim limitation where it says, "Wherein K antenna port groups off the base station are used to transmit the first wireless signal."

A I do.

Q In your understanding of

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claim 1, if K equals 3, does the claim require that 3 antenna port groups off the base station are used to transmit the first wireless signal?

A Would you repeat the question?

Q Sure.

In your understanding of claim 1, if K equals 3, does the claim require that 3 antenna port groups off the base station are used to transmit the first wireless signal?

A That's a hypothetical of K having a specific value of 3, so I didn't offer any opinions on that hypothetical.

Q Right, but I'm asking the hypothetical now, in the situation that K equals 3.

So if K equals 3, does the claim require that 3 antenna port groups off the base station are used to transmit the first wireless signal?

A Well, if K is 3, then this portion of the claim requires 3 antenna port

1 APOSTOLOS KAKAES
2 groups off the base station are used to
3 transmit the first wireless signal, that's
4 what the claim says.
5 Q Would you please turn to
6 paragraph 111 of the 571 Declaration.
7 Let me know when you are
8 there.
9 A I believe you said paragraph
10 111, am I correct?
11 Q That's correct.
12 A Yes, I am there.
13 Q The first sentence of
14 paragraph 111 of your declaration in the 571
15 proceeding says that "Liu explains that the
16 base station transmit signals of the M
17 antenna ports to the user equipment which
18 receives the signals of the M antenna
19 ports," do you see that?
20 MR. RODKEY: Objection,
21 mischaracterizes the document.
22 A So, to read the sentence that
23 I think you are referring to is the sentence
24 states that Liu explains that the base
25 station "transmits signals of the M antenna

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ports 'to the user equipment,' which receives the signals of the M antenna ports which a POSITA would have understood, teaches transmitting and receiving the wireless signal of M antenna ports identified by the configuration information."

So I'm not sure what your question is.

Q No, it was just do you see the first sentence of paragraph 111, the first sentence?

A I see the first sentence of paragraph 111.

Q Okay.

Does Liu disclose any numerical limitation on the quantity of M?

A Liu provides examples of M. I don't think that it provides any numerical limitations, but Liu provides examples for M is an integer, a positive integer greater than 1, as the claim requires, for what the claim calls K.

Q Does the quantity M in Liu

1 APOSTOLOS KAKAES
2 have to be greater than 1?
3 A At a minimum, Liu discloses
4 the situation where M is greater than 1.
5 I did not analyze, because I
6 did not have to analyze whether M has to be
7 greater than 1.
8 But it certainly provides
9 examples where M is greater than 1, which is
10 all I needed to show that certain elements
11 of the claims were met by Liu.
12 Q In the same paragraph closer
13 to the bottom of page 69, do you see the
14 sentence that reads, "The second network
15 device 'transmitting the M wireless signals'
16 may be a base station," and the "first
17 network device" receiving the M wireless
18 signals" may be user equipment (UE)"
19 A I believe you read that
20 sentence correctly.
21 Q Is it your opinion that the M
22 antenna ports of Liu transmit M wireless
23 signals?
24 A So, the M wireless signals
25 that I'm discussing there are collectively

1 APOSTOLOS KAKAES
2 from the first wireless signal required by
3 the claim.
4 So, which is consistent with
5 what the '271 Patent taught, is that a
6 number of signals or just quote the claim,
7 the patent, the '271 Patent to be exact --
8 give me one second.
9 So, in the '271 Patent in
10 column 3, at line -- I will say line 16 to
11 17, it states, "In one embodiment the first
12 wireless signal is a CSI RS burst."
13 A CSI RS burst is a channel
14 state information reference signal burst,
15 meaning it consists of several CSI RSs, and
16 that's what the M wireless signals form
17 together, a burst, which is the first
18 wireless signal consistent with the
19 teachings of the '271 Patent.
20 Q My question is slightly
21 different, which is is it your opinion that
22 the M antenna ports of Liu transmit the M
23 wireless signals that you describe in
24 paragraph 111 of your declaration?
25 MR. RODKEY: Objection, asked

1 APOSTOLOS KAKAES
2 and answered.
3 A Well, you are asking the same
4 question, and my answer is the same.
5 Q And just for clarification,
6 what was the answer again?
7 Is it your opinion that the M
8 antenna ports of Liu transmit M wireless
9 signals?
10 MR. RODKEY: Same objection.
11 A As I explained in the context
12 of Liu, the transmitting the M wireless
13 signals collectively form what the '271
14 Patent called a burst, and the '271 Patent
15 said that that burst can be the first
16 wireless signal.
17 Or I should say differently
18 an example of what the first wireless signal
19 of the claim is is such a burst.
20 So those M wireless signals
21 that I'm discussing, paragraph 111, together
22 form what the '271 Patent calls a burst and
23 identifies that as an example of what a
24 first wireless signal can be.
25 Q But are those M wireless

1 APOSTOLOS KAKAES
2 signals transmitted by M antenna ports?
3 A I'm sorry, could you repeat
4 the question?
5 Q Are those M antenna -- sorry,
6 are those M wireless signals transmitted by
7 Liu's M antenna ports?
8 A So, reading Liu in the
9 context of Liu, those wireless signals are
10 channel state information, reference signals
11 and those -- each of the -- each of the
12 ports transmits such reference signal and
13 those reference signals viewed in their
14 totality consistent with what Liu teaches
15 and consistent with the '271 Patent teaches,
16 form the first wireless signal of the claim,
17 of claim 1 of the '271 Patent.
18 Q Does Liu describe bursts?
19 A I don't remember if Liu uses
20 the word burst, but Liu describes that set
21 of reference signals the same way in which
22 the set of reference signals is described in
23 the '271 Patent, and that's why I, as I
24 explain in detail, the limitation of the
25 first wireless signal is met by the

1 APOSTOLOS KAKAES
2 collection of those reference signals
3 transmitted by each of the M antenna ports.
4 Q Where in Liu describes the
5 set of reference signals the same way in
6 which the set of reference signals is
7 described in the '271 Patent?
8 A So, as I explain in paragraph
9 110, which describes the first of at least
10 two alternative ways that Kim -- sorry, that
11 Liu discusses this.
12 So, in paragraph 110, I
13 explain that the base station transmits the
14 first wireless signal using M individual
15 antenna ports.
16 And as I explained earlier,
17 the M antenna ports in Liu correspond to the
18 K antenna ports of the '271 Patent.
19 It's a bunch of antenna
20 ports, and the '271 Patent uses the symbol K
21 for them and Liu uses the symbol M for them.
22 And I then go on to also say
23 that there is another way in which Liu
24 describes that same limitation, which is the
25 base station transmits the wireless signal

APOSTOLOS KAKAES

using X cells, or X groups of Liu, correspond to the K antenna port groups of the '271 Patent, "Where each antenna port group has two ports," again in each of the X groups.

So I provide two examples in Liu where the wireless signal is transmitted by the antenna port groups where the first example each antenna port group consists of one antenna port and the second example each antenna port group consists of 2 antenna ports.

Q Does your declaration describe a set of reference signals in Liu?

A So, yes, it does.

Q Where does it?

A For example, on Liu on page 16, Liu states that, "In the prior art the only information taken into consideration when performing cell selection is receive signal power information, e.g.,, RSRP and RSRP would be understood to mean reference signal received power."

So -- and then goes on to

1 APOSTOLOS KAKAES
2 provides other cases, RSSI and RSRQ.
3 However, in the present
4 embodiment, cell selection also takes into
5 consideration antenna correlation, et
6 cetera.
7 So, a person of ordinary
8 skill in the art reading that would
9 understand that in Liu's disclosure, several
10 things are taken into consideration, and
11 those things include the reference signal
12 received power which would be understood by
13 a person of ordinary skill that that means
14 that reference signals are being transmitted
15 by the base station, or else the cell
16 selection could not be performed using the
17 received power of reference signals if there
18 were not to be any reference signals.
19 That's one example where Liu
20 discloses reference signals.
21 And another example is on
22 page 21 where it says towards the end --
23 towards the bottom of the page, says, "A
24 user equipment employs a random beam forming
25 approach in the code book set CI corresponds

1 APOSTOLOS KAKAES
2 to the pilot frequency of each antenna
3 configuration to calculate and report the
4 mean reference signal received power."
5 And again, this spells out
6 what the acronym I used before, the RSRP.
7 Or the reference in the received quality.
8 So it specifically discloses
9 a situation where the user equipment
10 calculates and reports the mean reference
11 signal receiving power which means that the
12 reference signal was received by the UE,
13 which of necessity means that the reference
14 signal was transmitted by the base station
15 in Liu's network.
16 Q So my question wasn't exactly
17 about whether Liu discloses reference
18 signals, my question was does your
19 declaration describe a set of reference
20 signals in Liu?
21 A I'm sorry, could you repeat
22 that?
23 Q Sure.
24 Does your declaration, 571
25 Declaration describe a set of reference

1 APOSTOLOS KAKAES
2 signals in Liu, or creating a set of
3 reference signals in Liu?
4 A I'm sorry, you chopped there,
5 or what?
6 Q So I will repeat the
7 question.
8 Does your 571 Declaration
9 describe a set of reference signals in Liu
10 or creating a set of reference signals in
11 Liu?
12 A It describes that -- my
13 declaration, as I discuss there in paragraph
14 115, discusses the presence of the reference
15 signals and related reference signal
16 received power for each antenna port group
17 as received by the UE that has been
18 transmitted by the base station.
19 So, yes, it discusses that
20 Liu disclosed a transmission of reference
21 signals, which Liu does.
22 Q And it is your opinion that
23 Liu discloses a transmission of reference
24 signals at the same time, is that correct?
25 A I'm not sure I understand the

1 APOSTOLOS KAKAES
2 question.
3 Q Is it your opinion that Liu
4 discloses a transmission of a set of
5 reference signals at the same time?
6 A You will have to be more
7 precise as exactly what you mean by at the
8 same time.
9 Q Is it your opinion that Liu
10 discloses transmitting a set of reference
11 signals?
12 A As I discuss in the past
13 several minutes, Liu does disclose that each
14 antenna port or each antenna port group
15 transmits reference signals, and the mobile
16 device or the UE calculates, among other
17 things, the reference signal received power.
18 Q Does your declaration
19 describe bursts?
20 A I'm not sure I understand
21 what you mean.
22 Q Does your declaration
23 describe a CSI RS burst in Liu?
24 A Yes, it does.
25 Q Where does your declaration

1 APOSTOLOS KAKAES
2 describe that?
3 A For example, in paragraph
4 115, where I -- towards the bottom of the
5 page, 72, where I say, where I explain that
6 the user equipment uses this information to
7 determine and measure the antenna port
8 groups, such as calculating the SNR or RSRP
9 of each antenna port group.
10 So, this is the calculating
11 the RSRP of each antenna port group is the
12 burst, that is what the '271 Patent calls
13 the burst.
14 Q So it's your opinion that
15 calculating RSRP is a CSI RS burst?
16 MR. RODKEY: Objection,
17 mischaracterizes.
18 A Yeah, I didn't say that.
19 Q Okay, could you please
20 clarify?
21 A As I explain, calculating the
22 SNR or the RSRP of each antenna port group
23 is what the '271 Patent explained is --
24 constitutes the first wireless signal is an
25 CSI RS burst, so it's a reference signal

1 APOSTOLOS KAKAES
2 burst and that's what the RSRP is when
3 viewed as described by Liu by the RSRP of
4 each antenna port group.
5 Q Is it your opinion that
6 having an SNR or RSRP of each antenna port
7 group necessarily implies a CSI RS burst?
8 A The '271 Patent explained
9 that in one embodiment the first wireless
10 signal is a channel state information
11 reference signal burst.
12 So, the channel state
13 information reference signal burst is a set
14 of channel state information reference
15 signals, and Liu's disclosure of the
16 reference signal received power is -- for
17 each antenna port group, is an example of
18 having such -- the situation of having a
19 wireless signal which consists of the
20 reference -- consists of the reference
21 signals transmitted in that set of antenna
22 port groups as required by the '271 Patent.
23 Q So having an SNR or RSRP of
24 each antenna port group doesn't necessarily
25 imply a CSI RS burst, correct?

APOSTOLOS KAKAES

A I didn't say that.

Q Okay, so does the SNR or RSRP of each antenna port group necessarily imply a CSI RS burst?

A A channel state information reference signal burst is a collection of reference signal reception -- transmissions and receptions and that's what the RSRP of each antenna port group of Liu is.

Q Okay, but just because an RSRP of each antenna port group exists, does that necessarily mean that there was a CSI RS burst?

A When Liu is read in -- when that portion of Liu is read in the context of what Liu is discussing, then the answer is yes.

Q Okay, where is Liu discussing that there is necessarily a CSI RS burst when an RSRP of each antenna port group exists?

A So going back again to, as an example, I'm sure there are other places, too, but as an example going to page 16 of

1 APOSTOLOS KAKAES
2 Liu, the portion I read a few minutes ago, I
3 will read it again, in the prior art, the
4 sentence starts with in the prior art, "The
5 only information taken into consideration
6 when performing cell selection is received
7 signal power information where e.g., RSRP,
8 RSI and RSRQ.
9 "However in the present
10 embodiment, cell selection also takes into
11 consideration antenna correlation, et
12 cetera."
13 So, the key point there, and
14 I put some emphasis in the way I spoke, is
15 the word cell selection.
16 And the cell selection also
17 takes into consideration other things, a
18 person of ordinary skill would understand
19 that it also takes the RSRP into
20 consideration.
21 So, again, read in context,
22 what Liu is disclosing is that the RSRP is
23 taken into consideration when performing
24 cell selection.
25 And cell selection means that

1 APOSTOLOS KAKAES
2 this -- the information that's being
3 considered has been available, the RSRP of
4 the various different antenna port groups
5 was available for the mobile device to
6 perform the stated cell selection.
7 Q In your opinion cell
8 selection discloses a CSI RS burst?
9 A You're mischaracterizing what
10 I said.
11 What I said is when one reads
12 Liu, Liu's disclosure in its full context,
13 the fact that Liu discusses the reception of
14 the reference signals and specifically the
15 evaluation of the reference signal received
16 power of each antenna port group in the
17 process of performing cell selection, means
18 that that collection of RSRP of each antenna
19 port group was burst, to use the language of
20 the '271 Patent, and therefore it meets that
21 limitation.
22 So, again, I'm not picking
23 one specific word of Liu, I'm reading Liu in
24 its proper context.
25 By the way, just because you

1 APOSTOLOS KAKAES
2 asked me and I did remember, Mr. Goldberg
3 just left the room.
4 Q Okay, thank you for that.
5 Does Liu use the word burst?
6 A I don't remember.
7 Q Do you want to check if Liu
8 uses the word burst at all?
9 A I mean I can read through
10 Liu, but the point is that Liu discloses
11 what the '271 Patent required to be
12 disclosed.
13 Whether or not Liu uses the
14 word burst, I don't remember, and I could
15 read the -- I could read Liu now to tell you
16 if it does or not, if you would like me to.
17 Q Well, you can do a search
18 using control F on your digital copy, it's a
19 really simple question, does Liu use the
20 word burst?
21 A Like I said, I don't
22 remember.
23 Q Right, and I'm asking you
24 does Liu use the word burst, and you can use
25 control F to find out.

APOSTOLOS KAKAES

A I don't remember. I mean I don't remember. Like I said, I could read through Liu, I could do a search and the search is not always 100 percent accurate, so that's why I'm not suggesting doing a search.

But if you would like me to do a search and think what Adobe thinks, then I could do that.

Q Sure.

Does Liu use the word burst?

A Same question, the same answer, I don't know, if you would like me to have Adobe --

Q I said yes, go ahead.

MR. RODKEY: Counsel, please don't interrupt the witness.

A So according to Adobe Acrobat the word burst does not appear in this document.

But as I explained earlier, the concept of a burst as discussed in the '271 Patent is certainly disclosed in Liu, even though the word burst according to

APOSTOLOS KAKAES

Adobe Acrobat does not appear.

Q Does your declaration, the 571 Declaration, use the word burst?

A Again, I don't remember if I use the word burst in my declaration.

Q My question is not whether you remember or not, I'm asking does your declaration use the word burst?

A I mean I can't answer a question if I don't remember; and I don't recall one way or the other if I use the word burst or not.

Q You can use the search function on your declaration to ascertain the answer to my question.

Which is does your declaration use the word burst?

A Well, again, are you asking me to do a search, or are you asking me the question?

Q Well, if you have to search to answer the question since you said you don't remember, then sure, you can go ahead and search.

APOSTOLOS KAKAES

I'm just going to repeat the question for the record, which is does your declaration use the word burst?

A And my answer to that question was and continues to be I don't remember one way or the other.

Q Right, are you going to do a search?

A If you ask me to, if you ask me to.

If you ask me to do a search I will do, and I will tell you what Adobe Acrobat thinks.

Q Right, I did mention that you can do a search.

Q And if it would help to restate the question for you, based on your Adobe Acrobat search of your declaration, does your declaration use the word burst?

A According to Adobe Acrobat, the word burst is not in my declaration.

But again, just like in Liu, the concept of what the '271 Patent calls a burst is discussed at length in my

1 APOSTOLOS KAKAES
2 declaration.
3 Q And as you mentioned
4 previously, the '271 Patent mentions that
5 the first wireless signal in one embodiment
6 can be a CSI RS burst, and that's located at
7 column 3 line 16 to 17, correct?
8 A Could you repeat the
9 question? I want to make sure I hear it
10 correctly.
11 Q Sure.
12 The '271 Patent discloses
13 that in one embodiment the first wireless
14 signal is a CSI RS burst located on column
15 3, lines 16 to 17, correct?
16 A Yes, I think that's right.
17 Q Do you cite to the '271
18 Patent column 3 line 16 to 17 in your
19 declaration based on searching through Adobe
20 Acrobat?
21 A So I don't know that I can
22 search Adobe Acrobat to see if that specific
23 portion is cited, because it may be cited in
24 various different ways.
25 So, I don't recall if I have

1 APOSTOLOS KAKAES
2 cited this explicitly, but certainly the
3 fact that the first wireless signal is in
4 CSI RS burst is part of the '271 Patent and
5 that first wireless signal is met by the
6 prior art I've cited to, including Liu that
7 we have been discussing.
8 Q Between paragraphs 109 of
9 your declaration to 112 of your declaration,
10 do you cite to the '271 Patent column 3 line
11 16 to 17?
12 A So those paragraphs do not
13 cite to those two specific lines of the '271
14 Patent, but they also, within those
15 paragraphs, referring to the same wireless
16 signals as I discussed in element 1B.
17 And in element 1B I do
18 explain how those wireless signals would be
19 understood by a person of ordinary skill in
20 the art, citing to various different points.
21 And that's a person of
22 ordinary skill in the art would understand
23 those reference signals to constitute the
24 claimed first wireless signal originating
25 from the base station, which is again

1 APOSTOLOS KAKAES
2 consistent with the disclosure of the '271
3 Patent of an example of what that first
4 signal could be.
5 And, of course, in the '271
6 Patent there is other examples as well.
7 But this is one of them.
8 Q So I know we have been going
9 over an hour, I just have a couple of
10 questions to close out this issue.
11 So if you will bear with me
12 then we can take a break for as long as you
13 want after.
14 A Okay.
15 Q In paragraph 112 of the 571
16 Declaration, do you see where it says, and
17 this is about five lines down from the top
18 of paragraph 112, it says when, "The M
19 antenna ports are divided into X groups?"
20 A Hold on, hold on, you said
21 112?
22 Q Yes, paragraph 112.
23 A Okay.
24 Q There is a sentence that
25 begins five lines down from the beginning of

APOSTOLOS KAKAES

paragraph 112.

It says when, "The M antenna ports are divided into X groups" the "base station'individually configures one code book set for each antenna port group."

Do you see that part of the sentence?

A Yes, I do.

Q Is it your opinion that a code book set of Liu corresponds to each antenna group of Liu?

A I'm sorry, could you repeat that?

Q Is it your opinion that a code book set of Liu corresponds to each antenna group of Liu?

A Again, I may have misheard, but if you could repeat it I'll make sure I hear it correctly.

Q No problem.

Is it your opinion that a code book set of Liu corresponds to each antenna port group of Liu?

A Well, what I'm explaining

1 APOSTOLOS KAKAES
2 here is that the base station individually
3 configures one code book set for each
4 antenna port group.
5 So, to the extent that by
6 corresponds you mean something that I may or
7 may not understand what you mean, I want to
8 phrase it as I phrase it here, as Liu
9 explains, that the base station individually
10 configures one code book set for each
11 antenna port group.
12 So for each antenna port
13 group, there is a code book set.
14 Q Slightly further down there
15 is a line that begins with "because" in
16 paragraph 112 and it says, "because the code
17 book information for each group
18 corresponds" --
19 A Hold on, let me find you.
20 Q It's just a line that begins
21 with a lower case because.
22 A Okay, yes, I just saw the
23 because.
24 Q And after the because,
25 paragraph 112 says, "The code book

APOSTOLOS KAKAES

information for each group corresponds to the matrix that describes the beam pattern created for the transmission by the base station."

That's part of a sentence, do you see that?

A I see that part of the sentence.

Q Is it your opinion that the code book information for each group corresponds to a beam pattern description?

A I didn't say that, you're taking some of the words and I think that the way you phrase it I wouldn't agree.

Q Okay, what issue -- I mean I thought I was just simplifying this, a matrix that describes the beam pattern.

So is it not true that the code book information for each group corresponds to a description of a beam pattern?

A As I explain there, the code book information for each group corresponds to the matrix that describes the beam

1 APOSTOLOS KAKAES
2 pattern created for a transmission by the
3 base station.
4 MR. PYMENTO: All right, I
5 think now is a good time to take a
6 break, Dr. Kakaes.
7 How long would you like?
8 THE WITNESS: Ten minutes.
9 MR. PYMENTO: All right, that
10 sounds good to me.
11 (At this point in the proceedings
12 there was a recess, after which the
13 deposition continued as follows:)
14 Q Dr. Kakaes, could you turn to
15 paragraph 105 of your declaration in the 747
16 proceeding?
17 A Okay, I am at paragraph 105.
18 Q Actually it's the last
19 sentence of paragraph 105, so it's on page
20 66.
21 Do you see the last sentence
22 where it says, "A POSITA would also have
23 understood that the CRSs are mapped on a per
24 antenna port basis based on Kim's teaching
25 that is shown in figure 6.

1 APOSTOLOS KAKAES
2 "CSI RSs are mapped to REs on
3 a per antenna port basis and CRSs are mapped
4 to respective antenna ports."
5 A I think you read that
6 correctly, as best I could hear it.
7 Q Do you need me to speak a
8 little louder or slower? Is there a hearing
9 problem?
10 A A little louder would help,
11 but I think you read it correctly.
12 Q No problem, I will keep that
13 in mind.
14 Is it your understanding that
15 each CSI RS in Kim is mapped to each antenna
16 port in Kim?
17 A It's mapped to resource
18 elements on a per antenna port basis, as I
19 explain there.
20 Q Right, I'm just trying to get
21 at the meaning of per antenna port basis.
22 Is it your opinion that each
23 CSI RS in Kim is mapped to each antenna
24 port?
25 A It's mapped to resource

1 APOSTOLOS KAKAES
2 elements for each antenna port.
3 Q And then the last quote of
4 that paragraph says CRSs are mapped to
5 respective antenna ports.
6 Does that mean that each CRS
7 is mapped to an antenna port?
8 A So as I explain there, with
9 respect to the portions that you are
10 reading, I'm referring to what's shown in
11 Kim's figure 6, and if we turn to Kim's
12 figure 6, we see that there is a mapping to
13 specific resource elements for both the
14 CRSs, as well as for the CRSs -- sorry, I
15 think I misspoke, for both the CSI RSs as
16 well as for the CRSs on a specific to each
17 antenna port.
18 Q Would you please go to
19 paragraph 118.
20 A I assume of the same
21 declaration?
22 Q The same declaration, yes,
23 that's correct.
24 Again, it's the last sentence
25 of that paragraph, so it's going to be on

1 APOSTOLOS KAKAES
2 the following page, page 75.
3 And in part that sentence
4 states, "A POSITA would have found it
5 obvious to configure Kim's system such that
6 each of K antenna port groups is
7 transmitting from a single base station."
8 Is it your opinion that each
9 of Kim's antenna port groups transmits a
10 signal from a single base station?
11 A So the portion that you point
12 to in paragraph 118 is a continuation of the
13 discussion that I started, at least in
14 paragraph 117, where I explain that to the
15 extent that patent owner argues that this
16 claim is limited to having only a single
17 base station, and also argues that Kim does
18 not disclose a single base station and so
19 on, goes on.
20 So this is addressing the
21 question what follows in paragraph 118,
22 addresses the question under the assumption
23 that a patent owner argues that Kim does not
24 disclose a single base station for
25 transmitting the CRS and/or CSI RS in the K

1 APOSTOLOS KAKAES
2 antenna port groups.
3 So to the extent that's the
4 case, what I'm explaining there is that the
5 POSITA would have found it obvious to
6 configure Kim's system such that each of the
7 K antenna port groups is transmitting from a
8 single base station so that the base station
9 can provide improved transmission to the UEs
10 within its broadcast area, as I explain
11 there.
12 So I think I have answered
13 the question.
14 Q Just so I understand it
15 completely, I'm just going to maybe slightly
16 rephrase, but is it your opinion that each
17 of Kim's antenna port groups transmits a
18 signal from a single base station?
19 A So I have explained that in
20 this portion of my declaration I am
21 contemplating the case where the patent
22 owner argues this claim is limited to having
23 only a single base station and also argues
24 that Kim does not disclose a single base
25 station.

1 APOSTOLOS KAKAES
2 And what I'm saying is that
3 Kim would have found it obvious, or a POSITA
4 would have found it obvious to configure
5 Kim's system such that each of the K antenna
6 port groups is transmitting from a single
7 base station.
8 And that transmission we are
9 talking about is a transmission we have been
10 talking about earlier, and that -- this
11 discussion is in the context of limitation
12 1D1 which requires that the K antenna port
13 groups of the base station are used to
14 transmit the first wireless signal.
15 So, what I'm saying here is
16 that the person -- again, to the extent that
17 Kim doesn't disclose that, a person of
18 ordinary skill in the art would have found
19 it obvious to configure Kim's system such
20 that each of the K antenna port groups is
21 transmitting the first wireless signal
22 that's required in the claim from a single
23 base station.
24 Q So, I understand the context
25 that you're trying to -- that you are

1 APOSTOLOS KAKAES
2 describing here.
3 My question is a little
4 different, like regardless of the context,
5 I'm just asking specifically about Kim,
6 which is in your opinion, regardless of what
7 patent owner's arguments might be, is it
8 your opinion that that each of Kim's antenna
9 port groups transmits a signal from a single
10 base station?
11 A So I discuss that in the
12 previous paragraphs specifically. For
13 example, in paragraph 116, Kim explains that
14 transmitting the wireless signal from
15 antenna ports that are located at one or
16 more base stations, including a single base
17 station, or more base stations forming a
18 cluster.
19 So in my opinion Kim
20 discloses that.
21 But you were pointing me to
22 the discussion paragraph 118 and in the
23 context of paragraph 118, it is the context
24 there does matter and I cannot answer that
25 question the way you pose it outside of that

1 APOSTOLOS KAKAES
2 context, because that phrase appears in that
3 context, which is where I'm discussing that
4 it would have been obvious for Kim to do so
5 to the extent that one argues that Kim
6 doesn't already do so, which I think Kim
7 does.
8 Q So, could you turn to
9 paragraph 117, same declaration.
10 There is a sentence close to
11 the bottom of the page which begins with
12 "Chen explains."
13 Do you see that?
14 A I see the point where it says
15 Chen explains.
16 Q And then the part of the
17 sentence before the semicolon states that
18 "Chen explains that a base station transmits
19 M types of pilot signals.
20 "The M types of pilot signals
21 corresponding to M pilot ports
22 respectively."
23 Do you see that?
24 A I do see that.
25 Q Is it your understanding that

1 APOSTOLOS KAKAES
2 each type of pilot signal in Chen
3 corresponds to a pilot port?
4 A So, as I quote in the
5 explanation of Chen, a base station
6 transmits M types of pilot signals and
7 that's M as in Monday, I guess.
8 The M types of pilot signals
9 corresponding to the M pilot ports
10 respectively.
11 So, a person of ordinary
12 skill in the art would understand that a
13 given pilot signal is transmitted on a pilot
14 port, and the second one of those pilot
15 signals would be transmitted on a second
16 port, and a third one would be transmitted
17 on the third pilot port and so on, until you
18 get to all M of them.
19 Q Referring to the same
20 declaration, can we please turn to paragraph
21 132.
22 It's a very long paragraph
23 and it extends to page 85 as well, and I'm
24 just going to focus on the equation that is
25 listed in the middle of page 85.

APOSTOLOS KAKAES

Do you see that?

A I see the equation, roughly the middle of the page of page 85.

Q And that equation corresponds to equation 4 from Kim, correct?

A Yes, I believe that's correct.

Q And the equation reads, "RSRP_N divided by maximum of RSRP_I is greater than threshold."

Correct?

A No, I wouldn't read it that way.

Q Okay, how would you read it?

A I would read RSRP_N divided by maximum RSRP_I being greater than threshold.

Q I thought I said that, but okay.

A No, you inserted the word there that didn't make sense.

Q Okay.

Is it your understanding from equation 4 that Kim discloses that a ratio

APOSTOLOS KAKAES

is created for each RSRP to the maximum RSRP?

A I didn't quite hear the last couple of words, so could you repeat it?

Q Sure.

Is it your understanding from equation 4 that Kim discloses that a ratio is created for each RSRP to the maximum RSRP?

A I think you said it correctly, but just to make sure, what equation 4 shows is that an RSRP of any given one port group is divided by the RSRP of the port group for which the RSRP is maximum and that is compared to threshold, specifically asking the question as to whether or not that ratio is larger than the threshold.

Q And does the set of those ratios created by equation 4 correspond to the claimed first proportional sequence?

A So the '271 Patent at column 4 at line 39 discusses one -- in discussing one embodiment, it states that in one

1 APOSTOLOS KAKAES
2 embodiment the first proportional sequence
3 is composed of K1 positive real numbers.
4 The K1 positive real numbers
5 are respectively ratios between the K1
6 channel quality values and the best channel
7 quality value of the K1 channel quality
8 values.
9 So, that embodiment of what
10 constitutes the first proportional sequence
11 is precisely what is being taught here by
12 Kim.
13 Q Therefore, in any one of
14 these sequences, at least one ratio value
15 would be equal to 1, correct?
16 A I don't understand the
17 question.
18 Q In any given proportional
19 sequence, according to the embodiment you
20 just mentioned in the '271 Patent, at least
21 one ratio would be equal to 1, correct?
22 A For -- in a given sequence
23 that's discussed here, one of those
24 numerators would be equal to the denominator
25 and that would yield a ratio of 1, if that's

1 APOSTOLOS KAKAES
2 what you're asking.
3 Q And that would be the case
4 where it's the ratio of the best channel
5 quality value of the K1 channel quality
6 values to itself, correct?
7 A That would be an example of
8 that, yes.
9 Q And could you turn to
10 paragraph 130 of the 571 Declaration, and
11 specifically on page 83 there is a
12 representation of figure 12 of Park, an
13 annotated version.
14 A So, are you asking me if I
15 see the figure, or I'm not sure what the
16 question is.
17 Q Yes, are you at the figure on
18 page 83?
19 A Yes.
20 Q The maximum RSRP value for an
21 antenna port in figure 12 corresponds to
22 port 13 in this figure, correct?
23 A Yes, it appears that way,
24 yes, port 13.
25 Q Is it your understanding that

1 APOSTOLOS KAKAES
2 figure 12 shows the RSRP values of each
3 antenna port compared to that maximum RSRP
4 value of port 13?
5 MR. RODKEY: Objection to
6 form.
7 A What figure -- what Park
8 figure shows or that figure 12 of Park shows
9 is on the X axis an index for the antenna
10 port going from 0 to 31, and on the Y axis
11 it shows the RSRP corresponding to each of
12 those antenna ports.
13 So, it's a visual
14 representation of what the RSRP is for each
15 of the 32 ports.
16 Q Is it your understanding that
17 the set of these RSRP values corresponds to
18 the claimed first proportional sequence?
19 A So, I'm going to read to see
20 this in context. You need to go back to
21 paragraph 128 where Park explains that --
22 I'm going to read from paragraph 128,
23 starting at almost the bottom of page 80,
24 "To determine the 'strongly received'
25 antenna port signals, Park aligns each

1 APOSTOLOS KAKAES
2 measured RSRP, 'and limits reporting to
3 RSRPs of ports that are within a certain
4 difference compared to the RSRP of the
5 selected antenna ports.'"
6 In other words, maximum RSRP,
7 and I am skipping the parentheticals -- the
8 arguments in the parentheses.
9 And reports the antenna ports
10 having "an RSRP difference greater than a
11 certain threshold value expressed as an RSRP
12 ratio or a DB scale."
13 So Park discloses that the
14 RSRP of any one port can be expressed as a
15 ratio or in the DB scale.
16 So, a person of ordinary
17 skill in the art reading Park would have
18 understood that the RSRP ratio described by
19 Park describes a power ratio of any one of
20 the antenna ports to the -- of the power,
21 the RSRP of any one of the antenna ports to
22 the maximum RSRP of the antenna ports,
23 because it is constructed -- and it also
24 could be contrasted with the alternative
25 decibel scale.

1 APOSTOLOS KAKAES
2 So Park discloses both an
3 RSRP ratio and an alternative which is using
4 the DB scale and what shows -- what Park
5 shows in figure 12, is a DB scale
6 comparison.
7 But Park has already
8 explained that that comparison of the RSRPs
9 could be done as a ratio.
10 And I just noticed by the way
11 that Mr. Goldberg just came into the room.
12 Q Thank you.
13 MR. PYMENTO: I think now
14 would be a good time to take a
15 break, I think Steve has an
16 engagement.
17 How about we take a ten
18 minute break here.
19 (At this point in the proceedings
20 there was a recess, after which the
21 deposition continued as follows:)
22 Q Dr. Kakaes, could you please
23 turn to claim 4 of the '271 Patent.
24 It's column 28.
25 A You said claim 4 I think,

APOSTOLOS KAKAES

right?

Q That's correct, yes.

A Yes, I am there.

Q Claim 4 recites in part, "Where in any two antenna ports in the K1 antenna port groups are co-located or quasi-co-located (QCL)"

Do you see that?

A I do.

Q What is your understanding of the term co-located in claim 4?

A That the two antenna ports are located at the same place.

Q And what is your understanding of the term quasi-co-located? In claim 4?

A I did not offer claim construction of what that term means, and the '271 Patent doesn't provide any indication of the quasi-co-located -- of what quasi-co-located would mean, but I did have an understanding of quasi-co-located as described in one of the references, and I need to refresh my memory of exactly which

1 APOSTOLOS KAKAES
2 one that was, so I will go to my
3 declaration.
4 Q Just if it would help things
5 along, I think you mentioned
6 quasi-co-located in paragraphs 188 and 189
7 of the 571 Declaration, if that helps.
8 A Which paragraphs again, since
9 you are helping me?
10 Q Its paragraphs 188 onwards.
11 A So, yes, in paragraph 190 I
12 explain, and I couldn't remember which
13 paragraph part of the document it was, it
14 was Park which confirms, POSITA's
15 understanding of a view explaining that
16 quasi-co-located includes when antenna
17 ports, "May be assumed to be transmitted at
18 the same location."
19 So at least one meaning of
20 quasi-co-located as Park has used the term
21 would be the fact that the antennas are
22 located in such a way so that it may be
23 assumed that the transmission is taking
24 place from antennas that are located at the
25 same location, even though they might not

APOSTOLOS KAKAES

be.

So one form of quasi-co-location is the ability to assume that the transmission is actually taking place from antennas that are co-located.

Q When you use the term same location, what exactly do you mean?

A A person of ordinary skill in the art would understand that same location refers to the fact that the antennas are located at a location that is sufficiently small, or that the distance between the two antennas is sufficiently small so as to make the channel characteristics from one of those antennas, let's call it antenna 1, to a mobile device, be the same as the channel characteristics from the second antenna, let's call it antenna 2.

So, if the channel characteristics of the two transmitting -- that the two transmitted signals are subjected to by the channel, if they are the same, then the antennas are said to be co-located.

APOSTOLOS KAKAES

Q And in paragraph 189, is your opinion that the same location or assumed same location for M antenna ports in Liu could be the base station?

A I'm not sure I understood the question, could you repeat it?

Q Sure.

Based on paragraph 189 of the 571 Declaration, is your opinion that the same location or assumed same location or M antenna ports in Liu could be the base station?

A Well, the base station is not a location, the base station is located somewhere.

So, a person of ordinary skill in the art reading this phrase that I have there, where it said Liu teaches that each of the M ports is located at the "second network device" which may be a base station.

So, the M ports are located at the second network device, i.e., located at the base station, meaning that they are

APOSTOLOS KAKAES

at the same location as the base station is, or a micro base station, just to complete the sentence, but all that's saying is that what I just said, that the M ports are located at where the base station is located.

Q Continuing to refer to claim 4, the next claim limitation after the co-located, quasi-co-located limitation says "Or any two antenna ports in K1 antenna port groups are on the same carrier and any two antenna ports in the K2 antenna port groups are on the same carrier."

Do you see that claim limitation?

A I think you didn't read it quite correctly, but I do see it.

Q Okay.

What is your understanding of the phrase on a same carrier?

A There is a carrier and that the K1 antenna port groups are on that same carrier.

Q What is a carrier?

1 APOSTOLOS KAKAES
2 A So, the definition of
3 carrier, if you will, is not something that
4 I endeavor to do, because the plain and
5 ordinary meaning of a carrier is that it's
6 an RF carrier, but the patent provides some
7 guidance as to what that carrier might be.
8 For example, the '271 Patent
9 at column 14 it discusses at line 14 as a
10 subembodiment the "Wide band channel
11 measurement refers to a channel measurement
12 value for the entire system bandwidth
13 obtained by measuring a channel on the
14 entire system bandwidth."
15 The entire system bandwidth
16 is the bandwidth of the carrier is the
17 carrier.
18 Which is -- similarly a
19 person of ordinary skill in the art looking
20 at figure 2 of the '271 Patent would
21 recognize that those carriers are being
22 transmitted by the NR node B, the new radio
23 node B, and those carriers are the carriers
24 defined by the 5G standard that the patent
25 also is referred to in different places.

1 APOSTOLOS KAKAES
2 It goes on to provide some
3 additional structure on how those carriers
4 are construed, but that would be enough to
5 understand that the carrier is the full --
6 the entire system bandwidth that is being
7 used at the time.
8 Q So what is your understanding
9 of what this means to have multiple antenna
10 port groups on a same carrier?
11 A It means that multiple
12 antenna groups occupy resource elements on
13 the same carrier.
14 Q Is it your understanding that
15 antenna port groups on a same carrier are
16 antenna port groups that transmit at the
17 same carrier frequency?
18 A They transmit on the same
19 carrier, that carrier occupies a range of
20 frequencies, so they transmit on the same
21 carrier.
22 That's all that the claim
23 requires.
24 Q Let's turn to claim 5 of the
25 '271 Patent.

APOSTOLOS KAKAES

In part, claim 5 -- well, are you there?

A Yes, I have claim 5.

Q In part, claim 5 recites the target antenna port group is associated with the K1 antenna port groups and the first proportional sequence, or the target antenna port group is associated with the K2 antenna port groups and the second proportional sequence.

Do you see that?

A I do see that.

Q Is it your understanding that this claim requires one port group to be selected from either the K1 or K2 antenna port groups to be associated with a target antenna port group?

MR. RODKEY: Objection to form.

A Yes, I was just going to ask you if you could repeat the question, because I don't think I understood it.

Q Is it your understanding that this claim requires one port group to be

1 APOSTOLOS KAKAES
2 selected from either the K1 or K2 antenna
3 port groups in order to be associated with a
4 target antenna port group?
5 A What the claim requires is
6 that the target antenna port group is
7 associated with the K1 antenna port groups,
8 and the first proportional sequence, or that
9 it, meaning the target antenna port group,
10 is associated with the K2 antenna port
11 groups and their respective second
12 proportional sequence.
13 So, to the extent that the
14 target antenna port group is the K1 antenna
15 port group or the K2 antenna port group, I
16 suppose that's the strongest form of
17 association, but I have not opined on what
18 is the breadth of the word associated.
19 Q Is it your understanding that
20 this claim limitation of claim 5 requires
21 the presence of both a first proportional
22 sequence and a second proportional sequence?
23 A So the way the claim --
24 reading the claim, I did not need to form an
25 opinion as to whether or not it requires

1 APOSTOLOS KAKAES
2 both, because the claim I didn't need to
3 address that question.
4 What I did address is what
5 the claim requires, which is the target
6 antenna port group is associated with either
7 the K1 antenna port groups and the first
8 proportional sequence, or the target antenna
9 port group is associated with a K2 antenna
10 port groups and the second proportional
11 sequence.
12 So I showed, as I detail in
13 my respective declarations, that that is
14 met, and past that I didn't need to form any
15 additional opinion as to what the claim does
16 or does not require.
17 Q Have you reviewed the
18 decision granting institution in IPR 2023571
19 in preparation for this deposition?
20 MR. RODKEY: I object on
21 privilege.
22 So, Dr. Kakaes you can state
23 if you reviewed the decision, but
24 don't disclose the substance of any
25 conversations with counsel.

1 APOSTOLOS KAKAES
2 A I reviewed it quickly.
3 Q Have you reviewed the
4 decision granting institution in IPR 2023747
5 in preparation for this deposition?
6 MR. RODKEY: I'm going to
7 object on privilege.
8 Dr. Kakaes, you can state
9 whether you reviewed the decision,
10 but don't disclose the substance of
11 any conversations with counsel.
12 A Yes, I did give it a similar
13 review.
14 Q Based on reviewing these
15 decisions, did you want to revise anything
16 in your declaration in either of your
17 declarations?
18 A Nothing that I can think of,
19 no.
20 MR. PYMENTO: I do not have
21 any further questions.
22 MR. RODKEY: Can we take
23 maybe a ten minute break?
24 MR. PYMENTO: Sounds good.
25 (At this point in the proceedings

APOSTOLOS KAKAES

there was a recess, after which the deposition continued as follows:)

MR. RODKEY: I have no questions.

Thank you for your time, Dr. Kakaes.

THE WITNESS: Thank you.

(Time noted 12:52 p.m.)

_____

APOSTOLOS KAKAES

Subscribed and sworn to before me this _____ day of _____, 2024.

_____

NOTARY PUBLIC

APOSTOLOS KAKAES

C E R T I F I C A T E

I, STEPHEN J. MOORE, a Shorthand Reporter and Notary Public of the State of New York, do hereby certify:

That, APOSTOLOS KAKAES, the witness whose deposition is hereinbefore set forth, was duly sworn, and that such deposition is a true and accurate record of the testimony given by such witness.

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

STEPHEN J. MOORE, RPR, CRR

1 APOSTOLOS KAKAES

2

3 ERRATA SHEET

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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