

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

APEX BEAM TECHNOLOGIES LLC,
Patent Owner

IPR2023-00603
Patent 10,944,527 B2

Record of Oral Hearing
Held: August 8, 2024

Before JOHN D. HAMANN, SEAN P. O'HANLON, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

IPR2023-00603
Patent 10,944,527 B2

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P R O C E E D I N G S

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JUDGE HAMANN: This is the oral hearing in IPR2023-00603, Samsung Electronics Company Limited and Samsung Electronics America Inc. v. Apex Beam Technologies LLC. I am Judge Hamann, also on the panel, Judges O'Hanlon and Raevsky. I'd like to begin with introductions for the parties. Who is appearing on behalf of Petitioner?

MR. GOLDBERG: Good afternoon, Your Honor. Joshua Goldberg for Petitioner, and with me in the room, I have my colleague, Yi Yu, Y-I, Y-U.

JUDGE HAMANN: Thank you. And who is appearing on behalf of Patent Owner?

MR. RUBINO: Good afternoon, Your Honors. Vincent Rubino on behalf of Patent Owners, and today is just me.

JUDGE HAMANN: Well, welcome to all of you. I would like to remind the parties that we do have a public line. And so, members of the public may be joining in. So, do refrain from mentioning any confidential information or whatnot. I don't believe we have a protective order in this case, so I'm not sure it's an issue, but I thought I'd give them a reminder, nonetheless. Obviously, this is a video hearing. So, just a few reminders for best practices as such. When you're not speaking, please mute yourself so there's no unnecessary background noise. Also, endeavor to make certain that you unmute yourself before you begin to speak. We have the file in front of us and all the papers and exhibits that were filed. So, please, when referring to anything, be it a paper or exhibit, do so by the appropriate

1 number, an appropriate page number, appropriate slide number, et cetera.
2 Also, if for some reason you have audio visual problems, if you could let us
3 know, you know, if it's just degraded, please let us know when that happens
4 during the hearing, but if you get disconnected, you should have the
5 information, contact information that's provided in setting up today's
6 hearing, you know, immediately reach out to those folks. We have -- we're
7 going to begin with Petitioner because Petitioner bears the burden. Patent
8 Owner will have its response and then there'll be rebuttal followed by sur-
9 rebuttal if any time is reserved. Each side will have 45 minutes total
10 argument time today. I will endeavor to give a time warning when you get
11 towards the end of your allotment. But I think it would be helpful if you
12 also, to the extent you can, track yourself because it may provide for better
13 pacing for you. So, with that, I turn to Petitioner, Mr. Goldberg. How
14 much, if any, time would you like to reserve for --

15 MR. GOLDBERG: I'll reserve 15 minutes, Your Honor.

16 JUDGE HAMANN: Thank you. You may begin when you're
17 ready.

18 MR. GOLDBERG: Thank you. We can start with slide 4. As
19 Your Honors will recall, our petition included several grounds. But at this
20 point, the only disputes between the parties relate to whether Kim teaches
21 certain aspects of Claim 1. So, that's where I will focus today. If we go to
22 slide 6, Claim 1 relates to how a first radio signal and a first signaling are
23 transmitted by a base station and received by a user equipment. The patent
24 provides several examples of a first radio signal, recognizing that it could be,
25 for example, different types of symbols, or it could be one or more reference
26 signals, such as channel state information reference signals, abbreviated

1 commonly CSI-RS. The patent also provides several examples of first
2 signaling, recognizing that it could be, for example, higher level signaling.
3 The parties dispute whether the Kim reference teaches wherein the first radio
4 signal is transmitted by K antenna port groups of the base station and
5 whether the Kim reference teaches the first signaling is used to determine a
6 first time resource pool. Figure 9, shown on the righthand side of the slide,
7 shows the claimed K antenna port groups. And the '527 patent says that
8 associating the first time resource pool with the first antenna port group, that
9 by doing that, the UE can quickly determine the location of the first time
10 resource pool in the time domain.

11 We go to slide 8, and turning to Kim, we can see here in paragraph
12 55 that it discloses an exemplary embodiment of the present invention
13 proposes a method of transmitting a CSI-RS. So, again, that's one of the
14 examples the patent provided as a radio signal, and that in order to transmit a
15 CSI-RS through scores or more transmission antennas by using limited
16 resources as described above, an eNB, that's a base station, divides the
17 transmission antennas into a plurality of groups. And we can see this on the
18 righthand side of the slide in Figure 5, antenna group one, two, three, four,
19 five, all of those collectively being used to transmit a CSI-RS for a massive
20 MIMO. The figure depicts that single CSI-RS as over all five of those
21 antenna work groups.

22 If we go to slide 9, Kim also discloses that when CSI-RSs for
23 massive MIMO are transmitted using a plurality of beams transmitted after
24 being differently pre-coded, the plurality of beams may be grouped into a
25 plurality of beam groups for transmission. And we can see on the righthand
26 side, Figure 7 of Kim, which is similar to Figure 5, except it's calling them

1 beam groups instead of antenna groups. But if we look back on the left side
2 of the slide at the quote at the bottom from the '527 patent, we can see that
3 the '527 patent recognizes that the K antenna port groups respectively
4 correspond to K different beam groups. So, this disclosure in Figure 7 of
5 Kim is just another disclosure of the claimed transmitting of the radio signal
6 using multiple antenna port groups.

7 We go to slide 10, like the '527 patent, Kim discloses associating a
8 time resource pool with a respective antenna port group. We can see this in
9 the figures on this slide, for example, that the blue time intervals would be a
10 time resource pool associated with beam group one on the left and
11 associated with antenna group one on the right.

12 We go to slide 14. If we look at what's used to determine the first
13 time resource pool in Kim, it is control information that's sent before the
14 CSI-RS corresponding to the first radio signal. Kim says that in order to
15 transmit the CSI-RSs for massive MIMO as illustrated in Figures 5 and 6, an
16 eNB, again, that's the base station, should only notify a UE of related control
17 information before transmitting a CSI-RS. And then if we go down toward
18 the bottom of paragraph 65 on the slide, it says, such control information
19 may include at least one of the following. And into paragraph 69,
20 information on the time and frequency resource positions at which the CSI-
21 RSs for massive MIMO are transmitted. Wherein this information includes
22 positions of time and frequency resources at which a CSI-RS for each
23 antenna group is transmitted.

24 Now, if we go to slide 17, as I mentioned earlier, the first dispute
25 between the parties is about whether Kim teaches the first radio signal is
26 transmitted by K antenna port groups of the base station. Apex relies on a

1 claim construction argument to support its position that Kim is allegedly
2 deficient in this regard. But as we'll see, not only is Apex's claim
3 construction unhelpful and wrong, it also doesn't impact the outcome of the
4 case because Kim teaches the claim language even with Apex's construction.

5 If we go to slide 18, Apex didn't seek to construe this limitation in
6 District Court, but here it proposes altering the limitation in two ways. First,
7 it says that the first radio signal is collectively transmitted instead of just
8 transmitted. So, they inserted that word collectively. And second, Apex
9 rewrites K antenna port groups as K groups of antenna ports.

10 We go to slide 19. We don't think the word collectively should be
11 added because Apex hasn't identified anything in the intrinsic or extrinsic
12 record that would justify its addition. The portion of the patent that Apex
13 cited is shown on the left-hand side of this slide, slide 19. It doesn't use the
14 word collectively. And it's unclear how a supposed dictionary definition of
15 the word group that isn't even evidence in this case could justify adding the
16 word collectively to the claim language when Apex's construction still
17 retains the word group. And in any case, the definition of group shown on
18 the right-hand side of this slide says nothing about a signal being
19 collectively transmitted by multiple antenna port groups.

20 If we go to slide 20, the word collectively is also problematic
21 because it introduces ambiguity instead of clarifying the meaning of the
22 claim. When deposed, Mr. Gomez, Apex's expert, first said collectively
23 means together. This is at the top left of the slide. Then when asked, at the
24 top righthand of the slide, so by collectively, you do mean that the first radio
25 signal should be transmitted by K groups of antenna ports at the same time?
26 Answer, again, they're treated -- they're sent collectively as a unit. And then

1 on the bottom right of the slide, when asked, does the first radio signal being
2 transmitted by K antenna port groups of the first base station, sorry, of the
3 base station require that the first radio signal be transmitted by K groups of
4 internet ports of the base station at the same time? Answer, I think I've
5 written that in my declaration that the first radio signal is transmitted by K
6 antenna port groups collectively, which would be, you know, similar to at
7 the same time. But according to Apex, collectively doesn't refer to the
8 timing of the transmission. We can see this at the bottom left-hand of the
9 slide. This is a screenshot from their sur-reply, Apex says collectively refers
10 to the responsibility for transmission, not the timing of the transmission. So,
11 given this lack of clarity about the word collectively, and because t's not
12 supported by any of the extrinsic or intrinsic evidence, the Board should
13 reject Apex's addition of the word collectively to the claim language.

14 JUDGE HAMANN: Mr. Goldberg --

15 MR. GOLDBERG: Yes.

16 JUDGE HAMANN: This is Judge Hamann. Just trying to
17 understand. I believe, obviously that there's a lack of clarity as to the word
18 collectively. I believe also, a moment ago, you said, obviously you disagree
19 with Patent Owner's proposed construction, but I believe you said it's
20 Petitioner's view that Kim teaches a limitation even under Patent Owner's
21 proposed construction. So, in that context, what meaning did Petitioner
22 provide for collectively?

23 MR. GOLDBERG: So, given Apex's direct statement here in its
24 sur-reply that collectively refers to the responsibility for transmission, we
25 would submit that that would be an appropriate thing to look at. And if
26 you're just talking about who's responsible for the transmission, I don't think

1 there's any dispute by Apex that it's the base station in Kim that is
2 transmitting the radio signal, and it's doing that through all of the different
3 ports. So, the same base station is what has responsibility to us. That would
4 mean that to the extent collectively just means you've got to have the same
5 entity doing all the transmissions that's met by Kim because it's always the
6 base station that's doing the transmission of the radio signal.

7 JUDGE HAMANN: Thank you.

8 MR. GOLDBERG: If we go to slide 21, in our view, the Board
9 should also reject Apex's changing of K antenna port groups to K groups of
10 antenna ports. Apex's construction requires multiple antenna ports in each
11 group, but the '527 patent expressly permits one antenna port in an antenna
12 port group at column 3, lines 18 to 19. The Board should thus also reject
13 Apex's construction to the extent that it includes this change of words, and in
14 fact should reject Apex's construction in its entirety.

15 If we go to slide 22, Your Honor, again, as I mentioned earlier, and
16 you recognized, even if the Board was to adopt Apex's construction, it's our
17 view that that would not impact the outcome. We can see here on slide 22,
18 looking at that middle yellow area, that each antenna group transmits a CSI-
19 RS in each transmission interval by using one CSI-RS resource, as indicated
20 by reference, numeral 500 of Figure 5 for eight ports. So, it doesn't matter
21 whether you have to have one port or multiple ports, because Kim is
22 disclosing that, in fact, each of its groups right there has eight ports. And
23 going back just to that collectively for a moment, if that's just referring to
24 responsibility for transmission, again, I don't think there's any dispute that
25 it's the eNB, the base station in Kim that's doing all these transmissions, so it
26 would be meeting that construction as well, to the extent that that's what

1 collectively meant.

2 We go to slide 23, the same as what we just looked at for Figure 5
3 is true. With Figure 7, each antenna group has eight ports, and again, I don't
4 think there's any dispute that the eNB, the base station in Kim is responsible
5 for all the transmissions of the CSI-RS 710 in Figure 7 of Kim.

6 We go to slide 24. I think Apex may also be disputing whether the
7 CSI-RS 510 in Kim can correspond to the claimed radio signal. First, as we
8 discussed earlier, the '527 patent itself contemplates that multiple CSI-RS
9 can together constitute the claimed radio signal. So, even if you were to
10 start splitting it out and saying that it's a separate signal for each antenna port
11 group, that still wouldn't change anything because the '527 patent itself
12 contemplates that the radio signal can have multiple of these CSI-RS. But
13 Kim is also clear that it is really a single reference signal that's being
14 transmitted using the multiple groups. Kim illustrates all the groups together
15 transmitting a CSI-RS singular in Figure 5. It's written right on Figure 5,
16 right above all those groups as just CSI-RS, no plural. It also expressly
17 discloses transmitting the reference signal, which is the CSI-RS in paragraph
18 22 in different time intervals or frequency intervals according to the antenna
19 groups, plural. And when Kim wants to differentiate signals, it gives a
20 different number. For example, it uses 520 in Figure 5 instead of 510 when
21 it wants to talk about the signal that is truly different. Or --

22 JUDGE HAMANN: Mr. Goldberg, --

23 MR. GOLDBERG: Yes.

24 JUDGE HAMANN: -- not to interrupt, I'm just still processing
25 something you just said to make sure I'm following. I believe Petitioner's
26 argument is that the CSI-RS that is transmitted, it's the same signal. So, in

1 other words, it's the same information being conveyed across all the
2 transmissions of the antenna groups. Is that correct?

3 MR. GOLDBERG: Yes.

4 JUDGE HAMANN: Now, that CSI-RS is channel condition
5 information. Is that fair? Let me ask it this way. How would you --

6 MR. GOLDBERG: Channel state -- it's channel state information.
7 Yeah.

8 JUDGE HAMANN: Thank you. I should have asked instead of
9 telling you what it was. So, it's fair to say this CSI-RS is channel state
10 information?

11 MR. GOLDBERG: Yes.

12 JUDGE HAMANN: And so, is that going to be the same channel
13 that that information is being conveyed for, regardless of which antenna
14 group is making the transmission?

15 MR. GOLDBERG: Yes.

16 JUDGE HAMANN: Where is that in Kim?

17 MR. GOLDBERG: I don't have a cite for that readily available,
18 Your Honor, but I'll ask my colleague to find that and give it to you if I can.
19 I think that from our perspective, the more important point here is that the
20 way that the Kim reference uses CSI-RS, it uses it to refer to the entirety of
21 all of those CSI-RSs that are in those groups. And again, we can see that on
22 the top above the figure. And when it wants to talk about a signal that is just
23 a completely different signal, it gives it a different number or it gives it a
24 different number -- sorry, gives it a different name. Like it refers to it as
25 another reference signal, as we can see in red underlining on the left-hand
26 side of the slide. And then also, I just want to remind Your Honor one more

1 time too, that the patent itself, the '527 patent itself, takes the view that the
2 radio signal can actually be multiple CSI-RSs, plural. This is at column 2 of
3 the patent at line 29. It says in one embodiment, the first radio signal
4 includes one or more of, and it lists a bunch of different things, one of which
5 at the end is channel state information reference signal with a parenthesis S
6 to indicate that it could be multiple CSI-RSs. So, the patent itself
7 contemplates that you can have the claim signal actually include within it
8 multiple other signals. So, even if it was the case that in Kim, it was
9 multiple different signals within the big CSI-RS 510. And we don't think
10 that that's the case. But even if it was that still would be meeting the claim
11 limitation.

12 JUDGE HAMANN: Thank you.

13 MR. GOLDBERG: We go to slide 25. The same analysis, I won't
14 repeat it, applies to the Figure 7 example in Kim with the singular CSI-RS in
15 the figure and then the use of different numbers 710 versus 720 to show
16 things that are truly different. And the use of another reference signal to go
17 to signals that are actually different.

18 If we go to slide 28. The only other substantive dispute between
19 the parties is whether Kim teaches the first signaling is used to determine a
20 first time resource pool. Apex also hinges its arguments here on claim
21 construction. But again, Apex's construction is irrelevant to the outcome.
22 And to the extent Apex is trying to inject additional limitations into the
23 claim, the Board should reject that.

24 If we go to slide 29, as we can see here, Apex seeks to construe the
25 time resource pool to mean collection of time resources for a shared use.
26 We don't think this construction is necessary. And as we'll see in a few

1 minutes, all it does is add ambiguity. As with the other claim construction
2 here too, Apex and its expert disagree on the meaning of their claim
3 construction.

4 JUDGE HAMANN: Mr. Goldberg?

5 MR. GOLDBERG: Yes.

6 JUDGE HAMANN: This is Judge Hamann again. And I know
7 from the papers too, it seems like the Petitioner at times takes the view that
8 we don't need to construe this term. And I'm trying to -- is that a fair
9 characterization of at least an argument that Petitioner has made?

10 MR. GOLDBERG: Yes. Yeah, and the reason being that whether
11 you were to apply the plain and ordinary meaning as we suggest you should,
12 and as was done in the institution decision, or whether you were to apply
13 Apex's construction from its Patent Owner response, in our view, you get to
14 the same outcome. And if you're going to get to the same outcome, then
15 there's really no point in settling the claim construction issue, because either
16 way you end up at the same place. Now, of course, to the extent Your
17 Honors disagree with that and you think that the claim construction does
18 matter because the grounds would be good under plain and ordinary
19 meaning, but they would not be good under Apex's express construction,
20 then in that situation, we think you would need to deal with the claim
21 construction issues.

22 JUDGE HAMANN: Thank you.

23 MR. GOLDBERG: If we go to slide 30, if we take Apex's claim
24 construction at face value, we don't think that Apex disputes that Kim
25 teaches the shared use of time resources by an antenna port group. We can
26 see in both Figures 5 and 7 of Kim that, for example, the blue boxes are

1 collections of time resources for a shared use by the ports in antenna group
2 one and in the beam groups in beam group one, respectively.

3 JUDGE HAMANN: What did you mean by shared use in that
4 context?

5 MR. GOLDBERG: So, within each group there are a series of
6 ports as we saw earlier there's eight ports per group. And we would just
7 mean that that time resources that are in the blue boxes are available for
8 shared use by that particular port group which would mean that the ports
9 within that group are able to use those resources.

10 JUDGE HAMANN: Thank you.

11 MR. GOLDBERG: That actually, as we'll see in a minute, is the
12 view that Apex's expert took of what this claim construction would mean.

13 If we look at slide 31, just before we get to that issue with the
14 expert, it also doesn't matter that there are gaps between the time resources
15 and we see that in Figure 5 for example. You've got the left blue box and
16 then there's a bunch of other colors and then you get to another blue box.
17 The fact that there's those gaps there doesn't matter. The '527 patent
18 recognizes that the first time resource pool can be discontinuous in the time
19 domain. We see that in the figure at the top on the left side of the slide, and
20 we also see that in Claim 5 of the patent where it says the first time resource
21 pool is discontinuous in the time domain.

22 If we go to slide 33, the issue that I think we have here at this point
23 is Apex's prior art arguments actually go beyond its claim construction
24 arguments. In its claim construction arguments Apex says that time resource
25 pool should mean collection of time resources for a shared use. That's
26 what's on the left side in both the Patent Owner response and in the sur-

1 reply. And as we just saw, as we just discussed, Kim teaches that. But in
2 Apex's prior art arguments, they say that the shared collection of time
3 resources is for transmission by all K antenna port groups. So, they're
4 looking at this sharing having to occur across port groups, which is not what
5 they said in their claim construction, but that's what they're arguing against
6 Kim.

7 We go to slide 34. Yep.

8 JUDGE HAMANN: Well, is it -- this Judge Hamann. Isn't it
9 basically construing shared use in a sense? You say it's not what they argue
10 in the construction. It really depends on what's meant by shared use. So, it
11 seems like we would need to construe the construction to the extent it's
12 something that we need to turn to.

13 MR. GOLDBERG: Yes, Your Honor. And that's actually what
14 I'm going to get to right now is why you can't look at it as having to be this
15 shared use across groups, which is what Apex is arguing on the right-hand
16 side.

17 If we go to slide 34, just looking at the claim itself, the claims don't
18 link the first time resource pool to more than one port group. They never do
19 that. So, there's no basis to start saying that you have to look across groups
20 when you're construing time resource pool.

21 If we go to slide 35, the specification of the '527 patent only links
22 the first time resource pool to a single port group. It says the first time
23 resource pool is a time resource pool corresponding to the first antenna port
24 group. It's on the left-hand side of slide 35. If we go to slide 36, in fact, the
25 '527 touts the advantages of reading the red underlining on the slide,
26 associating the first time resource pool with the first antenna port group, not

1 multiple port groups.

2 And finally, if we go to slide 37, this is the expert testimony that I
3 alluded to earlier. Mr. Gomez agrees with us. He agrees with the '527
4 patent. During his deposition, we asked him, does the term time resource
5 pool require a shared use of the same time resources by all K antenna port
6 groups? His answer, it's shared among a port. I'm sorry, a port group.
7 Question, so, the time resource pool can be time resources shared for use by
8 one antenna port group? Answer, yes. So, we think that settles that
9 construction of a construction issue that Your Honor was alluding to, that it
10 really can just be shared among one antenna port group. You don't go across
11 port groups like Apex was suggesting in its arguments against Kim.

12 JUDGE HAMANN: You have about five minutes left, Mr.
13 Goldberg in your initial 30.

14 MR. GOLDBERG: Thank you. I'll be brief here. Just one last
15 thing. If we go to slide 39, Your Honor. As you know, like in all the other
16 cases, there's been a dispute about whether Mr. Gomez is qualified to testify
17 in this case. I just want to note that contrary to Apex's assertion that it
18 makes in its slides, we don't agree that more generic work experience can
19 compensate for less education. Mr. Gomez doesn't have the required
20 master's degree and hasn't identified two years of experience working with
21 MIMO technology, much less the significantly more than two years that
22 would be required to compensate for his lower education level.

23 And unless there's any questions, I'll stop there.

24 JUDGE HAMANN: Yeah, actually, this is Judge Hamann. I have
25 a few questions about these arguments. I guess first off, I recognize in the
26 DI we took exception to an aspect of what was put forward by Petitioner for

1 ordinary skill. But certainly, Petitioner agrees that with the concept I believe
2 that more work experience, you know, we can talk about what that may
3 constitute, more work experience can compensate for some level of
4 education. Is that a fair characterization?

5 MR. GOLDBERG: Yes, we agree, Your Honor. The issue is that
6 if you just look at the definition before you even get to the issue of more
7 work experience compensating for less education or vice versa, just the base
8 definition needs to be at least a master's degree in electrical engineering or a
9 similar field. So, that Mr. Gomez doesn't have, he only has a bachelor's.
10 But let's look at the work experience part. And so, even if you had a
11 master's, you still got to have and at least two years of experience working
12 with multiple input, multiple output, MIMO technology and
13 telecommunications systems. What we take issue with is that Apex seems to
14 take the view, if you have a lot of work experience, you know, if you've
15 been in the industry for 30 years, it doesn't matter if you ever did anything
16 with MIMO. If all you did was focus on landline communications, hardline
17 stuff, which I think is a lot of what Mr. Gomez did, that's sufficient. They
18 don't even identify two years of MIMO experience. And if you want more
19 work experience to compensate for the lack of education, you should be
20 having to go more than two years of MIMO experience. And since they
21 can't even identify any, we think that he fails no matter what. That's what
22 the difference is, that we're focusing on the MIMO, they're focusing on just,
23 he's an experienced guy. It doesn't matter what his experience is in, he's an
24 experienced guy that's good enough.

25 JUDGE HAMANN: Thank you.

26 MR. GOLDBERG: I'll stop there, Your Honor.

1 JUDGE HAMANN: I believe you have two minutes left. So,
2 that'd be 17 minutes for rebuttal.

3 MR. GOLDBERG: Thank you.

4 JUDGE HAMANN: Mr. Rubino, how much time, if any, would
5 you like to reserve for sur-rebuttal?

6 MR. RUBINO: Your Honors, I would like to reserve 15 minutes
7 for sur-rebuttal.

8 JUDGE HAMANN: Thank you. You may proceed when you're
9 ready.

10 MR. RUBINO: Thank you, Your Honors. So, I think in terms of
11 background information, I don't think there's much in dispute about a lot of
12 what was discussed for the background of the patents and the background of
13 the prior art. So, I'll just cut right to the issue. There are two issues here, as
14 Petitioner pointed out. The first is whether or not Kim teaches the first radio
15 signal is transmitted by K antenna port groups of the base station. The
16 second issue is whether Kim teaches the pool.

17 Patent Owner set forth several arguments under the claim
18 construction sections in its Patent Owner response, but I think it should be
19 evident from our briefs. To the extent that it's not, I'll just reiterate that this
20 is really just an interpretation of the plain meaning of the terms. We're not
21 trying to read in additional limitations that aren't already in the term. We're
22 trying to give some explanation of, for example, what a pool is. The word
23 pool is in the claim, and there has to be some meaning ascribed to it.
24 Otherwise, it seems like it would just be read out. And that's the purpose of
25 the claim construction sections. Again, with regard to the first radio signal
26 term, the issue is that the first radio signal is transmitted by K antenna port

1 groups, plural, of the base station. And the understanding from reading the
2 specification and from the claim term itself is that that means that there has
3 to be a signal, a first radio signal, one signal, singular signal, that is
4 transmitted by more than one group. So, there has to be at least two groups
5 that are transmitting the one signal. Now, we put the word in collectively to
6 try to highlight that issue, but even without the word collectively in the
7 claim, the plain language of the claim itself still reads that one signal has to
8 be sent by at least two groups.

9 In the parlance of the Kim reference, Your Honors keyed into this
10 pretty clearly that the issue is whether Kim teaches a single CSI-RS being
11 sent by multiple groups or multiple CSI-RSs, each of which is sent by a
12 separate group. Patent Owner's position, supported by its expert declaration,
13 is that what Kim teaches in Figure 5 and Figure 7 is multiple CSI-RSs,
14 plural S, which would be channel state information for multiple different
15 channels as separate signals, each of which is sent on its own antenna port
16 group. And that the claim requires a CSI-RS to be sent by each antenna port
17 group, the same CSI-RS. Petitioner, in its petition, tried to draw a box
18 around all of the antenna port groups, and if we look at and I'll go to
19 Petitioner's slides here. If we look at Petitioner's slide 8, for example in
20 Figure 5 they draw a dotted box around the 510 and say that is one CSI-RS.
21 But when we look at the disclosure in paragraph 60, for example, it says
22 referring to Figure 5, the CSI-RS is plural for massive MIMO are
23 transmitted at different time intervals. And a sidetrack, know I've said
24 MIMO. I know Petitioner says MIMO. I'm not sure which one is correct.
25 But I've said MIMO. If I'm wrong, I will I'll change it to MIMO.

26 JUDGE HAMANN: Mr. Rubino, I've heard both, and I use both.

1 So, you're -- I'm not sure which is correct myself. But --

2 MR. RUBINO: Thank you, Your Honor. And I'm hoping -- I
3 don't think this decision, Your Honors' decision, will depend on that
4 pronunciation. But --

5 JUDGE HAMANN: Likely not.

6 MR. RUBINO: So, in terms of paragraph 60 it says referring to
7 Figure 5, the CSI-RS is plural, and while the figure itself says CSI-RS
8 singular and has an arrow, it's if anything, vague. It doesn't explicitly state
9 that the same CSI-RS is transmitted by each antenna port group or that
10 they're characterizing multiple CSI-RSs together as broader a CSI-RS. The
11 petition itself was fairly sparse on this topic. They merely pointed to this
12 and said that's the CSI-RS. That is the radio signal. All -- whatever this
13 blue circle is and the blue highlighting, that's the first radio signal. In our
14 Patent Owner response, we pointed out that that's actually not a disclosure of
15 a radio signal. It's a disclosure of in 510 five radio signals, each of which is
16 individually sent on a single antenna port group. Again, Your Honors
17 pointed out that CSI-RS is channel state information and there's just nothing
18 in Kim stating that it is the same channel for each antenna port group that is
19 the same channel information being transmitted on each group of antenna
20 ports that would satisfy this claim limitation.

21 JUDGE RAEVSKY: Mr. Rubino, this is Judge Raevsky. What in
22 Claim 1 requires there to be only a single first radio signal?

23 MR. RUBINO: So, Claim 1, in the claim term that we are trying --
24 that we've identified for construction, it says, the first radio signal is
25 transmitted by K antenna port groups of the base station. It doesn't say the
26 first radio signal is transmitted by a group. It doesn't say, you know, the

1 broader term that may mean one or more like a or a. It says the.

2 JUDGE RAEVSKY: But isn't that referring back to the earlier
3 recited a first radio signal, which under well-established Federal Circuit
4 precedent could include multiple radio signals?

5 MR. RUBINO: Your Honor, that has not been at issue in this
6 proceeding. Our position is that based on the specification and the claim
7 itself, it is one radio signal, a single radio signal. And Petitioner doesn't
8 have an argument that construction should be two radio signals. Their
9 interpretation, they've got two interpretations. One is that the CSI-RSs is are
10 potentially multiple signals that collectively can be treated as a single signal.
11 Where it's, you know, divided up five in a row and if you start at one and
12 end at five that is one. But their position, I don't believe and maybe we'll
13 hear from them, is not that the claim permits multiple radio signals to be
14 transmitted by K antenna port groups. And with regard to --

15 JUDGE HAMANN: Mr. Rubino, --

16 MR. RUBINO: Yes.

17 JUDGE HAMANN: -- this is Judge Hamann. Again, it gets into
18 somewhat a dispute about once you say plain and ordinary meaning, but
19 there's -- that the parties disagree what, you know, what exactly does that
20 mean? You know, obviously, Petitioner has stated, you know, Kim teaches
21 the first signal under the plain and ordinary meaning of that. And so,
22 looking at, you know, what does that, you know, maybe what does that
23 mean? Mr. Goldberg pointed us to column 2 of the challenged patent, and I
24 can't recall the line specifically. But where the radio signal was referenced
25 as CSI-RS with the signals being, you know, that it can be singular, plural, a
26 parenthesis S within it. Wouldn't that suggest that the first radio signal can

1 be separate CSI-RSs or multiple CSI-RSs?

2 MR. RUBINO: Sure, absolutely. But if it's multiple CSI-RSs,
3 they would have to be sent by K antenna port groups, not by -- not where
4 one CSI-RS is sent by one antenna port group. For example, Your Honor,
5 the first radio signal has to be able to include one or more CSI-RSs.
6 Because the concept here in this patent is if you have eight antennas, eight
7 antenna port groups, or five antenna port groups, that you're going to have
8 five CSI-RSs, and all five of those CSI-RSs are going to be transmitted by
9 antenna port group one, by antenna port group two, by antenna port group
10 three, by antenna port group four, by antenna port group five. That is the
11 reading -- that is Patent Owner's reading of the claim, is that whatever you
12 are calling the first radio signal, whether it's a single CSI-RS or a string of
13 CSI-RSs, collectively CSI-RS information, is sent by all of the antenna or by
14 the K antenna port groups, not by half of it on one antenna port group, half
15 of it on another antenna port group. And that's the crux of the dispute. And
16 so, if the Board finds that the claim requires or doesn't require all that
17 information to be sent on all the antenna port groups or on multiple antenna
18 port groups, then that's potentially also a claim construction position of the
19 plain and ordinary meaning of the term. But that's the dispute. That is the
20 crux of the dispute. And it is consistent with what is in the specification of
21 the '527 patent.

22 Additionally, Petitioner seems to understand this now and has
23 raised a new argument in their reply brief. So, if we look at the Kim
24 reference, there is disclosure in the Kim reference of a non-MIMO, sorry,
25 not non-MIMO, non-massively MIMO embodiment. And Kim describes
26 that, just point to the same figure that we were on before. If we look at

1 Figure 5 of Kim, 520 is the example of what to do with non-massively
2 MIMO. In that scenario, Kim discloses that you take all the CSI-RS
3 information, multiple CSI-RSs, and send it as one signal. So, Petitioner did
4 not rely on that embodiment in its petition. The non-massively MIMO
5 embodiment was not discussed at all in the petition. All Petitioner relied on
6 was 510, and the massively MIMO embodiment. But in its reply brief,
7 Petitioner points to this other embodiment, 520, and says, oh, Kim actually
8 does explain that you could send all of the information on one radio signal
9 for all the antennas. But that is in the context of a non-massively MIMO
10 embodiment. And Petitioner doesn't have that in its petition. It's not
11 addressed by its expert. And it's a separate embodiment from Kim. They
12 don't provide any analysis as to why you would combine the two
13 embodiments, no obvious analysis whatsoever. It is merely lumped into
14 their reply brief as an alternative.

15 JUDGE HAMANN: Mr. Rubino, this is Judge Hamann. Where in
16 the claim is it limited to massive MIMO?

17 MR. RUBINO: Your Honor, my understanding is that massive
18 MIMO is where you have multiple antennas from the base station and the
19 handset, as opposed to just virtual antennas in the handset. Like LTE is non-
20 massively MIMO because it only has virtual antennas in the handset, and
21 you're not doing beamforming in both directions. You're not doing -- I'm
22 going to get this wrong, both digital and analog beamforming in both
23 directions. And if we look at the specification of the '527 patent, the first
24 line says that the solutions of the '527 patent are for massively MIMO
25 systems. And it's in the claims because it's -- I'm sorry, Your Honor.

26 JUDGE HAMANN: Yeah, I'm focused on the claim. Claim 1.

1 I'm looking for what particular limitation or wording.

2 ME. RUBINO: Yes, Your Honor. In Claim 1, because there is
3 beamforming information being sent by the base station for the handset to
4 use for its antenna port groups, and multiple antenna port groups, that means
5 it is massively -- it is doing beamforming in both direction, digital and
6 analog beamforming in both direction, and therefore is a massively MIMO
7 system. But this is, again, this is something that hasn't been fleshed out in
8 the briefing or by the experts, because this was raised in, for the first time in
9 Petitioner's reply brief, that there is this non-massively MIMO embodiment
10 to combine. And even if the claims were directed to non-massively MIMO,
11 the point is that it's a separate embodiment in Kim, that Petitioner didn't rely
12 on in the petition, and it's not explained other than in passing in its reply.

13 And so, they just wouldn't have met their burden to show that that
14 embodiment could render the claims obvious. But my point --

15 JUDGE HAMANN: Mr. Rubino, this is Judge Hamann. Well,
16 you would agree certainly that Petitioner in a reply can respond to issues
17 raised by Patent Owner's response. Isn't that correct?

18 MR. RUBINO: Not to supplement the petition with additional
19 obviousness arguments. They can show how their original obviousness
20 argument and support was correct, but they can't go and make up a whole
21 new one. That's my understanding.

22 JUDGE HAMANN: Okay. Well, I guess obviously it also, to the
23 extent it relates to claim construction issues, if Patent Owner raises a claim
24 construction issue, that may provide for a broader reply. But I understand
25 Patent Owner's position. Thank you.

26 MR. RUBINO: Thank you, Your Honor. With regard to -- so, I

1 think I've addressed pretty much everything we have with regard to the first
2 radio signal and I will move on to the pool issue unless the panel has, Your
3 Honors, have any additional questions.

4 JUDGE HAMANN: No. Please proceed as you'd like.

5 MR. RUBINO: Thank you, Your Honors. With regard to the pool
6 issue, it is very simple, which is just that the word pool in the claims has to
7 have some meaning. And if we go to Patent Owner's slide 12, we discuss
8 generally what the issue is. And essentially, Petitioner is saying that the
9 time resource pool is the same thing as a time resource. Our understanding
10 of what a pool is, and we tried to put this into the construction, and again,
11 this is not a disclaimer issue. This is not a lexicography issue. This is just
12 why is the word pool in the claim. Under Petitioner's interpretation of this
13 claim limitation, any collection of resources, if you start with time one and
14 end with time five, and you have five time slots and they're each allocated
15 statically to be used by five antennas, that could be a pool. So, there's really
16 no distinction from Petitioner with regard to what a time resource pool is and
17 what a time resource would be, which is why Patent Owner has proposed the
18 construction it proposed to try to give some meaning to this claim term and
19 not render it superfluous. And Petitioner would have to agree that you can't,
20 in claim construction, render a claim term superfluous. Again, this is not --
21 this is an attempt by Patent Owner to be as precise as possible. If the Board
22 were to have a different meaning that is perhaps more precise, that would be
23 welcome as well. But the idea is that you can't read out the word pool. And
24 in the petition, Patent Owner's position is that in the petition, Petitioner did
25 not identify what the pool is or how it could be a pool as opposed to just any
26 other time resource. And we don't think that's really been clarified even by

1 Petitioner to date in this hearing.

2 Now, unless the Board has any specific questions, that's the crux of
3 our argument, is just that a pool has to be something more than a group of
4 resources. And there's nothing that's been provided today or throughout the
5 course of this proceeding that would give any meaning to that term by
6 Petitioner's reading.

7 And if I could just turn back to one other issue, which is I know we
8 have been discussing and I'm turning back to the first radio signal issue. I
9 just wanted to point out that I heard Petitioner at the beginning of his
10 argument say something about how multiple CSI-RSs can be one signal.
11 And I know we just discussed that and whether or not that's supported by the
12 specification, but whether or not multiple CSI-RSs strung together are the
13 first radio signal and can be the first radio signal, that concept was not really
14 addressed in the petition. They drew a box and made it and pointed to it and
15 said, this is it, but they didn't explain how or why that was the case. And so,
16 we still think the petition and Petitioner's arguments are deficient with
17 regard to that new argument we heard today at the hearing and that they
18 have not met their burden.

19 So, unless the Board has any additional questions about these
20 issues, I would reserve the rest of my time for reply.

21 JUDGE HAMANN: Mr. Rubino, do you want to turn to the issues
22 as to Mr. Gomez?

23 MR. RUBINO: Sure. You know, I would point out that I think the
24 distinction between -- some of this is -- well, let me say this. Mr. Gomez has
25 a lot of experience. He has a bachelor's in electrical engineering. As
26 someone who's done bachelor's and master's, I don't really see much gained

1 by the master's to render someone not a person of ordinary skill in the art.
2 It's not like we're saying or it's not like the Petitioner is saying they have to
3 have a Ph.D., which is a huge leap above bachelor's or master's. I think Mr.
4 Gomez's experience speaks for itself and that you can't just be static and say
5 that if he doesn't have the master's in electrical engineering, he's right out. I
6 understand that they're saying that there's work experience that could be
7 used and they don't think his work experience is specific enough. I would
8 point out that he does have a lot of experience in various types of
9 networking and the general concepts of time allocation, reserving time
10 resources, channel information, beamforming, two-way beamforming,
11 single-way beamforming. Those are all very common across hardwire
12 networks as, well, maybe not beamforming, but everything up to
13 beamforming is common across hardwire networks. Wireless networks all
14 have the concept of beamforming in them. Even if you don't say the word
15 MIMO in your experience, the concepts still translate over. And Mr. Gomez
16 certainly has enough experience to date in these fields, and particularly in
17 the cellular fields, with his work experience of recent times as an expert to
18 be able to, in terms of his consulting work, to be able to qualify as an expert
19 in this case.

20 JUDGE HAMANN: Thank you. I understand Patent Owner's
21 position. I'm looking if there's any other questions. I don't believe there are
22 now. I don't know if you have anything additional you want to discuss, Mr.
23 Rubino, or would like to rest and reserve the rest of your time for a sur-
24 rebuttal.

25 MR. RUBINO: No, I don't, Your Honor. That was -- my last
26 point was going to be about Mr. Gomez. I will reserve the rest of my time.

1 JUDGE HAMANN: I believe you have 24 minutes.

2 MR. RUBINO: Thank you, Your Honors.

3 JUDGE HAMANN: Or half of 45, actually, I think is under our
4 rules, but I'm not sure they'll be much of an issue there. Let me turn to Mr.
5 Goldberg, 17 minutes for rebuttal. And let me just before you begin, so I
6 don't forget, I think you were looking for a particular cite for Kim, and if
7 you happened to have located it, if you could let us know, but otherwise,
8 certainly please proceed how you'd like to.

9 MR. GOLDBERG: Yeah, Your Honor, I'll get to that in one
10 second. But if I could just first start with the pool issue and go a little bit in
11 reverse order. We do not read out the word pool in our mappings. If you'd
12 like to look at our slide 10, as I've mentioned repeatedly throughout the day,
13 when we point to the pool, when we say what is that, it's the blue boxes. In
14 Figure 7 you see two blue boxes. In Figure 5, you see two blue boxes. And
15 each blue box is a subframe. So, just between the two blue boxes that are
16 shown, and you'll see there's also dot, dot, dot on the left and dot, dot, dot on
17 the right, you have multiple time resources as well because you have these
18 multiple subframes. And it actually goes even a further step than that. I'll
19 draw your attention to slide 8 of Patent Owner's deck. And if you look at the
20 very bottom of the slide on the left and on the right, it concludes by saying,
21 in a sub-embodiment 2, the time resource is an OFDM symbol. So, even if
22 you had to have multiple time resources within one of these blue boxes, it
23 would still qualify as a pool, because you can see in both Figure 7 and
24 Figure 5, there's this blowout that goes up and shows what is inside each of
25 these boxes. And we can see there, all the resource elements, frequency on
26 the vertical axis, symbols on the horizontal axis, making up each of these

1 subframes. So, even if you only look, only if you focus on one blue box,
2 even one blue box would be a pool because it would have 14 symbols in it,
3 14 time resources in it. And it makes clear the Kim reference, if you look at
4 the earlier figures like Figure 1 and 2, that that is what's being shown, that
5 grid there is just a standard resource element grid of OFDM symbols and
6 frequencies.

7 JUDGE HAMANN: Mr. Goldberg?

8 MR. GOLDBERG: Yes.

9 JUDGE HAMANN: This is Judge Hamann. I'm trying to
10 understand if I heard correctly. So, you're suggesting, I think obviously you
11 pointed to a subframe, which is comprised of two slots. And for example,
12 often there's seven OFDM symbols in a slot. So, you have 14 symbols,
13 basically. And obviously, a symbol is going to take up a portion of the time
14 domain, I think, what is a subframe? A subframe is a millisecond, or is it
15 half a millisecond? I can't recall. But so, it's going to be a seventh or
16 fourteenth of that, right?

17 MR. GOLDBERG: Yes.

18 JUDGE HAMANN: And so, in what way -- so, there's multiple
19 time resources. It seems like the argument, as I understand it, is just the pool
20 is nothing more than multiple resources. Is that correct?

21 MR. GOLDBERG: Yeah, that's the argument, I think, at this point
22 that Apex is making, and their view was that all we pointed to was these
23 subframes. And therefore, that wasn't sufficient. Because in their view, if
24 we say that the subframe is a pool, the subframe can't also be a resource, and
25 there's got to be multiple resources. So, if you take all their arguments as
26 true, and I would disagree with that, but if you did, as a first step, you just

1 look at the figures here. If we say, a subframe is a time resource, which is
2 valid according to the '527 patent. That's on their slide 8. That's one of the
3 examples. They say that a time resource can be a subframe. We have two
4 blue boxes in figure 7, so there's two subframes. So, we've got a pool that
5 has two time resources in it. Same thing on the right-hand side. We have
6 two blue boxes. We've got a pool that has at least two subframes, and
7 therefore, at least two time resources in it under the '527's own discussions
8 of what a time resource can be. My point was it actually goes even further
9 than that because if you want to accept, maybe Apex argues, we should only
10 look at one blue box. If you only look at one blue box, it's still a pool
11 because that individual blue box, that individual subframe has within it 14
12 symbols, which would be 14 time resources. Again, according to the '527
13 patent itself, which says that an OFDM symbol can be a time resource.

14 JUDGE HAMANN: But isn't, I'm just trying to remember, you
15 know, like a resource block, for example. I don't, can, in the challenged
16 patent the technology describes, assign something at a symbol level. I
17 thought that was too granular. I thought a resource block was a subframe.

18 MR. GOLDBERG: No, there is in this technology things assigned
19 at much smaller levels. You can actually see up on the top in Figure 5,
20 there's those dark black boxes, which are actually showing the portion of the
21 subframe that can actually be used by individual ports. And it's only taking
22 up two symbols, the far right two symbols. And you can see on the left three
23 symbols, that's actually, if I recall correctly, the channel portion. And then
24 the data portion on the resource elements to the right. But I don't think any
25 of this is really mattering for the claim, because all the claim requires is the
26 pool. And we have the pool here in the form of the blue boxes, whether you

1 look at it at the subframe level, there's multiple time resources. Or if you go
2 down to the within a subframe, there's still multiple time resources. And
3 that's why it's called a resource element, because each one of them is a
4 resource.

5 JUDGE HAMANN: Thank you.

6 MR. GOLDBERG: On -- I heard Apex's counsel say that they
7 thought that we did not take the view that it was possible for the radio signal
8 and the claim to actually include multiple signals. And as we discussed
9 earlier, and we talked about that cite in column 2, Your Honors, that clearly
10 has to be the case in the '527 patent because the patent itself recognizes that
11 the radio signal can be multiple CSI-RSs.

12 Lastly, I want to come back to the cite that Your Honor asked for.
13 We were talking about how we knew that the different groups are
14 transmitting the same CSI-RS. So, how do we know that it's the same 510
15 that's for one, and two, and three and four, and five. And I had said that it
16 was, and you had questioned, well, this is CSI, so this is channel state
17 information, and aren't we going to have to be on different channels, so it's
18 going to end up being different when we're looking at these different
19 groups? And I said, no, that's not going to be the case. It's going to be the
20 same everywhere. And the reason that we know that, using Figure 5 as the
21 example, is in Figure 5, all of those antenna port groups, they are all
22 happening at the same frequency, the same channels. And we know that
23 because if you look at paragraph 61 of the Kim reference, it says that
24 although an individual time resource allocated to each antenna group is used
25 for transmission of CSI-RSs for massive MIMO in Figure 5, not only the
26 individual time resource, but also -- so, we're calling out a difference here,

1 but also an individual frequency resource may be allocated for transmission
2 of the CSI-RSs for massive MIMO. So, the baseline Figure 5 is it's only one
3 frequency, and then it's talking about the possibility that you could also have
4 different frequencies happening. So, when you know that you're only
5 talking about one frequency in Figure 5, that means all of these antenna port
6 groups, they're all the same channel. It's all the same frequency. So, all the
7 channel state information, it's all going to be the same. All the five times to
8 the extent there's more than one of them would be the same. And again, I
9 would just refer back to the discussion earlier that the Kim reference, when
10 it wants to talk about a different signal, it does it by using a different
11 number, like 520. Or it does it by using different words by talking about
12 another signal. There was some discussion by Apex's counsel about, it
13 seems like maybe we were making some new argument by talking about that
14 non-massive MIMO, the 520, and be another signal. We aren't trying to
15 make some new combination or point to something new. We were just
16 talking about that to show the distinction, the difference, that in one situation
17 when they're talking about CSI-RS 510, they always use 510. And when
18 they truly want to talk about a different signal, they do it by calling it a
19 different thing and by using a different number.

20 And finally, I just want to note that Apex's counsel made it sound
21 like we had maybe done some funny business with our annotations and the
22 figures to make it look like the CSI-RS was one instead of being multiple.
23 But if you look at our slide 10, you can see we don't have any of the colors
24 on the top there. The text says CSI-RS, no plural for massive MIMO. It has
25 the dotted arrow that goes from the beginning at group one to the end group
26 five. That is original to the Kim reference. That is not something that we

1 added. The reference itself is indicating that that is a single signal.

2 And unless there's any questions, I'll stop there.

3 JUDGE RAEVSKY: Mr. Goldberg, this is Judge Raevsky. I
4 didn't hear you squarely address Patent Owner's argument that the petition
5 refers to Kim disclosing a single CSI-RS, but that the reply includes a new
6 argument that it could be plural CSI-RSs. And as I look at the petition, I see,
7 for example, on page 16 where it says Kim discloses the user equipment
8 receiving a CSI-RS, and on page 11 of the reply where it quotes CSI-RSs in
9 plural. So, could you just respond to that argument?

10 MR. GOLDBERG: So, first of all, as I think Judge Hamann may
11 have noted earlier, given that they are setting forth these new claim
12 construction arguments, it would be entirely appropriate if we were to add
13 something in response to that. I personally don't think that we did. I think
14 that we are citing to the same portions of Kim that we were citing to
15 previously. And Kim, as has been recognized in some places, it will refer to
16 the CSI-RS 510, singular, to refer to that group of all the ports, and in other
17 places, the text of the reference itself will say CSI-RS is, plural, 510. But
18 that's the same place, the same area that we've been citing to all along. And
19 to the extent that the arguments are now turning on, did we quote one line
20 versus another line when they're all really referring to the same thing, and
21 we were citing the same paragraphs, I don't think that that would be an issue,
22 even if we weren't allowed to be responding to what they had said in their
23 Patent Owner response.

24 JUDGE HAMANN: Seeing no further questions, anything further,
25 Mr. Goldberg?

26 MR. GOLDBERG: No, Your Honors, thank you.

1 JUDGE HAMANN: Thank you. Mr. Rubino, you actually have, I
2 believe, 24 minutes, but by our rules you're limited -- the rebuttal or sur-
3 rebuttal can't be more than half of the initial time allotment. So, it'll be 22
4 and a half, we'll make it 23. I don't anticipate just from the earlier tenor that
5 you'll need that. But you're welcome to it if you want it. You may begin
6 when you're ready.

7 MR. RUBINO: Thank you, Your Honors. No, I intend to be fairly
8 brief here unless the panel has specific questions. Two, really two points.
9 The first is with regard to the pool issue. I think a lot of what we just heard
10 about pool from Petitioner was also new. You know, the petition is fairly
11 basic when it comes to describing this limitation. I think it's also fairly basic
12 even in the reply brief. So, a lot of what we just heard Petitioner describe in
13 its rebuttal time I don't think I had heard or seen in any of its papers. That
14 was one point.

15 The second point is with regard to the first radio signal issue. You
16 know, I don't think that Patent Owner has so changed the term or adopted a
17 construction that is outside the scope of what really is in the plain and
18 ordinary language of the claim itself, at least our interpretation, to merit
19 going so far beyond the scope of the petition to add a new obviousness
20 argument. But that being said, it sounds like Petitioner is not saying that
21 there's a new obviousness argument, and it is not relying on 520. I think
22 that's what I heard for its argument. It's merely saying that when the Kim
23 reference wants to talk about one kind of signal, it uses one terminology, in a
24 different kind of signal, it uses another. In that regard, 520, which is not
25 what is being relied on by Petitioner to show obviousness, describes one
26 signal with multiple CSI-RSs in it versus 510, which is a different kind of

1 signal. The Patent Owner's understanding of 510 is that it is multiple
2 signals, each of which has its own CSI-RS information being sent on a
3 separate antenna. That is supported by the Patent Owner's expert
4 declaration. There is nothing in the record in Petitioner's expert declaration
5 that really gets into the crux of this issue. And so, as a merits issue, as an
6 evidence issue, Petitioner's expert declaration in its papers are very vague as
7 to what the CSI-RS is. And by the way, I didn't mean to imply, and I don't
8 think I did imply, that there was any funny business being done with regard
9 to the label as CSI-RS for massive MIMO in Figure 5. I merely mentioned
10 it was highlighted. There is a dotted circle around 510 trying to group things
11 together. But I don't think there's anything in the petition that states that the
12 word CSI-RS for massive MIMO and that left-right arrow means it is one
13 signal, or that each of the antenna port groups is sending the same CSI-RS
14 information, which is what Patent Owner is reading the requirement as. I
15 don't think -- I'm certain that the expert declaration of Petitioner doesn't
16 address that squarely, and that Patent Owner's expert does address it
17 squarely, particularly in paragraphs 40 through 42 of his declaration. He
18 says he's read Kim and that the description in Kim of 510 and the CSI-RS
19 for massive MIMO label that is placed above it do not mean that it is a radio
20 signal, one radio signal transmitted by multiple antenna port groups. He's
21 clear about that. He's set up to it -- to cross-examination in his deposition,
22 and Petitioner has nothing really in terms of evidence other than the
23 argument it's making today and some vagaries about the Kim reference,
24 which at best maybe it's ambiguous to be able to carry its burden by
25 preponderance of the evidence.

26 And with that, unless the panel has any further questions, I have

1 nothing further.

2 JUDGE HAMANN: I see no further questions. I thank the parties
3 for their time and their arguments. Excuse me. I ask that the parties remain
4 on the line after we adjourn the hearing so that they can answer any spelling
5 or whatnot questions like that for the court reporter. With that, the hearing
6 is adjourned. Thank you.

7 (Whereupon the above-entitled matter went off the record at 4:13
8 p.m.)

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Patent 10,944,527 B2

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