

1 UNITED STATES INTERNATIONAL TRADE COMMISSION

2 Washington, D.C.

3 Before the Honorable MaryJoan McNamara

4 Administrative Law Judge

5 -----X

6 In the Matter of Investigation No.

7 337-TA-1375

8 CERTAIN MOBILE PHONES, COMPONENTS

9 THEREOF, AND PRODUCTS CONTAINING

10 SAME

11 -----X

12

13 International Trade Commission

14 500 E Street, SW

15 Washington, D.C.

16

17 Evidentiary Hearing

18 Tuesday, July 16, 2024

19 Volume V

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21 The parties met pursuant to notice of the

22 Administrative Law Judge at 9:31 a.m. Eastern.

23

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25 Reported by: Linda S. Kinkade RDR CRR RMR RPR CSR

1 Kevin Hess for Ericsson. For our next witness we recall
2 Dr. Mahon to the stand.

3 JUDGE MCNAMARA: Very good. Thank you, Mr. Hess.
4 How are we on time, by the way?

5 MARK MAHON,
6 having been previously duly sworn or affirmed
7 on his oath, was thereafter examined and testified further
8 as follows:

9 JUDGE MCNAMARA: You're still under oath.

10 THE WITNESS: Yes, Your Honor.

11 MR. AROVAS: Greg Arovas, Your Honor.

12 We did meet and confer on the break, as we had
13 mentioned. So the remaining time is Lenovo 120, Ericsson
14 108, Staff 35.

15 JUDGE MCNAMARA: We're heading into good time for
16 tomorrow, too. We seem to be on track, correct.

17 MR. AROVAS: Yes. In those estimates we assumed
18 three fours for tomorrow.

19 MR. HAYNES: We agree, Your Honor.

20 MR. HESS: I'll try to keep it that way.

21 DIRECT EXAMINATION

22 BY MR. HESS:

23 Q. Welcome back, Professor.

24 Can you remind the Court which patents you're
25 here to discuss?

1 A. Yes. I'm here to give me rebuttal opinions and
2 validity opinions on the '817 and '669 patents.

3 Q. Do you have a set of slides prepared for your
4 testimony today?

5 A. Yes, I do.

6 Q. What's the prefix of that deck?

7 A. CDX-21.

8 Q. Let's turn to slide 2.

9 Can you briefly remind the Court about the two
10 patents that you're going to discuss?

11 A. Yes. The '817 patent is focused on a --
12 encrypting subscriber permanent identifiers for privacy and
13 protection and discloses a particular technique for doing
14 that.

15 The '669 patent is focused on determination of
16 PUCCH uplink resources associated with downlink control
17 messages and a variable timing environment that uses rules
18 and signaling to do that.

19 Q. Turning to slide 3, and before we get into your
20 claim analysis, is there any dispute between the parties on
21 the level of ordinary skill in the art here?

22 A. A slight difference in definition. Lenovo states
23 a master's degree. I state a bachelor's degree. But for
24 the most part it's the same.

25 Q. Do you qualify as a person of ordinary skill in

1 the art under the parties' definitions?

2 A. Yes, I do.

3 Q. Does any difference in the parties' definitions
4 affect your opinions in this case?

5 A. No.

6 Q. Let's turn to the '817 patent, slide 4.

7 Can you remind us what date the patent
8 application that led to the patent was filed on?

9 A. July 25th, 2017.

10 Q. Does Lenovo challenge this July 25th, 2017
11 priority claim?

12 A. No, they do not.

13 Q. Who were the '817 patent inventors?

14 A. Well, they were members of 3GPP, most of them,
15 and they were participating in particularly security working
16 groups, and they were focused on, in particular, how to
17 protect subscriber permanent identifiers.

18 Q. We've heard a lot about this in the last few
19 days. I just want to ask this question for folks who might
20 be wondering.

21 If the problem was just that the identifiers in
22 the art were unencrypted, why isn't the solution just
23 encrypt the subscriber?

24 A. Well, it's more complicated than that. Back in
25 the second generation networks, we knew the IMSIs were

1 vulnerable. That was back in the '90s.

2 And so what they did is came up with temporary
3 identifiers, that was still vulnerable. So for the third
4 generation, they improved on that, came up with additional
5 identifiers and techniques. Fourth generation, same thing.

6 So this problem had been hanging out for 25
7 years. It's not like we didn't identify the problem. The
8 problem is context. You have an architecture to deal with,
9 you have devices that have to be able to integrate that
10 particular solution, and it also has to be basically
11 future-proof. It has to be able to be utilized in the
12 future.

13 Q. So, briefly, can you, turning to slide 5, can you
14 remind the Court what the '817 invention really was?

15 A. Yes. So they disclosed something called the
16 SUCI, which we've heard a lot about, and it has a particular
17 structure as shown in Fig. 3 here.

18 And what the patent discloses is that particular
19 combination and that SUCI is transmitted from the device
20 through the serving network to the home network's AUSF for
21 forwarding to the SIDF for de-concealing.

22 And, in particular, the patent addresses the
23 architecture for 5G and also protecting that identifier very
24 thoroughly.

25 Q. Did the inventors of the '817 patent propose

1 their solutions to the 5G standard?

2 A. Yes, they did.

3 Q. Does Lenovo dispute the 5G standard adopted
4 Ericsson's SUCI approach?

5 A. No.

6 Q. Let's go to slide 6.

7 Can you tell me a little bit about how Ericsson's
8 SUCI approach was received in the industry?

9 A. Yes. I have a paper here that was published by
10 three Ohio State researchers, Ohio State University
11 researchers, looking into security for 5G networks.

12 And specifically they say that the new generation
13 adopted a subscription concealed identifier as a key feature
14 of modern 5G networks moving forward. And it particularly
15 calls out here it's a new model. They recognized it, as a
16 person of ordinary skill in the art would, knowing second
17 generation through fourth generation, that what's being
18 proposed is different.

19 Q. Is this the only paper you've seen that lauds the
20 addition of the SUCI to 5G?

21 A. No, I've seen both textbooks and also other
22 articles addressing the security architecture.

23 Q. Let's turn briefly to some infringement opinions.

24 We heard from Dr. Bims earlier this morning.

25 Were you here in the court for those opinions?

1 A. Yes, I was.

2 Q. I want to go back to slide 4 for this.

3 Sorry, slide 5.

4 Can you summarize looking at the Fig. 6 here what
5 Dr. Bims' noninfringement argument seems to be about?

6 A. Yes. Apparently he is saying --

7 MR. APPLEBY: Your Honor, I would like to lodge
8 an objection.

9 JUDGE MCNAMARA: Mr. Appleby?

10 MR. APPLEBY: Yes. I would like to object that
11 this is infringement evidence. This is a rebuttal case, and
12 the issues that we should be rebutting on are validity.
13 This is not a time to be introducing additional evidence
14 that should have been presented in the case-in-chief.

15 And, also, with respect to the disclosures last
16 night, they had indicated their wish to use an exhibit that
17 was clearly related to infringement. We objected, and they
18 withdrew it, leading us to believe that they had agreed that
19 this presentation would be focused on validity only, as it
20 should be as in the rebuttal case. Thank you.

21 JUDGE MCNAMARA: There is a fair point there.

22 Mr. Hess, can you tell me what happened last
23 night?

24 MR. HESS: I'm actually not sure which exhibit it
25 was, but, as we understand the ground rules, specifically

1 9.1.4, our rebuttal case here as Complainants can include a
2 response to the scope of Respondents' defendant's case.

3 We literally just heard these noninfringement
4 opinions this morning, and we're briefly going to respond
5 with maybe two minutes of conversation about those opinions.

6 JUDGE MCNAMARA: That isn't what my ground rule
7 says. It doesn't say that it necessarily has to be on your
8 burden, your burden in the case, your rebuttal has to be to
9 the burden the other side is carrying.

10 So I will allow this, but I guess the question
11 that I have is that I wasn't able to finish my remark on was
12 the issue of the slides and what was disclosed.

13 So one of the infringement slides was withdrawn,
14 but did you have this one, Mr. Appleby?

15 MR. APPLEBY: Just to be clear, it was an exhibit
16 that was clearly directed to infringement, and we objected
17 on the grounds that it was improper rebuttal, and it was
18 withdrawn, which led us to believe that the parties were in
19 agreement that this presentation would be focused on
20 validity only.

21 So I would certainly defer to your ground rules,
22 but we were led to believe based on our meet-and-confer that
23 this would be a validity presentation.

24 JUDGE MCNAMARA: I'm not going to ask --

25 Were you part of that meet-and-confer, Ms. Chang?

1 MS. CHANG: I did not get to attend the
2 meet-and-confer, but I did see the emails back and forth,
3 but I think that this slide in particular was disclosed. I
4 don't think anybody is disputing that.

5 JUDGE MCNAMARA: Okay. This slide was -- I'm
6 going to, again, allow it provisionally. And, Mr. Appleby,
7 you can make your case again with a motion to strike.

8 And in the past I have, in fact, ruled and moved
9 out of evidence certain evidence that was subject to -- I
10 don't want to use the word "valid" -- motions to strike that
11 were supported.

12 MR. APPLEBY: Thank you, Your Honor.

13 MR. HESS: May I proceed, Your Honor?

14 JUDGE MCNAMARA: Yes.

15 Q. Can you briefly explain Dr. Bims' noninfringement
16 argument with respect to this figure, as you understand it?

17 A. Yes. As I heard this morning from Dr. Bims, he
18 contends that the SEAF has the option of deciding what to do
19 with the SUCI, can take an action, drop it, it can forward
20 it. And, therefore, it's not the claims disclosing
21 transmitting the SUCI through the serving network to an AUSF
22 or not -- don't infringe because they don't read on the
23 5G patent -- standards, I'm sorry.

24 Q. And then when it comes to the structure here, we
25 have seen these nodes quite a bit, and there was some talk

1 of serving network versus home network. Can you clarify
2 what that means?

3 A. Yes. The serving network is a network you attach
4 to, and it can be a visited network. It doesn't have to be.
5 It can be your network operator. But the UE is attaching to
6 the AMF SEAF, which is in the serving network, and then, by
7 design, the AUSF, the authentication server, and the
8 de-concealing server, are tucked away in the home network on
9 the right side of this diagram.

10 Q. And the last question on this. Does anything you
11 heard from Dr. Bims this morning change your opinion on
12 infringement?

13 A. Absolutely not.

14 Q. Let's move on to validity, and we'll turn to
15 slide 7 here.

16 Can you summarize Lenovo's invalidity grounds for
17 the '817 patent?

18 A. Yes. They have three grounds. The first ground
19 is abstract idea, and then they have two grounds based on
20 combinations of Nair, Forsberg, and Togawa.

21 Q. Can we start with the 101 argument, please?

22 A. Okay.

23 Q. Do you agree or disagree that the asserted claims
24 are invalid under 101?

25 A. I disagree.

1 Q. Can we pull up slide RDX-2.54?

2 What are we seeing here?

3 A. We're seeing a slide from Dr. Bims' presentation
4 where he said that the idea of concealing data is how he put
5 it was an abstract idea.

6 Q. Do you agree with Dr. Bims?

7 A. I absolutely do disagree. He is ignoring the
8 fact that the '817 discloses a particular structure and the
9 SUCI is transmitted in a particular way.

10 Q. Let's go back to -- actually can we go back to
11 this, RDX-2.54.

12 I see Dr. Bims has highlighted just a few words
13 here.

14 A. Yes, he has.

15 Q. Where are those words in the claims?

16 A. So that's in the preamble of claim, method, and a
17 user equipment in both instances.

18 Q. Does Dr. Bims ignore the rest of the claims?

19 A. Yes. He did not mention anything about the 90
20 percent of the rest of the claims.

21 Q. Let's have 21.8.

22 Are these the claims in full?

23 A. Yes, they are. And as you can see, it's only the
24 beginning of the claim element -- each one of the claims
25 that he was pointing to.

1 Q. Let me ask you this. Could the claims of the
2 '817 patent have been implemented on then existing UEs in
3 2017?

4 A. No. The UE wouldn't know how to calculate it.
5 And then in terms of transmitting it, it could transmit
6 something, but the network certainly wouldn't know how to
7 handle it. So that would not be possible.

8 Q. Let's move on to the obviousness grounds.

9 Here we'll start with the question, do you agree
10 with Dr. Bims that the asserted claims are obvious over the
11 grounds he presented?

12 A. I do not.

13 Q. What are you showing here with this timeline?

14 A. Well, this is very similar to -- well, this is
15 from Dr. Bims' testimony. And what I have on here are the
16 filing dates associated with each one of the references.

17 So what this shows you or shows a person of
18 ordinary skill in the art, you have on the right side
19 basically proposals for 5G networks, the coming generation,
20 the next generation.

21 Then you have a competing proposal from Nair, and
22 Nair was very simplistic and clean, I guess I would say.
23 It's designed to be simple and clean, competing against the
24 '817 disclosure. That's anticipating hopefully being used
25 in the 5G, but it was grounded in the 4G, 3G, and 2G

1 techniques of the time.

2 And then you have, moving along, you have this
3 big time gap between Nair and Forsberg, for example, and
4 Forsberg was before 4G even was -- the first release of 4G
5 came out -- LTE. So that was grounded really or released
6 during 3G technology anticipating 4G.

7 And then you have all the way to the left you
8 have Togawa. Togawa doesn't even have anything to do with
9 subscription identifiers or authentication procedures. And
10 that, to me, is a very big stretch to say a person of
11 ordinary skill in the art would look at these and say, okay,
12 I'm going to combine these particular references and reach
13 all the way back to find this element and this element in
14 the way that it was presented and asserted.

15 Q. Does this timeline affect your view on Dr. Bims'
16 arguments in any way?

17 A. Yeah, it helps inform my view in terms of, again,
18 from the perspective of a person of ordinary skill in the
19 art, someone who knows how security techniques and
20 architecture evolved over time in particular, and looking at
21 this and saying, yeah, again, that's a big stretch, so I
22 think it undermines his assertions.

23 Q. Let's turn to the references. Can we start with
24 Nair, please.

25 Here on slide 21, CX-21.10, we see Nair. What

1 are your opinions on this reference?

2 A. Well, as I just mentioned, Nair takes a clean
3 approach, a simplified approach, and it doesn't include an
4 encryption scheme identifier or public key identifiers, for
5 example. Again, simple and clean.

6 And what it does is basically uses a privacy
7 indicator to say, hey, I have this identifier, and it's
8 either yes or no, encrypted or not, and then it assumes that
9 both the UE and the network know what the encryption scheme
10 is, and so, therefore, it is not flexible.

11 Q. You mentioned flexibility. What do you mean by
12 that? Let's look at slide 11 for this.

13 A. Well, in particular, again, referencing that
14 paper put out by those three researchers from Ohio State,
15 they called out again referencing this new approach that the
16 network operators can choose which of the encryption schemes
17 they want to use, but both choices are resoundingly secure.

18 They're saying network operators can come forward
19 and say, hey, I got a new encryption scheme I want to use,
20 incorporate it, and the disclosures in the '817 patent and
21 as adopted in the 5G standard would be able to implement
22 that.

23 Q. You talked about the 5G standard. How many
24 values are in the encryption scheme identifier in the SUCI
25 and 5G?

1 A. 16. So you can have 16 different encryption
2 schemes implemented.

3 Q. Turning to slide 12, do you know if the carriers
4 have expressed interest in any new encryption schemes?

5 A. Yes, this is an excerpt of the testimony of
6 Eduardo Gomez, an Ericsson engineer, who said they were
7 approached by private companies and also an entity of the
8 U.S. government requesting another encryption scheme being
9 integrated into their products. So that's an example of the
10 future proof or the flexibility.

11 Q. Turning to slide 13, what did Ericsson's
12 inventors have to say about the flexibility of their
13 approach?

14 A. Well, that it was a main, basically, design
15 criteria. So they said that, over time, everybody knows
16 that algorithms are going to be tested, and eventually some
17 cracks are going to show up, so they become weak over time.

18 So, again, your technique has to be able to be
19 flexible to be updated with, for example, new encryption
20 schemes.

21 Q. Turning back to the Nair reference, does Nair
22 contemplate different types of encryption schemes?

23 A. No, it does not.

24 Q. Does Nair have any need for an encryption scheme
25 identifier at all?

1 A. No, it does not.

2 Q. Let's go to slide 14 and turn to the Forsberg
3 reference.

4 Did you hear Dr. Bims testify about this
5 reference?

6 A. Yes, I did.

7 Q. Does Forsberg disclose all the claim elements of
8 the '817 claimant?

9 A. No, it does not.

10 Q. What's it missing?

11 A. It's missing a public key identifier.

12 Q. Is it also missing the encryption scheme
13 identifier?

14 A. It does not have an encryption scheme identifier,
15 because, as I said, Forsberg was filed right before the
16 first release of 4G, for example, and the 4G, 3G, 2G
17 technology, the techniques that were used were basically
18 pretty rigid and fixed, as far as the authentication process
19 and encryption is concerned. So they did not disclose that.

20 Q. I want to clear up the record here. I think you
21 said "public key identifier" first. What you meant to say
22 was "encryption scheme identifier"; is that right?

23 A. That's correct. I'm sorry.

24 Q. We've got a lot of identifiers going on, I know.
25 What about the structural elements of Forsberg,

1 how did those compare to the '817 patent claims?

2 A. Well, Forsberg is directed to 4G, and you notice
3 the acronyms in this slide, MME, that's a mobility
4 management entity that you find in the 4G architecture.

5 And so it's directed to 4G architecture, which
6 is, again, as I said in my opening, is very different from
7 the completely redesigned core in 5G.

8 Q. Was Forsberg considered during the prosecution of
9 the '817 patent?

10 A. Yes. It does show up on the face of the '817
11 patent.

12 Q. Let's turn to slide 15 here.

13 Can you explain a little bit more about the
14 authentication approach as it relates to the structural
15 elements of Forsberg?

16 A. Yes. Again, this is consistent with the
17 understanding of a person of ordinary skill in the art that
18 Forsberg's disclosure is definitely anchored in the previous
19 legacy systems, and here you see that mobility management
20 entity is making a decision. It's actually doing the -- it
21 could do the encryption -- decryption, I'm sorry.

22 So its first decision is, hey, I received an
23 identifier, can I decrypt this. If yes, it does it. Again,
24 that's in the serving network, very different than the
25 5G network.

1 If it can't, what it does is it reaches back to
2 the home network MME in a 4G system and says, can you help
3 me, and that's what this flowchart shows.

4 Q. Can we please pull up RDX-2.49.

5 Was this another slide we saw Dr. Bims opine
6 about today?

7 A. Yes, it is.

8 Q. What's the Visited-MME in Forsberg?

9 A. So that's the LTE entity or node that I was just
10 talking about. So, again, that's in the serving network.
11 And he points to that, and Forsberg says that could do the
12 decryption.

13 Q. What about the de-concealing server, what does he
14 point to there?

15 A. He is pointing to, again, another 4G node in the
16 home network, and he is calling that the de-concealing
17 server.

18 Q. Do you agree with Dr. Bims' characterization of
19 the Home and Visited-MMEs in Forsberg?

20 A. Absolutely not.

21 Q. Why not?

22 A. Well, again, you're comparing this, from my view,
23 a muddled and I believe a person of ordinary skill in the
24 art's view of a muddled interpretation of how 4G worked and
25 trying to apply it to a 5G system with the terminologies

1 that the '817 discloses -- the authentication server and
2 de-concealing server. The disclosed functionality is not
3 the same as disclosed on this slide.

4 Q. Can we go back to CDX-21 and pull up slide 17,
5 please.

6 What did Dr. Bims have to say about claim 13 of
7 the '817 patent as it relates to Forsberg?

8 A. Well, here he is kind of having his cake and
9 eating it too. He's calling the Visited-MME both an AMF,
10 which is what's disclosed in the '817, and the
11 authentication server as disclosed in the '817. He is
12 calling it both.

13 Q. Do you agree that's possible here?

14 A. No, I do not.

15 Q. Let's move on to Togawa, which I'm showing here
16 on slide 19.

17 What's the Togawa reference?

18 A. The Togawa reference is focused on voice signals.
19 So you talk into your computer, it digitizes it, sends it on
20 the internet. So it's focused on voice signals.

21 Again, this was anchored back in the day, and
22 it's not focused on subscription identifiers and it's not
23 focused on authentication procedures at all.

24 Q. What does Dr. Bims need Togawa for?

25 A. Well, he needs it to try to cover the encryption

1 scheme identifier.

2 Q. Do you agree that Togawa discloses an encryption
3 scheme identifier?

4 A. Certainly not as disclosed in the '817 patent.
5 The '817 patent says you have an encryption scheme
6 identifier that's used to encrypt the permanent identifier
7 of the user, and as used by the UE, and put into the SUCI
8 and used to transmit the SUCI to the AUSF.

9 Q. Does Togawa have anything to do with subscription
10 identifiers or authentication?

11 A. No, it does not.

12 Q. How does the fact that Togawa has nothing to do
13 with subscription identifiers or authentication affect your
14 opinions here?

15 A. Well, again, I think it's a really big stretch to
16 try to take something out of both security, authentication,
17 and with respect to 4G -- or actually 4G/3G networks -- and
18 try to pull that in to cover the '817 disclosures.

19 The ideas there don't match up. For example, a
20 person of ordinary skill at the time would understand, when
21 you connect to a network, the first thing you do is
22 authenticate. Then once you're authenticated, sure, you can
23 pick up and make a voice call.

24 So you have a control plane for identification,
25 and then you have a second data plane for sending your data.

1 And, at best, Togawa is focused on that data plane
2 structure, completely outside the architecture for
3 authentication in cellular networks.

4 Q. Let's go to slide 20.

5 Did we see this figure from Dr. Bims'
6 presentation this morning?

7 A. No, we did not.

8 Q. This is from Togawa, right?

9 A. Yes, it is.

10 Q. What does Fig. 8 of Togawa show you?

11 A. So this is for encrypting the voice signal, data.
12 And the timeline on the right shows you, you start a call at
13 zero and then you have these demarcations of times steps,
14 T-1, T-2, et cetera.

15 What it says is, you're sending data and it's
16 being encrypted. So your voice signal is going out
17 encrypted, and you're sending this data with an encryption
18 key essentially.

19 And then what you're doing is you're changing it
20 during your call so to provide you with additional security.
21 And so at various time steps you're switching that
22 encryption key so that you need to tell the user that the
23 change happened, for example.

24 And, again, that's a very different construct
25 from what happens during authentication to say, hey, is this

1 user a valid user to attach to the network, where you're
2 trying to figure out is that SUPI connected to, for example,
3 a contract for a particular network operator.

4 Q. Slide 9 here of your presentation, I think you
5 mentioned sort of disagreeing with Dr. Bims on combining all
6 these references.

7 Can you explain a little bit more about why?

8 A. Well, again, you have different architectures
9 exposed here. You have, basically, simplistic technique of
10 Nair, unflexible, you have Forsberg directed to 4G, and then
11 you have Togawa outside of anything, authentication or
12 subscription identifier related.

13 And you try to combine those to say, hey, you
14 know, basically, a person of ordinary skill in the art would
15 recognize these and say, yeah, that makes the claims of the
16 '817 patent obvious.

17 We had 25 years to do this. It's not an easy
18 problem. And that's why the researchers from Ohio State
19 recognized and others recognized that this is new and
20 inventive, and it's actually a core element of the
21 5G network.

22 Q. What about with respect to the composition of the
23 messages in these references, does that inform your
24 motivation to combine analysis?

25 A. Yes, it does. So we have the Togawa, which is

1 data, and then you have the composition, you know, in
2 Forsberg and then Nair.

3 Nair is just a privacy indicator. It's a single
4 bit, right? You can't -- it's inflexible. You can't put in
5 multiple encryption schemes, for example. So, yes, it does.

6 Q. Does Bims take Nair and make it more complex?

7 A. Yes, he does.

8 Q. What about with respect to the various network
9 architectures, does that inform your motivation to combine
10 analysis here?

11 A. Yes, because, as I said before, there were
12 attempts to improve the privacy and security techniques as
13 we move through generations, and each architecture has
14 particular structures obviously and also provide particular
15 opportunities.

16 When you go to try to mix and match those, it's
17 not very easy, which is why one reason we explained that,
18 from the perspective of a person of ordinary skill in the
19 art, is that the redesign of 5G enabled the reevaluation and
20 competition of ideas to say, let's see if we can do it right
21 finally. We've known about this. Here's a possible
22 solution. Other people did submit other possible solutions.

23 Q. I see a fourth reference here that we haven't
24 talked much about, if at all, today. What's that reference?

25 A. 5G-Ensure.

1 Q. And what's 5G-Ensure used for in Dr. Bims'
2 combinations?

3 A. Well, that's that ECIES encryption algorithm that
4 he uses to cover.

5 Q. Does 5G-Ensure provide any additional motivations
6 to combine Togawa with Nair or Forsberg?

7 A. No, it doesn't provide, for example, a nice
8 architecture where you can grab the different structures and
9 integrate them all in together for a person of ordinary
10 skill in the art to understand and say, oh, yeah, if we put
11 it together this way, it's going to work, and also it would
12 achieve the same results, for example.

13 Q. Turning to slide 6, and I want to ask you, do you
14 have any secondary considerations of non-obviousness of the
15 '817 patent claims?

16 A. Yes. And this slide, again, we've, seen this
17 before, but here we say, I call out another section where
18 the SUCI was adopted, they point out, the researchers, as a
19 key feature of modern 5G networks in a new model.

20 And so it's providing additional support that
21 they identified, people who work in the security area,
22 identified as a key feature.

23 Q. Can we jump ahead to slide 21?

24 At this point I want to move on to the second
25 patent, the '669 patent, if that's okay.

1 A. Okay.

2 Q. Before we get into validity on the patent, maybe
3 the easiest question of the day, did you hear Dr. Rangan
4 offer any opinions on infringement of the asserted claims of
5 the '669 patent?

6 A. I did not.

7 Q. So let's turn to validity. Can you summarize
8 your opinions regarding the validity of the '669 patent
9 claims?

10 A. Yes. My opinion is the asserted claims are
11 valid.

12 Q. Let's turn to slide 22.

13 I think we have seen this slide before, but can
14 you summarize what the problem the '669 inventors were
15 trying to solve was?

16 A. Yes. And if you recall from my opening, that
17 basically the current system, the 4G system, had more of a
18 type kind of structure, and so, 5G, they wanted it to be
19 dynamic and flexible.

20 And so there was a problem with identifying the
21 uplink control channel resources to send up responses to
22 downlink data coming down, right, those HARQ responses.

23 And so what they did is they came up with rules
24 and signaling to be able to solve that problem to make -- to
25 respond to the demand for flexibility.

1 Q. Turning to slide 23, were Ericsson's inventors
2 alone in working on this on the standard?

3 A. No. As I mentioned, there's an opportunity to
4 redesign a network architecture, so a lot of people, a lot
5 of corporations, many, many engineers made submissions.

6 Q. And this is the CATT reference I think we have
7 seen before, but what does it say about the status of that
8 work and study as of August 2017, a few months before
9 Ericsson's patent?

10 A. Yeah, this is right before the Ericsson patent
11 was filed. And you can see that the CATT reference here
12 says that it is for future study, the details of the PUCCH
13 resource determination rule, including implicit resource
14 mapping and/or explicit signaling.

15 So they were saying, hey, we're still working on
16 the details of how to figure this out.

17 Q. Let's turn to slide 24.

18 Can you remind the Court what invalidity grounds
19 Dr. Rangan advanced for the '669 patent yesterday?

20 A. Yes. For claim 8, he said it's anticipated by
21 Ahn, and then for grounds 2 and 3, with respect to claims 8,
22 9, 15 and 17, that they were covered by a combination of Ahn
23 in view of Intel or Ahn in view of Park '389.

24 Q. How many references does Lenovo assert across
25 these grounds?

1 A. I've heard three.

2 Q. How many of those three references were already
3 considered by the USPTO for the '669 patent?

4 A. Two of the three.

5 Q. We're on slide 25 now.

6 When was Park '389 considered?

7 A. It was considered, as disclosed here on the face
8 of the patent, it was listed on the face of the patent for
9 consideration by the PT0.

10 Q. Was this one patent out of dozens and dozens that
11 Ericsson disclosed?

12 A. A handful.

13 Q. Let's turn to slide 26.

14 When was 3GPP-Intel disclosed?

15 A. Well, Apple filed an IPR against the '669, and,
16 as you can see, they listed Intel here, and it also dealt
17 with the asserted claims.

18 Q. What was the outcome of that IPR?

19 A. Institution was denied.

20 Q. Slide 27, and I want to turn to Lenovo's third
21 and final reference here shortly, but before we do that, can
22 you remind the Court what claims 1 and 6 require as far as
23 the PUCCH resource determination?

24 A. Yes. 1 and 6 require the determination based on
25 the latest received one of the first or second downlink

1 channel messages.

2 Q. Do claims 1 and 6 also require selecting a
3 resource from the selected set?

4 A. Yes, it does, and I have that called out in
5 element 6.J here, that the selecting from the selected
6 uplink control channel resource set is based on dynamic
7 signaling from the network.

8 Q. So what does claim 8 add on top of these
9 requirements?

10 A. Well, claim 8 then adds on that the message that
11 you're receiving from the network comprises bits for use to
12 select one or more uplink control channel resources sets to
13 send up that information.

14 And it also adds in 8.C here, you see that the
15 selecting is done from the one or two or more uplink control
16 channel resources, so you're selecting the resources from
17 this selected set based on the bits in the downlink message.
18 So that's added on here. And it also adds on in the latest
19 received message from the network.

20 Q. Let's go to slide 29.

21 What is Dr. Rangan's primary reference for these
22 three grounds?

23 A. Ahn.

24 Q. Let's start here. How is the Ahn patent
25 organized?

1 A. Excuse me. The Ahn patent has over 30 figures,
2 has many, many embodiments, and it's actually organized in
3 sections. So you have these section headers listed
4 throughout Ahn, which is a little unusual for a patent.

5 Q. Now I want to get right to the dispute, at least
6 when it comes down to claim 8 of the '669 patent, and for
7 this I want to turn to Lenovo's slide RDX-6.74.

8 Can you just remind the Court, what does
9 Dr. Rangan rely on from the Ahn reference of grounds 1, 2
10 and 3 for the latest received limitations?

11 A. He is relying on, as you see in the top frame
12 there, the DCI in a most recently received subframe.

13 Q. And what --

14 (Clarification requested by the court reporter.)

15 A. I'm sorry. I was saying for the latest received
16 disclosure.

17 Q. And what is the DCI in a most recently received
18 subframe used for in that top disclosure?

19 A. Well, as you see in the light blue there, it's
20 for selecting a PUCCH format.

21 Q. Is a PUCCH format the same thing as a PUCCH
22 resource?

23 A. Absolutely not. Two different things. A PUCCH
24 format is basically a particular way to arrange bits, and we
25 talked about this with the DCI messages, and what goes into

1 it.

2 So that's very different than selecting a time
3 and frequency resource for transmitting data.

4 Q. So how does Dr. Rangan, then, attempt, to bridge
5 the gap between the PUCCH format and the PUCCH resource with
6 respect to Ahn?

7 A. Well, he reaches back eleven columns in the
8 patent and he says, he cites to an ARI value, that may
9 designate a combination of the PUCCH format and the PUCCH
10 resource.

11 And that's what he relies on. And these are two
12 different embodiments that he is combining together.

13 Q. Okay. So putting that problem aside, let's turn
14 back to your slide 30.

15 How does Ahn describe this ARI field can be used?

16 A. Well, Ahn discloses that the ARI field is
17 considered a PUCCH resource index, and, therefore, you can
18 consider it as pointing to a resource.

19 Q. Does Ahn discuss using this latest received ARI
20 to override a previous one and determine a PUCCH resource?

21 A. No, he does not at all.

22 Q. Let's turn to slide 31.

23 Does Ahn have embodiments where there's a
24 conflict between the ARIs that come down?

25 A. Yes. That's what I'm showing on this slide. In

1 orange, you see highlighted the ARI values that are in
2 conflict. And what is closed in the '669 for this situation
3 is that you have what are called cell groups, cell group Y,
4 cell group C.

5 And so you assume that a cell group corresponding
6 to both PUCCHy and PUCCHz, that's the format, is cell group
7 Y. And a cell group corresponding to only PUCCHz is cell
8 group Z.

9 So what do you do to adjudicate the conflict?
10 You look at the cell group and the cell group that has a
11 common PUCCH format is Z, so you select PUCCHz.

12 Q. Does this rule here have anything to do with the
13 time order in which the messages came down?

14 A. No, there is no time ordering here, not the one
15 on the right, it comes after the one on the left, or
16 vice versa. There is absolutely no time reference with
17 respect to this disclosure.

18 Q. Let's turn back to RDX-6.74 one more time.

19 And remind us, what does Dr. Rangan rely on with
20 respect to the time order rule again?

21 A. He is relying on the DCI in the most recently
22 received subframe.

23 Q. What does that select again?

24 A. A PUCCH format, not a resource.

25 Q. Let's go to slide 32 in your presentation.

1 Did we see the same disclosure maybe with a
2 little bit less highlighting yesterday in Dr. Rangan's
3 cross?

4 A. Yes, we did.

5 Q. Let me ask you this. Before we dive in, what's
6 the top line here that we've got a box around?

7 A. So it starts out, therefore, the following method
8 is proposed, so it's proposing in a particular embodiment,
9 and it goes on to do that.

10 Q. And have you excerpted this in any way or is this
11 the entire method --

12 A. It's the entire embodiment.

13 Q. And which sentence does Dr. Rangan rely on here?

14 A. Basically, the very first sentence after the one
15 I just read beginning "the wireless device may select a
16 PUCCH format."

17 Q. Does that paragraph teach selecting a PUCCH
18 resource, or is it directed to selecting a PUCCH format?

19 A. No, that's clearly directed to selecting a PUCCH
20 format.

21 Q. Does this entire embodiment ever discuss
22 determining a PUCCH resource?

23 A. No. You won't see the word "resource" here
24 anywhere in the embodiment.

25 Q. Does this embodiment mention the ARI even once?

1 A. No, not at all. It's showing an alternative.

2 Q. How does this embodiment say that the PUCCH
3 format, not the resource, but the format can be selected
4 here?

5 A. Well, it discloses a couple things. One, as I
6 have underlined here in red, according to a cell group, and
7 we just saw an example of that, the received last DAI value,
8 for example, and also the received last total DAI value.

9 Q. Do those three or four options here, the DAI
10 values and the cell group corresponding to the DCI, do those
11 relate to the DCI message?

12 A. Yes, they are contained in the DCI message also.

13 Q. Is the ARI in the DCI message?

14 A. Yes, it sure is.

15 Q. But this is just a different part?

16 A. Yes, it is.

17 Q. Did you hear Dr. Rangan say it would be, and I
18 think he used the word "insane" to use something besides the
19 ARI to make the PUCCH selection here?

20 A. I was here for that testimony, yes.

21 Q. What is Ahn using to make the PUCCH selection
22 here?

23 A. Well, apparently Ahn is a little insane here,
24 because he is not using ARI at all in this embodiment. It's
25 actually in contention with what Dr. Rangan was saying.

1 Q. Let's move on to slide 33.

2 Besides the examples we just saw in column 20,
3 are there other examples in the patent where something
4 besides the ARI is used to determine the PUCCH format?

5 A. Yes. I have another callout here from the patent
6 to include, to determine the PUCCH format, another thing
7 called the PUCCH format indication, PFI, can be used.

8 Q. Within what message does Ahn teach sending the
9 PFI?

10 A. Well, it says the DCI may include. So it's in
11 the DCI also.

12 Q. So does Ahn disclose several examples of
13 selecting the PUCCH format based on something other than the
14 ARI in the DCI?

15 A. Yes, it certainly does.

16 Q. Let's go to 34.

17 Let's turn our focus back to the sentence in
18 column 9 that Dr. Rangan relied on.

19 Is that the paragraph that's highlighted here in
20 the middle?

21 A. Yes, it is.

22 Q. What does Ahn say here that the ARI can indicate
23 in this embodiment?

24 A. Specifically it's saying it can indicate a
25 combination of the PUCCH format and the PUCCH resource.

1 Q. So in this instance it can designate both.

2 A. In this embodiment, yes.

3 Q. Well, I want to zoom out from that sentence to
4 the paragraph just above it.

5 Did we see that yesterday with Dr. Rangan?

6 A. We did not.

7 Q. How does the Ahn patent describe this embodiment?

8 A. This is described as a reinterpretation of the
9 ARI. So you have the disclosures for the ARI, now we look
10 at a particular reinterpretation of the ARI in this
11 embodiment.

12 Q. Has Dr. Rangan provided any reason why a person
13 of ordinary skill in the art would combine this
14 reinterpretation ARI embodiment from column 9 with the
15 embodiment that doesn't discuss the ARI in column 20?

16 A. No, absolutely not. I have not heard any
17 motivation to combine.

18 Q. And so let's turn to slide 35 and look at claim 8
19 again.

20 Why is it -- well, in your opinion, does Ahn come
21 up short with respect to claim 8?

22 A. Yes, it does.

23 Q. Why is that?

24 A. Well, as claim 8 requires, is that you're doing
25 the selection of the resource based on the selected resource

1 set using bits in the latest received message.

2 So Ahn doesn't disclose that, and what Dr. Rangan
3 is pointing to certainly does not disclose that.

4 Q. Does Dr. Rangan advance an inherency argument for
5 Ahn with respect to this claim?

6 A. No, he does not.

7 Q. Across all three of his grounds, does Dr. Rangan
8 rely on any secondary references to teach this latest
9 received disclosure?

10 A. No, the latest received is not covered by any
11 others.

12 Q. Let's move on from that element.

13 Before we get to Dr. Rangan's combinations, have
14 you identified any other claim elements that you believe Ahn
15 fails to disclose?

16 A. Yes, many.

17 Q. Let's go to slide 36.

18 Does Ahn disclose the UE receiving signaling
19 comprising semi-static configuration of multiple sets of
20 multiple resources?

21 A. No, it does not.

22 Q. Why not?

23 A. Well, here we see a disclosure from Ahn, again,
24 and what it's disclosing is that the UE is receiving one
25 table, one piece of information, that does not constitute

1 multiple resource sets.

2 Q. Were you here when Dr. Rangan highlighted the top
3 two rows and called it one format and one set, and in the
4 bottom two rows another set?

5 A. Yes, I was.

6 Q. Does the Ahn patent itself ever say those two
7 rows are multiple resource sets?

8 A. No, it does not, and it actually never uses the
9 words "resource sets."

10 Q. Let's turn to slide 37.

11 What do claims 9 and 15 require with respect to
12 the variable timing limitation?

13 A. So this includes the variable timing between when
14 the wireless device receives the first and second downlink
15 control channel messages, which schedule the downlink shared
16 channel transmissions, and when the wireless device
17 transmits on the uplink. So here you have variable timing
18 between both messages coming down and when the uplink is
19 going up.

20 Q. How do these variable timing limitations in these
21 claims relate to the problems the patent was trying to solve
22 as a whole?

23 A. Well, it's directly related. It's the core
24 problem they were trying to address with their combination
25 of rules and signaling in their patent.

1 Q. Turning to slide 38, does Ahn disclose variable
2 timing between the two downlink control messages and the
3 uplink message as in claims 9 and 15?

4 A. Absolutely not. So what you see here as
5 disclosed or pulled out, redacted from Ahn, you see a
6 reference, again, which would be understood by a person of
7 ordinary skill in the art as consistent with 4G and other
8 networks, is that it's a fixed offset. They say N plus 4.
9 4 is a constant. That's not variable.

10 Q. Did you see that Dr. Rangan yesterday annotated a
11 different figure, Fig. 1, to discuss timing?

12 A. Yes, I did.

13 Q. Does Ahn's Fig. 1 or the related disclosure
14 disclose anything about the timing between any downlink and
15 uplink messages?

16 A. Absolutely not, no.

17 Q. Along with Fig. 1, I think Dr. Rangan did point
18 to some disclosure in Ahn that downlink messages can come
19 down different subframes, and then an uplink message for
20 both can go up in one subframe. Do you remember that?

21 A. Yes, I do.

22 Q. Do you agree that the -- let me say it again.
23 Do you agree that that disclosure discloses the
24 variable timing in claims 9 and 15?

25 A. No, there's nothing in Ahn to support that

1 interpretation. A person of ordinary skill in the art,
2 reading that, sees that, sure, there's an N plus 4 offset.
3 It could be from the first one received, it could be from
4 the second one, but there's no variable indication from
5 both.

6 Q. Let's turn to slide 39.

7 Does Ahn disclose determining the PUCCH resource
8 based on all three of those inputs for payload size, CCE,
9 and dynamic signaling that we've got in claims 15 and 17 of
10 the '669 patent?

11 A. No, it does not.

12 Q. Why not?

13 A. It doesn't -- it doesn't include the starting
14 control channel element index.

15 Q. Now that we're through talking about Ahn, do you
16 have slides summarizing what limitations we've discussed as
17 missing from Ahn for each claim?

18 A. Yes, I do.

19 Q. Can we flip through those very quickly?

20 A. Yes, please. That can be for the Court's
21 reference.

22 Q. I want to interrupt now to Dr. Rangan's two
23 combinations, and let's start on slide 44 with ground 2.

24 What is that combination again?

25 A. Ahn in a submission by Intel to 3GPP.

1 Q. Does Dr. Rangan rely on 3GPP-Intel for the latest
2 received disclosure?

3 A. No, he does not.

4 Q. So what two limitations does he use Intel for?

5 A. He relies on it for the combination of those
6 three elements -- payload size, starting CCE, and dynamic
7 signaling -- and then also the variable timing element.

8 Q. So let's start with the resource determination.
9 Does 3GPP-Intel disclose determining the PUCCH resource
10 based on payload?

11 A. It certainly does not. As a matter of fact, you
12 don't see a UE, a user device, doing any determination here.
13 And all it says is that PUCCH formats can be supported to
14 accommodate various UCI types and payloads, whether that's a
15 network, who knows. No, it's not UE determination.

16 Q. Let's turn next to variable timing claims.

17 And I just want to ask, Professor, how would you
18 describe the motivations to combine that Dr. Rangan provided
19 for his ground 2 there?

20 A. Well, I would say, at best, they were very high
21 level, if not hand-waving almost, to say a person of
22 ordinary skill in the art would just naturally combine
23 these.

24 Q. Did Dr. Rangan provide any specific reason how or
25 why a person of ordinary skill in the art would have been

1 motivated to combine Ahn with 3GPP-Intel in the way
2 described by claims 9 and 15?

3 A. I have not heard any, no.

4 Q. And remind us again, what does this variable
5 timing issue have to do with the '669 patent claims as a
6 whole?

7 A. Again, it's the key feature. It's a key thing it
8 was trying to solve in the '669 patent.

9 Q. Let's go to slide 45.

10 Can you remind us what ground 3 is?

11 A. Yes, it's a combination of Ahn in view of Park.

12 Q. Does Dr. Rangan rely on Park '389 for the latest
13 received limitations?

14 A. He does not.

15 Q. So what two limitations does Dr. Rangan use Park
16 '389 for here in ground 3?

17 A. Well, the same things we just talked about, the
18 payload size, the starting CCE, and the dynamic signaling as
19 well as the variable timing element.

20 Q. Let's take the variable timing claims first, and
21 my question here is, again, how would you describe those
22 combinations, motivations to combine, that Dr. Rangan
23 offered for the combinations as it relates to these two
24 claims?

25 A. I didn't find them substantive. I thought they

1 were very cursory at a high level.

2 Q. Did he provide any specific reason how or why a
3 person of ordinary skill in the art would have been
4 motivated to combine Ahn, which you said was fixed, with the
5 Park '389 reference in the way described by claims 9 and 15?

6 A. No, he did not.

7 Q. Okay. Let's turn to Dr. Rangan's argument that
8 Park '389 discloses those three inputs of payload, starting
9 CCE, and dynamic signaling for claims 15 and 17.

10 A. Okay.

11 Q. So did you see Dr. Rangan rely on this part of
12 Park '389?

13 A. Yes, I did.

14 Q. Do you agree that this disclosure shows a UE
15 determining a PUCCH resource based on payload?

16 A. I certainly do not. Again, you don't see any
17 reference here to a UE doing any determination, and it just
18 calls out a number of first or second transmission resources
19 may be allocated.

20 Q. Let's turn to slide 47.

21 Does what Dr. Rangan relies on here meet the
22 determination based on all three of these elements as well?

23 A. No. If you look at the middle of this slide, you
24 see that red box with the N superscript 1 in parentheses
25 there, that's a resource index. So that's actually a

1 resource.

2 And on the right of the equation, the equal sign,
3 to the right of the equal sign, you just see the CCE and
4 then green indicating dynamic signaling.

5 So you can't do determination based on what
6 you're calculating. I mean, that's -- those other two are
7 inputs to the third. You can't do the determination based
8 on that equation.

9 Q. Let's turn to slide 48, just a couple high-level
10 questions here.

11 Did Dr. Rangan also point to these disclosures?

12 A. Yes, he did.

13 Q. Are these disclosures described in the same
14 embodiment in Park '389?

15 A. No, as I have listed on this slide here, there
16 are two different embodiments.

17 Q. Did Dr. Rangan or Park itself ever explain how or
18 why a person of ordinary skill in the art would have been
19 motivated to combine these embodiments?

20 A. Again, I did not hear any compelling reason.

21 Q. Before we move on, let's go to claim 17, and this
22 is on slide 49.

23 Can you remind us what reference does Dr. Rangan
24 rely on for the latest received part of this claim?

25 A. Ahn.

1 Q. For both of his obviousness grounds?

2 A. Yes.

3 Q. Does Ahn disclose basing a resource determination
4 on the starting CCE?

5 A. It does not.

6 Q. Okay. Which references does Dr. Rangan rely on
7 for the starting CCE elements?

8 A. Well, Park and Intel.

9 Q. Well, do either Park or Intel disclose basing a
10 resource determination on the latest received downlink
11 control messages?

12 A. They certainly do not.

13 Q. Do they even have two downlink control messages?

14 A. No, they do not.

15 Q. So can any of these references individually
16 disclose this entire claim element in orange and green of
17 the UE determining a resource based on the starting CCE
18 index and the latest received one of the downlink control
19 messages?

20 A. No, they cannot.

21 Q. Let's put the patents aside for now.

22 Dr. Mahon, I want to turn very briefly to your
23 opinions on FRAND. Just one or two quick questions here.

24 Did you see that Lenovo and its counsel
25 referenced a few third-party essentiality studies in

1 rebuttal to some of your FRAND opinions?

2 A. Yes, I did.

3 Q. Have you reviewed these studies referenced by
4 Lenovo?

5 A. Yes, I looked at them.

6 Q. Turning to slide 50, do you view these studies as
7 reliable?

8 A. No, I find them deficient for several reasons
9 that I have listed on this slide.

10 First of all, they aren't identifying relevant
11 patents. They are pointing to, for example, smartphones and
12 other equipment and mixing them all together with respect to
13 their studies.

14 Second of all, they're not transparent. They
15 don't disclose how the study was done, who performed the
16 work, and who paid for the study. Neither do they provide
17 an auditable trail. They don't disclose the patent results
18 and they don't produce claim charts for a person of ordinary
19 skill in the art to look at to say, hey, here's the work
20 that shows how these map as a standard essential patent onto
21 the standards.

22 Q. So what's your conclusion on these studies?

23 A. That these are deficient.

24 Q. Are they reliable?

25 A. Unreliable, in my opinion.

1 Q. Has any Lenovo technical witness vouched for any
2 of the patent studies that Lenovo cited?

3 A. Not that I know of, no.

4 Q. In your view, what is a more reliable source of
5 patent strength?

6 A. Claim charts.

7 MR. HESS: I'll pass the witness.

8 JUDGE MCNAMARA: Thank you, Mr. Hess.

9 Mr. Appleby?

10 MR. APPLEBY: Thank you, Your Honor.

11 CROSS-EXAMINATION

12 MR. APPLEBY: May I proceed, Your Honor?

13 JUDGE MCNAMARA: Yes.

14 MR. APPLEBY: Robert Appleby for the Respondents.

15 Q. Good afternoon, Dr. Mahon. It's very nice to see
16 you again.

17 A. Good afternoon, sir. Nice to see you too.

18 Q. Now I'm going to start where you started with the
19 '817 patent and see if we can agree on things that were
20 known previous to that patent.

21 Now you'll agree that the '817 patent was not the
22 first disclosure of protecting a user's permanent
23 subscription identifier, right?

24 A. There are other -- in other places, but not as
25 disclosed in the '817, no.

1 Q. Right, but there had been other approaches in the
2 past directed towards protecting a user's subscription
3 identifier, right?

4 A. Well, 2G systems, for example, had the A-3
5 algorithm that they tried to use in authentication to
6 protect information. So the concept was known.

7 Q. So let's focus on the particular claims, and I'm
8 going to jump to RDX-27.3.

9 And let's just look at the -- this is the
10 preamble of claim 10. This is one of the claims you're
11 asserting in this investigation, right?

12 A. That's correct.

13 Q. Now on what we see here is the preamble requires
14 a method performed by a user equipment for concealing a
15 subscription permanent identifier, SUPI, wherein the SUPI is
16 a globally unique identifier allocated to a subscriber, and
17 the SUPI comprises a home network identifier identifying a
18 home network of the subscriber and a subscription identifier
19 identifying a subscription within the home network.

20 That's what the preamble of claim 10 requires,
21 right?

22 A. Yes, it does.

23 Q. Now a subscription permanent identifier (SUPI)
24 that is globally unique and allocated to a subscriber, that
25 certainly existed before the '817 patent, right?

1 A. There were permanent identifiers such as an IMSI
2 that we've talked about that included the home network as
3 part of it.

4 Q. Right. And, in fact, for purposes of
5 infringement in this case, you're relying on an IMSI-based
6 SUPI, right?

7 A. That's correct.

8 Q. And in that situation, and an IMSI-based SUPI and
9 an IMSI are the same thing, right?

10 A. They are -- they have the same contents, yes.

11 Q. Right. And an IMSI has a home network identifier
12 that identifies the home network of the subscriber?

13 A. Yes, it does.

14 Q. And it has a subscription identifier that
15 identifies the subscription within the home network?

16 A. That's correct.

17 Q. And IMSIs were known before the '817 patent. In
18 fact, they were used in LTE, right?

19 A. They were used all the way back to 2G, yes.

20 Q. So when we were here together last time, we
21 talked about the SUCI, and I know you and I have been
22 calling it "SUCI" and "SUCI."

23 A. Sorry about that. I call it the SUCI, because
24 that's the way the inventors pronounce it.

25 Q. I'm sure I'll go back and forth over the course

1 of this examination, but the claims required concealing the
2 SUPI by generating something called the SUCI, right?

3 A. I'm sorry. I'm not sure what you said there.

4 Q. The asserted claims of the '817 patent require a
5 UE to generate a SUCI that is concealing the SUPI; is that
6 fair?

7 A. Yes. For the purposes of sending it as disclosed
8 or transmitting as disclosed in the patent, yes.

9 Q. So when we were together last time -- and I'm
10 going to go to RDX-27.4 -- we agreed on what the contents of
11 the claimed SUCI were, right?

12 A. Those elements are as disclosed in the claims of
13 the '817.

14 Q. And you and I created this figure together that
15 we show on RDX-27.4, right?

16 A. Well, you created it. I just annotated it along
17 the way.

18 Q. But you agree that this represents the contents
19 of the SUCI as claimed.

20 A. It does accurately represent the elements as
21 disclosed in the '817 patent.

22 Q. And as claimed, correct?

23 A. Well, the clear-text part, the encrypted part,
24 yes.

25 Q. You just anticipated my next question. The SUCI

1 has an encrypted part and a clear-text part, right?

2 A. Yes, it is. Yes, it does.

3 Q. And the encrypted part has a subscription
4 identifier, right?

5 A. It has a subscription identifier that is
6 specifically used to encrypt the SUPI for transmission, yes.

7 Q. Right. And, in particular, the MSIN of IMSI,
8 right?

9 A. Yes, that's what is encrypted.

10 Q. And the clear-text part has three things: a home
11 network identifier; an encryption scheme identifier; and a
12 public key identifier, right?

13 A. That is correct.

14 Q. Now encrypting the MSIN, that was known before
15 the '817 patent; we all agree on that, right?

16 A. As we have looked at the references for trying to
17 encrypt in a system proposing to encrypt the identifier,
18 yes.

19 Q. And as for the home network ID, the MCC and MNC,
20 those were known, correct?

21 A. They have been around for a long time, yes.

22 Q. And they were transmitted in clear-text in the
23 prior art, right?

24 A. They sure were, yes.

25 Q. And so let's -- I want to talk now about one of

1 the references you addressed on direct, and that's, in
2 particular, the Forsberg reference.

3 Now you talked about Forsberg on direct, right?

4 A. Yes, I did.

5 Q. Now you don't dispute that Forsberg is prior art
6 to the '817 patent, right?

7 A. It's very prior art, yes.

8 Q. And you also discuss another reference called
9 Togawa on direct, right?

10 A. Yes, I did.

11 Q. And you don't dispute that Togawa is prior art to
12 the '817.

13 A. Certainly not, sir.

14 Q. Okay. So let's start with Forsberg, and I want
15 to talk about what it discloses in relation to this claimed
16 SUCI.

17 Now you agree that Forsberg concerns a cellular
18 wireless system, right?

19 A. Yes. It is anchored in the 4G system, yes.

20 Q. It's directed to protecting subscriber
21 information in such a system, right?

22 A. Correct.

23 Q. And it discloses a particular method for
24 concealing a subscription permanent identifier, in
25 particular, an IMSI, right?

1 A. Well, it discloses a technique well-grounded in
2 the previously legacy systems of encrypting an identifier
3 and sending it to the network.

4 Q. Right. An encrypted IMSI, right?

5 A. That would be an IMSI, yes.

6 Q. Right. And as we went through it, the IMSI of
7 the 4G systems, that is a globally unique identifier
8 allocated to a subscriber, right?

9 A. It is, yes.

10 Q. And it generates, Forsberg discloses generating
11 an encrypted IMSI, in particular, encrypting the MSIN of the
12 IMSI, right?

13 A. That's correct.

14 Q. Now if we compare the disclosures of Forsberg to
15 what we're looking at here -- if we can go to 27.5, and this
16 is Fig. 4 from Forsberg. You recognize that, right?

17 A. Yes, I've seen this before.

18 Q. Right. And as we see here, Forsberg discloses
19 that a UE, which we see in green, generates a user identity
20 response, which we have colored in yellow, right?

21 A. That's correct.

22 Q. And Forsberg discloses that that user identity
23 response comprises an encrypted part and a clear-text part,
24 right?

25 A. It's sending the public key along with the

1 encrypted IMSI.

2 Q. Right. There is an encrypted part and a
3 clear-text part, right?

4 A. Well, certainly the IMSI is encrypted and the
5 public key identifier is not encrypted.

6 Q. So let's compare that user identity response of
7 the SUCI to the '817 patent, and I'm going to go to 27.6,
8 and I'm going to put our diagram that we created together
9 last time of the claimed SUCI on the left.

10 And we just agreed that the Forsberg user
11 identity response like the SUCI has an encrypted part and
12 clear-text part, right?

13 A. It has an encrypted part and a part that is not
14 encrypted, the public key identifier.

15 Q. Let's put those two boxes here. I put a blue box
16 for the encrypted part and a green box for the clear-text
17 part. Fair?

18 A. I do see that on the slide.

19 Q. So the encrypted part of the user identity
20 response in Forsberg includes the subscription identifier
21 for identifying the subscription within the home network,
22 right?

23 A. It is an encrypted identifier of the user who is
24 attaching to a 4G system, which obviously would be for
25 obtaining services. So it certainly is an encrypted

1 identifier.

2 Q. Right. So I can put in the subscription
3 identifier in the encrypted part of the Forsberg user
4 identity response, right?

5 A. Well, you can put it there, but it certainly is
6 not the disclosed subscription -- encrypted subscription
7 identifier as in the '817 patent. So I wouldn't agree with
8 that part.

9 Q. Well, I'm confused by that, because you're
10 relying on an IMSI-based SUPI for purposes of your
11 infringement, right?

12 A. That's correct.

13 Q. And in an IMSI-based SUPI the encrypted part of
14 that IMSI is the MSIN, right?

15 A. That's correct.

16 Q. And Forsberg teaches encrypting the MSIN, right?

17 A. Yes, it does.

18 Q. And so the subscription identifier that's
19 encrypted in Forsberg is the same encryption -- subscription
20 identifier that's being encrypted in the '817 patent, right?

21 A. I disagree.

22 Q. They are both MSINs, right?

23 A. Yes, they are.

24 Q. And they are both being encrypted, right?

25 A. They are.

1 Q. And they are both -- in Forsberg that encrypted
2 MSIN is being sent as part of the Forsberg user identity
3 response, correct?

4 A. It's certainly sent in forwards.

5 Q. Okay. So there's an encrypted subscription
6 identifier in the user identity response of Forsberg, right?

7 A. There is an encrypted IMSI in -- sent in
8 Forsberg.

9 Q. Okay. And Forsberg also discloses that the
10 clear-text part of the user identity response will include
11 the home network identifier, right?

12 A. So it certainly discloses the public key ID. The
13 home network identifier is discussed in Forsberg.

14 Q. And you agree that the clear-text part of the
15 user identity response in Fig. 4 of Forsberg includes the
16 home network identifier, right?

17 A. So it does send a home -- it sends a home network
18 identifier, which is not encrypted in Forsberg.

19 Q. Okay. So we can put that in the clear-text part
20 of the Forsberg user identity response, right?

21 A. You can put it there, but, again, I disagree with
22 the context of what you're trying to assemble here.

23 Q. Do you disagree that the clear-text part of the
24 user identity response as shown in Fig. 4 of Forsberg
25 includes a home network identifier, sir?

1 A. No. All I'm saying is, in terms of what's
2 disclosed in the '817 patent, this simple comparison doesn't
3 capture the actual claim elements as disclosed in the '817
4 patent.

5 Q. I'm just talking about a comparison in the user
6 identity response to the claimed SUCI at this point. We'll
7 get to your disputes in a moment.

8 But you'll agree with me that that clear-text
9 part of the user identity response includes the home network
10 identifier, right?

11 A. So the clear-text part does include a home
12 network identifier.

13 Q. Okay. So now that clear-text part of the user
14 identity response also includes a public key identifier,
15 right?

16 A. I'm sorry. Could you repeat the question one
17 more time, please?

18 Q. Yes. In Forsberg, as we saw in Fig. 4 of
19 Forsberg, the clear-text part of the user identity response
20 includes a public key identifier, right?

21 A. The Forsberg does disclose sending a public key
22 identifier along with the encrypted IMSI.

23 Q. And that public key identifier is in the
24 clear-text part of the Forsberg user identity response,
25 right?

1 A. Again, it's not encrypted. It's not encrypted.

2 Q. It's in the clear-text part of the user identity
3 response.

4 A. Again, you're referring to the claimed SUCI. You
5 can make the comparison. Neither are encrypted. I agree
6 with that.

7 Q. So we can put public key identifier within our
8 user identity response in Forsberg, fair?

9 A. You can put it there.

10 Q. Now I think you told us on direct that Forsberg
11 does not disclose an encryption scheme identifier, right?

12 A. That's correct.

13 Q. And that's an identifier that identifies the
14 encryption scheme that's used to encrypt the subscription
15 identifier, right?

16 A. For the transmitted SUCI, yes.

17 Q. And what it does is it tells the network what
18 encryption scheme was used to decrypt the subscription
19 identifier, right?

20 A. Well, to encrypt so that it can be decrypted by
21 the network.

22 Q. You're absolutely right. I got ahead of myself.
23 So it tells the network what encryption scheme
24 was used to encrypt its subscription identifier, right?

25 A. Correct.

1 Q. And that's so the network knows what scheme to
2 use to decrypt the subscription identifier, right?

3 A. Correct.

4 Q. Okay. Now you also discussed Togawa on direct,
5 right?

6 A. Yes, I did.

7 Q. And my understanding of your testimony is you
8 said it had nothing to do with the '817 patent, didn't
9 describe an encryption scheme identifier in that context,
10 but you will agree with me that Togawa discloses an
11 encryption scheme identifier within the meaning of the '817
12 patent, right?

13 A. No. It discloses an encryption method identifier
14 that's used for voice signals, which is very different than
15 how the encryption scheme identifier is used for
16 subscriber -- encrypting subscriber identities in the '817
17 patent.

18 Q. You gave a deposition in this case, sir, did you
19 not?

20 A. Yes, I did.

21 Q. Can we bring up your deposition transcript at
22 124, 6 to 9?

23 You were asked the question:

24 "Do you disagree that Exhibit 9, Togawa,
25 discloses an encryption scheme identifier within the meaning

1 of the '817 patent?

2 "Answer. No, I do not."

3 Were you asked that question and did you give
4 that answer?

5 A. So I was asked that question, and specifically I
6 answered that with respect to the identifier within the
7 claim element not as disclosed in the claim element.

8 Q. So going back to our diagram, if we put Togawa
9 over here, you will agree that Togawa discloses an
10 encryption scheme identifier, right?

11 A. Again, it discloses an encryption method
12 identifier for voice signals, which is very different than
13 how the encryption scheme identifier is used in the '817
14 patent.

15 Q. And Togawa discloses encrypting data and
16 transmitting encrypted data in the context of phone calls,
17 right?

18 A. Yes.

19 Q. Now the UE -- let's go to RDX-27.12, which is the
20 next.

21 Now I want to go to another element of the claim,
22 which, claim 10, which requires the UE to transmit the SUCI
23 to an authentication server for forwarding of the SUCI to a
24 de-concealing server.

25 I read that correctly, right?

1 A. Yes, capable of decrypting the encrypted part,
2 yes.

3 Q. Now let's go back to Forsberg, and we can go to
4 RDX-27.13, and I want to look at the transmission path
5 described in Forsberg.

6 Now this is, again, Fig. 4, and I've highlighted
7 the UE box in green. We see that on the right-hand side of
8 the diagram -- or the left-hand side of the diagram,
9 correct?

10 A. The user device, yes, UE.

11 Q. Now Forsberg discloses that the UE transmits this
12 user identity response, which we've highlighted in yellow,
13 correct?

14 A. Correct.

15 Q. And the UE transmits the user identity response
16 to a server that's called the Visited-MME, correct?

17 A. That is correct.

18 Q. We've highlighted that in blue, right?

19 A. Yes, I do see that.

20 Q. And then Forsberg discloses that the Visited-MME
21 server forwards the encrypted IMSI and public key identifier
22 to another server called the Home-MME, which we've
23 highlighted in brown, correct?

24 A. I would disagree with that.

25 Q. Again, you gave a deposition in this case, sir?

1 A. That's correct.

2 Q. Let's bring up 122, 25, to 123, 4.

3 JUDGE MCNAMARA: What is the date, please,
4 Mr. Appleby?

5 MR. APPLEBY: May 22, 2024.

6 JUDGE MCNAMARA: Thank you.

7 Q. Now in your deposition you were asked:

8 "As shown in Figure 4 of Forsberg, that server,
9 the Visited-MME, forwards the encrypted IMSI and public key
10 identifier to another server called the Home-MME. Correct?

11 "Answer. That is correct."

12 Were you asked that question and did you give
13 that answer?

14 A. Yes, I gave that answer after the Visited-MME
15 tries to decrypt, yes.

16 Q. Now Forsberg also discloses that the home and MME
17 server will decrypt the encrypted IMSI, correct?

18 A. If it's contacted by the Visited-MME, yes, it
19 will do the decryption.

20 Q. And then, in particular, Forsberg discloses that
21 the Home-MME decrypts the MSIN portion of the IMSI, correct?

22 A. That's correct.

23 Q. And then Forsberg discloses that an IMSI
24 decryption response containing the decrypted IMSI is sent
25 back to the Visited-MME. We have highlighted that in red.

1 Correct?

2 A. Yes.

3 Q. Now you also discussed another reference on
4 direct called Nair, right?

5 We can take that down.

6 A. Yes, I did.

7 Q. Now you do not dispute that the Nair provisional
8 application was filed before the earliest claimed priority
9 date of the '817 patent, right?

10 A. That's correct.

11 Q. Now Nair discloses an IMSI, correct?

12 A. Yes.

13 Q. And it discloses in particular a system in which
14 the MSIN of the IMSI is encrypted to protect subscriber
15 privacy, right?

16 A. It does, yes.

17 Q. And I know you referred to Forsberg as 4G and old
18 technology, but you'll agree with me that Nair was directed
19 to 5G, right?

20 A. Well, Nair's disclosure -- I was pointing out
21 it's anchored in 4G legacy technology. Yes, it was a
22 competing submission for being adopted in 5G.

23 Q. You'll agree with me that Nair is directed to 5G,
24 right?

25 A. It certainly was a competing proposal for being

1 adopted in 5G.

2 Q. And Nair, like Forsberg, is directed to privacy
3 in cellular systems?

4 A. Yes.

5 Q. And is it a fair assessment to say that Nair and
6 Forsberg are directed to the same areas?

7 A. What do you mean by "areas"?

8 Q. You'll agree with me that Nair and Forsberg are
9 in the same field, right?

10 A. Yes.

11 Q. And, in fact, I think on direct you said 4G was
12 very different from the completely redesigned core in 5G.
13 Did I get that right?

14 A. You sure did.

15 Q. But you'll agree with me that a reference related
16 to 4G is not in a wholly different field than a reference
17 related to 5G, right?

18 A. It's in telecommunications. It's, yeah, a
19 similar field.

20 Q. So now Nair discloses, as we just discussed, an
21 IMSI that includes an MSIN, right?

22 A. Yes.

23 Q. And it discloses a Mobile Country Code and a
24 Mobile Network Code, which are a home network identifier,
25 right?

1 A. Yes.

2 Q. And if we look at Fig. 6 of the Nair provisional,
3 RDX-27.14, Nair discloses a UE, which I've highlighted in
4 green, sending a registration request that includes an
5 encrypted IMSI, which I've highlighted in yellow, right?

6 A. Yes, I see that.

7 Q. And looking at this, if we jump to RDX-27.15,
8 Nair discloses that only the MSIN -- MSIN part needs to be
9 encrypted because MNC + MCC is needed by the serving network
10 to route to the correct home network. That's what Nair
11 says, right?

12 A. Yes. That's consistent as I was saying with the
13 previous generation systems, yes.

14 Q. Right. So Nair discloses an encrypted part with
15 an MSIN and a clear-text part with a home network
16 identifier, right?

17 A. Well, certainly discloses the encrypted MSIN and
18 using the home network for identifiers connecting to the
19 network, yes.

20 Q. And the home network being sent in clear-text,
21 right?

22 A. Well, it's not encrypted, no.

23 Q. Right. If we go to RDX-27.16, Nair also
24 discloses one or more privacy indicators, right?

25 A. That's correct.

1 Q. And it also calls that an identity privacy flag,
2 right?

3 A. That's correct.

4 Q. And what the identity privacy flag or privacy
5 indicator does is indicate whether the MSIN is provided in
6 encrypted form, right?

7 A. Yes, that's a flag or a yes or no, yes.

8 Q. So you agree that the privacy flag of Nair
9 indicates whether or not encryption is turned on, right?

10 A. That's correct.

11 Q. Okay. Now for the purposes of infringement,
12 you're reading the authentication server on the 5G AUSF
13 authentication server function, right?

14 A. Yes.

15 Q. So as we mentioned before, that Nair also is
16 directed to 5G, right?

17 A. As you just showed, the figure is directed to the
18 5G nodes, yes.

19 Q. Right. Let's take another look at that figure,
20 which is RDX-27.17.

21 Nair, in particular, also discloses the AUSF,
22 right?

23 A. It does have the AUSF listed, yes.

24 Q. And Nair's AUSF is an authentication server
25 function, right?

1 A. That's what it stands for, yes.

2 Q. And as we mentioned earlier, there's a UE in
3 green on the left?

4 A. Yes.

5 Q. And Nair discloses that the authentication server
6 AUSF in Nair receives the encrypted IMSI and forwards that
7 encrypted IMSI to an SLF, which I'm highlighting in brown on
8 RDX-27.19. Is that right?

9 A. Yes, the server location function.

10 Q. And Nair discloses that the SLF will decrypt the
11 encrypted MSIN, right?

12 A. Yes, using the certificate, yes.

13 Q. Okay. Thank you. I'd like to now turn to the
14 '669 patent.

15 Again, I think you mentioned this on direct, that
16 the '669 patent is related to PUCCH or PUCCH, I think we've
17 been calling it.

18 A. I call it PUCCH.

19 Q. PUCCH. You and I are going to get the acronyms
20 aligned at some point.

21 That's physical uplink control channel, right?

22 A. That's correct.

23 Q. It's really a resource determination for that
24 channel, right?

25 A. The '669, yes.

1 Q. And you agreed with me last time that there were
2 techniques for PUCCH resource determination known before the
3 '669 patent, right?

4 A. Well, uplink information was sent previous to the
5 '669, yes.

6 Q. So if we go to 27.20, in fact, the '669 patent
7 itself says that there were existing solutions for PUCCH
8 resource determination that used explicit signaling, such as
9 a combination of semi-static signaling and dynamic
10 signaling, right?

11 A. Yes, or a combination of explicit signaling or
12 implicit determination, yes.

13 Q. Right. I'll get to that second piece, but you'll
14 agree with me that, among the existing solutions called out
15 in the '669 patent is a combination of semi-static and
16 dynamic signaling, right?

17 A. Correct.

18 Q. And as we see here, the semi-static signaling is
19 Radio Resource Control messages?

20 A. Yes.

21 Q. And the dynamic signaling is Downlink Control
22 Information or DCI messages, right?

23 A. It does say that, yes.

24 Q. And as you mentioned just a moment ago, if we go
25 to slide RDX-27.21, there were existing solutions for

1 determining PUCCH resources that had a combination of both
2 explicit signaling and implicit determination, right?

3 A. That is an "or" there, yes, it does also include
4 the or combination.

5 Q. Right. So if we go to 27.22, one piece of known
6 implicit determination for this purpose was using the
7 starting control channel element or CCE index for PDCCH,
8 right?

9 A. Yes.

10 Q. And implicit determination of PUCCH resources
11 using the CCE index of a control channel message was used in
12 LTE, right?

13 A. I'm sorry. Could you repeat the question,
14 please? I think I didn't hear the tail end.

15 Q. So you'll agree with me that implicit
16 determination of PUCCH resources using a CCE index of a
17 control channel message was used in LTE, right?

18 A. Correct.

19 Q. Now I know you disputed that the prior art
20 references that Dr. Rangan relied on render obvious the
21 claims or anticipate the claims of the '669 patent, but
22 let's see what we can agree on.

23 Now you discussed the Ahn reference on direct,
24 right?

25 A. Yes, I did.

1 Q. And you don't dispute that Ahn is prior art to
2 the '669 patent, right?

3 A. I do not.

4 Q. Now on direct you made a point of telling us that
5 Park '389 was cited on the face of the '669 patent, right?

6 A. Yes, I did.

7 Q. And you also told us that the 3GPP-Intel was
8 considered by the Patent Office in an IPR, I believe you
9 told us?

10 A. Yes. It was an Apple IPR.

11 Q. Now you were here for Dr. Rangan's presentation,
12 right?

13 A. Yes, I was.

14 Q. And you understand that the primary reference he
15 is relying on is Ahn, correct?

16 A. That is his primary reference, yes.

17 Q. Right. And you didn't tell us that Ahn was cited
18 on the face of the patent, right?

19 A. I did not say that, no.

20 Q. It's not cited on the face of the patent, is it?

21 A. That's correct.

22 Q. As far as you know, it has not been considered by
23 the Patent Office, right?

24 A. Not that I can recall.

25 Q. Okay. So let's go back to Ahn. And you would

1 agree with me that Ahn relates to transmitting ACK/NACK and
2 HARQ information in a wireless communication system, right?

3 A. Yes, it's related to that.

4 Q. And you're not disputing that Ahn describes a
5 wireless device, right?

6 A. That's correct.

7 Q. And you don't dispute that Ahn discloses an
8 interface within the meaning of claim 6 of the '669 patent,
9 right?

10 A. I have not made that.

11 Q. Okay. And Ahn discloses a wireless device that
12 includes processing circuitry, right?

13 A. That's reasonable.

14 Q. And you do not dispute that Ahn discloses
15 receiving a first downlink control channel message that
16 schedules a first downlink control channel transmission and
17 also receiving a second downlink control channel message
18 that schedules a second downlink shared channel
19 transmission, right?

20 A. That's correct.

21 Q. And Ahn also discloses determining an uplink
22 control channel resource to use for transmitting uplink
23 control information to a network node, right?

24 A. There were embodiments in Ahn discussing
25 determination of uplink control channel resources.

1 Q. Right. And the uplink control information that's
2 transmitted comprises Hybrid Automatic Repeat Request, HARQ,
3 feedback from both the first downlink shared channel
4 transmission and the second downlink shared channel
5 transmission, right?

6 A. Well, it certainly discloses the uplink control
7 channel transmissions, yes.

8 Q. Right. And HARQ feedback is being sent on those
9 transmissions, right?

10 A. Yeah, the HARQ messages are being sent back up,
11 correct.

12 Q. Now you don't dispute that Ahn discloses
13 determining an uplink control channel resource for
14 transmitting the uplink control information based in part on
15 signaling received from a base station, right?

16 A. Correct.

17 Q. And, in fact, you'll agree that Ahn discloses
18 determining uplink control -- an uplink control channel
19 resource for use and for transmitting uplink control
20 information based in part on signaling in the form of RRC
21 messages, right?

22 A. That's correct.

23 Q. Now one of the things you mentioned on direct, if
24 I understood you correctly, is you were suggesting that Ahn
25 did not disclose a resource set; is that right?

1 A. That's right.

2 Q. Okay. Now let's go to slide 27.26.

3 Ahn does state that a base station -- that's BS
4 stands for base station, right?

5 A. Correct.

6 Q. -- that a base station may predetermine a
7 plurality of candidate resources for the PUCCHy and a
8 plurality of candidate resources for the PUCCHz through RRC
9 signaling. That's what Ahn says, right?

10 A. That's correct.

11 Q. And you'll also agree that the base station's
12 predetermination of a plurality of candidate resources
13 through RRC signaling constitutes a semi-static
14 configuration, right?

15 A. The RRC signal is considered a semi-static signal
16 in the disclosure. So it's determining PUCCH formats, and
17 it says there is a plurality of candidate resources as part
18 of that process.

19 Q. Right. And that process through RRC signaling
20 constitutes a semi-static configuration, right?

21 A. Yes.

22 Q. And Ahn also states, if we go to RDX-27.27, that
23 which candidate resource will be used among the plurality of
24 candidate resources may be designated by an ARI in a DCI,
25 right?

1 A. In certain embodiments, yes.

2 Q. And designating the resource to use by an ARI in
3 a DCI is dynamic signaling, right?

4 A. Yes, as understood.

5 Q. Okay. So if I understood your direct correctly,
6 you dispute that Ahn discloses resource determination based
7 on a latest received downlink control channel message,
8 right?

9 A. The latest received DCI as disclosed in column
10 20, yes.

11 Q. Okay. So I want to kind of walk through some
12 disclosures. Let's look at Fig. 17. This is RDX-27.28.

13 You actually show it as Fig. 17 of Ahn on direct,
14 right?

15 A. Yes, I did.

16 Q. And Fig. 17 shows us two separate DCIs in two
17 separate downlink control channel messages, right?

18 A. Yes, it does.

19 Q. And each of those DCIs schedules a downlink
20 shared channel transmission, right?

21 A. Yes, they do.

22 Q. And in Fig. 17 the DCI in the downlink control
23 channel message on the left specifies a PUCCH resource of 2,
24 right?

25 A. ARI of 2. It does disclose that, yes.

1 Q. Right. We see ARI equals 2, and that means that
2 downlink control channel message is specifying a PUCCH or
3 PUCCH resource 2, right?

4 A. Correct.

5 Q. And the DCI in the other downlink control message
6 on the right specifies a PUCCH resource of 0, right?

7 A. That's correct.

8 Q. And that's what we see, ARI equals 0, right?

9 A. ARI is indicated as 0 on that slide.

10 Q. Right. So we can agree that Ahn discloses two
11 downlink control channel messages that each indicate a
12 different resource for the uplink control channel PUCCH,
13 right?

14 A. Yes. This is the example I showed where they
15 were in conflict and how the patent disclosed how that
16 conflict is adjudicated by looking at the cell group.

17 Q. Okay. I'll get there in a moment, but we both
18 can agree that Ahn discloses two downlink control channel
19 messages that each indicate a different resource for the
20 uplink control channel PUCCH, right?

21 A. Correct.

22 Q. Okay. And Fig. 17 shows that hybrid ARQ or HARQ
23 for those two downlink transmissions is being transmitted on
24 the uplink control channel in resource 0, right?

25 A. Within that PUCCHz format resource 0, as

1 indicated.

2 Q. Okay. So we can agree that Ahn discloses that
3 two downlink channel resource messages are acknowledged in a
4 single uplink control channel resource, right?

5 A. It's making a determination based on, as we will
6 talk about, the cell group, and it is going up in resource
7 0.

8 Q. Just to be clear, and I'll get to the cell group
9 issue in a moment, Ahn discloses that the two downlink
10 channel resource messages are acknowledged in a single
11 uplink control channel resource, right?

12 A. Ahn discloses that it's -- in this disclosure it
13 is going up in that resource 0 as indicated.

14 Q. For both downlink messages, right?

15 A. Correct.

16 Q. And the uplink control channel resource in which
17 both downlink control channel messages are acknowledged or
18 downlink shared transmissions are acknowledged, is indicated
19 by the DCI on the right, correct?

20 A. That's where the ARI equals 0 is indicated, so
21 yes.

22 Q. Now if I understood your direct testimony --
23 we're going to get to this, you mentioned in just a
24 moment -- your view is that you believe the selection of
25 which downlink control message to use to select the

1 resources is based, not on the latest received DCI message,
2 but rather the cell group. Did I understand that correctly?

3 A. That's what Ahn discloses, yes.

4 Q. Okay. And you brought up one of Dr. Rangan's
5 slides.

6 Can we go to -- I'm going to change the slide --
7 RDX-6.74.

8 And you showed us this slide on direct, right?

9 A. Yes, I did.

10 Q. And you were talking about this passage at the
11 top of this slide, which is that column 20, lines 8-10,
12 right?

13 A. That's correct.

14 Q. And that states the wireless device may select a
15 PUCCH format or may configure an ACK/NACK payload through
16 DCI in a most recently received subframe among the M
17 subframes, right?

18 A. That is correct.

19 Q. Now on direct you told us your view that this
20 passage didn't apply to other embodiments in Ahn, right?

21 A. This was a separate embodiment disclosed in Ahn,
22 correct.

23 Q. Okay. Now I was a little surprised by the
24 testimony, because I asked you about this passage at your
25 deposition, and at that time you told me you didn't have an

1 opinion on this passage, right?

2 A. That's correct.

3 Q. Now, in any event, you know that Dr. Rangan
4 disagrees with you that this only -- this doesn't apply to
5 other embodiments in Ahn, right?

6 A. Could you state that again, please?

7 Q. You know that Dr. Rangan disagrees with you and
8 that he testified that this disclosure applies to all
9 embodiments in Ahn, right?

10 A. Yes, this is the one I pointed to that he would
11 indicate is insane, yes.

12 Q. Okay. And then the other thing you told us on
13 direct is that in this passage Ahn suggests using the latest
14 received DCI for selection of the PUCCH format, not the
15 resource, correct?

16 A. That's exactly what it says, yes.

17 Q. And in your view that selection of a format does
18 not disclose selection of a resource, right?

19 A. That is correct.

20 Q. So now when we refer to a PUCCH format, we are
21 referring to the format of the message that will go up on
22 the PUCCH, right?

23 A. Correct.

24 Q. And different PUCCH formats might require
25 different amount of resources for that message, right?

1 A. As I indicated, the PUCCH format is a particular
2 arrangement with particular elements in it. So depending
3 upon the length of that, sure, you're going to need a
4 different amount of resources.

5 Q. And to select a PUCCH resource, I would first
6 need to know the PUCCH format that I'm using, right?

7 A. Well, you know, one has -- in terms of doing the
8 uplink transmission, you need to know what the format is to
9 be able to send the message, and obviously you're going to
10 have to do a determination of the resource to send it on.
11 So both elements are required.

12 Q. Right. In fact, it wouldn't make sense to choose
13 the resource first and then find out what the format is,
14 right?

15 A. Well, again, certainly if you're going to be
16 picking a resource, you know, before you do the selection,
17 there's a balance there in terms of how you're going to
18 implement the system, are you wasting resources, are you
19 going to be short on resources.

20 So that would be a less than probably
21 advantageous approach.

22 Q. Right. You would want to know the format before
23 you actually select the resource, right?

24 A. Well, it's certainly -- the format has to be able
25 to be chosen based upon what's going to go up in terms of --

1 and, therefore, what resource is going to be used. So it
2 certainly makes sense to do it that way.

3 Q. Right. It makes sense to use the resource after
4 you've chosen the format, right?

5 A. Yeah, just in general.

6 Q. Okay. And now if we go to 27.29 --

7 JUDGE MCNAMARA: Pardon me, Mr. Appleby, we are
8 past 5:30. I know you're making points here and you're on a
9 roll. I can see that enthusiasm. But we really need to be
10 coming to a stop.

11 Is there much more on the PUCCH?

12 MR. APPLEBY: I have one question left in this
13 module and then --

14 JUDGE MCNAMARA: How much do you have?

15 MR. APPLEBY: I have one question in this module.

16 JUDGE MCNAMARA: Then would that be a good
17 breaking place --

18 MR. APPLEBY: It would be from my perspective,
19 yes.

20 JUDGE MCNAMARA: All right. Then why don't you
21 go ahead and then we'll stop.

22 BY MR. APPLEBY:

23 Q. So if we go to 27.29, and you talked about this
24 passage on direct, right?

25 A. Yes, I did.

1 Q. And what Ahn says, an ARI value may designate a
2 combination of the PUCCH format and the PUCCH resource,
3 right?

4 A. Yes, in this embodiment it sure does.

5 Q. And, in fact, that's what the table shows,
6 designation in the ARI of both the format and a resource,
7 right?

8 A. That's correct.

9 Q. Okay.

10 MR. APPLEBY: With that, I can stop, Your Honor.

11 JUDGE MCNAMARA: All right.

12 MR. HESS: Are you passing the witness or are you
13 holding him over?

14 MR. APPLEBY: Can I confer with counsel on that
15 issue?

16 JUDGE MCNAMARA: Yes. Why don't you confirm and
17 we'll see what's happening tomorrow.

18 MR. APPLEBY: Your Honor, I don't have much more,
19 but I think I will have five to ten more minutes tomorrow.

20 JUDGE MCNAMARA: Okay. I'm fine with that.

21 Mr. Hess, you seem to be a little disconcerted.

22 MR. HESS: We had some scheduling issues that
23 that would create. I understand if Your Honor needs this to
24 be over today, we can figure it out, I suppose.

25 JUDGE MCNAMARA: Why don't you do that. Three

1 hours, will that be enough time tomorrow, then? Is that
2 what you're wrestling with?

3 MR. HAYNES: Your Honor, John Haynes. I think
4 tomorrow we've got several witnesses. We're going to have
5 to go back and see what we can do to trim that down. I
6 think it is going to be challenging with three hours, if
7 there is any minutes to give. We also need to confer with
8 the Staff to see how much she thinks she is going to use and
9 whether there will be time there.

10 JUDGE MCNAMARA: As it turns out, I've got some
11 wiggle room tomorrow. I had something scheduled for
12 tomorrow afternoon that has fallen through.

13 So I always want a full record, a complete
14 record. If you think you need additional time, why don't
15 you confer. There is time to be worked with tomorrow, if
16 that would help both sides. But it has to be -- it has to
17 help both sides. It has to be -- there has to be equity.

18 MR. AROVAS: Your Honor, we'll meet and confer
19 over the evening and see what we can do. Obviously many
20 witnesses have been timed out based on a certain amount of
21 allotted time, and those witnesses are now gone and those
22 opportunities are gone. That said, we'll see what we can do
23 and we'll meet and confer and discuss it.

24 JUDGE MCNAMARA: All right. And then you can let
25 me know first thing tomorrow morning. Please make sure to

1 include Ms. Chang in your deliberations, even though I
2 recognize that most of this has to do with the time that you
3 have spent and need, and she has not asked many questions.
4 She hasn't taken much time and I think has most of her
5 allotted time.

6 So let's just confirm tomorrow morning. We can
7 deal with exhibits at the end so that doesn't take up any
8 time, and we'll try and just move and we'll see what we can
9 do. But, again, I have some flexibility for tomorrow that I
10 did not expect to have.

11 MR. AROVAS: Thank you, Your Honor.

12 JUDGE MCNAMARA: So choose it wisely.

13 MR. HAYNES: Thank you, Your Honor.

14 JUDGE MCNAMARA: All right. With that, I will
15 wish you all a good evening.

16 Dr. Mahon, thank you for staying over. I think
17 that's really helpful for everybody.

18 THE WITNESS: Yes, Your Honor.

19 JUDGE MCNAMARA: I will see you tomorrow on
20 Webex. And you all have instructions. Those went out. And
21 so I will see you on Webex tomorrow.

22 THE WITNESS: I will receive instructions on how
23 to do the Webex?

24 JUDGE MCNAMARA: You should receive those. Can
25 you help Dr. Mahon with the Webex instructions? I think

1 we're going to have to send you -- we're going to have to
2 have your email, we're going to have to have your phone
3 number, and we will get instructions out early tomorrow
4 morning or tonight. We'll do it. We'll get it done.

5 THE WITNESS: Okay. Thank you, Your Honor.

6 JUDGE MCNAMARA: Thank you.

7 Is there any other witness who needs the Webex
8 link?

9 MR. HAYNES: Your Honor, I believe the remaining
10 witnesses have it. We will double-check that. Is it
11 possible for one of the attorneys to just forward the invite
12 or -- we're happy to do that.

13 JUDGE MCNAMARA: Yes.

14 MR. HAYNES: As long as the other side doesn't
15 complain that that's going to violate the sequestration
16 rule.

17 JUDGE MCNAMARA: That will work. Please make
18 sure that also the links to Heritage are also passed on,
19 okay? And we should be good. Okay. So, also, will you
20 take care of Dr. Mahon, then?

21 MR. HAYNES: Yes, we will.

22 JUDGE MCNAMARA: Very good. Thank you very much,
23 then. Have a good evening.

24 (Whereupon, the proceedings adjourned at
25 5:42 p.m., scheduled to resume via remote conference the

1 following day, July 17, 2024, at 9:00 a.m.)
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1 EXHIBIT LISTS SUBMITTED FOR ADMISSION:
2 ADMITTED TRIAL EXHIBITS AND DEMONSTRATIVES (DAY 4 7/15/24)
3 John Mulgrew
4 CDX-0045C
5 CX-2441
6 CX-2446
7 CX-5695C
8 CX-5716C
9 CX-5718C
10 CX-5837C
11 CX-5842C
12 CX-5841C
13 CX-5844C
14 CX-5870C
15 CX-6502
16 JX-0026C
17 RDX-0010C
18 RX-0067C
19 RX-0068C
20 RX-0072C
21 RX-0074C
22 RX-0077C
23 RX-0083C
24 RX-0084C
25 RX-0302C

- 1 RX-0306C
- 2 RX-0308C
- 3 RX-0310C
- 4 RX-0475C
- 5 RX-0570C
- 6 RX-0604C
- 7 RX-0635C
- 8 RX-0646C
- 9 RX-0657C
- 10 RX-0865C
- 11 RX-2517C
- 12 Dr . Sundeep Rangan
- 13 JX-0002
- 14 JX-0003
- 15 RDX-0006C
- 16 RX-0043
- 17 RX-0051
- 18 RX-0299
- 19 RX-0684
- 20 RX-0688
- 21 RX-0695
- 22 RX-1310
- 23 RX-1323
- 24 RX-2107C
- 25 RX-0280

1	RX-2293
2	CDX-0043
3	RX-2280
4	CX-1292
5	Dr. Lingjia Liu
6	JX-0004
7	JX-0014
8	JX-0033C
9	JX-0036C
10	JX-0037C
11	JX-0040C
12	JX-0043C
13	RDX-0008
14	RPX-0001C
15	RPX-0002C
16	RPX-0003C
17	RPX-0004C
18	RPX-0005C
19	RPX-0006C
20	RPX-0007C
21	RPX-0008C
22	RPX-0013C
23	RPX-0016C
24	RPX-0017C
25	RPX-0070C

1	RPX-0074C
2	RPX-0075C
3	RPX-0076C
4	RPX-0077C
5	RPX-0119C
6	RPX-0121C
7	RPX-0122C
8	RPX-0123C
9	RPX-0124C
10	RPX-0125C
11	RPX-0126C
12	RPX-0127C
13	RPX-0128C
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16	RPX-0131C
17	RPX-0132C
18	RPX-0133C
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20	RPX-0135C
21	RPX-0142C
22	RPX-0143C
23	RPX-0144C
24	RPX-0145C
25	RPX-0146C

1	RPX-0147C
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3	RPX-0156C
4	RPX-0160C
5	RPX-0164C
6	RPX-0166C
7	RPX-0167C
8	RX-0044
9	RX-0055
10	RX-0318
11	RX-0382
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1 C E R T I F I C A T E

2 TITLE: IN THE MATTER OF CERTAIN MOBILE PHONES, COMPONENTS
3 THEREOF, AND PRODUCTS CONTAINING SAME

4 INVESTIGATION NO.: 337-TA-1375

5 HEARING DATE: July 16, 2024

6 LOCATION: Courtroom B

7 NATURE OF HEARING: Evidentiary Hearing

8 I hereby certify that the foregoing/attached
9 transcript is a true, correct and complete record of the
above-referenced proceedings of the U.S. International Trade
Commission.

10 Date: July 16, 2024

Signed:

11 ss//

12 Signature of the Contractor or the Authorized Contractor's
Representative

13

I hereby certify that I am not the court reporter
and that I have proofread the above-referenced transcript of
the proceedings of the U.S. International Trade Commission
against the aforementioned court reporter's notes and
recordings for accuracy in transcription in the spelling,
hyphenation, punctuation and speaker identification and did
not make any changes of a substantive nature. The
foregoing/attached transcript is a true, correct and
complete transcription of the proceedings.

18 Signed:

19 ss//

20

I hereby certify that I reported the
above-referenced proceedings of the U.S. International Trade
Commission and caused to be prepared from my record media
and notes of the proceedings a true, correct and complete
verbatim recording of the proceedings.

23 Signed: July 16, 2024

24 ss//

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