UNITED STATES
INTERNATIONAL TRADE COMMISSION

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In the Matter of Investigation No. 337-TA-1375

CERTAIN MOBILE PHONES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING SAME

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Lenovo (US) Inc. v. Telefonaktiebolaget LM Ericsson
IPR2024-00702

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

Before the Honorable MaryJoan McNamara

Administrative Law Judge

In the Matter of: Investigation No. 337-TA-1375

CERTAIN MOBILE PHONES, COMPONENTS THEREOF, AND PRODUCTS CONTAINING SAME

International Trade Commission

500 E Street, SW

Washington, D.C.

Evidentiary Hearing

Tuesday, July 16, 2024

Volume V

The parties met pursuant to notice of the Administrative Law Judge at 9:31 a.m. Eastern.

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

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P R O C E E D I N G S

(In session at 9:31 a.m.)

JUDGE MCNAMARA: Good morning, everyone. Please be seated.

Before we get started, is there anything you would like me to address before we start with Mr. Bims?

MR. HAYES: Not for Respondents, Your Honor. Good morning. Eric Hayes on behalf of Respondents.

MS. CHURCHMAN: You had asked for an update on the use of the remaining time. The parties and Staff have conferred, and we should be able to provide a revised time proposal at the first break, if that works for Your Honor.

JUDGE MCNAMARA: Sure.

MS. CHURCHMAN: Ericsson has an update to our schedule to the order of witnesses provided yesterday. We intend to call Mr. Mills before the Professor.

JUDGE MCNAMARA: That's fine. Thank you.

Ms. Chang, anything?

MS. CHANG: Nothing from the Staff, Your Honor.

JUDGE MCNAMARA: Okay. I have some questions from the bench that I would like you to think about, and it may be in the rebuttal some of this will be taken care of, and there may be questions that I would ask you to consider in your post-hearing briefing.

The first is, we have been listening to the

testimony on CRUE, and it's pretty clear that Dr. Rangan made a demarcation between 5G NA and 4G by virtue of the radio frequency, by virtue of the frequency, a band, on which 5G is available, and the fact that it's not backward compatible. And yet the backward compatibility was not linked necessarily to the radio frequency. So we would like to know if there is, first of all, a subquestion, is there linkage there and what is it.

The second thing is, is Lenovo saying that 5G NA is actually just CRUE, are all of the features just CRUE, because this plays into the issue of which of the features or which of the 4G, and even I think it's the Moto Razr phone that had the 5G capability, which -- what was covered under the Motorola 2011 license are which features, which phones. So we're having trouble with the demarcation line between 4G and 5G and what Lenovo is claiming.

Is that clear to you why we're having some issues?

MR. AROVAS: Yes, Your Honor. So let me confer with the technical team on that first question, and maybe we can confer with the other side, and maybe it is something we can answer during this hearing. Certainly we can address it during the briefing. But we'll take those questions back to the team and discuss it and try to figure out the best way to address it.

JUDGE MCNAMARA: Great. The lines seem blurred. It's not clear exactly where you're coming down on CRUE.

Another issue that we've been thinking about is the issue of 101, and based on the testimony that Dr. Rangan and others have given so far, we're wondering if you are maintaining 101 as an alternative in the validity argument, because, if you are also claiming prior art anticipation and obviousness, it seems to me, and, again, this could be wrong, it is something we have been thinking about, how can you claim 101 and at the same time say that Chiu and Yue -- and I'm not going to get this right -- the third prior art piece --

Could you pronounce it for me?

MS. CHANG: I believe it's Jayasinghe.

JUDGE MCNAMARA: Yes, how can you maintain that they are prior art if you're saying that the patent is invalid, how can you do that, based on 101?

I think it is -- the '839 patent has all of the features, the matrix, the parity matrix, the base matrix and so forth, all the features as all those other patents, how can you say that they are also not valid under 101?

MR. AROVAS: Let me give two quick answers to some of your questions.

So with regard to the CRUE questions, taking them in that order, as Mr. Castano testified --

JUDGE MCNAMARA: Can you turn on your mic?

MR. AROVAS: So with regard to the CRUE issue, Mr. Castano testified that the update and extension process at Motorola was taking generation to generation, sort of phone after phone, building on the other, the prior models, the prior designs.

Our position, I believe, and what the contract covers and is the position being taken in the UK license action is that is a continuous process of improving the prior model, so the transition from 4G to 5G would not change that.

JUDGE MCNAMARA: Well, that's what my understanding is. So what makes 5G different? That's the problem I'm having. So if you are saying that it's just an iterative process that is incremental and nothing really changing between 4G and 5G, it is all CRUE, we're having a problem with that intellectually, and maybe you are too, based on the way 5G has been presented, consistently, I've seen it for seven years.

MR. AROVAS: So 5G came out -- the first one, I think, was 2019, so that was at least the first Motorola.

JUDGE MCNAMARA: Well, except that, again, there are components of 5G that, again, Lenovo has been arguing already existed as part of the working group since 2017.

MR. AROVAS: Yes. So I'd say there's multiple

arguments. The first argument is the contract covers anything in the field of Motorola, and that's why Mr. Castano testified that the field of Motorola --

JUDGE MCNAMARA: I will go back to that. I am still struggling with the inconsistency here. Tell me where CRUE ends and where 5G begins. Is there a demarcation point? Is there something that is significant about 5G that makes it not CRUE?

Again, there is something intellectually to me inconsistent in some of this, in some of the arguments.

MR. AROVAS: Yes. Let me answer that specifically. The answer is that the transition from 4G to 5G has nothing to do with CRUE.

JUDGE MCNAMARA: Has nothing to do --

MR. AROVAS: Has nothing to do with whether something would be CRUE or not CRUE, because during that time frame that we're talking about there is a transition from 3G to 4G and from 4G to 5G.

So 3G to 4G is a change in the cellular standard that transitions that period and new components came out, no different than, let's say --

JUDGE MCNAMARA: I understand that.

MR. AROVAS: Yes.

JUDGE MCNAMARA: I understand that. We understand that. But we are hearing both arguments being

made by Lenovo that 5G is different, but yet, at least in terms of the Motorola contract and the different iterations of the Motorola phone, even the phone that was able to hook onto that -- have that little clip-on part of it, it's all CRUE, it all belongs under the 2011 contract.

Instead of answering now, why don't you think about this, and you can address it at another point rather than taking time from testimony, but there has to be some demarcation point. We know that 5G is New Radio.

MR. AROVAS: It is improved radio. It borrows some features from 4G and introduces some new features.

JUDGE MCNAMARA: Of course it does, but the question is, then, for purposes also of your Motorola contract, the Motorola license, how far in the future are we talking? I mean, which components?

Again, the capture date was December 2015. And so I think you need to be clear about what fell within the capture date of 2015 as well, and that wasn't always completely clear either.

And that raises another question for me about the September 13 letter. One of the witnesses touched on the fact that the -- the September 13, 2015 letter was portrayed as a warning of termination by Ericsson, and when I looked at that letter, and I think it's -- well, I have the note in my notes -- but it came up on one of the demonstratives, and

when I read that letter, it seems to me it was no more than giving notice that, again, the Motorola license terminated at the end of December 2015, and it was just a letter that was letting Lenovo know that the termination date was coming up on the 2015 license, the term date of the 2015 license, and that Ericsson was reserving certain rights depending on what the parties did.

So I've been playing around with this. So, again, I will put this in writing. I will put some of this in writing and ask you to address it, unless someone is addressing it today.

And, again, there is the issue about Alice, since this is an alternative argument, or how can you maintain both, and if you're maintaining both anticipation and obviousness of the prior art, how do you also maintain Alice.

MR. AROVAS: All right. We will address that at the time Your Honor chooses.

With regard to the termination, the agreement wasn't terminated. I think the point that the witness was making was that there was a threat to terminate based on change of control. It was not terminated. In fact, I think Ms. Petersson admitted that it is a binding and enforceable contract today.

JUDGE MCNAMARA: You're dropping again.

MR. AROVAS: Oh, sorry. There was a threat to terminate.

JUDGE MCNAMARA: That's how it was portrayed.

MR. AROVAS: But it was not, in fact, terminated, and Ms. Petersson testified that the contract is still binding and enforceable today.

JUDGE MCNAMARA: Yes.

MR. AROVAS: So nothing was terminated.

JUDGE MCNAMARA: That was my understanding, and so I didn't understand why that was --

Never mind. You've answered the question for me. It just seemed to me it was part of the negotiations, the end of the -- again, the termination date was coming up on the 2011 license. I think they were -- it seemed to me that Ericsson was just letting you know that that termination date was coming up.

MR. AROVAS: No, I don't think that's right.

JUDGE MCNAMARA: That's not right.

MR. AROVAS: No, that's not right. So the license goes to the end of the last of the patents. It's the lifetime of the patents.

So what the argument that was being made, and I think Mr. Mulgrew's point was, it was a pressure tactic, was that, because of the change of control, the corporate transaction, that they could and were threatening to

terminate the contract based on the acquisition. That did not occur.

The contract on its face continues until the expiration of the last of the patents. There is no expiration date.

JUDGE MCNAMARA: That's right. I will have questions, I think, after the hearing, just to make sure certain things get clarified and which patents you maintain still were under the 2011 license.

MR. AROVAS: Yes, we can do that. So if Your Honor lets us know when you would like to address the questions, we can do it orally during the hearing or we can do it in the post-hearing brief, whenever Your Honor wants.

JUDGE MCNAMARA: I'll let you know about that.

MR. AROVAS: Thank you.

JUDGE MCNAMARA: Okay. Thank you.

MR. HAYNES: Your Honor, there will be some more testimony about CRUE, so if it would be okay, I would like to respond to just a few points so that it will frame that testimony a little more clearly.

JUDGE MCNAMARA: Sure.

MR. HAYNES: First, on 5G, you're exactly right. Dr. Rangan clearly said 5G is a New Radio. It's a new Air interface. And if you look at the definition of standards in the 2011 license, it specifically says that it covers up

through 4G, it does not list 5G, even though people knew that 5G was around.

JUDGE MCNAMARA: And now they are talking about 6G.

MR. HAYNES: Didn't say anything about 6G, didn't say anything about 7G. And you've hit exactly the point.

Lenovo's position is it never stops. What Mr. Castano testified is products continue to evolve and people expect them to evolve.

But with respect to 5G, the standard in any patent that reads on that standard is not covered. It's not a licensed patent because it doesn't cover license standards. You'll see in that provision for standards it specifically says, as an example of what is not a continuing standard, is a new standard that has a new Air interface.

JUDGE MCNAMARA: Right. Again, that piece of it -- it is just the way that it is being portrayed. Either it's incremental or it's not. Either part of it is a leap forward and is entirely new, which parts are those, and I think that's where we are trying to do some line-drawing.

MR. HAYNES: There will be some more testimony on that, Your Honor, which I think will help frame it.

On the 4G issue, that really pertains more to section 2.4 of the CRUE license, and what that says is that it does cover products for Motorola and updates and

extensions, but if you look at that clause, what it says is it does not cover natural evolutions unless they are commercially reasonable updates and extensions. So that update and extension narrows the scope of the natural evolution.

And what Mr. Castano testified to is Motorola's products do have natural evolutions. Nobody disputes that. What we dispute is that the natural evolution is not what they are allowed to do. They are allowed to only do those evolutions that constitute commercially reasonable updates and extensions, which is a subset.

JUDGE MCNAMARA: Right, I understand that, but you have to understand that, again, intellectually, functionally, some of this is not that clear, and so I am going to ask that you in post-hearing briefing make sure that you are addressing those issues. We will try and frame them a little better for you and we will be looking specifically at the contracts.

But, again, people have been sliding, to me at least, as I listen to the testimony, they are sliding between this is what is, again, CRUE, this is -- this was an expected extension, continuation, et cetera, and then all of a sudden the issue becomes what does -- what did that really cover and what doesn't it cover.

MR. HAYNES: Understood, Your Honor.

JUDGE MCNAMARA: All right. Thank you.

Are we ready to start with Dr. Bims?

MR. HAYES: Good morning, Your Honor. Eric Hayes again for Lenovo. We'll call Dr. Bims.

HARRY BIMS,

having been previously duly sworn or affirmed on his oath, was thereafter examined and testified further as follows:

JUDGE MCNAMARA: Good morning, Dr. Bims. You may be seated. You're still under oath.

DIRECT EXAMINATION (resumed)

BY MR. HAYES:

Q. Can we have RDX-2.19?

Just to bring us back to where we were when we finished yesterday, Dr. Bims, we were talking about the security anchor function and the policy of it and the control it has on the SUCI.

Do you remember that?

A. Yes.

Q. Let's move ahead to RDX-2.20.

We've been focusing on the transmit part of the claim. Let's take a look at the forwarding part.

Dr. Bims, the claims require the UE transmit the SUCI to an authentication server for forwarding to a de-concealing server.

Does the UE transmitting the SUCI to the SEAF, and then in this RDX-2.20 the SEAF forwarding the SUCI to the authentication server, meet this limitation?

A. No.

Q. For what reason?

A. Well, for starters, what's shown here is that the SEAF is doing the forwarding to an authentication server, the claim is about forwarding from an authentication server to a de-concealing server, number one, and as Dr. Mahon agrees with me, the SEAF is not an authentication server.

And also the transmission of the SEAF message happens prior to the authentication server.

Q. In the accused products that we have here on 2.20, is the forwarding happening before the authentication server or after?

A. Before.

Q. And within the claims, do the claims of the '817 patent require that forwarding happens before the authentication server or after?

A. After.

Q. Dr. Bims, now we've got the gate opened on RDX-2.20.

What does that show?

A. So that shows the result of the SEAF going through various internal policies to decide what to do with

the SUCI that it's received. And once it has decided, based on those operations, to forward the SUCI, then the gate opens and the SUCI embedded inside of a SEAF message is then allowed to proceed to the authentication server.

Q. Per the 5G standard, does practicing and the policy of the SEAF, does practicing the 5G standard infringe any of the '817 patent's asserted claims?

A. No.

Q. In your opinion, then, Dr. Bims, do any of the accused products literally infringe any of the '817 patent's asserted claims?

A. No.

Q. Okay. RDX-2.21, let's move on to doctrine of equivalents.

I think Dr. Mahon last week suggested that the accused products infringe under the doctrine of equivalents.

Do you agree?

A. No.

Q. Dr. Bims, what is substantially different about the way in which the SUCI is transmitted as compared to the claims?

A. In the 5G standard the SUCI is transmitted only to a security anchor function, which is not what the claims state. The claims state that the SUCI is only transmitted to an authentication server.

Q. RDX-2.20.

What is substantially different about the accused products result compared to the claims?

A. So in the accused products the result is that the SUCI is transmitted to a security anchor function, which then determines what to do with it. The result in the claims is that the SUCI is transmitted by the user equipment to an authentication server for forwarding to a de-concealing server, and that's not what you see here in the 5G standard.

Q. Dr. Bims, in your opinion do any of the products under DOE infringe any of the asserted claims in this case?

A. No.

Q. RDX-2.23.

Now that we've addressed your opinion with respect to noninfringement, let's move on to technical domestic industry.

As an initial matter, does Ericsson contend that any Ericsson products practice the '817 patent?

A. No.

Q. RDX-2.24.

Dr. Mahon contends that the Samsung DI products practice the '817 patent.

Do you agree?

A. I don't agree.

Q. For what reason do the Samsung domestic industry products not practice the '817 patent?

A. Well, for all of the reasons that I mentioned yesterday with respect to the accused products, the Samsung domestic industry products also do not practice the asserted claims.

Q. Did you consider and analyze the 5G standard and technical specifications in forming your opinion that there is no technical domestic industry in this case with respect to the '817 patent?

A. Yes.

Q. Okay. Let's move on to invalidity.

RDX-2.25. Actually, let's move ahead to RDX-2.26.

Dr. Bims, what are the two grounds of invalidity that you are going to present here today?

A. Well, ground 1 is Nair as the primary reference, and then Forsberg, Togawa and 5G-Ensure as secondary references.

Ground 2 is Forsberg application as the primary reference, and then Togawa and 5G-Ensure as secondary references.

Q. RDX-2.27, please.

What level of skill in the art did you apply when performing your analysis?

A. Master's degree in electrical engineering, computer engineering, or computer science, or equivalent and at least three years of experience in the field of telecommunications or wireless systems.

Q. Dr. Bims, were you a person of skill in the art at the time of the '817 patent?

A. Yes.

Q. RDX-2.28.

Let's start by taking a look at the Nair reference. There's a provisional and the nonprovisional. RX-828 and 832, for the record.

Dr. Bims, what is the title of the Nair prior art?

A. Privacy Indicators for Controlling Authentication Requests.

Q. What is the field of the Nair reference?

A. It's about improving the security of communication systems and, in particular, the subscription privacy of 5G networks.

Q. Dr. Bims, did you consider both the Nair provisional, RX-828, and the RX-832, Nair document in forming your opinion in this case?

A. Yes.

Q. RDX-2.29, please.

There's the Forsberg reference, RX-830.

What is the title of the Forsberg prior art?

A. Identifiers in a Communication System.

Q. What is the field of the Forsberg reference?

A. It's about improving the security in communication networks by encrypting an identifier that is decrypted in the network.

Q. RDX-2.30.

The Togawa reference. What is the Togawa prior art -- sorry, what is the title of the Togawa prior art?

A. Data Decryption Apparatus and Data Encryption Apparatus.

Q. What is the field of the Togawa reference?

A. It's about improving the security of communication networks, just like the '817 patent.

Q. RDX-2.31.

The first three prior art references were patent-type documents.

Dr. Bims, what is the 5G-Ensure reference we're looking at here, RX-806?

A. The 5G-Ensure reference is a document generated by a consortium of companies to describe the improvements to security in 5G networks by using an encryption scheme for user identifiers.

Q. So are all the four prior art references that we've looked at here in the same field as the '817 patent?

A. Yes.
Q. RDX-2.32.
Let's look at the dates.
What's the date of the Togawa patent?
A. August 23, 2011.
Q. What's the publication date of Forsberg?
A. January 3, 2013.
Q. And what is the date of the 5G-Ensure?
A. November 3, 2016.
Q. And what is the filing date of the Nair provisional?
A. May 5th, 2017.
Q. And, Dr. Bims, just to be sure, are all of your invalidity opinions in this case based on the Nair provisional?
A. Yes.
Q. And do all the priority dates of your prior art references, sorry, do all the dates of your prior art references predate the claimed priority of the '817 patent?
A. Yes.
Q. RDX-2.33.
Let's look at your first ground, ground 1. RDX-2.34.
This is the first time we've seen this slide, Dr. Bims.

Can you just kind of explain the setup?

A. Okay. So on the left of this slide I've shown the prior art combination that I'll be talking about, which is the Nair provisional Forsberg application and Togawa, and on the right I'm showing the claimed SUCI as a list of identifiers. And next to that is a comparison list of prior art that I will be showing how it matches up with the claimed SUCI.

Q. Let's look at the first part of the claimed SUCI, the subscription identifier or the encrypted part. What does Nair disclose with respect to the subscription identifier?

A. So Nair discloses that an MSIN can be encrypted, and because the '817 patent describes the MSIN as a subscription identifier, that discloses that part of the claimed SUCI.

Q. RDX-2.35.

What does Nair disclose with respect to the home network ID part of the claimed SUCI?

A. So Nair discloses an MNC plus MCC, which, as disclosed in the '817 patent, is the home network ID in the claimed SUCI.

Q. RDX-2.36.

What does Nair disclose with respect to the encryption scheme ID?

A. So Nair discloses that there are one or more privacy indicators.

Q. And did these multiple privacy indicators suggest to one of skill multiple encryption schemes?

A. These multiple privacy indicators imply to a person of ordinary skill that an encryption scheme is being used when privacy is enabled.

Q. If an encryption scheme is being used, what does that suggest about needing a way to identify which encryption scheme is being used?

A. Well, Nair does not disclose what encryption scheme is used when privacy is enabled. And that's why a person of ordinary skill would look to Togawa to bring an express description of the encryption scheme that is used.

Q. What specifically does Togawa, '834, disclose with respect to the encryption scheme identifier?

A. Togawa discloses an encryption method ID, which is the encryption scheme ID and the claimed SUCI.

Q. What is it about Nair's disclosure of privacy indicators that would provide reason and motivation to one of skill in the art to combine Togawa's encryption method ID with Nair?

A. Well, because Nair does not expressly disclose the encryption scheme that is associated with privacy indicators, it means that the de-concealing server would not

know what encryption scheme is being used and would have to do an exhaustive search to determine what encryption scheme is associated with a privacy indicator.

And because of this, a person of ordinary skill would look to address this issue by combining Nair with Togawa so that the network can know what encryption scheme is associated with what privacy indicator.

Q. And would one of skill have a reasonable expectation of success combining Togawa with Nair for the encryption scheme ID part of the SUCI?

A. Yes.

Q. RDX-2.37.

Dr. Bims, please tell the judge what does Nair disclose with respect to the public key ID?

A. So Nair discloses a public-key-based solution in which a home operator provides its public key to all home network subscribers.

Q. And is that an express disclosure of a public key ID?

A. No, that's not.

Q. What does Forsberg disclose with respect to the public key ID?

A. So Forsberg expressly discloses a public key identifier that is provided by user equipment along with an encrypted IMSI.

Q. So what is it about Nair's disclosure of a public-key-based solution that would provide reason and motivation to one of skill in the art to combine Forsberg's public key identifier with Nair?

A. So a person of ordinary skill reading Nair would understand that, when a home operator is providing its public key to all of its home network subscribers, that a public key ID would be involved. But a person of ordinary skill would have to consider multiple ways of involving a public key ID.

Forsberg solves that problem by expressly disclosing a public key identifier that is provided along with the encrypted IMSI as a solution to that problem.

Q. Would one of skill in the art have a reasonable expectation of success in combining Forsberg with Nair for the public key identifier?

A. Yes.

Q. For the record, before we go, we've been looking at Nair RX-828, 24 to 29, and 29, Forsberg 830 at 11.

RDX-2.38.

So in your opinion, Dr. Bims, do the prior art references of ground 1 teach all the elements of the claimed SUCI?

A. Yes.

Q. And how well do these prior art references match

up with the parts of the claimed SUCI?

A. As you can see from this side-by-side comparison that they are word for word almost identical.

Q. Do your ground 1 opinions here with respect to the prior disclosure of the claimed SUCI components apply to all the claims, 10, 13, 14, and 15?

A. Yes.

Q. RDX-2.39.

Let's look at the SUCI transmission part.

What are the two callouts you're showing here on RDX-2.39, RX-636 and RX-828?

A. What I'm showing on this slide is, at the bottom, the accused 5G transmission path that Dr. Mahon relies upon for his infringement opinion.

And what I'm showing at the top of the slide is that this accused 5G transmission is mimicking a disclosure in Nair Fig. 6.

Q. So does Nair disclose the claimed SUCI transmission under Ericsson's infringement theory?

A. Yes.

Q. Are you saying, then, that the accused products meet the SUCI transmission path and Nair discloses that limitation?

A. Yes.

Q. RDX-2.40.

Does your analysis here with respect to Nair's disclosure under Ericsson's infringement theory apply to all the claims, 10, 13, 14, and 15?

A. Yes.

Q. RDX-2.41.

Let's take a look at dependent claim 13.

What additional element does dependent claim 13 add, Dr. Bims?

A. It adds that the authentication and mobility management function must send an identifier request message to the UE prior to the UE responding by transmitting the SUCI.

Q. What disclosure in Nair meets the dependent claim 13 additional limitation?

A. So Nair discloses an access and mobility management function, or AMF, and goes into further details about that.

Q. So you note the Technical Report 33.899 incorporated into Nair.

What support do you have for that?

A. So that Technical Report, 33.899, is disclosed in Nair, and in fact Nair goes on to say that its disclosure is incorporated by reference herein in its entirety.

Q. What does the Technical Report 33.899 incorporated into Nair disclose with respect to dependent

claim 13?

A. So, as you can see, on the right is a figure from this 5G Technical Report, and what you can see here is that, in the figure, the AMF transmits an identity request to the UE prior to the UE responding by transmitting the SUCI.

Q. RDX-2.42.

Let's look at dependent claim 14.

What additional limitation does dependent claim 14 add?

A. So dependent claim 14 adds to independent claim 10 that the encryption scheme is an elliptic curve integrated encryption scheme.

Q. What disclosure in 5G-Ensure meets the dependent claim 14 limitation?

A. 5G-Ensure discloses an encryption scheme for user identifiers that is based on elliptic curve pairings.

Q. And what reason and motivation would one of skill in the art have in combining the 5G-Ensure elliptic curve pairing disclosures with Nair?

A. So in Nair it describes encrypting an MSIN, but Nair does not disclose the particular encryption scheme to encrypt the MSIN. So a person of ordinary skill would look to 5G-Ensure for its teachings of a specific encryption scheme that is based on elliptic curve pairings.

Q. What is it about 5G-Ensure's disclosure of the

elliptic curve pairings being practical and inherently included in message randomization as a reason or motivation to combine the 5G-Ensure disclosure with Nair?

A. So those are two reasons, among others, such as the smaller size of the key, that would motivate a person of ordinary skill to apply these elliptic curve pairings.

Q. Would one of skill have a reasonable expectation of success in combining the 5G-Ensure with Nair?

A. Yes.

Q. Dr. Bims, in your opinion does the ground 1 reference teach and render obvious claims 10, 13, 14, and 15 of the '817 patent?

A. Yes.

Q. Let's go on to your ground 2, RDX-2.43.

Please remind us of the combination that you're relying on here for ground 2.

A. Forsberg as the primary reference and Togawa and 5G-Ensure as secondary references.

Q. So RDX-2.44.

We've seen this setup before, so let's jump right into it.

What does Forsberg disclose with respect to the subscription identifier part of the claimed SUCI?

A. Forsberg discloses that the MSIN is transmitted in an encrypted form over the air, and that matches up to

the subscription identifier in the encrypted part of the claimed SUCI.

Q. RDX-2.45, please.

What does Forsberg disclose with respect to the home network ID?

A. Forsberg discloses an MCC and MNC combination, which is the home network ID in the claimed SUCI.

Q. RDX-2.46, please.

What does Forsberg disclose with respect to the public key ID?

A. So Forsberg discloses that the user equipment will provide a public key identifier along with the encrypted IMSI. So Forsberg is disclosing the public key ID in the claimed SUCI.

Q. RDX-2.47.

What does Forsberg disclose with respect to the encryption scheme, the last part here, with the claimed SUCI?

A. Forsberg discloses that there is an encrypted IMSI that is provided along with the public key identifier.

Q. What does Togawa disclose with respect to the encryption scheme ID?

A. Togawa describes an encryption scheme identifier that can identify the particular encryption scheme that was -- that can be incorporated into Forsberg.

Q. What is it about Forsberg's disclosure of an encrypted IMSI that would provide reason and motivation to one of skill in the art to combine Togawa's encryption method ID with Forsberg?

A. Well, Forsberg teaches that there is an encrypted IMSI, but Forsberg does not teach what encryption scheme is used. And so a person of ordinary skill would not know what encryption scheme to apply so that the network will know what encryption scheme to decrypt.

However, with the Togawa reference, it teaches the use of an encryption scheme ID that can identify in particular the encryption scheme used within the Forsberg teaching, which then allows for a couple of advantages.

One is that, if an encryption scheme is compromised, then the combined system can then move to a different encryption scheme. And it also provides, for the de-concealing server to be able to expressly know what encryption scheme is used so it does not have to do an exhaustive search to determine what that encryption scheme is.

Q. Would one of skill in the art have a reasonable expectation of success combining Togawa's encryption method ID with Forsberg?

A. Yes.

Q. RDX-2.48.

Do the prior art references of ground 2 teach all the elements of the claimed SUCI?

A. Yes.

Q. Dr. Bims, explain or tell the judge how well the ground 2 references disclosures match up with each one of the parts of the claimed SUCI.

A. So as you can see from this slide, the ground 2 references match up with the claimed SUCI almost word for word.

Q. Does your analysis here and opinion apply to all the claims, 10, 13, 14, and 15?

A. Yes.

Q. RDX-2.49.

Let's take a look at the SUCI transmission part of the claims.

What are the two callouts you have here on RDX-2.49?

A. So on the left I'm showing the claimed transmission path that I showed earlier for claims 10, 13, 14, and 15. And on the right I'm showing Fig. 4 from the Forsberg reference.

Q. So you're pointing to the Visited-MME in Forsberg RX-830.5, Fig. 4, as the authentication server.

What support does Forsberg provide for that?

A. So in Forsberg I've highlighted in blue that the

Visited-MME is playing the role of the authentication server.

Q. What support does Forsberg provide for that?

A. So what you see here in Fig. 4 is the user equipment transmits an encrypted IMSI to the Visited-MME, which is an authentication server.

Q. Thank you.

And then what support does Forsberg provide for with respect the Home-MME as the de-concealing server?

A. So as you can see here, in the Forsberg Fig. 4, the encrypted IMSI that is transmitted to the Visited-MME is then forwarded to the de-concealing server, which is labeled Home-MME in the Forsberg figure.

Q. Does your analysis and opinion here on RDX-2.49 apply to all the claims, 10, 13, 14, and 15?

A. Yes.

Q. RX-2.50. We're back to dependent claim 13. We have already looked at that additional limitation.

Dr. Bims, what disclosure in Forsberg meets the dependent claim 13 limitation?

A. As you can see in paragraphs 48 and 49 from Forsberg, Forsberg teaches that the MME of the network will send a message to the user equipment requesting its user identity. In response, the user equipment will then transmit the SUCI back to the MME.

Q. RDX-2.51, please.

Dependent claim 14, elliptic curve integrated encryption scheme limitation, what disclosure in 5G-Ensure meets this limitation?

A. The encryption scheme user identifier, which is based on elliptic curve pairings.

Q. What reason and motivation would one of skill in the art have to combine the 5G-Ensure in this case with the Forsberg reference?

A. So the Forsberg reference discloses an encrypted MSIN, but does not disclose what type of encryption to use. In 5G-Ensure, it expressly discloses elliptic curve pairings can be used.

Q. So in your opinion do the ground 2 references teach and render obvious claims 10, 13, 14 and 15 of the '817 patent?

A. Yes.

Q. RDX-2.52.

Now that we've gone through your two grounds, let's take a quick look at secondary considerations.

Dr. Bims, have you considered Dr. Mahon's assertions regarding secondary considerations of non-obviousness?

A. Yes.

Q. And I know we haven't heard from him on that yet,

but Ericsson's pre-hearing brief suggests that Dr. Mahon is going to testify that there is objective evidence showing that the asserted claims of the '817 patent are not obvious.

Do you agree?

A. I don't agree.

Q. What are you showing here on RDX-2.52?

A. What I'm showing here is a study was conducted to determine 5G essential patents, and in that study it was determined that there were around 350,000 patents grouped into more than 67,000 patent families found to be relevant to 5G.

Q. Have you seen any evidence in this case tying the commercial success of 5G, the accused 5G products, to the one patent, the '817 patent?

A. No.

Q. Dr. Mahon opines that the '817 patent solved a long-felt need by encrypting user's personal information.

Was encryption of user's personal information known at the time of the '817 patent?

A. That was known long before the '817 patent.

Q. I think Dr. Mahon cites a paper praising the SUCI.

Have you seen any evidence praising the claimed SUCI and the SUCI transmission path in this case?

A. No.

Q. Have you seen any evidence that Lenovo copied the '817 patent?

A. No.

Q. Have you seen any evidence that the '817 patent claims are incorporated in the 5G standard?

A. No.

Q. Final topic, RDX-2.53. Section 101, RDX-2.54.

Dr. Bims, do you have an opinion on whether the '817 patent claims are directed at an abstract idea?

A. Yes.

Q. And what is that abstract idea in your opinion?

A. Well, claims 10 and 15 start out by describing concealing a subscription permanent identifier, and a person of ordinary skill would know that concealing, as a general matter, is an intangible action and not related to anything other than an abstract idea.

Q. RDX-2.55.

Do the claim limitations add anything inventive to this concept of concealing or concealing and transmitting the concealed information?

A. No.

Q. For what reason? What's your analysis?

A. So as you can see on this slide, the two parts of the claims are generating the SUCI and transmitting the SUCI. And as we've shown before, generating the SUCI uses

known components and transmitting the SUCI uses a known transmission path. And on top of that, both generating the SUCI and transmitting the SUCI can be implemented using common processing circuitry and memory circuitry.

Q. Dr. Bims, thank you for your testimony.

MR. HAYES: Your Honor, we pass the witness.

JUDGE MCNAMARA: Thank you very much.

MR. VERBONCOEUR: Good morning, Your Honor. Mitch Verboncoeur for Ericsson.

JUDGE MCNAMARA: Yes.

CROSS-EXAMINATION

BY MR. VERBONCOEUR:

Q. Good morning, Dr. Bims.

A. Good morning.

MR. VERBONCOEUR: May I proceed?

JUDGE MCNAMARA: Yes.

Q. Can we please have RDX-2.19, please.

Dr. Bims, this is a demonstrative that you used during your direct examination, correct?

A. Yes.

Q. RDX-2.19 is showing a UE, or user equipment, security anchor function, or SEAF, and an authentication server, or AUSF, right?

A. Yes.

Q. And you agree that this is 5G-Standalone

architecture.

A. Yes.

Q. A person of skill in the art would know that the acronym 5G SA refers to the 5G-Standalone, right?

A. Yes.

Q. And, conversely, the acronym 5G NSA refers to non-standalone.

A. That's correct.

Q. A person with skill in the art would also know that the acronym NR or New Radio is sometimes used interchangeably with 5G.

A. Sometimes, yes.

Q. Dr. Bims, did you create RDX-2.19?

A. I gave input on its design, but a graphics person actually selected the individual graphics that you see.

Q. And was it your intention, Dr. Bims, to include the UE, the SEAF, and the AUSF in this slide?

A. Yes.

Q. I found that curious, Dr. Bims, because, at the time you formed your opinions in this case, you didn't know one way or the other whether there even were 5G-Standalone networks in the United States; is that right?

A. Correct.

Q. Lenovo hired you to give an opinion on whether it infringes the asserted claims of the '817 patent, right?

A. I was retained by counsel for Lenovo to provide my opinions with respect to infringement and validity and domestic industry.

Q. And expert work is your full-time job?

A. Expert witness work is something that I spend a lot of time on, yes.

Q. In fact, expert work is 100 percent of your personal income.

A. I wouldn't say a hundred percent.

Q. Do you remember giving a deposition in this case, Dr. Bims?

A. Yes.

Q. Before that deposition began you raised your right hand and you promised to tell the truth?

A. Yes.

Q. Just like you did when you began your direct examination in this case?

A. Yes.

Q. Let's look at that transcript.

Can we please have Dr. Bims' deposition transcript at page 117, lines 5-16?

JUDGE MCNAMARA: What's the date, please?

MR. VERBONCOEUR: The date of the deposition, Your Honor, is May 31, 2024.

JUDGE MCNAMARA: Thank you.

Q. I'm going to read this deposition, Dr. Bims.

"Question. So if we just look at you as an individual, would it be correct to say that 100 percent of your annual income comes from your work as an expert witness?

"Answer. I would say in the last three years, that would be the case.

"Question. Would that be the case for the last 10 years?

"Answer. I believe within the last 10 years -- and this may be stated in my CV -- I would say, in the last 10 years, my income has come from testifying as an expert."

Did I read that correctly, Dr. Bims?

A. Yes.

Q. I want to point out something that the priority date that you assume for the '817 patent is July 25th, 2017, right?

A. Yes.

Q. That's roughly seven years ago?

A. Roughly, yes.

Q. Now, Dr. Bims, you've spent hundreds of hours on this case, right?

A. Probably, yes.

Q. As an expert, you claim to keep up to date on developments in 5G technologies to the best of your ability,

right?

A. Yes.

Q. You've read the '817 patent.

A. Yes, I have.

Q. And you knew that Ericsson's theory of infringement for the '817 patent involved 5G-Standalone, right?

A. Yes.

Q. But you did not investigate whether there are in fact 5G-Standalone networks in the United States.

A. That's correct.

Q. You had no idea whether millions of Americans, including those using the accused products, are connecting to 5G-Standalone networks every single day, right?

A. At the time of the deposition, that's true.

Q. And you disputed that Dr. Mahon has shown that the accused products connect to 5G-Standalone networks?

A. Yes.

Q. Dr. Bims, this isn't the only matter for which you're engaged on behalf of Lenovo and Motorola against Ericsson; isn't that right?

A. That's correct.

Q. Mr. Moreno, can we please have CDX-42.2.

Dr. Bims, we're looking at a public SignalCheck Pro testing document that Motorola produced in a case before

Judge McNamara between Motorola and Ericsson.

Do you see the Bates numbers that begin with MOTOROLA, in all caps, at the bottom of CDX-42.2?

A. Yes.

Q. Now there is a date at the top right corner of CDX-42.2. That date is April 18th, 2024.

Did I read that correctly?

A. Where is that?

Q. At the top right corner, Dr. Bims.

A. Yes, I see that.

Q. Okay. Thank you.

Let's look at the bottom of CDX-42.2 in the center, and Motorola's testing document says, Model, Motorola, Motorola Edge+, 2023.

Do you see that?

A. Yes.

Q. Now the Motorola Edge+ 2023 is an accused product in this case, right?

A. Yes.

Q. And if you look just a bit higher, CDX-42.2, Motorola's testing shows the network type for the Motorola Edge+ 2023 is 5G NR SA.

Did I read that correctly?

A. Yes.

Q. And 5G NR SA refers to 5G-Standalone, right?

A. Yes.

Q. Dr. Bims, did Lenovo or Motorola show you these testing results when you were forming your opinions in this investigation?

A. I believe in this case I don't recall seeing this particular slide.

Q. Did Lenovo or Motorola tell you that it had confirmed the accused products were on 5G-Standalone networks in the United States?

A. No.

Q. So we saw testing results for the Moto Edge+ 2023. Let's look at the Moto Edge 2022.

Now, Dr. Bims, you'll recall that I handed you this same Moto Edge 2022, model number XT22051, during your deposition?

A. Yes.

Q. Now we can access this Moto Edge 2022, and for the record this is CPX-19, and also for the record the password on this particular device is 1111. We can go to settings. We can go to About Phone, SIM Status.

And I'm reading here right from CPX-19, which you agree is an accused product in this case, right?

A. Yes.

Q. Mobile voice network type, NR SA. That's 5G-Standalone, right, Dr. Bims?

A. Yes.
Q. Mobile data network type, NR SA, 5G-Standalone, right?
A. Yes.
Q. Dr. Bims, will you agree that the accused products connect the 5G-Standalone networks in the United States?
A. The evidence you presented today suggests that.
Q. Right. And we're in Washington, D.C., United States of America, and the accused product just connected to a 5G-Standalone network, right?
A. If I believe your setup, yes.
Q. I have other accused products with me.
Dr. Bims, will you just agree that the same is true for the other accused products in this case?
A. No, I wouldn't agree with that.
Q. So we have to use other products and go through them, Dr. Bims?
A. You've only shown me one product.
Q. What about the Samsung domestic industry products, Dr. Bims, would you agree with that?
A. I haven't seen evidence of that.
Q. All right. So I have here CPX-22. This is a Samsung Galaxy S23. And I am showing here the SIM card status. As you can see on the screen, mobile voice network

type, NR SA.

That's 5G-Standalone, right?

A. Yes.

Q. Mobile data network type, NR SA.

That's 5G-Standalone, right?

A. Yes.

Q. And are you disputing, Dr. Bims, that the Samsung domestic industry products connect to 5G-Standalone networks in the United States?

A. I have not expressed an opinion today about that.

Q. You testified on direct, Dr. Bims, that the accused and domestic industry products do not transmit their SUCIs to the AUSF because the SUCI first goes to the SEAF.

Do you recall that?

A. Yes.

Q. Let's please have RDX-2.19.

Dr. Bims, we discussed this demonstrative a moment ago.

Is it your opinion that this demonstrative is technically accurate?

A. This demonstrative is an example of the network. It does not show every component in the network. But, at a high level, it is accurate.

Q. You gave the opinion shown here on RDX-2.19 that the SEAF might do one of three things with the SUCI -- act

on it, drop it, or forward it, right?

A. Yes.

Q. But the SEAF cannot act on the SUCI, right?

A. The 5G standard does say that the SUCI has three options that it can perform when it's performing passthrough. It can either act on the SUCI, drop it, or forward it.

Q. Now, Dr. Bims, the SEAF does not ever authenticate a user based on a SUCI, correct?

A. Well, my testimony is that the SEAF can do one of three things -- act on it, drop it, or forward it.

Q. Right. That wasn't my question, Dr. Bims.

The SEAF cannot ever authenticate a user based on a SUCI, correct?

A. That has not been my testimony.

Q. Dr. Bims, you're not aware of any scenario in which the SEAF will authenticate a user based on a SUCI, are you?

A. Well, the SEAF can act on the SUCI, and under that category a number of operations can take place, none of which results in forwarding to an authentication server, and within that category the 5G standard does not specifically say what is the full range of things the SEAF can do, but, hypothetically, a SEAF could try to perform an authentication operation under that category.

Q. Can we please have Dr. Bims' deposition transcript at page 84, lines 7-9.

Now, Dr. Bims, I'm reading from your deposition transcript:

"Question. Are you aware of any scenario in which the SEAF will authenticate a user based on a SUCI?

"Answer. No."

Did I read that correctly?

A. Yes.

Q. So let's go back to RDX-2.19, please.

You're also saying the SEAF can drop the SUCI, that is, refuse the message containing the SUCI, right?

A. Yes.

Q. Or it could forward the SUCI, correct?

A. Right.

Q. And, Dr. Bims, you've heard the term "carrier" to refer to mobile network operators before, right?

A. Yes.

Q. And so if I use the term carrier, you'll understand me to refer to an entity like T-Mobile or Verizon?

A. Yes.

Q. And the SEAF, in the example depicted in your RDX-2.19, will be associated with a particular carrier and will act according to that carrier's policy, right?

A. That's not expressly stated in the 5G standard. It's possible.

Q. Let's have the slide immediately before this one, RDX-2.18, please.

Dr. Bims, this is your slide as well, isn't it?

A. Yes.

Q. And I see here you have on slide RDX-2.18 in underlining, that underlining is from the 5G standard, isn't it?

A. Yes.

Q. And you've underlined, "according to the SEAF's policy," right?

A. Yes.

Q. And you just disagreed with me that there are carriers in the United States like T-Mobile and Verizon, right?

A. Yes.

Q. And the SEAF is going to operate according to the particular carrier's policy that controls the SEAF.

I thought we just agreed on that, didn't we?

A. Well, what the 5G standard says and what's underlined is that the SEAF has its own policy. It doesn't expressly say whether that policy came from the carrier or not.

Q. Now the SEAF, or the SEAF, is an inanimate

object, right? A person would attribute some policy? I think you have to agree with that.

A. Policies can be enforced by computer.

Q. Right. In the course of a carrier like T-Mobile or Verizon, they are going to make some decisions about what policies they put in the computer that will enforce them on the SEAF, right?

A. Well, that hypothetical is possible.

Q. Right. And so the SEAF's policy is something determined by the carrier that controls the SEAF. I think you'll agree with that.

A. Well, again, the 5G standard does not expressly disclose that.

Q. Right. The 5G standard doesn't say what the policy is one way or the other. I think we agree on that.

A. It doesn't say who put the policy into the SEAF, but it does describe that the policy has three options.

Q. All right. Are you suggesting, Dr. Bims, that someone other than the carrier who controls the SEAF is making this policy?

A. No, I'm saying that the 5G standard does not expressly state that the policy must come from a carrier.

Q. Who else would it come from, Dr. Bims?

A. The standard doesn't say.

Q. So you can't think of anyone else it might come

from other than the carrier, correct?

A. I'm just not trying to read into the standard something that's not there.

Q. And so, Dr. Bims, if we can go back to RDX-2.19, I find this curious because your noninfringement argument relies on the SEAF taking a particular action, according to you, act on it, drop it, or forward it.

On the slide before we saw that that is going to be according to some policy, but you can't tell me what that policy is or where it came from, can you?

A. The 5G standard does describe that the policy is to do one of three things -- to act on it, to drop it, or to forward it. That's what the 5G standard teaches.

Q. And you don't actually follow carrier deployments of 5G technology in the United States, do you, Dr. Bims?

A. No.

Q. I want to talk to you more about this diagram in RDX-2.19. You have three parts displayed here. You've got the UE, the SEAF, and the AUSF.

I think we agreed on that a while ago, right?

A. Yes.

Q. And the SEAF is part of the serving network, right?

A. It depends.

Q. Let's have Dr. Bims' deposition transcript at

page 74, line 18, through line 22, please.

Dr. Bims, I'll read from your deposition transcript:

"Question. What is an SEAF?

"Answer. That is a secure anchor function.

"Question. Is the secure anchor function part of the serving network?

"Answer. Yes."

Did I read that correctly?

A. Yes.

Q. Let's go back to RDX-2.19, please.

Now the AUSF is part of the home network, right?

A. Yes, that is, yes.

Q. So we have a UE, an SEAF in the serving network, and an AUSF in the home network.

That's just like the patent describes, right?

A. So in a roaming situation, the security anchor function would be in a serving network. Outside of a roaming situation, where, for example, an AT&T phone is on an AT&T network, then the security anchor function would be in the AT&T network.

Q. Let's have CDX-42.3, please.

Dr. Bims, we just agreed we have a UE, the SEAF on the serving network, and the AUSF on the home network, and Fig. 1 of the '817 patent shows a UE, a serving network,

and a home network, right?

A. Well, again, the security anchor function would be in a serving network in a roaming situation.

Q. According to the '817 patent, the UE accesses the home network using the serving network.

A. Yes.

Q. Let's have CDX-42.4.

In fact, the '817 patent expressly says this. It cites here to Fig. 1, on slide 42.4, and the patent says, the UE and home network are both communicatively connected to, and exchange signals with each other via the serving network. The UE is configured with the subscription identifier identifying a subscription supported by the home network and accesses the home network using the serving network.

Did I read that correctly?

A. Yes.

Q. And, of course, this isn't surprising, because any person of skill in the art knows that a UE on a serving network communicates with the serving network, right?

A. In a roaming situation the UE would communicate with the serving network, that's correct.

Q. Let's turn to CDX-42.5, please.

What we're looking at here, Dr. Bims, is the figure that you showed from the 5G standard, right?

A. Yes.
Q. And Fig. 6.1.2-1 of TS 33.501 of the 5G standard looks an awful lot like Fig. 6 of the '817 patent, right?
A. Yes, it's very similar, yes.
Q. And let's have CDX-42.6.
On the left on CDX-42.6 we have the 5G standard and on the right we have the '817 patent.
Agree?
A. Yes.
Q. And in both cases we have UE, SEAF, AUSF, and then UDM/SIDF.
Agree?
A. Yes.
Q. And I think we agreed a moment ago that we can call the SEAF the serving network, I understand that you're talking about a certain scenario, and we can call the AUSF the home network, right?
A. In a roaming situation, yes.
Q. Let's turn to CDX-42.7, please.
Now one of the arguments that you made in your direct examination was that the SEAF can reject the SUCI from a UE.
Do you recall that?
A. Yes.
Q. Now, Dr. Bims, I believe I heard you during your

direct examination say that the UE transmits the SUCI to the SEAF, right?

A. Yes.

Q. And so it's your opinion that using the verb "transmit" from the claims, the UE is transmitting the SUCI to the SEAF?

A. According to the claims, the UE transmits the SUCI to the authentication server.

Q. Right. Just using the verb "transmit," your opinion is that the UE transmits the SUCI to the SEAF, right?

A. According to the claim language the UE transmits to the authentication server, the SUCI.

Q. Now, Dr. Bims, this is a yes or no question.

Do you believe that the UE transmits the SUCI to the SEAF?

A. Well, again, if we're talking about the claim language, it says the UE transmits the SUCI to the authentication server.

MR. VERBONCOEUR: Your Honor, I'll object to that as not responsive.

JUDGE MCNAMARA: I think he has answered it.

MR. VERBONCOEUR: Okay. I'll move on, then.

Q. So, Dr. Bims, the UE SUCI does not go directly from the UE to the SEAF, correct?

A. It's not a direct transmission, correct.
Q. Right. It's actually relayed to the SEAF by a base station, right?
A. Yes.
Q. Just like the SEAF, a base station in certain circumstances can reject a message from a UE?
A. Hypothetically it could be reprogrammed to do that, yes.
Q. Can I please have RDX-2.22, please?
If a base station rejected a message from a UE that contained a SUCI, you would put up a fence here as well, there would be a fence between the UE and the SEAF, right?
A. If the base station were to implement the SEAF policies?
Q. No, that's not what I'm asking.
I'm asking if the base station rejected the message from the UE containing the SUCI, we would have to amend your RDX-2.22 to put up a fence between the UE and the SEAF, right?
A. Yes, if the base station were to specifically target a SUCI message and reject it, then that would be yet another reason why the SUCI is not transmitted to the authentication server.
Q. Dr. Bims, I noticed during your direct

examination testimony yesterday you testified that the base station doesn't know that the SUCI would be in any message that passed through it, right?

A. Correct.

Q. Now in your answer here you just said that the base station might specifically target a SUCI, but that wouldn't be possible, would it?

A. No. We're talking hypotheticals here.

Q. But not hypothetically, in the real world, a base station can in certain circumstances reject the message from the UE, correct?

A. Well, as I said, hypothetically, a base station could be reprogrammed to identify a SUCI and reject it.

Q. Let's talk about the role the SEAF plays in this process.

Now we just agreed a moment ago that the SEAF will not ever authenticate a user based on a SUCI, correct?

A. Right.

Q. And the SEAF will never modify the SUCI, right?

A. Right, it never modifies the SUCI, right.

Q. If we could please have CDX-42.7, please.

So looking at the figure on CDX-42.7, the SUCI goes from the UE to the SEAF.

I think we agree on that, right?

A. Yes.

Q. And then the exact same SUCI goes from the SEAF to the AUSF, correct?

A. Correct.

Q. And when the SUCI goes from the AUSF to the SIDF, the 5G figure on 42.7 tells us it's part of an Nudm_UE Authentication Get Request, right?

A. Yes.

Q. Now because the SEAF is part of the serving network in our scenario, according to the 5G standard, the SEAF cannot request the subscriber identifier de-concealing function, or SIDF, right?

A. So what's shown in this figure is that the security anchor function can send an authentication request to the home network including the SUCI.

Q. Right. My question was different, Dr. Bims.

The SEAF, which you said is on the serving network, cannot request the SIDF, correct?

A. Right. It goes to the authentication server, right.

Q. Right.

And let's have CDX-42.8.

In fact, the 5G standard explains this. And it says, access rights to the SIDF shall be defined, such that only a network element of the home network is allowed to request SIDF.

Right?

A. Yes.

Q. If we go back to CDX-42.7, the only entity pictured in this 5G standard figure that can request the SIDF is the AUSF, correct?

A. So, again, this figure is annotated to add serving network and home network. That actually does not appear in the 5G standard. The 5G standard allows for non-roaming situations in which the UE transmits a SUCI, and in a non-roaming situation the SEAF would be part of the home network.

Q. Right. But, Dr. Bims, in your deposition you said that the SEAF is part of the serving network, correct?

A. Yes, the SEAF is part of the serving network in roaming scenarios.

Q. So let's go to CDX-42.9.

So in your scenario, the roaming scenario, where the SEAF is part of the serving network, we can draw a line from the AUSF to the SIDF because only the AUSF of the home network can request SIDF, right?

A. Yes.

Q. And the asserted claims require transmitting the SUCI to an authentication server for forwarding of the SUCI to a de-concealing server capable of decrypting the encrypted part, right?

A. Yes.
Q. Let's talk briefly about MediaTek source code. I think we can stay on the public record for that.
You heard Dr. Mahon discuss MediaTek source code, right?
A. Yes.
Q. And if one wants to know how a product works, the source code is a good thing to investigate?
A. Yes.
Q. Let's have RDX-2.3, please.
Dr. Bims, when you presented your direct testimony, you stated that you included source code as part of your technical analysis, right?
A. Yes.
Q. But you did not tell us which source code you reviewed, right?
A. That's correct.
Q. And the fact is you did not look at any MediaTek source code at all in forming your opinions for this investigation?
A. That's correct.
Q. And the only expert in this courtroom who has offered opinions about the '817 patent who has analyzed the MediaTek source code is Dr. Mahon.
A. That is correct.

Q. Let's talk about your validity opinions.

We can take this down, please?

You rely on four references in total -- Nair, Forsberg, Togawa, and 5G-Ensure, right?

A. Yes.

Q. And you have two obviousness grounds, one ground is Nair, Forsberg, Togawa, and for claim 14, 5G-Ensure?

A. Yes.

Q. And the other ground is Forsberg, Togawa, and for claim 14 5G-Ensure?

A. Yes.

Q. Let's talk about Nair.

Nair does not expressly disclose an encryption scheme identifier, right?

A. That's correct.

Q. And Nair does not expressly disclose public key identifiers.

A. That's correct.

Q. And Forsberg also does not expressly disclose encryption scheme identifiers?

A. That's correct.

Q. And Forsberg is cited on the very first page of the '817 patent?

A. Yes.

Q. And even though you have Nair, Forsberg,

5G-Ensure, you are relying on Togawa to provide the encryption scheme identifier?

A. Correct.

Q. Let's look at RDX-2.32, please.

This was one of your demonstrative slides that you presented today, right?

A. Yes.

Q. And on the right of RDX-2.32 we have the '817 patent that has a date of July 25th, 2017?

A. Yes.

Q. And then we have the references you're relying on on the left-hand side?

A. Yes.

Q. And if we look at the four references on the left-hand side of RDX-2.32, the implication is that they are within a roughly six-year period?

A. Yes.

Q. And the date you have listed for Nair, May 5, 2017, is the date of the Nair provisional filing, right?

A. That's correct.

Q. Now let's go to the far left of this figure where we have Togawa.

Do you see that?

A. Yes.

Q. And for Togawa you have listed August 23, 2011,

right?

A. Yes.

Q. But unlike you did for Nair, that's not the earliest filing date for Togawa, right?

A. That's correct.

Q. Let's have CDX-42.10, please.

Dr. Bims, this is Togawa, right, on CDX-42.10?

A. This is the Togawa patent itself, the '219 patent, yes.

Q. And this is the same Togawa patent you're relying on for your invalidity opinions?

A. Yes.

Q. The U.S. filing date of Togawa is July 23, 2007, right?

A. Yes.

Q. And do you know that's before the freeze date of the 4G LTE standard?

A. I don't remember the freeze date specifically.

Q. Do you know that's before the publication date of the 4G LTE standard?

A. You're talking about release 8 or release 9?

Q. The first release, Dr. Bims.

A. From what I recall, release 8 was around that time. I don't know precisely what the date was.

Q. There is an earlier Japanese application also

listed on Togawa, and that is August 14, 2006, right?

A. Yes.

Q. If we wanted to compare the filing dates of the references on which you rely, we would have to update the timeline on your demonstrative RDX-2.32 to show a much earlier date for Togawa?

A. We could do that, yeah.

Q. During your direct examination the only Togawa disclosure that you pointed to in your demonstratives was Fig. 13 of Togawa, right?

A. Yes.

Q. Let's look at CDX-42.11, please.

All Fig. 13 has is encryption specification information 90, and we see encryption method ID and encryption key, right?

A. Yes.

Q. Togawa doesn't say anything about subscription identifiers.

A. Yeah, that's correct.

Q. And the SUCI of the asserted claims doesn't just have any encryption scheme identifier. Instead, the SUCI must have an encryption scheme identifier that identifies an encryption scheme used by the UE to encrypt the subscription identifier, right?

A. That's correct.

Q. And if we could please have CDX-42.12.

And Togawa on CDX-42.12 is describing what Fig. 13 is, right?

A. Yes.

Q. And Togawa says that Fig. 13 is a diagram showing an example of encryption specification information 90 to be transmitted in the form of being embedded in a voice signal.

Do you see that?

A. Yes.

Q. Dr. Bims, earlier you said that Togawa is the same field as the '817 patent, but I think you'd agree that embedding data in a voice signal is not the same thing as subscription identifiers.

A. So, again, you've also highlighted in this same passage the encryption method ID is the identity that identifies an encryption method for use in encrypting user data.

Q. Where is that user data, Dr. Bims? Is it embedded in the voice signal like Togawa tells us two sentences above?

A. User data can be transmitted through a voice signal, but it's still user data.

Q. Let's have RDX-2.41, please.

Let's talk about your opinions on Nair and claim 13.

You're relying on RX-0803, which is TR 33.899, for your opinions here for claim 13, right?

A. Yes.

Q. And I think you pointed out during your direct examination that the disclosure in RX-0803 is, quote, incorporated by reference herein in its entirety, end quote, into Nair, right?

A. Yes.

Q. Nair doesn't identify any specific material from TR 33.899, right?

A. Well, it goes on in this final sentence and says, in particular, TR 33.899 identifies subscription UE privacy as one of the most important security areas to be addressed in 5G networks.

Q. And Nair doesn't mention Fig. 5.1.4.30.2-1 of 33.899.

A. Nair does incorporate the entirety of the reference as stated in Nair, and, therefore, Nair incorporates the figure you just mentioned.

Q. Now RX-0803, TR 33.899 is a huge document, right?

A. Yes, it's the 5G standard.

Q. And in fact, I'm holding RX-0803 in my hand. It's a nearly 600-page document.

A. Yes.

Q. And something else struck me about RX-0803 that I

wanted to ask you about.

Dr. Bims, are you able to see RX-0803 on which you're relying for your claim 13 opinions?

A. Yes.

Q. It says 3GPP TR 33.899, and then there's a date in parentheses.

Do you see that?

A. Yeah, I see that date, yes.

Q. And this date is June 2017, right?

A. Yes.

Q. I want you to put a pin in that.

And if we could please have RDX-2.32 again, please.

Now, Dr. Bims, you just said that RX-0803 is incorporated by Nair in its entirety, but right here you have a date of May 5, 2017, for Nair, right?

A. Yes.

Q. How can it be that a May 2017 document incorporates by reference in its entirety a June 2017 document?

A. Well, if we go back to the TR document that you displayed on the screen, you'll notice that that is version 1.2.0. In the Nair reference, it incorporates version 1.1.0.

MR. VERBONCOEUR: Your Honor, pass the witness.

JUDGE MCNAMARA: Thank you, Mr. Verboncoeur.

Ms. Chang?

MS. CHANG: No questions from the Staff, Your Honor.

JUDGE MCNAMARA: All right. Thank you.

Mr. Hayes?

REDIRECT EXAMINATION

BY MR. HAYES:

Q. Just a few questions.

Dr. Bims, counsel for Ericsson raised the fact that you work as an expert witness and somehow suggested that that biases your opinions here today.

Is that true?

A. No.

Q. Are your opinions in this case based in any way on the outcome of this case?

A. No.

Q. Counsel for Ericsson also pulled out the phones and did a demonstrative showing that the phones connect to 5G SA and went on and on about that.

Does the fact that the accused products connect to 5G SA affect in any way your opinions in this case?

A. No.

Q. In fact, your opinions are based on looking at the 5G standard, right?

A. Yes.

Q. Does the fact that the accused products connect to 5G SA affect in any way your opinions with respect to the SEAF policy and what it does with the SUCI?

A. It has no effect on that.

Q. Can we have RDX-2.19, please.

Counsel for Ericsson asked you some questions about acting on the -- the SEAF acting on the SUCI and said it doesn't authenticate the SUCI.

Well, it's the authentication server that authenticates the SUCI, right?

A. Yes, that's correct.

Q. And I think yesterday, maybe it was this morning, you described what acting on it means.

What does it mean for the SEAF to act on the SUCI?

A. Well, what it means is the standard is not very clear as to what particular actions the SEAF can take, but one thing that it does make clear is that, when the SEAF acts on the SUCI, it does not forward it to an authentication server.

Q. RDX-2.16, please.

Counsel for Ericsson also talked about the SEAF being in the serving network and the home network, and I think you gave some testimony about a roaming situation.

Let me ask you this.

In the context of a non-roaming phone, does the UE transmit the SUCI to the authentication server as required by the claims? Let me ask the question again.

We're talking about roaming.

A. Right.

Q. In non-roaming, right, is the UE security anchor function and authentication server arrangement the same?

A. Yes.

Q. I don't know if I was clear, but we talked about 5G SA.

What does SA stand for?

A. Standalone.

Q. Okay. Let me ask the question again.

Does the fact that the accused products connect to the 5G-Standalone affect in any way your opinion in this case?

A. No.

Q. One last question about the base station.

I think counsel for Ericsson asked you about what effect, if the base station in your hypothetical situation had a policy or implemented a policy to act on or do something with the SUCI, what effect, if any, would that have on your opinion in this case?

A. Well, if the base station were to intercept the

SUCI and perform its own internal policy on that SUCI, that could lead to the SUCI not being relayed by the base station. That would be yet another reason why the 5G UE does not transmit a SUCI to the authentication server.

Q. So, Dr. Bims, at the end of the day, according to the 5G standard, can the accused product UE transmit the SUCI to an authentication server as claimed?

A. No.

Q. According to the 5G standard, what is the only element that can transmit the SUCI to the authentication server?

A. That would be the security anchor function, which is capable of forwarding the SUCI to an authentication server.

Q. And does the security anchor function act according to its own policy?

A. Yes.

MR. HAYES: No further questions, Your Honor.

JUDGE MCNAMARA: Thank you, Mr. Hayes.

Mr. Verboncoeur?

MR. VERBONCOEUR: Your Honor, I don't have questions, but I just wanted to communicate with you what we're going to do with these exhibits. These are physical exhibits that are in the record, but what we also intend to do is we'll mark these, and we can follow up with you on how

we transmit them, but CDX-42.50 and CDX-42.51, we'll take a screenshot of the network configurations that I was showing earlier.

JUDGE MCNAMARA: That's great. Thank you.

Are you in agreement?

MR. HAYES: Sure. We'll coordinate with them.

MR. VERBONCOEUR: No questions for me, Your Honor.

JUDGE MCNAMARA: All right. Thank you.

Ms. Chang, do you have anything?

MS. CHANG: Nothing from the Staff either.

JUDGE MCNAMARA: Thank you.

Dr. Bims, you may step down. Thank you very much.

MR. AROVAS: Your Honor, the next witness will be Professor Stoffel-Munck and will be presented by Ms. Diva Hollis, who is our NextGen Advocate.

JUDGE MCNAMARA: Very good.

Good morning, Dr. Stoffel-Munck. We have met before.

Good morning, Ms. Hollis.

PHILIPPE STOFFEL-MUNCK,

having been first duly sworn or affirmed on his oath, was thereafter examined and testified as follows:

JUDGE MCNAMARA: Please state your full name.

THE WITNESS: Philippe Stoffel-Munck.

DIRECT EXAMINATION

BY MS. HOLLIS:

Q. Good morning, Professor.

JUDGE MCNAMARA: And your mic isn't on.

Q. Good morning, Professor Stoffel-Munck.

Can you please introduce yourself?

A. My name is Philippe Stoffel-Munck.

Q. Can you tell us what you do for a living?

A. I'm a French professor, tenured French professor at Paris 1 University (Pantheon Sorbonne University), Paris, France.

Q. Were you retained as an expert in this case?

A. Yes, I was.

Q. What is your area of expertise?

A. French contractor.

Q. What were you asked to do in this case?

A. I was asked to opine on certain French law issues and how they apply to licensing declaration under the ETSI rules and how they apply to Ericsson's conduct with respect to its 5G offers.

Q. I'd like to discuss your credentials as an expert in French contract law.

Turning to RX-2544 in your binder, is this a copy of your CV?

A. Yes, it is.

Q. Can you describe for us some of your academic work?

A. Yes. I have a -- I've had my Ph.D. 20 years ago on abuse of rights in contracts, which question the question of -- which questions the duty of good faith and contract law. I co-author a textbook on law of contract, which is, I think, one of the most used textbooks in France in this area. I regularly write in law journals on contract law issue. I will take part in a symposium in Oxford in fall on the duty of loyalty. And that's all.

Q. Can you describe some of your professional work outside of your academic positions?

A. Yes. Outside of my academic activity, I mainly work as an arbitrator now, and I keep on serving, from time to time, as legal expert before French courts, foreign courts or arbitral tribunals.

Q. Have you served as an expert in French contract law in the United States?

A. Yes, I have. And as Your Honor said, it is not the first time that I'm here on this stand, and it's the third time that I appear in the ITC.

JUDGE MCNAMARA: I believe you appeared before Judge Shaw as well.

THE WITNESS: Exactly. Exactly, Your Honor.

MS. HOLLIS: Your Honor, at this time Respondents offer Professor Philippe Stoffel-Munck as an expert in French law and in particular French contract law.

MR. NEWCOMER: No objection, Your Honor.

JUDGE MCNAMARA: Again, I know --

MR. NEWCOMER: Josh Newcomer for Complainants. No objection.

MS. CHANG: No objection from Staff.

JUDGE MCNAMARA: All right. Dr. Stoffel-Munck is accepted as an expert on the subject on which he has been called to testify without objection.

BY MS. HOLLIS:

Q. Professor, can you please provide for us a summary of your opinions in this case?

A. Yes. My conclusions are threefold:

First, as to the reciprocity condition, under French law this reciprocity condition is met as soon as the third-party beneficiary has undertaken an identical commitment to the commitment made by the declarant;

Second, French law requires a duty of good faith throughout the process leading to a FRAND license and prohibits coercion;

And, third, Ericsson's conduct by seeking multiple injunctions, although it had signed such licensing declaration, is not consistent with what requires that duty

of good faith.

Q. What did you consider in forming your opinions?

A. Well, I considered French statutory law, French case law, the IPR Policy, of course, the guide that explains, that tends to clarify the policy, the correspondence between the parties as of the 11 October 2023 first 5G offers by Ericsson, and the conduct of the parties in the ensuing litigation.

Q. Let's start with the ETSI IPR Policy.

Can you tell us what the relevance is of French law to this case and to the ETSI IPR policy and declaration?

If we could please pull up RX-2537.

A. The policy is expressly governed by French law and so are all its legal effects.

Q. And is the ETSI declaration a contract under French law? Page 9.

A. Yes, a declaration is a contract. It's a contract with ETSI for the benefit of third parties.

Q. If we could pull up page 9 in RX-2937.

In your opinion, how should this declaration be interpreted under French law?

A. Under French law, when you have to enter into a contract, the first thing you have to do is to seek to the common interest to the parties of that contract, but when it comes to a contract that has been entered into by multiple

parties such as in that case, because ETSI was already a big organization at that time, it becomes very impractical to seek for the intent of each and every right up to the policy.

In this type of circumstances, French law then provides for an alternative test, which is an objective test, and direct the charge to understand the terms of the policy, the terms of the contract further to what a reasonable person would understand of those terms in the same context.

Q. What sources would a French court look to for understanding the language of the declaration under the reasonable person standard?

A. Well, it would first look at the plain meaning of the terms that are used insofar as they are clear, and then it would look at where the terms stand within the contract. It would look at the contract as a whole, so at the policy as a whole, and it would give much importance to the purpose of the policy.

Looking at the purpose of the contract is critical for its interpretation.

Q. Let's turn to your first opinion.

What does the ETSI IPR declaration say about reciprocity?

If we could highlight the last checkbox.

A. As you can see on the screen, the undertaking made by the declarant can be made subject to reciprocity on the part of the third-party beneficiaries.

Q. And in view of the sources that you previously mentioned, how should the reciprocity clause be understood under French law?

A. From a legal standpoint, under French law, that is a condition precedent, that would be seen as a condition precedent. And reciprocity refers to the party A doing something for a party B and requesting that party B to do the same thing in return.

So in the context of the licensing declaration, what is doing the declarant. The declarant is committing to be prepared to grant a license on FRAND terms.

So to reciprocate, the third-party beneficiary has to do the same, which is to commit to be prepared to grant a license on FRAND terms. And once -- and that is the specific legal effect of signing declaration form under the ETSI rules.

So to reciprocate, the third-party beneficiary has to sign an identical licensing declaration, and, by doing so, once this is done, the condition is met.

Q. Does the reciprocity requirement excuse a declarant from complying with its FRAND obligations?

A. Not at all. Once a condition is met, the

obligation that was subjected to that condition is affirmed and becomes enforceable, and it's another story of knowing if that obligation is not performed correctly, then you have remedies, but, in itself, the obligation is affirmed, and the condition has exhausted all its legal effects.

Q. Turning now to your second opinion, under French law, how in your opinion would a French court view seeking injunctions while negotiating a contract?

A. By negotiating a contract against -- sorry, not against -- by negotiating a contract with a willing licensee, a French court would view it as being inconsistent with the duty to perform in good faith to seek an injunction against a willing licensee.

Q. Can you show some authority under French law that supports your opinion?

If we could please pull up RDX-5 pages 2 and 10.

A. Yes. My opinion is based on the basic statutory principle that you see on the screen, Article 1104, contracts must be negotiated, formed, and performed in good faith.

And that's a mandatory rule. All negotiations that are governed by French law must be made in good faith. There is no need to specify it. It's in the statutes.

And then it's interesting to look at the subsequent chapter of the Civil Code, which explain in the

formation of contract what is required by this principle and what is prohibited under this principle.

And you could -- and then you can see by flipping the pages of the code, deceit is not good faith, duress is not good faith. And you have a specific article addressing the hypothesis where duress is made by taking a legal action against the other party. It's Article 1141 that you've got on the screen.

Normally speaking, a threat of legal action is not duress, but it becomes duress where, as the stated reason, where the legal process is deflected from its proper purpose or where it is exercised in order to obtain a manifestly excessive advantage.

And so seeking an injunction against a willing licensee falls under this clause.

Q. Had the French courts had the opportunity to address injunctive relief against a willing licensee?

A. Yes, they have.

Q. Mr. Beall, if we could please pull up RX-2541 and RX-2542.

What have the French courts said?

If we could pull up page 16 at RX-2541 and page 20 at RX-2542.

A. You must be aware that there are very few French cases on FRAND litigation. And so it's very telling that,

among these very few cases, on two occasions the court faced an IPR holder seeking an injunction in the midst of negotiations with a seeking licensee.

And in either case, in both cases, sorry, in both cases the court had the same reaction, saying you cannot obtain an injunction against someone you are negotiating with toward a FRAND license, because it's disrupting the negotiation process, which has to be conducted, as I've said, in good faith.

And in both cases you see that the reason why is because it would grant you an undue advantage in the negotiation.

Q. Turning to your final opinion, based on your review of the record, how would Ericsson's conduct in bringing injunctions with its initial offer be viewed under French law?

A. I think it would be found inconsistent with the duty to perform its obligations undertaken with regard to ETSI inconsistent with the duty to perform them in good faith. And it's all the more so that it did not only seek an injunction on the very same day it made its first offer, but it also repeatedly continued to seek injunctions against, Lenovo was willing to get a license, in trying to throw Lenovo out of major markets such as Brazil.

And I think that this is not consistent with the

requirements of good faith, and, at least I know, better manners, to be consistent with the duty to negotiate in good faith or to repeat the terminology of the guide to IPRs to, I know, more friendly manners to resolve the dispute.

Q. Thank you, Professor.

MS. HOLLIS: Your Honor, I pass the witness.

JUDGE MCNAMARA: Thank you very much.

Mr. Newcomer?

CROSS-EXAMINATION

MR. NEWCOMER: Josh Newcomer for the Complainants. May I proceed, Your Honor?

JUDGE MCNAMARA: Yes. Thank you.

CROSS-EXAMINATION

BY MR. NEWCOMER:

Q. Good morning, Professor Stoffel-Munck. Shall I call you Professor?

A. Yes, or doctor, the way you like.

Q. Thank you. You spent some time on direct discussing two French court decisions, correct?

A. Yes.

Q. Those decisions related to whether or not the French court in those cases would grant injunctions, right?

A. Yes.

Q. Those two cases involved French patents?

A. Yes.

Q. They involved allegations of infringement under French law, right?
A. Yes.
Q. They were subject to French injunctive remedies, right?
A. That's correct.
Q. And they were denied the -- the injunctions were denied under the specific facts of those cases, right?
A. Yes.
Q. In this case we have U.S. patents, right?
A. Yes.
Q. We're alleging violations of U.S. patent and trade law, right?
A. That's correct.
Q. Subject to specific United States statutory remedies of an exclusion order to be issued by the U.S. ITC, right?
A. Yes, that's correct, but you've got the French duty of good faith.
Q. And FRAND is considered here as part of the four U.S. statutory public interest factors, right?
A. Can you repeat that, please?
Q. Sure. Do you understand that FRAND is considered here as part of the four U.S. statutory public interest factors?

A. Maybe. I'm not aware of that.
Q. Okay. So you're not aware of the public interest factors?
A. No, I'm not -- no, I did not specialize in U.S. law. I specialized in French contract law, that's good.
Q. And here the International Trade Commission is going to have to decide the case on the facts of the case here, right?
A. I guess so, yes.
Q. Now on the facts of the case, you offered the opinion that Ericsson breached its ETSI obligations by seeking injunctions, right?
A. Yes, by seeking multiple injunctions against a willing licensee, that's important.
Q. Right. And when you formed your opinion, you were relying on a few documents starting in October 11, 2023, that were handpicked by counsel for Lenovo, right?
A. That's correct.
Q. You were not involved in the Ericsson-Lenovo negotiations?
A. No, I was not.
Q. You did not interview anybody at Lenovo to form your opinions?
A. No, I did not.
Q. And you do not dispute that Lenovo has an

obligation to negotiate in good faith for a license to Ericsson's SEP patents, right?

A. Well, as I've said in my report, I certainly think that Lenovo has a duty to negotiate in good faith, generally speaking.

Q. Okay.

A. But I don't think, technically speaking, that Lenovo is bound in its negotiation on Ericsson's patents, is bound by the French law specific duty of good faith, but I think that under any law there's a duty to negotiate in good faith.

Q. You're not testifying that Lenovo does not have to negotiate in good faith, are you?

A. I'm not.

Q. Okay. And in that regard, you have not offered an opinion about Lenovo's compliance with its obligations under the ETSI IPR policy, right?

A. I did not give such an opinion, that's correct.

Q. And you didn't draft the ETSI IPR Policy?

A. No, I did not.

Q. You've never worked in the private sector for a telecommunications company?

A. Well, it depends on what you call working. I didn't -- I was never an employee of a telecommunications company, but I've served as a legal expert for some

telecommunications company in many fields, not only the FRAND one.

Q. But you haven't actually worked in the private sector for a telecommunications company as an employee, right?

A. That's correct, yes.

Q. And you're not a patent licensing professional?

A. I am not.

Q. You're an arbitrator, but you've never even arbitrated an ETSI FRAND case, right?

A. Never.

Q. And you were qualified as an expert in French law, right?

A. That's correct.

Q. French contract law.

A. That's absolutely correct.

Q. Not ETSI, not contract negotiations for SEP licenses, right?

A. Well, it overlaps, of course, because when the negotiations have to be conducted under French law.

Q. Professor Stoffel-Munck, my question is a simple one.

You were tendered as an offeror for French contract law, right?

A. Yes.

Q. Here you're rendering an ultimate conclusion that Ericsson breached its good faith, right?

A. Yes, that's my conclusion according to the facts I'm aware of.

Q. The limited facts you're aware of, right?

A. If you like.

Q. Yet multiple courts in the past year have excluded or disregarded your opinions for going outside your core area of expertise, right?

A. Can you be more specific?

Q. I can be. Let's talk about the Panasonic v. Xiaomi case.

You offered an opinion in in that case, right?

A. Yes.

Q. You offered opinions on what good faith would direct a declarant to do, right?

A. Certainly, yes.

Q. And just this last month Justice Leach held that there was no French authority to support parts of your opinion and that they were inadmissible, right?

A. Honestly speaking, I don't know.

Q. Well, we can take a look at it.

Can I have CDX-46.3?

Let's take a look at what Justice Leach said. He said Professor Stoffel-Munck went much further than this and

expressed the opinion that good faith would direct a declarant to agree to enter into a provisional regime in the form of the interim license. He also expressed the opinion that a SEP holder acting in good faith in performance of its FRAND commitment would not, therefore, offer a provisional regime that amounted to anything less than a license. It was common ground that there was no French authority to support either of those propositions.

Do you see that?

A. Yes.

Q. And then Justice Leach continued, in my judgment, those opinions are irrelevant and inadmissible.

That's what he concluded, right?

A. Yes, with regard to --

Q. Professor Stoffel-Munck, that's what --

A. With regard to the interim license, and I can tell you that, as for my other legal conclusion, they were admitted.

Q. Sure. I'm not disputing your French law expertise, but he said you went too far there and he rendered them inadmissible, correct?

A. Yeah, with regard to being bound to sign an interim license.

Q. Okay. And, in fairness, he points out that your counsel did not even press him to accept those parts of your

testimony, right? Do you see that last line there?

A. Yes, I see that line.

Q. There's another case we can go to. You also testified --

You can take that down.

You also testified on behalf of Lenovo in Interdigital versus Lenovo, right?

A. Yes.

Q. You offered an opinion on what French law would say about what it meant to be a willing licensee?

A. That's possible. I don't have a clear recollection of that, but...

Q. We can put it up. CDX-46.4.

So if you look here, in that case Justice Mellor criticized your opinions for opining on various issues which in reality were not questions of French law at all but instead questions of fact, right?

A. Yes. You have to be aware that French law, just as many civil law systems, has general principles, and if you are to assist the judge, you have to put them in context, which binds you to go into the facts.

Q. Right. And his conclusion was that you were not opining on French law at all, but, as transpired, just questions of fact, right? That's what Justice Mellor held.

A. Yes. That's what I read.

MR. NEWCOMER: Pass the witness, Your Honor.
JUDGE MCNAMARA: Thank you very much.
Ms. Chang?
MS. CHANG: No questions from the Staff, Your Honor.
JUDGE MCNAMARA: Thank you.
Ms. Hollis?
MS. HOLLIS: No further questions, Your Honor.
JUDGE MCNAMARA: All right. Thank you.
Professor, you may step down. Thank you very much.
THE WITNESS: Thank you, Your Honor.
JUDGE MCNAMARA: I think now might be a good time for a break. It's just about 11:30. So why don't I see you back here in 15 minutes.
(Whereupon, the proceedings recessed at 11:27 a.m.)
(In session at 11:45 a.m.)
JUDGE MCNAMARA: Thank you, everyone. Please be seated.
MR. RAVISHANKAR: Your Honor, at this time the Respondents call their next witness, Sir Christopher Floyd.

SIR CHRISTOPHER FLOYD,

having been first duly sworn or affirmed on his oath, was thereafter examined and testified as follows:

JUDGE MCNAMARA: Please state your full name.

THE WITNESS: Christopher David Floyd.

JUDGE MCNAMARA: Thank you very much.

DIRECT EXAMINATION

BY MR. RAVISHANKAR:

Q. Good morning. What are you here to testify about today?

A. The practice and procedure of the courts of England and Wales, in particular, in relation to FRAND cases.

Q. Have you testified live in court before?

A. No, I have not.

Q. I see they are already on the screen.

Have you prepared any slides to help you illustrate your testimony today?

A. Yes, I have, Your Honor.

Q. For the record, that's RDX-4C.

Let's turn to slide 2?

Does this slide summarize your career?

A. Yes, it does.

Q. So what do you do for a living today?

A. I'm a retired member of the Court of Appeal of England and Wales, and I divide my working time between acting as a legal consultant and a certain amount of academic work as well as being called upon very occasionally

to continue to sit.

Q. How long have you been a judge or a justice?

A. I was appointed a judge of the High Court in 2007, and judge of the Court of Appeal in 2013. I retired from full-time sitting in 2021.

Q. Do you have any experience in patent law?

A. I spent my entire working life in intellectual property with a particular focus on patents.

Q. How many patent cases would you say you've presided over as a judge or a justice?

A. As a very nonscientific estimate, I would say probably 40 as a High Court judge and maybe slightly less than that, around 35, as a judge at the Court of Appeal.

Q. Do you have experience with how UK courts conduct FRAND rate-settings?

A. Yes, I do.

Q. Let's turn to RX-222 in your binder.

Once you're there, can you please let us know what that document is?

A. That is a more detailed CV, which includes a list of publications, lectures and seminars, and selected judgments, and also the cases in which I've previously provided reports.

Q. Does this document provide your qualifications in more detail?

A. It does.

Q. All right.

MR. RAVISHANKAR: At this time, Your Honor, Respondents move to have Sir Christopher Floyd admitted as an expert in UK practice and procedure including in FRAND cases.

JUDGE MCNAMARA: Thank you, Mr. Ravishankar.

MR. STEVENSON: Ted Stevenson for Ericsson. No objection.

JUDGE MCNAMARA: Thank you.

Ms. Chang?

MS. CHANG: No objection, Your Honor.

JUDGE MCNAMARA: All right. Then Sir Christopher Floyd is accepted as an expert on the subject matter for which he has been called to testify without objection.

MR. RAVISHANKAR: Out of an abundance of caution, at this time, Your Honor, could we please move to the party confidential record?

(Whereupon, the hearing proceeded in confidential session.)

O P E N S E S S I O N

MR. RAVISHANKAR: Thank you, Your Honor.

JUDGE MCNAMARA: Thank you.

BY MR. RAVISHANKAR:

Q. Now you mentioned that there were two Lenovo cases. We talked about the license case. Let's move on to the rate-setting case.

When was that case filed?

A. That was filed about a month earlier in October 2023.

Q. What court was that filed in?

A. Also in the Patents Court in London, part of the High Court.

Q. And that's the same court as Lenovo's license case, right?

A. That's correct.

Q. Let's pull up slide 6, RDX-4.6.

And I'm pulling up the particular claim, which is marked as RX-657C.

What was Lenovo's purpose or intent in filing this rate-setting case?

A. Well, this is Lenovo's pleading, Your Honor, and they state to the court that it is their intention to obtain a prompt and efficient determination of global FRAND terms leading to a cross-license and resolution of this dispute as

soon as possible.

Q. Is this type of request unusual in the UK courts?

A. No. These FRAND rate-setting cases have become increasingly common over the last ten years following the seminal decision of Mr. Justice Birss, as he was then, in the Unwired Planet and Huawei case.

Q. Since then have there been any other decisions handling rate-setting in the UK courts?

A. Well, no doubt there are many in the pipeline, but there have been two further decisions which have reached a final judgment. Those are Interdigital and Lenovo, and Optis and Apple.

Q. Has Ericsson ever sought a rate-setting from the UK courts?

A. Yes. Ericsson, in its case against, Apple sought a rate-setting in a case that it commenced in 2022.

Q. All right. Let's go to the next slide, slide 7, RDX-4.7.

We have yet another timeline. And starting with this filing on October 13, 2023, which is RX-656C, so after that filing, I see an item for December 5, 2023.

What happened then?

A. Ericsson filed a challenge to the jurisdiction of the English court and also asked for a stay of the English proceedings behind the proceedings in North Carolina. That

challenge was launched on December the 5th, and led to a hearing on March 12 and 13, and a judgment of Mr. Justice Richards on April 18th rejecting the challenge.

Q. And you say he rejected the challenge, but I want to talk a little bit more about this.

What was the overall outcome of that jurisdiction challenge on April 18th?

A. Ericsson's challenge to the jurisdiction failed, and they failed to obtain a stay of the English proceedings behind the North Carolina proceedings.

Q. For the record, the April 18th judgment being discussed here is RX-1303.

Going into a little bit more detail, what factors did the court consider in determining that it had jurisdiction to decide the FRAND rate-setting?

A. Well, the court considered a number of factors, but it had a considerable amount of evidence as to how the proceedings would go in the North Carolina court, but two things influenced it.

One was a little bit of uncertainty as to whether that court would produce a full set of license terms as opposed to simply concentrating on rate, and, secondly, the court was concerned about the length of time that the North Carolina court, on the evidence before the English court, was going to take before it reached a decision.

Q. You talk about the evidence that was before the English court.

Was Ericsson given an opportunity to provide evidence of that North Carolina and other foreign FRAND proceedings prior to this April 18th judgment?

A. Yes, Your Honor, these challenges are heard on written evidence, both sides have an opportunity to file whatever evidence they wish to, and so Ericsson could have provided evidence, and as I understand it did provide evidence as to alternative forums in support of their case.

Q. Mr. Beall, if we could, let's pull up RX-1303, which is that same April 18th judgment, and jumping to page 11, paragraph 55.

So what did the court conclude in its analysis of the North Carolina case filed by Ericsson?

A. Well, it raised -- this is the paragraph which summarizes the conclusion. The judge gives more reasons later on in the decision. I draw attention to items iv and v in that list, that there won't be a full draft of the legal terms of the cross-license and a trial is unlikely to take place before late 2026. I think the evidence before the judge was that the cases would meet the median length of time to trial in the EDNC, it was between 36 and 45 months.

Q. Let's mark that as RDX-4C.8, and we can actually pull that down.

Did Ericsson appeal the court's jurisdictional decision?

A. No. They would have been entitled to ask permission to appeal, and so there was a period of uncertainty after the court's decision as to whether they were going to appeal, but in the end they didn't seek permission to appeal, and, therefore, didn't appeal.

Q. Now that that window has passed, can Ericsson still appeal the jurisdiction?

A. No, they cannot, and they have entered a defense in the proceedings. Once a party has entered a defense in English proceedings, then they are taken to have submitted to the jurisdiction finally.

Q. Mr. Beall, if you could, let's go back to slide 7.

So how long did Ericsson's unappealed jurisdictional challenge delay progress of this rate-setting case?

A. Well, given the period of uncertainty after April 18th, I would put that at about five months.

Q. Okay. Now that this jurisdictional challenge has been briefed, heard, and ruled upon, did the court set a date for the FRAND rate-setting hearing itself?

A. Yes, the court held a case management conference on the 21st of June and made its order on the 3rd of July,

and it has ordered the case to start in the window April 29 to May 2nd, which is at the right-hand end of that slide. The time estimate for the case is 15 days.

Q. All right. And why did the court set a rate-setting hearing without scheduling a technical trial first?

A. My reading of the proceedings and the various decisions is that the court was very much persuaded that the important thing that these parties need to get settled, and settled fast, is the terms of the cross-license, which both parties contend needs to be settled.

Q. And --

A. And gave priority to the FRAND trial as a matter of case management on that basis.

Q. Thank you.

Now there's been testimony, I'd say a lot of testimony, in this case from Ericsson's fact and expert witnesses about claim charts comparable licenses and any other evidence that allegedly supports the October rate that was offered to Lenovo.

Is Ericsson able to present all that evidence in this UK rate-setting action?

A. Yes. There is no limit to what Ericsson can adduce by way of evidence provided, of course, it's relevant to the issues on the pleadings when they adduce it. They

can, in particular, ask the court to rule as to whether their October license offer is FRAND or not.

Q. All right. Did the UK court prohibit Ericsson from presenting any of that same FRAND evidence in North Carolina or any other jurisdiction?

A. No, of course not.

Q. All right. So let's pull slide 7 back up, if we could.

How soon after the conclusion of the FRAND rate-setting hearing in April or May, whenever it starts, is the UK court likely to issue a decision?

MR. STEVENSON: Your Honor, I'm going to raise an objection. I have not objected on the scope of the expert report because these are facts from pleadings, but this witness did not offer this opinion on when is the ruling likely to come out after the trial in his expert report. So I object that it's outside the scope.

JUDGE MCNAMARA: Mr. Ravishankar?

MR. RAVISHANKAR: Your Honor, he did provide a statement about a rough time period in which he would expect it to occur. We did not have the information that we have today, for example, about that FRAND trial setting. So that's additional information that he is considering. But he did provide an overall opinion about he would expect this trial or he would expect a decision to occur sometime --

well, I'll let him talk about it.

JUDGE MCNAMARA: What I'm going to do here, Mr. Stevenson, because this is essentially information about the English court proceedings, or, rather, the proceedings of the courts of England and Wales, what I'm going to do is allow this.

He certainly is knowledgeable about time frames that courts usually set or designate, so I'm going to allow this. It will have some limited utility since we will know exactly how long it will take and what will occur when it occurs. It's a little speculative even now, but it's still within the range of his knowledge of how courts typically act and the kinds of procedural schedules they would set.

THE WITNESS: May I proceed?

JUDGE MCNAMARA: Yes.

A. Your Honor, I've thought about this. I started by looking at what the Court of Appeal has said about the time judges should take to write their judgments -- not always observed. But they have said that even in the Petersburg case, they said that even in the most complex cases judges should aim to provide their judgments no later than three months after the trial.

I looked also at Unwired Planet and Huawei, which was the first of these FRAND-setting cases to see how long Mr. Justice Birss took, and he produced, impressively, his

judgment within three to four months. But since then the two others that I mentioned have taken considerably longer, of the order of one year.

And in Interdigital and Lenovo Lord Justice Birss, as he had now become, was very critical of the time which the judge had taken to reach his judgment. So I had thought that the judge hearing this case will be conscious of all that and endeavor to do his best. These are hard cases. And so make no mistake, it will take a considerable time. But I would have thought he would endeavor to reach his decision in three to four months.

Q. So let's talk a little bit about what that decision actually looks like.

For this I'd like to pull up Lenovo's particulars of claims. That's RX-2536C, and let's go to page 33. I'd like to focus on the parentheses 10.

So can you describe, based on this claim, what the form of a decision would look like?

A. The decision in these cases has settled the complete set of terms of a FRAND license. The idea is it should be executable and, therefore, all disputes between the parties as to all the terms, not just the rate, are ironed out in the course of the proceedings, and that's what Lenovo is seeking by its claim number 10.

Q. Let's mark this as RDX-4C.9.

Now you've been here for quite a bit of testimony, including Ms. Christina Petersson's testimony from this past Wednesday, July 10, 2024, right?

A. That's correct.

Q. Mr. Beall, if we could, let's pull up page 155 from the day 1 transcript, and I want to look at lines 20-22.

Do you recall Ms. Petersson's testimony that it will take years and years normally for appeals in the UK to be finally resolved?

A. That's not my experience. My experience, when hearing appeals in the Court of Appeal, is that the time that the appeals take to reach from the Court of Appeal from judgment is of the order of one year, usually less.

Q. Now there has also been the suggestion by Ericsson, its either witnesses or counsel, that Ericsson would not get paid until after an appeal concluded.

Is that accurate?

A. No. The practice that's developed is to ensure that money that is outstanding as a result of the decision is paid promptly, and that the parties respect the terms that the court settled pending any appeal.

Q. Does that award include interest?

A. In the Interdigital and Lenovo case, the judge concluded that FRAND parties would negotiate on the basis

that interest was payable, and he awarded compound interest with quarterly rests at a rate of which I'm afraid I can't remember.

Q. I understand that some of these awards, including what's being requested here by Lenovo, that there would be some past liability and also future running liability.

How is past liability and interest expected to be paid? Is that a lump sum or is it spread over time?

A. Provided parties are solvent, they are expected to pay their judgments when the court makes the order. I don't suppose there is any doubt about that in the present case.

JUDGE MCNAMARA: Mr. Stevenson?

MR. STEVENSON: This question and answer and this line, really, is completely outside his report, and I object again based on that.

JUDGE MCNAMARA: Mr. Ravishankar?

MR. RAVISHANKAR: Your Honor, first of all, in Sir Christopher's report there was a statement and discussion about what the form of remedy would be from this rate-setting case, which would be the full resolution of these parties' dispute. So he has explained that.

In terms of the payment, this is directly responsive to an argument Ericsson has raised, really, for the first time during this hearing, and it's appropriate for

Sir Christopher, who has been observing this, to be able to provide his opinion on that as an expert and as it relates to his view and his opinion that there would be this binding decision that effectively resolves the parties' dispute from the UK.

JUDGE MCNAMARA: So with respect to the statement in Sir Christopher Floyd's report, what can you tell me exactly what he said, or was he giving again the process, what the typical process is, what the typical outcome is?

MR. RAVISHANKAR: It was the typical process and typical outcome, also characterizing what it is that Lenovo asked for, which he is doing here as well.

MS. CHANG: Your Honor, typical outcome, I don't think he should be able to testify as to the specific circumstances here.

JUDGE MCNAMARA: I'm having trouble hearing you.

MS. CHANG: I'm sorry. If it's the typical outcome that they are pointing to, I don't think that he should be able to testify as to the specific circumstances here.

JUDGE MCNAMARA: What about with respect to the ability of the court or the parties' ability or requirement that they pay quickly?

MS. CHANG: I don't think that he has provided any opinion on that, or at least Mr. Ravishankar hasn't

pointed me to it in his report. So I don't think he should be able to testify as to that.

JUDGE MCNAMARA: Mr. Ravishankar, can you point to us where in the report that's provided?

MR. RAVISHANKAR: No, in his report he did not specifically discuss the issue of payment pending appeal. That's an issue that, again, was raised by Ericsson during this proceeding, and that is what he is responding to.

JUDGE MCNAMARA: Right, but the issue is whether or not Mr. Christopher Lloyd raised it in his report. So I think this is out.

MR. RAVISHANKAR: Understood, Your Honor.

Q. I want to turn back to the fact we have these two cases, the license action and the rate-setting action.

Can you describe what, if any, impact the UK license action will have on adjudicating the parties' FRAND license terms?

A. Well, they are obviously related, because whatever terms the court sets in the rate-setting action will have to take account of phones which are licensed under the existing license.

Q. Thank you, Sir Christopher.

I pass the witness.

JUDGE MCNAMARA: Thank you.

Mr. Stevenson?

MR. STEVENSON: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. STEVENSON:

Q. Good morning.

A. Good morning, Mr. Stevenson.

Q. While binders are being passed out, my name is Ted Stevenson. I'm the attorney for Ericsson. It's good to meet you, sir.

May I initially ask you, what is the customary and proper way to address you in court?

A. I will answer to most things, Mr. Stevenson, but Sir Christopher would be the formal way.

Q. If that's appropriate with the court, I will call you Sir Christopher.

Let's start off with one of the demonstrative exhibits that you used in your slide deck.

May I ask Lenovo's audio-visual person to pull up RDX-4.6?

There's been a bit of discussion in this case and an issue that came up, in the testimony of Mr. Mulgrew, the corporate representative of Lenovo yesterday, I don't know if you were here for that.

A. I was.

Q. And there was a question I raised to him as to whether Lenovo has agreed to make payment after the trial

court issues whatever rate-setting rule will come out or if they are going to wait until their appeal avenues are exhausted.

It appears to me that your slide answers that question for us, doesn't it?

A. Well, not really. You may well be right, Lenovo has not agreed to that, but it's not within Lenovo's gift. The court will order that. It's a matter for the court's regulation in its order.

Q. To be fair, Lenovo's undertaking is to be bound by the final, including any appeals, outcome of the court's FRAND determination, correct?

A. That's Lenovo's undertaking as it is written there, yes.

Q. Let's talk about timelines. In the United States when an Article III court conducts a civil bench trial, there's not a statutory deadline by which the court is required to issue a final judgment in the case. And obviously we know judges work very hard, but they have big dockets. You, of course, are familiar with that.

Is it similar in the UK, in other words, after these trials that occur in the matters between Ericsson and Lenovo, is there a statutory deadline by which the court must rule?

A. No.

Q. And I noticed in your report, you didn't speculate on when the rulings may come out. And I'm not going to ask you to do that in my questioning. But I would like to ask you about some of the historical timing.

Am I correct that in the UK a party can appeal by permission the ruling of the trial court?

A. Yes. Either by permission of the trial judge or, if the trial judge refuses, permission of the Court of Appeal.

Q. So let's look now at slide 47.2.

This is something from a case you discussed, Interdigital versus Lenovo, and this is a judgment of the trial court. You may be familiar with it.

A. Yes.

Q. And am I correctly interpreting this that the FRAND trial in that matter is indicated as having started in January 2022?

A. That's correct.

Q. And the draft judgment came out in March of 2023?

A. That's correct.

Q. And then if we go to slide 47.3, am I correct that the appeal ruling in that case came out in July of 2024, just a matter of weeks ago?

A. Yes, after a hearing in June.

Q. And am I -- an appeal hearing in June?

A. (Nodding head up and down.)
Q. Was that a yes?
A. That's correct.
Q. And am I also correct that there is the possibility of an appeal to the UK Supreme Court?
A. That is if the case raises a point of law of general public importance. This is the case I mentioned in my direct testimony where the judge, Justice Birss, was critical of the time that the judge had taken to reach his judgment.
Q. Let's talk now about the Unwired Planet case.
And if we can go to CDX-47.4.
This is the Unwired Planet-Huawei case that you discussed in your testimony, correct?
A. Yes.
Q. Now that case was initially filed in 2014, am I correct?
A. I don't see where you get that from.
Q. If you look at the case number at the top it seems to be a 2014 case.
A. You're right, yes.
Q. And then the court conducted a number of technical trials on patent infringement/essentiality/validity, correct?
A. Yes, that's rather going out of fashion now, but

that's what happened in that scenario.

Q. Following those technical trials the court conducted a FRAND trial starting in October of 2016.

A. That's correct.

Q. The FRAND judgment came out in April of 2017, correct?

A. True.

Q. And that was from Justice Birss who wrote that, judgment of the trial court, right?

A. Yes, the hearing wasn't completed until December 2016.

Q. And if we can turn to slide 47.5, am I correct that Huawei requested appeal, which was granted?

A. Requested permission to appeal, yes, and there was an appeal.

Q. The appeals court held argument in May of 2018, and the appellate order issued in October of 2018, correct?

A. That's correct, yes.

Q. And then the case was further appealed to the Supreme Court, wasn't it?

And if we turn to slide CDX-47.6, that hearing was held on October -- in October 2019, and the judgment came out in August of 2020.

A. Yes, that's correct.

Q. And you mentioned in your testimony a target date

of 12 months after filing to conduct the first instance trial, but that's not set in stone, right?

A. It's the policy of the Patents Court to seek to achieve that.

Q. The operative word is seek to achieve. It's not mandatory, correct?

A. It's policy.

Q. Now we have also been discussing thus far the FRAND trial, but in the UK case raising the FRAND rate-setting issue, there were also three patent claims asserted, correct?

A. There's one, my understanding, one infringement claim and two challenges.

Q. Lenovo has asserted one infringement claim against Ericsson and it has filed two declaratory judgment claims against Ericsson's patents seeking declarations of noninfringement invalidity, correct?

A. Yes. That's more accurate.

Q. There is going to need to be a further technical trial in the UK action?

A. Yes, I understand the technical trial has been listed for October.

Q. Of 2025?

A. I believe that's right.

Q. So there's first going to be a FRAND trial in the

April-May 2025 time period?

A. Yes.

Q. Then the technical trial in October of 2025?

A. I think that's correct.

Q. And you agree with me that there is no statutory mandate by which the court is required to issue its judgments from either the FRAND trial or the technical trial, correct?

A. I think I already answered that.

Q. I'd like to now switch gears and ask you a little bit about the term "FRAND injunctions" as that term is used in the UK. I'd like to put up your report, and I have it on a slide.

May I have slide 7, please, 47.7?

Do you recognize this as paragraph 50 of your initial report, which is RX-2221C?

A. Yes, I do.

Q. And it's only part of page 50, I couldn't fit it all on one slide, but I will show you in the next slide the rest of it.

Now in paragraph 50, Sir Christopher, you make the point that typically when a UK court does a rate-setting, one side, the Patent Owner, agrees to accept the determination in advance while typically the defendant will not.

Fair?

A. That's what I said there, yes.

Q. But if the Patent Owner and the defendant both agree in advance to accept a license on the terms set by the court, an injunction for patent infringement will not be granted because the license will come into effect as a result of that FRAND determination.

Is that fair?

A. I can't immediately see where you're reading from there.

Q. Well, I was doing a little bit of synopsis.

A. I see.

Q. But is that a fair synopsis?

A. Can you ask your question again, please?

Q. Yes. If the Patent Owner and defendant both agree in advance, they both agree, to accept a license on the terms set by the court, an injunction for patent infringement won't be granted because the license will come into effect as a result of the FRAND determination?

A. Yes. To generalize, but in those circumstances you'd expect that to occur.

Q. But you understand in this case Ericsson has not undertaken or agreed to be bound by the UK rate determination?

A. The ability of the English court to set the terms

of their FRAND license is not -- is not dependent on Ericsson's consent. Ericsson is now subject to the jurisdiction of the English court, and the court will go on at the trial in April of 2025 to determine those terms.

Q. That wasn't quite the question I asked, though.

You understand, don't you, that Ericsson has not undertaken in the UK court to be bound by the results of the rate-setting?

A. I understand that, yes.

Q. Okay. Let's go to slide 8, CDX-47.8.

And this has the remainder of paragraph 50 there. And this portion, am I correct, paragraph 50 at the top addresses the scenario where the defendant does not undertake to enter into a license at the rate set by the court?

A. Yes.

Q. Now in that event, a license agreement between the parties will not necessarily result from the court rate-setting, so you opine that the court may grant a FRAND injunction, correct?

A. I'm not sure about the first part of that, but if the party requiring a license has been found to infringe and not given the undertaking, then the court will grant a qualified injunction, which ceases to have effect once the defendant undertakes to take a license.

Q. Is it fair to say that this FRAND injunction, an injunction that is -- permits the enjoined party, the defendant, to take a license to avoid the injunction, we'll call that the FRAND injunction -- is that fair?

A. Yes. I mean, the effect is that he is put to an election between leaving the market and taking the license.

Q. Let's talk about that election. You said one aspect of the election after the rate-setting is the defendant may have to leave the market or take the rate that is set.

But isn't another election to potentially design around the patent?

A. Standard-essential patents, that's a rather hypothetical suggestion, because if the patent is essential to the standard, you can't continue to sell standard-compliant devices.

Q. And that would be a design-around, correct?

A. Well, it would be, but I don't see how it's possible in these sorts of circumstances.

Q. You don't really know -- have much expertise in noncompliance certificates for aspects of base stations, I take it?

A. I wouldn't profess expertise in that, no.

Q. So, for instance, the feature could be removed by the defendant to avoid an injunction as opposed to taking

the rate-setting, fair?

A. It would seem to follow that, by doing that, the base station is rendered noncompliant with the standard.

Q. And, similarly, would it be also the case that, if as a result of the technical trial, there's no infringement found or the patent is found to be invalid, there would be no FRAND injunction granted?

A. That's correct, yes. You can't grant an injunction without a valid patent.

Q. And Lenovo was asserting one patent in the UK against Ericsson and Ericsson is contesting both infringement and validity, correct?

A. That's correct, but there's another side to this, which is that Lenovo have gone to the court and they have not insisted on going through that sort of process. They have said we undertake to take the license anyway. And in -- that's a new situation. The court -- they haven't been compelled to take a license, but they have offered to take one. And in those circumstances, seems to me entirely plausible that the court will order Ericsson to grant the license on the terms that it settles.

Q. But you said plausible, not inevitable.

A. Well, we have not encountered this. As you've said, the usual scenario is to compel an implementer to take a license under the threat of an injunction, but here you

have a willing party saying -- coming to the court with an open undertaking, saying, please, court, settle the terms, tell me how much I've got to pay, and I will pay it. So no need for a FRAND injunction against Lenovo.

Q. Let's go to slide 10, please.

Have you reviewed the transcript of the hearing on June 21st, 2024 in the Lenovo-Ericsson matter?

A. I don't think -- Lenovo-Ericsson.

Q. It's RX-2535, and I believe you referred to this hearing.

A. I honestly don't recall.

Q. Isn't it true that Justice Richards in that hearing, when talking about the rate-setting request of Lenovo, said the court could make a declaration, which turns out to be a dead letter or not really worth that much because, for example, the English patent is found to be invalid or because Ericsson will not offer a license in those terms because they want to wait and see what the Eastern District, referring to the Eastern District of North Carolina, says.

A. Well, this is not a judgment. This is part of a discussion between the judge and counsel for various ideas thrown out. I would need to see the entire context and read his decision before expressing any views about that.

Q. Sir Christopher, thank you for your time. Thank

you for coming over here.

MR. STEVENSON: I will pass the witness.

JUDGE MCNAMARA: Ms. Chang?

MS. CHANG: No questions for Staff, Your Honor.

JUDGE MCNAMARA: Thank you.

Mr. Ravishankar?

MR. RAVISHANKAR: Your Honor, briefly, if I may.

REDIRECT EXAMINATION

BY MR. RAVISHANKAR:

Q. All right. On cross-examination you were asked by counsel for Ericsson about Lenovo's undertaking in a pleading where they said they would be bound by FRAND license after exhausting their appeal avenues, right?

A. Yes, I recall that.

Q. And you had responded that the court will order it.

A. Yes.

Q. What did you mean by that?

A. Well, the court has powers to enforce its order pending an appeal, and in circumstances such as this it would, in my opinion, do so.

Q. And when you say enforcing its order, what form would that take in a rate-setting case?

A. Well, a variety of things can be done. If there is a lump sum that's been determined, the court makes an

order, absolutely standard money judgment, and the defendant says, if the defendant says I can't pay, then the court may have to give them time to pay. But between solvent parties, normally they would be required to pay pending the appeal, subject, of course, to an adjustment if the appeal is successful.

Q. And when would that payment be made?

A. Well, in Interdigital and Lenovo it was made very promptly, two weeks, I think.

Q. Is there anything consistent about or inconsistent about Lenovo's pleading regarding being bound by a FRAND license pending avenues of appeal and the ordering of an interim payment pending appeal?

A. Yes. Lenovo's undertaking has nothing to do with when they would be required to pay.

Q. You were also asked a little bit about the English court conducting technical trials before they do a FRAND rate-setting trial.

Do you recall that?

A. Yes.

Q. All right. And you had mentioned that this had gone out of fashion, but counsel didn't follow up.

Do you remember that?

A. Yes.

Q. What did you mean by gone out of fashion?

A. Well, as it gathers experience, the court has seen this battlefield with both parties saying they want licenses, but meanwhile knocking chunks out of each other in litigation all around the world. And so the idea that it's a condition precedent to having a FRAND rate-setting to have a number of sort of token battles on patent infringement is going out of fashion. And I think the courts are likely to do what has been called FRAND first from now on.

Q. What procedure has been ordered for this dispute between Ericsson and Lenovo in the High Court?

A. What procedure?

Q. In terms of the procedure regarding the timing of trials.

A. We have had case management conferences in both cases, and the rate-setting action has been brought on and fixed for that April date, and the judge was not persuaded, although Ericsson asked for this, the judge was not persuaded to hold the patent infringement case first.

Q. Thank you, Sir Christopher.

MR. RAVISHANKAR: I will pass the witness.

JUDGE MCNAMARA: Thank you.

Mr. Stevenson?

MR. STEVENSON: Nothing further.

JUDGE MCNAMARA: Thank you very much.

Anything, Ms. Chang?

MS. CHANG: Nothing, Your Honor. Thank you.

JUDGE MCNAMARA: Very good. Sir Christopher, you may step down. Thank you very much.

THE WITNESS: Thank you very much, Your Honor.

JUDGE MCNAMARA: Now would be a good time to take lunch.

With that, is there anything you'd like me to address before we break for lunch?

MR. STEVENSON: Nothing from Ericsson.

MR. AROVAS: Nothing from Respondents, Your Honor.

MS. CHANG: Nothing from the Staff, Your Honor.

JUDGE MCNAMARA: All right. It is now 12:32. I will see you in an hour. Thank you.

(Whereupon, the proceedings recessed at 12:32 p.m.)

AFTERNOON SESSION

(In session at 1:32 p.m.)

JUDGE MCNAMARA: Thank you, everyone. Please be seated.

MR. MIZZO: Good afternoon, Your Honor. Chris Mizzo for Respondents. If you would like to proceed, we can call our next witness.

JUDGE MCNAMARA: Dr. Dippon?

MR. MIZZO: Respondents call Dr. Christian Dippon to the stand.

JUDGE MCNAMARA: Good afternoon, Dr. Dippon.

CHRISTIAN DIPPON,

having been first duly sworn or affirmed on their oath, was thereafter examined and testified as follows:

JUDGE MCNAMARA: Please state your full name.

THE WITNESS: Christian Michael Dippon.

JUDGE MCNAMARA: Thank you very much.

DIRECT EXAMINATION

BY MR. MIZZO:

Q. Good afternoon, Dr. Dippon. Would you please introduce yourself to Judge McNamara?

A. Yes. Good afternoon. My name is Christian Dippon.

Q. What do you do for a living?

A. I'm an economist and senior managing director at NERA Economic Consulting here in Washington, D.C.

Q. Why are you here today, Dr. Dippon?

A. Counsel for Lenovo asked me to apply my educational background and experience to analyze and quantify the public interest harm that will result in granting Ericsson's requested remedial orders, and also to examine whether current Motorola smartphones are commercially reasonable upgrades or extensions, CRUE, CRUE, relative to its predecessors.

Q. I just want to make sure the record is clear. I think you said commercially reasonable upgrades and extensions.

Did you mean updates?

A. I meant updates. My apologies.

Q. Did you prepare any slides to assist you with your testimony today?

A. I sure did, yes.

Q. Let's turn to RDX-9.2.

Could you please briefly summarize your educational background for Judge McNamara?

A. Certainly. I have a doctorate degree in economics, a master's in economics, and an undergraduate degree in business administration.

Q. Can you please briefly describe your work

experience?

A. Yes. I have over 28 years of experience. I specialize in analyzing and quantifying economic harm to the public interest, but also to private parties, competitive conduct and regulatory interventions. I have experience in over 20 countries around the globe, and I also have extensive testimonial track record.

Q. In your over 28 years of experience, what sorts of industries have you focused on?

A. I focus on the telecommunications sector, the broader digital economy, consumer electronics, and also the mining sector.

Q. Are you a member of any organizations or affiliations in your field?

A. Yes, I am.

Q. Can you provide an example?

A. Certainly. I'm on the board of directors of the International Telecommunications Society. That is an organization consisting mostly of academics studying the field of telecommunications.

Q. And I see on the slide a reference to RX-2110.

Is that your CV?

A. Yes, it is.

Q. Does that accurately reflect your experience and education?

A. It certainly does.

Q. Can you describe your experience with matters involving mobile telecommunications and smartphones?

A. Yes. I have extensive experience in all parts of the mobile wireless value chain as an economist, analyzing and testifying in matters relating to disputes at the network level or wholesale level and also in retail markets, and that could be breach of contract, class action lawsuit, mergers, general damages theory, but also matters pertaining to the public interest.

Q. Have you previously testified as an expert on the economics of the telecommunications sector?

A. Yes, I have. I've presented testimony in state and federal court before domestic and international arbitral tribunals, before regulators here in the U.S. and abroad, and also testified before this Commission.

Q. Has any of your prior expert work that you've done related to the public interest?

A. Yes, it has, several times.

MR. MIZZO: Your Honor, Respondents offer Dr. Dippon as an expert in the areas of economics, competitive conditions and related issues in the mobile telecommunications industry.

JUDGE MCNAMARA: Thank you, Mr. Mizzo.

Mr. Swain?

MR. SWAIN: No objection, Your Honor.

JUDGE MCNAMARA: Ms. Chang?

MS. CHANG: No objection, Your Honor.

JUDGE MCNAMARA: All right. Then Dr. Dippon is accepted as an expert or the subject matter upon which he was called to testify without objection.

MR. MIZZO: Thank you.

Q. Let's go to the next slide, RDX-9.3.

Dr. Dippon, can you provide a summary of your opinions in this case?

A. Of course. There are three takeaways from my completion of the assignment.

First, remedial orders eliminate Ericsson's FRAND obligations, thereby harming the public interest.

Second Ericsson's requested remedial orders will result in significant and long-lasting public interest harm.

And, third, Motorola smartphones are clearly updates and extensions of their predecessors.

Q. Turning to the next slide, RDX-9.4, what did you consider in forming your opinions?

A. Well, first I reviewed Ericsson's requested remedial orders to understand what the dispute is about, then I analyzed relevant documents produced by the parties and researched data and information available in the public domain. I examined the impact of the remedial orders on

Ericsson's FRAND obligations, and applied an econometric model to actually quantitative the public interest harm. And then I compared Motorola smartphones from 2010 to today.

Q. Did you also consider the materials that Dr. Akemann considered?

A. Yes, sir, I did.

Q. Let's now transition to your first opinion.

How would Ericsson's proposed remedial orders eliminate Ericsson's FRAND obligations?

A. Well, the FRAND obligations were put in place to ensure that Ericsson obtains a royalty rate that reflects the fair market value of the innovation. By granting an exclusion order, we would cancel that objective, and thereby allowing Ericsson or enabling Ericsson to charge supra-FRAND rate or even demand payment for products that Lenovo alleges it already licensed.

Q. Ericsson contends that its October 11, 2023, offer was reasonable.

Did you analyze that contention?

A. I did review some of the reasonableness tests that were offered, yes.

Q. What did you conclude?

A. I conclude that the reasonableness tests are not reliable and do not provide support for the contention.

Q. What are the reasons for your conclusion that

Ericsson's reasonableness claim is incorrect?

A. There are three problems with those reasonableness tests.

First, they rely on an incorrect patent stack share, a study performed by Dr. Stec and Dr. Cooper. There's two additional problems with those tests, and the second problem is they rely on a consumer survey conducted by Dr. Rebecca Reed-Arthurs. And I've carefully reviewed that survey. That service is not plausible. Its results are not plausible. We cannot rely on that survey.

And, third, it rests on an incorrect interpretation of a product, the 5G Mod, that was offered by Motorola to a niche segment of the market that had a special or had a particular line of Motorola phone.

Q. Let's talk about how eliminating FRAND obligations harms the public interest.

What are the components of that harm to the public interest from FRAND violations?

A. There are three overarching elements of harm. First, it harms competition, and that harm of competition then flows down to harm in consumers, thereby the public interest.

Q. Let's turn to RDX-9.5.

How would the injunctive relief Ericsson seeks here impact competition?

A. So as I previously mentioned, the injunctive relief based on the standard-essential patents or SEPs eliminates Ericsson's FRAND obligation. That, therefore, forces Lenovo to either accept Ericsson's demand or face a -- what in this case would be likely a 13-year long ban.

That, in turn, enables Ericsson to extract returns that are higher than the fair market value of the innovation and allows Ericsson to demand payment and injunctions for already-licensed products.

Q. What do these FRAND related harms have to do with the consumers here?

A. So the competitive effects flow to the consumer, and they would raise prices for 5G-enabled smartphones, reduce innovation, and discourage investment in standard-based products.

Q. Let's go to the next slide, RDX-9.6.

Did you analyze the economic impact of the proposed remedial orders in this case on the public interest?

A. Yes. I analyzed it and quantified the parts that I could quantify, yes.

Q. And what did you conclude?

A. The evidence is very clear that granting Ericsson's requested remedial orders will result in a significant and long-lasting public interest harm.

Q. What are the components of this significant harm?

A. So there are two components by which the public interest will be harmed, and one is the choice effect and one is the price effect. And let me explain those two effects.

So granting Ericsson's requested remedial order reduces consumer surplus because it eliminates the preferred device of those people who would like to purchase a Motorola smartphone. That's called the choice effect.

In granting Ericsson's request for remedial orders would also reduce consumer surplus because of higher prices that would result once Motorola exits. That consumer surplus reduction is the price effect.

The two -- the sum of the two, the sum of the choice effect and the price effect, is the total consumer surplus loss. That is the public interest harm.

Q. You've referred to consumer surplus.

What is consumer surplus?

A. Consumer surplus is simply the difference between an individual's maximum willingness to pay for a product or service and the price they end up paying for that same product or service.

Q. Let's turn to RDX-9.7.

Can you provide an example of consumer surplus?

A. Yes. So imagine there's a consumer and she would

like to buy a Motorola smartphone. She is willing to pay $1,000. What does that mean? That means that the benefits of device ownership is equal to $1,000, at least in this hypothetical example.

Now the person is willing to pay $1,000. The actual price is $600. So that means the person materializes or gains a consumer surplus of $400 that is sort of, quote/unquote, the profits from device ownership.

Q. Let's turn to RDX-9.8.

Can you provide an example of the choice effect?

A. Certainly. Just to remind everybody, the choice effect is a consumer surplus loss, because there are fewer choices in the market.

So, again, imagine the same person who would like to buy a Motorola phone would materialize a consumer surplus of $400, and now she goes to the store and the store representative tells her, we're sorry, but we no longer are allowed to sell Motorola smartphones. So that person must go to her second choice.

Now in this hypothetical example, let's assume this person says, okay, then I'm going to buy a Google Pixel phone. I show that there. Her maximum willingness to pay for this particular device is $800. The price point is $500. She gains a consumer surplus of $300. So, by virtue of the fact that her preferred choice is no longer

available, the individual loss consumer surplus of $100.

Q. Dr. Dippon, isn't there always going to be a loss due to the choice effect from an exclusion order?

A. Yes, there is. The question, though, and this is where I hope I can help the Commission, is to quantify what that harm is. That harm could be small or large. Depends on many different inputs, like market share, duration, duration of the proposed ban and so forth.

Q. Can you explain whether access to non-Motorola smartphones would eliminate the harm of the choice effect?

A. Access to other smartphones would not eliminate the choice effect. In fact, this very example assumes the individual has access to other smartphones, so that would not eliminate the choice effect.

Q. Let's turn to RDX-9.9.

Can you provide an example of the price effect?

A. Yes. The price effect, again, is the reduction of consumer surplus, because of changes in price, and best explained with the same example as we had before.

So the individual earns $300 if the Google Pixel phone is $500, but now because Motorola exits from the market, Google is able to charge a bit more for that same device. Again, hypothetical example here, say Google decides we're going to increase the price to $525. So the person now earns only a consumer surplus of $275. That

means, because of the $25 price increase, the consumer lost $25 of consumer surplus.

Q. Why would the price of non-Motorola smartphones increase?

A. That is because with the exit of Motorola competition will be decreased. These are not homogeneous products. We're not in a situation of perfect competition. So that allows Google to increase its prices.

Q. Ericsson's expert, Dr. Akemann, opined that, when LG Electronics exited the market there was no price impact on smartphones.

Is this different?

A. Yes, this is entirely different. LG exited the market because there was no longer demand for the product. At the time of exit, at the time it made the announcement, its market share was around 2 percent.

And so that's different. We're having a product here that has demand, that is thriving, successful, and it's not a natural exit, whereas LG was. I also add, Dr. Akemann did not examine whether there was a price effect or not.

Q. Dr. Akemann talked about market exits and entrances.

Did he identify anyone who could or would enter the market if Motorola's 5G smartphones were excluded?

A. No, he did not.

Q. Are you aware of anyone who could or would enter the market if Motorola's 5G smartphones were excluded?

A. I'm not, and I did carefully look, yes.

Q. Let's turn to RDX-9.10.

Why did you decide to use a consumer surplus analysis to measure the economic harm in this case?

A. Two reasons really. One is it's the proper tool to use from an economics point of view. We measure a lot in terms of consumer surplus. And, second, and more as a consequence of the first, several public agencies and organizations use consumer surplus in order to understand what impact their decisions have on the public interest. And I listed the Federal Trade Commission, Department of Justice, a few others, and also organizations like the ITU and the OECD.

Q. Let's turn to RDX-9.11.

How did you calculate the impact of the proposed remedial orders on consumer surplus in this case?

A. In order to quantify the consumer surplus loss, I went back to the economic literature, and I applied a model from that literature to the present investigation. The model is described in a 1994 article in the Journal of Law, Economics and Organization. It's a peer-reviewed journal. And the article was authored by Dr. Gregory Werden of the U.S. Department of Justice and also Dr. Luke Froeb, a

professor at Vanderbilt University, and that's in RX-1864.

Q. Why did you pick the Werden-Froeb model?

A. The Werden-Froeb model was built from mergers, merger simulations, and what Drs. Werden and Froeb were interested in understanding, amongst other things, was exactly the price effect and the choice effect that we talked about.

And so that model applies perfectly, arguably, even better than a merger situation. It applies perfectly to the current investigation.

Q. Let's be clear.

Is this model used today to determine competitive effects?

A. Yes, it is.

Q. Who uses it?

A. The Department of Justice and the Federal Trade Commission.

Q. What inputs does the Werden-Froeb model require?

A. It requires three types of inputs. First, product market shares, product prices, and then the gross margin of the product that's being excluded. In our case that would be the Motorola gross margin.

Q. Let's turn to RDX-9.12.

How did you determine those inputs for this case?

A. So I collected the relevant flagship device

prices for Motorola, Apple, Samsung, TCL, Google, and T-Mobile branded smartphones. Then I collected import shares, shipment shares, as a proxy to market share from market research firm IDC. And then, third, I had a conversation with the chief financial officer of Motorola Mobility to understand what Motorola's gross profit margin is on 5G smartphones.

Q. Are the exhibits that you relied on for this model input data collection, the RX numbers, are those reflected under A, B and C on RDX-9.12?

A. Yes, sir, they are.

Q. After you had this data, what did you do next with it?

A. Then I programmed the model. For this I used a program language called R. I could have used many other programming languages, but that's the one that I've used.

Q. And is your model implementation reflected in RX-1864, RX-1859, and RX-2113C?

A. It is.

Q. Mr. Beall, would you please pull up RX-2113C?

Dr. Dippon, is this Appendix D to your expert report?

A. Yes, sir. I describe my model and the derivation of the model in this particular appendix.

Q. Let's turn to page 6, please.

And if we could please blow up table D.3.

This table lists a column of old price and old share data.

What do those columns represent?

A. So the columns highlighted in yellow, those are actual prices and actual market shares. It's very important that this model is run with actual information.

Here, the old price, what I call old price, are the actual flagship prices of the smartphones being offered by the brands listed under company.

The old shares, those are actual market shares. Again, it's important that we start what we as economists call inequilibrium.

Once you run the model, the model will then predict what new prices are with the reduction of competition. That's showed under new price. And it will also then provide new market shares, and that's shown in the new share column at the very right side.

Q. So let's turn back to RDX-9.12.

What result did you obtain using the Werden-Froeb model?

A. So applying the Werden-Froeb model to this present investigation tells us there would be a choice effect of $8.57 per smartphone purchase, and that is across all smartphone purchases. That's the way the model works.

And also a price effect, an additional price effect of $9.54 per smartphone purchase, again, all smartphone purchases.

Q. Let's turn to RDX-913.

What is the total harm you calculated for proposed remedial orders?

A. So now that we have the result of the Werden-Froeb model, we simply have to multiply it by the number of projected smartphone sales in the United States.

And I did that version, the first 12 months of the ban, and in the first 12 months of the ban, public interest harm would result in $2.4 billion. That's the sum of the choice effect and the price effect in the first year.

And over a period of 13 years, which I estimate is the duration of the requested ban, that public interest harm would amass to $42.5 billion.

Q. Is consumer surplus loss the only harm to the public interest from the proposed remedial orders?

A. It is not. But that's the one that -- this is what I can quantity. The other ones I can better describe them.

Q. Let's turn to RDX-9.14.

What other public interest harm would exist from the remedial orders?

A. Well, there are at least three considerations

that we should not overlook is, number one, Motorola is particularly valued by lower income consumers, those seeking to purchase a smartphone below $400. Really the only competitor in that market segment is Samsung.

And so the harm that we just discussed would really impact those lower income consumers more than others.

And that's in RX-0609C.

Second, it would deprive U.S. consumers of Motorola's innovative solutions. Let's remember, Motorola was the first commercially available mobile wireless phone in 1984.

And that is in RX-1723, 1726, 1764, and RX-1777.

Then granting Ericsson's request for remedial orders would also harm existing Motorola smartphone users despite the fact that I understand they can keep their device. It would lower their resale value, it would lower their trade-in value, and it would make it impossible or legally prohibitive to repair the device.

And I listed the RX-numbers in the last line of the slide.

Q. Ericsson's expert, Dr. Akemann, reached a different conclusion and found no significant public interest harm.

What do you think of Dr. Akemann's opinion?

A. Well, Dr. Akemann did not measure the public

interest harm in this matter. Dr. Akemann looked at whether U.S. consumers would be able to purchase other smartphones if an exclusion were to be granted. And the answer is yes, and that's undisputed.

But what the problem is, is that there would still be the choice effect. There would still be the price effect. We would still face a public interest time of 42.5 billion, and Dr. Akemann overlooked that part, certainly didn't quantify it.

Q. I want to move to your third conclusion that Motorola smartphones are commercially reasonable updates or extensions.

How is CRUE, which is the term we've used to succinctly state that phrase, relevant to the public interest?

A. It is directly relevant to the public interest. I understand Lenovo contends that it has already a license to the product at issue here. And if so, this is an example of patent holdup, because now Ericsson can ask for or can double-dip, if you will, on those products and ask for payment for products that Lenovo contends it already has licensed.

And that, then, leads to the public interest harms that we talked about.

Q. With respect to this case, what does the 2011

license cover?

A. It's my understanding that it covers cellular devices including smartphones and commercially reasonable updates and extensions of such devices.

Q. What analysis did you conduct relevant to CRUE?

A. So the way I consider CRUE, and it's not a concept in economics, but the way I look at it from the perspective of an economist is we need to undertake a two-step test.

The first step is we need to look at the supply side to see if and how smartphones have changed over time, and, second, we need to understand whether these changes in the eye of the consumer resulted in treating these products or the resulting products as different products or simply CRUE relative to their predecessors.

Q. What conclusion did you reach based on your analysis?

A. Current Motorola smartphones are most certainly CRUE relative to their predecessors. They are smartphones. They were smartphones in 2011. They are still smartphones today.

Q. Let's go to slide RDX-9.15. What causes you to reach the conclusion that Motorola smartphones are CRUE?

A. So, again, there's two elements to this. First, I observed that current Motorola smartphones offer generally

the same value proposition as their predecessors. And, second, consumers still select their smartphones using the same or very similar purchase drivers as they did in 2011.

Q. Let's go to the next slide, RDX-9.16.

How do Motorola smartphones over the years offer consumers the same value proposition?

A. So what I did as part of my work as a telecommunications economist, I looked at Motorola smartphones starting with 2010 all the way to 2024. I think I did 14 different parallelized comparisons. And I looked at whether the attributes, the characteristics, if you will, of smartphones have changed during that time period.

Q. What did you find with regard to the basic functions of Motorola smartphones, have they changed over time?

A. They have not. When you look at that, the key attributes remain the same. We had mad smartphones in 2010. They had screens. They had a battery. You could do voice calls, access the internet, send text messages and so forth, they had cameras. All those considerations have not changed.

Now there's no dispute they have improved. They have improved nicely along the way. But the overall attribute list, the characteristics of smartphones has remained the same. Just to say one more time, smartphones

today are still smartphones, very much like they were in 2011.

Q. When you were looking at these smartphones on RDX-9.16 and looking at their attributes, were you looking at the RX exhibits that are at the bottom of this slide?

A. Yes, sir, I was.

Q. Let's turn to RDX-9.17.

And I think your previous answer is discussing this, but, if you could, perhaps elaborate for Judge McNamara, how did you conclude that the purchase drivers have remained the same for Motorola smartphones?

A. So now that we know that from the supply side there were improvements, changes made to the smartphones, but the overall characteristics remain the same, we need to look at this from the demand side, from us, the consumers.

And we need to see whether the purchase decision has changed. Do we select smartphones in a different way than we did in 2011?

And the answer is no. When you look at characteristics of smartphones in 2011, they had a battery, they had memory, they had a screen, an operating system and a camera. That's in RX-1701.

Now there were surveys made by third parties, not by myself, by third parties. There was a survey made and other surveys made, but this particular one was done in

2023, where it was asked, what are the purchase drivers today, how do we select smartphones? And the answer is the same. We still look at battery life, storage size, screen size, operating system, and camera. And that's in RX-1860 and RX-1866.

Q. Ericsson argues that 5G smartphones cannot be CRUE of their predecessors because they correspond to a new generation of cellular technology.

Do you agree?

A. No, I don't.

Q. Why not?

A. Well, at least two reasons. Number one, look, I've been studying this field for 30 years and I've been through the changes from 2G to 3G 4G and 5G and now we're starting to talk about 6G.

The generations, the air interface themselves, are, from the consumer perspective, they are upgrades relative to smartphone users. I'm not talking about the generally used system. And second --

Q. Just to make clear, you said upgrades again.

Did you mean upgrades or updates?

A. I keep confusing the two. I apologize. It's always "updates," never "upgrades."

So the second reason is that 5G on a smartphone offers some but really limited benefits to us as consumers.

They do not change. They're not turning a -- a 5G smartphone is not a different device relative to a 4G-only smartphone just because it has 5G connectivity.

Q. Do 5G smartphones include 4G?

A. Yes, they are backwards compatible.

Q. What are some metrics by which 5G is evaluated for consumers?

A. Well, 5G, when we talk about 5G, we're saying faster speeds, and better quality, quality being measured in improved jitter and latency.

Q. Are Ericsson's documents consistent with your understanding that 5G is not materially different than 4G?

A. Yes, they are.

Q. Let's pull up RX-1748.

Dr. Dippon, what is the title of this document?

A. Well, this is a blog -- this is a blog entry from Ericsson, and the blog entry is titled "Who cares about peak download speeds in 5G?"

Q. Let's turn to page 7.

And what did Ericsson say about whether consumers care about peak download speeds in 5G?

A. Ericsson pretty much says what I just said a minute ago, which is, and I quote, today's typical smartphone users don't benefit much from download speeds of multiple 100 megabits per second.

Q. Do the Ericsson documents you reviewed as part of your analysis say anything about latency in 5G?

A. Yes, they do.

Q. Mr. Beall, please pull up RX-1753.

And, Dr. Dippon, what is this document?

A. That's another Ericsson blog entry. This one is titled "Who cares about latency in 5G?"

Q. Let's turn to page 5. And what did Ericsson say about who cares about latency?

A. Ericsson says that, and I quote again, latency hardly impacts smartphone user experience in advanced 5G and 4G networks.

Q. Now as an --

You can take that down, Mr. Beall?

As an economist, and for the sake of this question, assuming there is a violation, what would be the most efficient outcome for the public interest in this case?

A. To protect, or the most efficient outcome rather, the most efficient outcome for the public interest is letting the court in the United Kingdom render a decision. Let me explain why.

If a court -- I'm not a lawyer, so I can tell you only what I understand. I understand that the court in the United Kingdom would issue what would be akin to a regulated rate. Well, if so, Ericsson's intellectual property rights

are protected. It gets a FRAND rate. Lenovo should be happy because it gets a FRAND rate.

But what makes this solution so much superior or efficient in terms of economics is we would not burden the public interest. There's agreement between Dr. Akemann and I that there is public interest harm. Now of course we disagree what the magnitude is, but we fundamentally don't disagree that there's harm.

And as an economist, I wonder why don't we go for a solution that protects the U.S. consumers yet still satisfies both parties in this matter.

MR. MIZZO: I'll pass the witness, Your Honor.

JUDGE MCNAMARA: Thank you, Mr. Mizzo.

Mr. Swain?

MR. SWAIN: Good afternoon, Your Honor.

CROSS-EXAMINATION

BY MR. SWAIN:

Q. Good afternoon, Dr. Dippon. Adam Swain on behalf of the Complainant.

It is nice to meet you in person finally. Thank you for your opinions.

Could I have RDX-9.10 up, please?

I listened to your testimony, Dr. Dippon, with great interest, and I love these agencies you have on the screen here.

There is one that's missing, is it not, Dr. Dippon? It's a beautiful gold crest just to the left shoulder of the ALJ, correct?

JUDGE MCNAMARA: I noticed that too.

Q. That's right. And the reason the ITC is not on your chart is because the ITC has never in 1300-plus investigations credited consumer surplus loss as a valid public interest concern, correct?

A. I can't answer it one way or the other way. I don't know.

Q. Okay. And you're familiar with consumer surplus because you, just last year, submitted consumer surplus declarations on behalf of Apple in the Apple Watch cases, correct?

A. Correct.

Q. Could I have CDX-48.2 up, please.

I have to say, Dr. Dippon, they look exactly like the ones you just showed in court here. On CDX-48.2, on the left, you just told us about a consumer surplus loss of a hundred dollars, the squares are the same, the font is the same. I'm having trouble telling these two apart.

You have a consumer surplus loss of both a hundred dollars on each, and you have the Apple Watch, which is a hugely popular product, and yet the Commission, correct, still found an exclusion order, correct?

A. I do not know what the Commission determined.
Q. You didn't follow up on the opinion of the Commission?
A. No, sir, I did not.
Q. Okay. You didn't miss anything because you weren't cited at all.
Now the consumer surplus model assumes that there's no new entrants to the smartphone market, that's correct?
A. That's right, yes.
Q. In the 13 years of the exclusion order no one new is going to come in and try to sell cell phones?
A. That's correct.
Q. You agree with me that cell phone market, though, is highly competitive, correct?
A. I agree with that yes.
Q. You agree the consumer surplus model assumes the demand for the long-departed Motorola phones 5, 10, 13 years later, people are still going to be wanting those phones, correct?
A. Yes, absent an exclusion order, yes.
Q. Okay. That demand level is still going to be the same ten years from now, 2034, '35, '36, right, the same demand for phones that were gone for ten years off the market, correct?

A. Well, it keeps demand constant. I think I'm having a little bit of trouble with your question because, yes, it assumes constant demand, we agree on that, but what you said under an exclusion order, and that's not quite right.

Q. Okay. When we talk about consumer surplus, Dr. Dippon, there's not going to be a situation where a consumer is going to be paying more than what they would otherwise be willing to pay for a smartphone, correct?

A. Correct.

Q. There is not actually monetary harm to the consumer.

A. Well, there's harm, but they wouldn't pay more than their maximum willingness to pay.

Q. Right. It wouldn't be monetary harm, correct?

A. Yes and no. Consumer surplus is and of itself not monetary. It's a loss in value. But here we actually, the price effect that we just talked about, that's monetary value. And in this case it's about, I forgot the exact number, but I think in the first year about $1 billion and over 13 years about $20 billion.

Q. We heard that before. I'm talking about the choice effect.

A. I'm sorry. I apologize. I thought you were talking about the price effect.

Q. No monetary harm from the consumer surplus choice effect, right?

A. You're right, yet.

Q. Thank you, Dr. Dippon.

I heard you discuss your public interest harm, and the only public interest harm that you quantified for the Commission is this consumer surplus, both the choice and price effect, correct?

A. Correct.

Q. Nothing on FRAND, nothing on innovation harm, nothing quantified from your standpoint, correct?

A. Yes.

Q. Okay. Dr. Dippon, we heard about you being an economist, correct? Fair to say you're an economist?

A. Yes, sir.

Q. And you own at least part of this NERA organization, this economic consulting group, with offices in D.C., correct?

A. I'm sorry. Can you say that again, please?

Q. NERA, your organization.

A. Yes, it's the firm I work for.

Q. You don't have -- you have no ownership stake in it whatsoever?

A. No, sir. I'm an employee.

Q. All right. Now we agree you're not an engineer,

correct?

A. Correct.

Q. Okay. You've never designed a smartphone?

A. No, sir.

Q. Okay. And you've never worked in smartphone development?

A. No, I have not.

Q. And you are absolutely not an industrial designer of any sort; is that fair?

A. We can agree on that.

Q. And as part of your examination of what is a commercially reasonable update or extension in this case, you didn't examine, actually take apart any of the Motorola phones, correct?

A. No, I did not.

Q. Okay. And you don't -- and you know that Motorola's 5G phones that are accused today, there is not a single physical component that those have in common with any of those in 2011, correct?

A. I don't know.

Q. You don't know because you didn't look?

A. Because I'm not qualified to look.

Q. Now, again, I want to use the term CRUE as commercially reasonable updates and extensions. I think that will help some of the confusion that was on your direct

as far as updates versus upgrades.

Is that fair?

A. That's fair.

Q. When I say CRUE, you know what I mean?

A. Yes, sir.

Q. Wonderful. That term CRUE comes in 2011 MMI license between Ericsson and Motorola, correct?

A. Yes.

Q. And that was signed in, I think, January of 2011?

A. I think that's right.

Q. Sounds right. Now this term CRUE, commercially reasonable updates and extensions, that's not a term you've ever seen before, correct?

A. Correct.

Q. Not as an economist, not as just a person in the world. You've never seen this term before, correct?

A. That's right, yes.

Q. Okay. And it doesn't have a particular economic term, I believe was your testimony.

A. No, there's no concept in economics.

Q. Okay. You didn't talk to anyone at Motorola or anywhere else to understand, well, what is the meaning of this CRUE term, right?

A. Correct.

Q. Okay. You could have talked to people at

Motorola, but you didn't do so?

A. I did not do so.

Q. Okay. Now if I understood your definition of CRUE from your expert report and your testimony, you looked to see whether consumers, and by consumers, in your definition, you mean the end users, correct?

A. That's correct.

Q. You or I using a cell phone, texting, calling, correct?

A. Correct.

Q. You look to see whether the people see that as a new product; is that fair?

A. Yes.

Q. And the definition of new, as I understand it, is if there's -- a product is truly distinct if it meets two characteristics: one, that consumers are willing to pay more, and if the sellers, firms, are effectively commanding higher prices for that product.

Is that fair?

A. I think that's part of it. We would expect to see higher prices being charged, but more fundamentally we would expect to see a shift in the demand curve.

Q. Can we have RDX-9.16 up, please.

I want to go back to your slide here. Now you have some phones on here ranging from 2010 to 2024.

Now, according to you, Dr. Dippon, and your analysis in this investigation, all these phones in RDX-9.16, these are CRUE, right?

A. Yes, sir.

Q. They are all commercially reasonable updates and extensions of the 2011 phones that existed at that time, correct?

A. You're right.

Q. Okay. And you agree with me that really, actually, we're looking at some 3G phones, some 4G phones and some 5G phones, correct?

A. That's correct, yes.

Q. And you haven't seen a single -- I mean, you analyzed -- I don't know about -- 116, 130 Motorola phones.

You haven't seen a single one that is not CRUE, correct?

A. The latter part of your statement is true. I didn't look at 116 phones. So I'm not quite sure where you get that.

Q. Let me ask it a different way.

You haven't seen a single Motorola phone either from 2010, 2011, all the way through present that is not CRUE; is that fair?

A. That's fair.

Q. Okay. Again, I mentioned -- I want to go back to

the phones here. I mentioned 3G and 4G and 5G.

Could I have CDX-48.4 up, please? Thank you.

And did I accurately shade this for you, Dr. Dippon? We've got CDX .4, we've got the 3G on the left, going to the fourth generation, and then to the evolution of the fifth generation.

Do you see that?

A. I see that. I don't know whether it's accurate or not, but I'm very happy to accept it as accurate.

Q. Thank you. Now you were here for the opening from my colleague Mr. Arovas, right? I think I saw you in the courtroom.

A. Yes, I think -- yes, I was here for the opening.

Q. He talked about Motorola's innovation, and one of those innovations, as we heard, is they had the first worldwide global 5G smartphone, right?

A. They sure did, yes.

Q. Let's just look at that again real quick.

Could I have RDX-12.3, please?

There it is on the right. Do you see it, the 2019? It should be on your screen, Dr. Dippon. It's lower right. World's first 5G smartphone from Motorola.

A. Yes.

Q. So let's be fair. Let's put that back on your continuum.

CDX-48.5, please.

I placed it right there in the middle on the advent from 4G to 5G. This is the world's first 5G smartphone from Motorola in April 2019.

Are you with me?

A. Yes.

Q. Great. Now before I get back to that phone, I want to talk to you about 5G in general.

Mobile phone makers in the United States, they need to have 5G capability and technology in their phones to compete, correct?

A. Yes.

Q. Okay. Because 5G, as you know, I mean, is expected to be the most significant -- to have the most significant economic impact of all the previous wireless generations, correct, 1G, 2G, 3G, 4G? It's the biggest one yet, correct?

A. Can you ask that question again.

Q. Sure. I'm happy to do that.

5G is expected to have the most significant economic impact of all the previous generations, correct?

A. I personally wouldn't agree with that, but I'm sure that --

Q. Well, a lot has happened in four years, Dr. Dippon.

Could I have CDX-48.9?

Article from Christian Dippon, that's you, right?

A. Yes.

Q. Okay. First author, second sentence in this article, March 2, 2020, the nascent worldwide deployment of the fifth generation 5G of mobile wireless technology is expected to have the most significant impact yet.

Do you remember that article now, Dr. Dippon?

A. Yes, I do. I look younger then.

Q. Thank you.

And you agree with me Motorola, when it came out with its first 5G phone, it told the world and its end users, customers, me, you, everyone in this room, that 5G is going to be different than 1G, 2G, 3G, 4G, correct?

A. Yes.

Q. Okay. Very different, correct?

A. Sure.

Q. They used the word -- could I have -- used the words --

Can I have CDX-48.10, please?

They used the words "transformational leap," correct, in their advertisements for their 5G phones, correct?

A. Yes.

Q. And having that 5G capability, again, is a

necessary attribute for smartphone participants in the market now, correct?

A. That is right.

Q. Okay. So much so that in your economic assumptions in your report, Dr. Dippon, you assumed that if Motorola's 5G phones were excluded, they would pack up all operations, including 4G phones and 3G phones, if they are still around, correct?

A. That is correct, yes.

Q. Because they have to have 5G to be a competitive business, correct?

A. Correct.

Q. Okay. You agree with me one of the reasons you have to have 5G as well is because the carriers have spent billions of dollars on 5G infrastructure, correct?

A. That is one of the reasons.

Q. You didn't consider the carriers at all as far as who the consumer of the mobile phones are, correct?

A. Yes, I did not consider carriers.

Q. Okay. Now in order to match this demand from its consumers and carrier customers, back to the phones, Lenovo had to spend hundreds of millions of dollars to develop their own 5G phones, correct?

A. I don't know the exact numbers, but that would not surprise me.

Q. You might be the only person in the room that doesn't know the numbers, because on Friday afternoon Motorola filed a summary determination of economic prong before Her Honor in a 1388 investigation claiming hundreds of millions of dollars of investment.

Is that fair?

A. I'm not aware of that.

Q. I want to go back to April 2019, Dr. Dippon.

Now, your testimony is that 5G phones are just a -- they are not new, they are just CRUE, correct?

A. Yes, they're CRUE.

Q. Okay. Now in order to get that first transformational leap into 5G, Motorola, right, they sold the 5G Mod, right? We talked about that before?

A. Yes.

Q. And they're selling it to consumers that already have a 4G phone. I have a Motorola flip-phone in my hand right now, the Z.

A. Yes, just for the Z though.

Q. Yeah, just for the Z.

A. Yes.

Q. 4G, I can call, I can text, I can video, transfer, I can do all the things that you've said in your report that makes the functionality the smartphone, correct?

A. Yes.

Q. What I can't do is communicate on a 5G network, correct?

A. Correct.

Q. I can't use mmWave?

A. You cannot.

Q. I can't use that new air interface, can I?

A. I'm sorry?

Q. You mentioned in your direct, you said there's no new air interface from the viewpoint of a consumer, but that's not on this phone, is it?

A. It's the 4G, the 4G air interface --

(Clarification requested by the court reporter.)

A. The phone can use the 4G air interface, but not the 5G air interface.

Q. Right. In order to get the 5G new air interface, you had to buy the 5G Mod, didn't you?

A. Yes, sir.

Q. Okay. Here it is. And they charged consumers telling them 5G will be a transformational leap, $300 or more per Mod, correct?

A. Yes, I think I've seen three different price points. I think I've seen over $300, I've seen $199, and I think Verizon had a presale at $50.

Q. Thank you.

Could I have CDX-48.8?

And now that consumer has spent 400 on the Z3 another 350 or so on the Moto Mod, and now they spent 750 just to get a 5G phone, correct?

A. Yes.

Q. I'll represent to you it weighs twice as much as it did before when I attached the Mod.

A. I can believe that.

Q. Now, Dr. Dippon, you understand that Motorola sold tens of thousands, maybe hundreds of thousands of these units for millions of dollars in revenue, correct?

A. That's not my understanding.

Q. Okay. It's your understanding they sold none of these products?

A. No, I think they didn't sell many. That's my understanding.

Q. Sitting here today do you know how many they sold?

A. I think less than ten thousand.

Q. Okay. Less than 10,000. Revenues into the hundreds of thousands, possibly millions, correct?

A. For a very short period of time, yes.

Q. Okay, yes. Is a million dollars, over a million dollars, is that a lot of money, Dr. Dippon?

A. Well, for me, sure it is.

Q. It should be, because hasn't Motorola paid you

almost one million dollars for your representation in this case?

A. No. It paid my firm, but not me.

Q. Yes. Thank you for the clarification.

MR. SWAIN: I pass the witness.

JUDGE MCNAMARA: Ms. Chang?

MS. CHANG: No questions from the Staff Your Honor.

JUDGE MCNAMARA: Thank you.

Mr. Mizzo?

MR. MIZZO: Yes, Your Honor.

REDIRECT EXAMINATION

BY MR. MIZZO:

Q. Chris Mizzo for Respondents.

I'd like to just take off where he began, he referred to 1300 ITC cases, presumably this is 1375 and that's where he is getting his number from.

Did Mr. Swain identify for you how many cases in which consumer surplus loss has been presented in a situation like this case?

A. No, he did not.

Q. He pulled up a slide and compared it to consumer surplus that you had provided.

It sounded like an Apple case involving the Apple Watch; is that correct?

A. Yes.

Q. And in that case was there a corresponding and pending UK rate-setting action going on?

A. No, I don't think so.

Q. Was there a UK action going on with a set trial date to resolve a global FRAND rate?

A. No.

Q. Was there a more efficient outcome in -- that's available in this case, was that most efficient outcome available in the Apple case?

A. No, it was not.

Q. And I want to make clear, because I think the record was a little muddled on this, he asked you questions about is it your testimony there is no monetary harm.

Sir, if the remedial orders were to issue and Motorola 5G smartphones were to be banned, is there potential real world monetary harm?

A. Yes, there is. We were talking about consumer surplus analysis. Consumer surplus on its own is not necessary monetary. It's a loss of value. I would say it's more important than money, because it's our utility, our happiness, our satisfaction.

But if we were just to talk about monetary harm, the price effect very much is monetary harm. And that is about a billion dollars in the first year, about 20 billion

over 13 years.

Q. If we could please pull up RDX-9.16, Mr. Beall.

And do you recall, Mr. Swain was asking you questions about this slide?

A. Yes, I do.

Q. And I think at one point Mr. Swain asked you a question about whether phones in 2010 and 2024 had a single physical component in common.

Do you recall that?

A. Yes.

Q. Let me ask you, sir.

Do smartphones in 2010 and in 2024 have displays?

A. They certainly do.

Q. Are those touchscreen displays?

A. Yes, they are.

Q. And do they have processors? Do both sets have processors?

A. That's my understanding, yes.

Q. Do they both have memory?

A. They certainly do.

Q. Let's go to RDX-17.

Can you just remind the Court what you found on this slide with regard to that slide of smartphones that you had analyzed from 2010 to 2024?

A. What this slide explains is that today's

consumers make their purchase decision very much the same way as they did in 2011. They look at the same elements of a phone in order to decide which phone they should acquire.

Q. Now we all understand that Motorola 5G smartphones, even if they include 4G, the ones at issue here, and I believe Mr. Swain asked you about 4G-only phones, given your assumption, I think your assumption was that, if the band issued, Motorola would stop selling its 4G-only phones.

Why did you assume that, sir?

A. Well, because by the time -- so I looked at what percent of consumers would demand a 4G-only phone by the time an exclusion order would issue, which I estimate is sort of about a year from now, maybe 11 months from now. And at that point 95 percent of consumers will purchase a 5G phone, leaving a very small consumer base for Motorola to sell to. It would not make economic sense to incur fixed costs to keep stores open, the retail channels open for smartphones.

So I think it's very reasonable to assume that they would -- that Motorola would pull its 4G and 5G phones. There's long not been any demand anymore for 3G phones, so I think that's a no issue.

Q. At around the time of potential remedial orders, what is the estimated market share of 4G-only phones?

A. 5 percent, less than 5 percent.
Q. Now counsel for Ericsson asked you questions about the 5G Moto Mod.
Do you recall that?
A. Yes, sir.
Q. And he held up, and he said you know when I have this and I add it to the phone, it's twice as heavy.
Do you recall that?
A. Yes, sir.
Q. Why do you think it's twice as heavy?
A. Well, I haven't taken it apart, but I do know that it has an integrated battery. So it offers not just 5G service. It also has a battery that comes with it, because 5G does use more battery power. So I would anticipate that a good part of that weight comes from the battery.
Q. And although Mr. Swain focused on a sale price of $300 or $350, has he shown that anyone paid $300 or $350 for it?
A. No, he has not.
Q. And what is the sale price that you're aware of for the 5G Moto Mod that Verizon was offering it at?
A. Well, Verizon offered in presale for $50.
Q. Now, sir, after the 5G Moto Mod was released in 2019, after that, are you aware of Motorola offering a Mod

for subsequent phones that had 5G capability?

A. No. This particular product was for a niche market. It was for individuals that had a Moto Z phone, and early adopters then, in 2019, wanted to have 5G. Now it's standard. That doesn't tell us anything about the average consumer's willingness to pay for 5G. It certainly doesn't tell us anything about what people are willing to pay today.

Q. Now Motorola has been offering 5G smartphones with 5G integrated into the phone, in other words, without a Mod, since at least 2020, right?

A. That's right.

Q. And has Mr. Swain shown you any evidence that Motorola has charged more for those phones than it did for the Motorola 4G phones that it was offering in 2019?

A. He has not.

Q. Do you recall that counsel for Ericsson asked you questions about whether Motorola smartphones are CRUE?

A. Yes.

Q. Ericsson argues that 5G is not CRUE of 4G.

So are the Motorola 5G smartphones CRUE of Motorola's 4G smartphones?

A. Yes, they are.

Q. Why?

A. Well, several reasons. 5G offers marginal benefits to consumers. It might offer us a bit more faster

download speeds, maybe if somebody wants to download Spotify playlist. But the latency and jitter, we as smartphone consumers really do not benefit from that.

Q. In your analysis, after you have looked at the phone and done the economic model, have you identified any Motorola smartphones that are not CRUE?

A. I --

Q. I'm sorry. Let me withdraw that and reask the question.

In your analysis of Motorola smartphones, have you identified any Motorola smartphones that are not CRUE?

A. No, I have not. They are all smartphones.

Q. What percent of Ericsson's 4G essential portfolio has Ericsson redeclared as essential to 5G?

A. My recollection is that 80 percent of the patents in 5G are also on the 4G standard.

Q. Sir, could that be one of the reasons you do not see a shift in the consumer demand curve as smartphones have transitioned from 4G to 5G?

A. Yes, it could certainly be an element. The challenge for 5G, and if you read the press, the media press and also statements by Ericsson and other network providers, the challenge for 5G is we don't have a killer application. We -- for smartphones. We don't know really what that's going to give us to consumers.

4G, we had the app economy, we have Uber, Spotify, we have a lot of apps, but 4G can take care of that. 5G there is no killer app. And so that's a challenge, and that slows down the adoption of 5G, or Motorola 5G really.

Q. Thank you, Dr. Dippon.

MR. MIZZO: No further questions, Your Honor.

JUDGE MCNAMARA: Thank you, Mr. Mizzo.

Mr. Swain?

RECROSS-EXAMINATION

BY MR. SWAIN:

Q. Just very brief recross.

You were asked about the Moto Mod in your redirect from Mr. Mizzo.

Do you recall that?

A. Yes, sir, I do.

Q. And the demand for 5G products as a result, or maybe not, of the Moto Mod.

Do you recall that?

A. Yes.

Q. Okay. Could I have CDX-4811C on the screen, please?

You're familiar with Dr. Meyer, correct?

A. Yes.

Q. Okay. Dr. Meyer, you understand, told us in his

report and in his testimony that Lenovo was the first to market with their modular attachment the Moto Mod in 2019, and with this first-mover advantage, Lenovo Motorola was able to sell 807.5 thousand units in 2020, correct?

A. That's what this sentence on the screen says.

Q. That's what Lenovo's expert has told the Court, correct?

A. I'll accept that, yes.

Q. And you understand when we talked about the 5G Mod, there were also other Mods that had the same exact battery without 5G capability, correct?

A. Yes.

Q. Okay. And they charged a lot less for those, correct?

A. They did.

MR. SWAIN: Thank you.

JUDGE MCNAMARA: Ms. Chang?

MS. CHANG: Nothing further from the Staff, Your Honor.

JUDGE MCNAMARA: I just have a couple of questions for clarification, if you don't mind.

I hope I'm not misstating this, but I believe that Dr. Akemann mentioned that he thought, briefly, when he showed us the chart of the market share of all the different phones, there was a demonstrative, I think he talked about

barriers to entry, and I think you basically, in passing, said that it would be expensive to get into this market, correct? So you disagree with Dr. Akemann on the barriers to entry in this phone market, do you not?

THE WITNESS: Yes, Your Honor. I absolutely do. The barriers of entries are not low. There are significant barriers to entry for a new smartphone manufacturer to enter into the United States. That doesn't only have to do with regulatory approval from the FCC and the FDA. It also has to do with mobile network operators accepting that phone in its lineup, allowing it on their network.

So, for instance, many of the Chinese operators can't come into the United States. They are worried about sanctions. They are worried with the regulatory regime. So we have statements from companies like OPPO. OPPO has very small presence with OnePlus in the United States, but the main OPPO brand is not in the United States. And we have statements from OPPO. We have statements from Xiaomi. We have, of course, statements from Huawei why they are not in the United States.

So the barriers of entries are very high, and you can also go back in the history of smartphones, and you have to understand is what happened to BlackBerry and how difficult it was for BlackBerry to convince that it had the value offering of the iPhone. So it's very high entry

barriers.

JUDGE MCNAMARA: Does your report cover some of this?

THE WITNESS: Maybe part -- yes, part of it, it does. I do talk about entry or lack of entry, especially in the rebuttal report I do.

JUDGE MCNAMARA: Okay. And another question. I apologize.

Mr. Mizzo asked you in passing on redirect about the supply demand curve. You didn't model the substitution effect, that is, if consumers or those who currently have Motorola phones were to decide -- pardon me, I guess my voice is going -- were to decide to purchase other phones, you didn't calculate what that would mean for consumers in terms of how consumers might benefit from other models that are available at equal or lesser costs as the market is changing, and that the effect that substitution would have on supply and demand and potentially on Motorola?

THE WITNESS: So I did calculate that. That's part of the Werden-Froeb model. What happens is, individuals will substitute to something else. And that could be another brand. That could mean they keep their old phone for a while until it no longer works. There could be all sorts of different outcomes.

What that Werden-Froeb model looks at is what can

we predict on how much is that consumer harmed because of that choice.

JUDGE MCNAMARA: Well, that was the choice. That's the choice effect. I'm talking not just about choice, as you narrowly defined it, but did you do any calculations of what the substitution effect would be? In other words, did you do a modeling across the United States that theorizes what other brands people could go to and what's available in the market instead of just a theoretical choice effect?

A. I understand. So I did not do a substitution analysis, so I can't tell you what is a substitute to another. I think that's a very difficult analysis. Dr. Akemann didn't do one either. So I think we both agree that that would be a very challenging exercise to undertake. But for me the important thing is there's not really disagreement that there are substitute product out there, but forcing these people, again, back to the choice effect, forcing these people to go for their second choice has harmed the public interest.

JUDGE MCNAMARA: Okay. Thank you.

THE WITNESS: Thank you, Your Honor.

JUDGE MCNAMARA: You may step down.

MR. AROVAS: Your Honor, that was the last witness. So Respondents rest their case.

I know Your Honor had asked for remaining time estimates.

JUDGE MCNAMARA: Yes.

MR. AROVAS: As well as elapsed time. So we have been going back and forth. We're still waiting to get an answer, final approval from the other side, but I know we're getting late in the day.

So as of lunch, we have not updated on our side for this most recent witness, but as of lunch Lenovo had 196 minutes left and Ericsson 156. That is including the three hours for tomorrow. I just want to be clear, though, these numbers have been given to the Complainants and we're waiting to hear back.

JUDGE MCNAMARA: Sure. I appreciate that. Thank you, Mr. Arovas.

MR. AROVAS: Thank you, Your Honor.

JUDGE MCNAMARA: Thank you.

MS. WROBLEWSKI: On their rebuttal case, Ericsson calls Dr. Wesel.

RICHARD WESEL,

having been previously duly sworn or affirmed on their oath, was thereafter examined and testified as follows:

JUDGE MCNAMARA: You are still under oath.

Would you introduce yourself, please, for the

record?

MS. WROBLEWSKI: Karlee Wroblewski on behalf of Ericsson.

DIRECT EXAMINATION

BY MS. WROBLEWSKI:

Q. Good afternoon, Dr. Wesel. You testified for us last week.

Could you briefly reintroduce yourself?

A. Sure. My name is Richard Dale Wesel. I'm a prefer at UCLA. I do a lot of work on LDPC codes.

Q. Could you please summarize your opinions regarding the validity of the '893 patent?

A. Yes. It's my opinion that the asserted claims of the '893 patent are valid. The subject matter of the '893 patent is directed towards specific novel shift coefficients that complete the design of parity-check matrices for low-density parity check encoding and decoding in 5G NR.

Q. Dr. Wesel, do the differences between the parties' definitions of one skilled in the art impact your opinions regarding validity of the '893 patent in any way?

A. No.

Q. Turning to CDX-24.2, which of the three parity-check matrices parameters that we talked about last week did Ericsson develop in connection with the '893 patent?

A. The shift coefficients.

Q. Turning to CDX-24.3, what does the patent tell us about the design parameters for the shift coefficients of the '893 patent?

A. So the innovative approach of the '893 patent was to use multiple ACE constraints for code rate, cycle length, shift size, whether the bits are systematic or parity bits. Specifically in the '893 patent, multiple ACE constraints are used for -- each for multiple rates and those multiple rates correspond to sub-matrices of the overall parity-check matrix.

Q. Dr. Wesel, what are ACE constraints?

A. So remember in my direct testimony I talked about how decoding in a low-density parity-check code happens on a graph that is determined by the parity-check matrix. So this graph can contain small cycles that are weakly connected to the rest of the graph. And when it does, the decoder fails when it shouldn't.

And so ACE constraints avoid those small weakly connected cycles by placing a requirement that cycles that are smaller than a certain size have to be connected to the rest of the graph by a certain amount.

Q. Now I seem to recall that last week you told us that you invented ACE constraints.

Do I have that right?

A. That's right. I invented ACE constraints along with my co-authors Tao Tian, Chris Jones and John Villasenor.

Q. If we turn to CDX-24.4, is this your paper involving the development of ACE constraints in the '893 specification?

A. Yes, that's correct.

Q. How did the '893 patent use your ACE constraint invention?

A. So, again, as I was saying, the innovation is to use multiple ACE constraints and specifically multiple ACE constraints where there are different ACE constraints for different code rates corresponding to different sub-matrices of the overall parity-check matrix.

Q. And that hadn't been done before?

A. No, it hadn't been done before.

Q. Turning to CDX-24.5, what does the patent disclose as the benefit of using different ACE constraints for different code rates?

A. Well, the overall parity-check matrix and the graph that corresponds to that overall parity-check matrix corresponds to the lowest rate code.

So by applying additional ACE constraints for the higher rates that correspond to those smaller sub-matrices, you'll improve performance for the higher rate codes.

Q. Does that in turn improve the performance of the error correction codes?

A. Yes.

Q. Turning to CDX-24.6, does the patent provide an example of these different ACE constraints for different code rates?

A. Sure. So here, looking on the left, this is a table for shift size 40. And you can see in the table there are seven different rates. And for each of those seven different rates we have three different ACE constraints.

Q. Turning to CDX-24.7, is this specific design approach claimed in the '893 patent?

A. No. The claims of the '893 patent do not claim the design approach. They claim the shift coefficients that result from using that innovative approach.

Q. Would the claimed values have been the same if another design approach had been used?

A. No. As I talked about before, there are very many solutions to this problem, and if you use a different design approach, you're going to get different shift coefficients.

Q. If we turn to CDX-24.8, how did the inventors of the '893 patent come up with the shift coefficient design and values for the parity-check matrix of the '893 patent?

A. The inventors testified that all three inventors

worked for over a year developing their new approach, and then once they understood what they were doing, they had to come up with all these different ACE constraints to finally get to the new shift coefficients.

Q. Turning to RDX-8.65, Dr. Wesel, do you recall when Lenovo displayed this slide yesterday?

A. Yes, I do.

Q. Is the parity-check matrix that's claimed random?

A. No. The ultimate parity-check matrix that you end up with is not a random matrix of bits. It is a parity-check matrix that's the result of a specific and complicated design process.

Q. If we turn to CDX-24.9, how did the inventors come up with the initial method of developing the shift coefficients for the parity-check matrix?

A. Well, as is in this testimony, basically they tried first using the prior art. So just applying ACE to the overall parity-check matrix. But it didn't work. They got bad performance, and that's what launched them on their investigation of the novel technique that they ended up using.

Q. Dr. Wesel, do you recall when Dr. Liu showed RDX-8.66 yesterday and suggested that Ericsson shift coefficients were the worst of the 3GPP proposals?

A. Yes, I recall that.

Q. Do you agree with that?

A. No, I do not.

Q. What is the 2 percent criteria that is on the right-hand side of the screen here?

A. Okay. So let's remember, in 5G, we're going to design a set of parity-check matrices that support a wide number of block links and a wide number of rates. So for each block link and each rate you have a block-error rate curve. That tells you how well you're doing at that particular operating point. So there are hundreds of these curves.

And this outlier curve is telling us, compared to a reference performance, so there is an initial shift coefficient result, and so they had all the block-error rate codes for that initial result. So Jayasinghe came out and said, okay, guys, design your shift coefficients and you got to do better than this one. And so what we're doing is we're counting what percentage of your block-error rate curves are better than the reference and what percentage are worse.

And so meeting the 2 percent threshold means that of those hundreds of block-error rate curves, 98 percent of your curves are better than the reference curves.

Q. Does it tell you how close the values were to passing that threshold?

A. No. So for the 2 percent that didn't do as well as the reference, we don't know if they were just barely worse or if they were a lot worse.

Q. Does this tell you anything with respect to how well the 98 percent of Ericsson's curves that passed performed?

A. No. It doesn't. We don't know how much better the 98 percent of curves that are better than the reference how much better they were from this curve. This curve also doesn't tell you anything about the error performance of the codes.

Q. If we turn to CDX-24.10, what did Ericsson's inventors say as to why their proposals were adopted into the 3GPP standard?

A. Their testimony is that their proposal was adopted because it was the best solution.

Q. Is there any other testimony that indicates that the inventors were wrong?

A. No, there's no testimony that says otherwise.

Q. Turning to CDX-24.11, Dr. Liu set forward theories regarding improper subject matter and obviousness.

Do you recall that?

A. Yes, I do.

Q. And based on the arguments set forth by Dr. Liu, in your opinion are the asserted claims of the '893 patent

valid or invalid?

A. It's my opinion that the claims of the '893 patent are valid.

Q. Turning to RDX-8.42, yesterday Dr. Liu said a number of times that the '893 patent is directed toward a mathematical equation that is abstract.

Do you recall that?

A. Yes, I do recall that.

Q. Are the claims directed to this mathematical equation?

A. No. This mathematical equation doesn't show up in the claims or the specification.

Q. What are the claims directed to?

A. The claims are directed to shift coefficients that resulted from a careful design that complete the determination of parity-check matrices that enable the encoding and decoding of bits in 5G NR.

Q. Is this mathematical formula what you use to create a parity-check matrix?

A. No. You do that using the ACE constraints, yeah, so, no.

Q. Turning to CDX-24.12, how do the figures on this slide inform the nonabstract nature of the '893 patent?

A. Well, as I've been saying, the claims of the '893 patent are directed towards transmitters and receivers. So

if we look at the blue box, claim 4 of the '893 patent is a battery receiver, and that receiver receives encoded information bits and it decodes those information bits using a parity-check matrix that was optimized according to this novel design technique. And this is not abstract. This is a receiver. And everybody who has a 5G phone has it in their pocket.

Q. If we turn to CDX-24.13, is the '893 patent directed toward improved encoding for 5G?

A. Yes. The '893 patent is directed towards, again, these specific shift coefficients that define specific parity-check matrices that then define specific encoders and decoders that support a wide range of block links and a wide range of rates while giving good error performance in 5G NR.

Q. And what evidence do we see on slide 13 that demonstrates that performance?

A. We have testimony from Sara Sandberg saying that the shift coefficients themselves are really crucial for the error performance of these LDPC codes, and we also have from the specification stating that an advantage of the lifting methods of the particular embodiment of this design has improved block-error rate performance, and then in the standards contribution, it states that the proposed shift coefficient design achieves very good block-error rate performance and no error flows above 10 to the minus 4.

Q. Turning to CDX-24.14, what references did Dr. Liu rely on for his obviousness opinions?

A. Jayasinghe, Yue, and Chiu.

Q. Did Dr. Liu set forward any argument that Jayasinghe, Yue or Chiu anticipate the '893 patent?

A. No, he did not.

Q. And does Lenovo contend that any of these references teach the claimed parity-check matrices?

A. No, they don't.

Q. If they don't contend that the references disclose the shift coefficients themselves, what are Dr. Liu's theories based upon?

A. Well, I had thought that Dr. Liu's theory was that using this prior art, it would have been obvious for a POSITA to arrive at the shift coefficients of the claims, but when I heard his testimony yesterday, that's not really what he said. So I don't -- our understanding from his testimony is that maybe they would come up with similar shift coefficients, but I didn't hear him say that they would come up with exactly the shift coefficients of the claims.

Q. And do these three references teach the design parameters that would lead one to come up with the parity-check matrices of the claims?

A. No. This art taken all together would not get

you to the parity-check matrices claimed by the '893 patent.

Q. Let's take the references one at a time.

Does that sound all right?

A. Sure.

Q. Turning to CDX-24.15, what was the first reference that Dr. Liu spoke about?

A. This is Jayasinghe.

Q. And what is the Jayasinghe reference directed toward?

A. Well, the Jayasinghe reference provides -- the Jayasinghe reference provides the shift sizes and the base matrix that had been agreed upon by 3GPP, and then it calls on the working groups to go ahead and design the needed shift coefficients.

Q. If we turn to CDX-24.16, how does Jayasinghe relate to the invention of the '893 patent at all?

A. Well, it doesn't teach anything about the invention, but it does set up the problem. It provides the basegraph, the base matrix, and the shift sizes, and it asks -- it says, this is a problem, can you guys provide the shift coefficients that will complete the parity-check matrix design.

Q. Does Jayasinghe teach anything about how the shift coefficients should be created or teach the use of different ACE parameters for different code rates?

A. No, it doesn't do that.

Q. Turning to CDX-24.17, what was the title of the UA reference?

A. Symptoms and methods for constructing the base matrix of quasi-cyclic low-density parity check codes.

Q. What is UA directed towards?

A. So Yue proposes the idea of having a single base matrix that supports a variety of block links by having multiple shift sizes supported by that same base matrix and by a shift coefficient that will provide shift values corresponding to these different shift sizes, but --

Q. Does -- sorry.

A. All for the same rate. All those codes at different block links have the same rate.

Q. Was the Yue reference before the Examiner during prosecution of the '893 patent?

A. Yes, it was.

Q. The Examiner granted the '893 patent anyway?

A. Yes, because Yue doesn't anticipate or make obvious the claims of the '893 patent.

Q. Turning to CDX-24.18, does the Yue reference render the shift coefficients of the parity-check matrix obvious using different ACE constraints for different code rates?

A. No, it doesn't.

Q. What does Yue teach?

A. Okay. So, first of all, it teaches its own version, its own novel way of using ACE called local girth and local ACE. And that's just different from what's done in the '893 patent. The '893 patent doesn't use this invention from Yue.

And the second thing is that, as we see on the bottom highlighted section, Yue is directed towards designing LDPC codes with the same basegraph, different sizes of the circulant L, that would be our shift size, with various block lengths but of the same rate. And that's an important distinction.

Q. If we turn to CDX-24.20.

What is the third reference that Dr. Liu discussed?

A. Chiu.

Q. Does the Chiu reference render the shift coefficients of the parity-check matrix obvious using different ACE constraints for different code rates?

A. No, it doesn't.

Q. Why is that?

A. Well, Chiu doesn't talk about designing shift coefficients at all. Chiu talks about storing and using shift coefficients that somebody else must have designed.

Q. Why is that different than the teachings of the

'893 patent?

A. Well, because it's just -- it doesn't address the problem of the '893 patent at all. The '893 patent is about designing shift coefficients, and Chiu doesn't address that.

Q. I'd like to turn next to whether a person of ordinary skill would be motivated to combine these references.

Okay?

A. Sure.

Q. Turning to CDX-24.21, would a person of ordinary skill have been motivated to combine Jayasinghe and Yue to arrive at the '893 patent?

A. No.

Q. And why is that?

A. Well, combining Jayasinghe and Yue can't get you to the '893 patent, because it's focused on designing for one rate.

And, as I was saying earlier, Chiu adds nothing to this picture. It doesn't talk about shift coefficient design at all.

And then the second point are these three different mapping functions, on the face of these documents Jayasinghe calls for a modulo mapping function, Yue calls for a Florian mapping function, and Chiu calls for a modulo mapping function with a perturbation.

So the fact that there are three different mapping functions would lead -- would make it not obvious for a POSITA to combine these documents.

Q. What about if I added Chiu, so Jayasinghe, Yue, and Chiu, would that change your opinion at all?

A. No. As I said, Chiu doesn't really add anything.

Q. So, based on these different teachings, why would a person of skill not be motivated to combine the references to arrive at the shift coefficients and a parity-check matrix of the '893 patent?

A. Well, again, I'm sorry, I think I -- anyway, they have these different mapping functions, but the bottom line is, even if you bring all of these references together, they just don't give you the design technique that's in the '893 patent.

Q. Thank you, Dr. Wesel.

If we turn to CDX-24.7, in your opinion, then, are the limitations 1.F and 4.F suggested or disclosed by any of the prior art Dr. Liu discussed either alone or in combination?

A. No.

Q. Turning to RDX-8.55, do you recall Dr. Liu putting this slide up and insinuating that the '893 patent was obvious because other companies were simultaneously developing proposed parity-check matrices?

A. Yes, I recall that.

Q. Did any of these references disclose the exact parity-check matrix of the '893 patent?

A. No, they don't.

Q. In your work, on LDPC coding, does it matter to you that the parity-check matrix be exact?

A. Yes. Even changing one bit in the parity-check matrix can introduce a small cycle that could cause bad decoding performance.

Q. Finally, Dr. Liu seemed to focus a lot of energy on the fact that other companies developed shift coefficient designs with similar performance as we were just talking about.

Do you recall that?

A. Yes.

Q. Does the fact that other companies were developing shift coefficients simultaneously change your opinions at all as to the obvious nature of the '893 shift coefficients and parity-check matrix?

A. No. I mean, if anything, the fact that other people were working on the same problem but coming up with different solutions sort of speaks to the novelty of the '893 solution.

Q. Turning to CDX-24.22, Dr. Wesel, were the inventions of the '893 patent commercially successful?

A. Yes. It's mentioned here by one of the inventors, Dr. Blankenship, that the '893 patent is very important to 5G NR, and I agree with that. One of the big innovations of 5G NR is its ability to support a wide variety of block links and a wide variety of rates while having a decoder that can keep the decoding latency low. And all of that comes down to LDPC codes. That is the engine of that particular benefit.

Q. And what did Ms. Blankenship say about the '893 patent in particular?

A. That it provides eight LDPC parity-check matrices that were needed to support the range of sizes of code rates, the range of sizes, block links, and code rates for 5G NR to work.

Q. What parity check matrices did the Space Development Agency adopt?

A. So the Space Development Agency adopted one of the parity-check matrices claimed by the '893 patent.

Q. Dr. Wesel, do you remember Dr. Liu putting up RDX-8.63 during his direct?

A. Yes, I do.

Q. Do you agree that the Examiner statements here render the invention of the '893 patent obvious?

A. No, I don't agree with that.

Q. If we could pull up JX-14.384.

And what did Ericsson's terminal disclaimer say with respect to Ericsson's agreements with the Examiner's rejection?

A. Well, if you look down sort of three lines from the bottom, it says, by not responding to additional statements made by the Examiner, applicants do not acquiesce to the Examiner's additional statements.

So --

Q. So did Ericsson agree with the Patent Examiner's rejection?

A. They did not agree with it.

Q. Do you think that the development of the shift coefficients for the '893 patent is obvious over the '724 patent?

A. No, I don't.

Q. Why is that?

A. Because the '724 patent designed shift coefficients for a different basegraph, and it would take significant effort to get to the -- to find the shift coefficients for the different basegraph.

Q. If we could go back to the presentation and return to CDX-24.23.

Dr. Wesel, is the '893 patent directed toward an invalid invention?

A. No, it's not. It's -- the '893 patent is

directed towards a valid invention. It's directed towards encoders and decoders with a specific parity-check matrix that are not abstract, and it's directed towards an inventive concept, this new design technique that produced these shift coefficients.

Q. And before we conclude, I just want to touch base on a couple of slides regarding source code.

Does that sound okay?

A. Sure.

MS. WROBLEWSKI: Before we do that, I'd like to go on the confidential record, and this will include both Ericsson and Qualcomm CBI.

(Whereupon, the hearing proceeded in confidential session.)

O P E N S E S S I O N

JUDGE MCNAMARA: Thank you.

Ms. Chang? You're right. I'm sorry.

Mr. Friedman?

MR. FRIEDMAN: Todd Friedman on behalf of Respondents.

JUDGE MCNAMARA: Yes.

MR. FRIEDMAN: May I proceed, Your Honor?

JUDGE MCNAMARA: Yes. Thank you.

CROSS-EXAMINATION

BY MR. FRIEDMAN:

Q. Good afternoon, Dr. Wesel.

A. Good afternoon.

Q. Good to see you again.

A. Good to see you.

Q. So let's start off on an area of common ground and turn to RDX-26.1.

We can agree that there's no dispute that everything that's highlighted in pink here in RDX-26.1 was known in the art before the priority date of the '893 patent, correct?

A. Yes, that's correct.

Q. If we could turn to RDX-26.7.

So, to be clear, the only part of the claims that you contend wasn't known in the art before the priority date

of the '893 patent is what I've highlighted here in yellow; is that right?

A. Yes, I think that's right. I mean, you know, a lot of the numbers aren't there for brevity, but we agree about that.

Q. Correct. And I can show the full numbers on the next slide, 26.8. We can focus in on that part of the claim so there's no confusion whatsoever.

I have claim 1 here, and you understand that's the same yellow part that exists in both claims 1 and 4, correct?

A. That's correct.

Q. And what we see here is a list of numbers, the 316 shift coefficients, right?

A. That's right.

Q. Now, again, to be clear, this is a list of numbers that's the shift coefficients of the LDPC parity-check matrices, correct?

A. That's right. These numbers complete the design of the LDPC parity-check matrices.

Q. And given the basegraph of the '893 patent, a POSITA could implement an efficient encoder that could operate on any shift coefficients supplied to that encoder, correct?

A. Yes. A POSITA could do that.

Q. Of course, the choice of the shift coefficients would impact the performance of the LDPC code, correct?

A. Yes, that's right. Changing the shift coefficients changes that graph that would be created by the parity-check matrix.

Q. Now some choices of shift coefficients will give you poor LDPC code performance and some choices of shift coefficients would give you an improved good LDPC code performance, correct?

A. Right. I want to say it's not really singular, because there are like hundreds of different rates and block links that we're talking about. So there are a lot of different performances, and they would swap back and forth, but, yes, that's correct.

Q. Okay. Now let's just take a step back. We did discuss this last week.

A low-density parity-check code is an error correction code characterized by a parity-check matrix that has more 0's than 1's, right?

A. That's true. Yes.

Q. And the equation H times X to the T equals zero, what was referred to at your deposition as the parity check theorem equation, that defines a system of operations, correct -- system of equations?

A. Yes, that defines a system of equation.

Q. And that's a well-known equation to persons of skill in the art, correct?

A. Yes, it is.

Q. In fact, any LDPC code satisfies the parity check theorem equation, right?

A. I would -- I would -- let me agree with you this way. The codewords of the LDPC code satisfy the parity check equation with the parity-check matrix of the LDPC code.

Q. Okay. Fair enough. And any LDPC code can be defined by the choice of the matrix H in the parity check theorem equation.

A. Yes, that's correct.

Q. Okay. All right. Now let's shift gears a bit here.

If we could -- so let's now talk about patent ineligibility.

And you understand that Lenovo contends that the asserted claims are patent-ineligible because they are directed to an abstract idea, correct?

A. Yes, I understand that.

Q. And you disagree with that, right?

A. Yes, I do disagree with it.

Q. Now one of the reasons you disagree is that, in your opinion, the '893 patent is an advance over the prior

art because it involves a specific shift coefficient design using ACE constraints for different code rates which correspond to sub-matrices of a PCM.

Do I have that right?

A. That's correct.

Q. We heard a lot in your opening presentation about ACE; isn't that right?

A. Yes.

Q. Now in your opinion the '893 patent's invention was a technological improvement over previous designs by applying different ACE constraints with a different sub-matrices, right?

A. That's right.

Q. Now the details of this alleged improvement are described in the specification for the '893 patent, correct?

A. Yes, the approach, yes.

Q. And as you testified on direct, and as we saw in -- I think I counted five of your slides, your patent-eligibility opinions are aided by consideration of the '893 patent specifications disclosure, correct?

A. I think, yeah, I guess so, yeah.

Q. Okay. Let's take a look at RDX-26.17. This is RX-889 at page 48.

Now this is an excerpt from the '893 patent provisional application.

Do you see that?

A. I do see that, yes.

Q. And you looked at this as part of your analysis in this case, correct, the provisional?

Is that a yes? I'm sorry.

A. Yes.

Q. And as we can see here, the provisional application included a claim that says, you can read it with me, encoding information bits using a parity-check matrix wherein the parity-check matrix is lifted from a base matrix and the shift coefficients used for lifting were selected to satisfy particular ACE constraints that vary for different portions of the parity-check matrix.

Do you see that?

A. I do see that.

Q. And that was in the provisional application, right?

A. Yes.

Q. Okay. But, Dr. Wesel, you'd agree with me that the ACE constraints aren't expressed anywhere in the asserted claims of the '893 patent, correct?

A. No, only the shift coefficients that resulted from applying them.

Q. The asserted claims don't say anything about applying ACE constraints to multiple sub-matrices, right?

A. No, they claim the shift coefficients that result from that design approach.

Q. Okay. The ACE limitations like we see in the provisional application did not end up in the asserted claims of the issued '893 patent at all, correct, they're not there?

A. That's correct.

Q. In fact, the word ACE does not appear anywhere in any claim, asserted or non-asserted, of the '893 patent, correct?

A. That's correct.

Q. And as we just saw in the provisional, the patentee, the patentees, knew how to claim ACE constraints, but they chose not to in the '893 patent, correct?

A. That's correct.

Q. Now let's look at the legal framework that you set out in your expert report for determining patent eligibility under 101.

If we could pull up RDX-26.19. This is CX-400 at paragraph 29.

Now here in your expert validity report you describe patent eligibility under 101 by first setting out your understanding of the legal standard, correct?

A. Yes, that's correct.

Q. And you reference the case law regarding patent

eligibility under 101, particularly the two steps of the Alice test, correct?

A. Yes.

Q. And you said that, in the first step, the court will determine whether the claims, not the specification, are directed to a patent-ineligible concept, right?

A. I see that, yes.

Q. And you said that in the second step courts consider the elements of the claims to determine whether the additional elements transform the nature of the claim into a patent-eligible application, right?

A. I see that, yes.

Q. Now consistent with your understanding of the framework for determining patent eligibility under 101, you're aware the Federal Circuit has consistently made clear that the 101 inquiry must focus on the language of the asserted claims themselves, correct?

A. I'm sorry. I'm not familiar with the circuit court rulings.

Q. Well, you certainly cited the Federal Circuit and discussed the Federal Circuit in your validity report, didn't you?

A. Yes.

Q. Okay. And I'm simply saying, consistent with your understanding of what the law is, are you aware that

the Federal Circuit has consistently said that the focus of the inquiry must be in the language of the claims?

A. Well, I mean, I think that makes sense to me. I'm not -- as I sit here today, I didn't remember that that came from a Federal Circuit ruling.

Q. Okay. Well, you certainly cited Alice and you certainly cited Federal Circuit cases in your validity report.

You don't disagree with me on that, do you?

A. No, I don't.

Q. Okay. So let's take a look at RDX-26.2.

And here we can see that the Federal Circuit has told us that the section 101 inquiry must focus on the language of the asserted claims themselves. And you can see that in the top excerpt from the Synopsys case.

Do you see that?

A. Yes.

Q. Okay. And, in fact, we can see here that the Federal Circuit previously admonished Ericsson for relying on disclosure in the specification stating that any reliance on the specification in the 101 analysis must always yield to the claim language.

We see that in the bottom excerpt, correct?

A. I see that.

Q. Okay. Now if this precedent is followed in this

case, consistent with the legal framework that you yourself set out in your expert validity report, and the focus is on the claim language, we can agree that there's nothing at all, zero, in the asserted claims mentioning the design technique of applying ACE constraints to sub-matrices, correct?

A. That's right. The claims contain the shift coefficients that resulted from that design technique.

Q. The claims contain a list of numbers that are the shift coefficients, correct?

A. That's right.

Q. They do not say anything at all about ACE constraints, right?

A. The claims don't use the words "ACE constraints."

Q. That's all in the specification, correct?

A. That's correct.

Q. Okay. Let's shift gears again.

And, in forming your opinions in this case, you reviewed the file history for the '893 patent, correct?

A. Yes.

Q. And you understand that the '893 patent is a continuation of an application that issued as the '724 patent, right?

A. Yes.

Q. So let's put up on the screen RDX-26.9, please.

And this shows claim 1 of the '724 patent from RX-890 side by side with claim 1 of the '893 patent, which is JX-4.

Do you see that?

A. Yes, I see that.

Q. And do you understand that the only difference -- the only difference between claim 1 of the '724 patent and claim 1 of the '893 patent are the shift sizes, the base matrix, and the values of the shift vector, correct?

A. That's correct. Yes.

Q. In other words, the claims are identical except for the specific values that I've highlighted here on this slide, right?

A. I believe that's correct.

Q. So let's add the notation identical claims except specific values for shift size, base matrix and shift coefficients between the claims on RDX-26.10, and that's a fair addition, correct?

A. I'm sorry. What?

Q. That's a fair addition to the slide, the gray arrows?

A. Can I get another bottle of water?

JUDGE MCNAMARA: Sure. Do your counsel have an extra bottle back there? Does anyone have an extra bottle?

MR. AROVAS: I've got one.

JUDGE MCNAMARA: Thank you.

MR. AROVAS: May I approach?

JUDGE MCNAMARA: Yes. Thank you.

THE WITNESS: Thank you.

A. I'm sorry about that. I want to -- did you just say that you added the gray arrow pointing both directions to this slide?

Q. Correct. I'm asking if it's a fair addition based on your testimony just now. That everything is identical except for the specific values for shift size, base matrix and shift coefficients.

A. It is true that the differences are what is highlighted in green and yellow on the claims.

Q. So is the answer to my question yes, that's a fair addition?

A. Yeah. It's values, not "valuses," but specific values for shift sizes, base matrix, and shift coefficients, yes.

Q. All right. Now you testified last week that together the shift size, the base matrix, and the values and the shift vector describe a parity-check matrix, right?

A. That's correct.

Q. Okay. So the difference between claim 1 of the '724 patent and claim 1 of the '893 patent is the particular parity-check matrix that's used to encode the information

bits for transmission, right?

A. Yes, that's correct. The different -- it's a different set of parity-check matrices.

Q. And in your view the particular parity-check matrix used to encode information bits for transmission is important because a different parity-check matrix defines a different LDPC code with different performance, right?

A. That's correct.

Q. So now let's put up RDX-26.12.

This has an excerpt from the '893 patent file history, JX-14 at page 350.

Now during prosecution of the '893 patent, you understood that the Examiner issued a double-patenting rejection of the pending claims in view of the '724 patent claims, right?

A. Yes.

Q. You talked about that on direct, right?

A. Yes.

Q. Okay. Now if we turn now to RDX-2613, we can see here that the Examiner said, although the claims at issue are not identical, they are not patentably distinct from each other.

Do you see that?

A. I do see that.

Q. And the Examiner knew all of the differences

between claim 1 of the '724 patent and the pending claim of the '893 patent, right?

A. The Examiner had both patents before them, so I assume that they understood.

Q. Right. And you know that the Examiner knew because you explained how this was put before the Examiner in your expert validity report.

So he knew the precise differences between the claims, correct?

A. Yes.

Q. And even knowing about these differences the Examiner said the claims were not patentably distinct, right?

A. Well, that's what it says in the highlighted text here, yes.

Q. And if we turn to RDX-26.14, we can see that, on page 386 of JX-14, Ericsson filed a terminal disclaimer to obviate a double-patenting rejection over a prior patent.

Do you see that?

A. I do see that.

Q. And that's what, in fact, happened, right?

A. Yes.

Q. Now let's turn to RDX-26.15 and look at the Examiner's Notice of Allowability, which comes from JX-14 at page 398.

We can see here that the Examiner in a statement of reasons for allowable subject matter provides only one reason why the claims were allowable, right? We see here the reason was that the terminal disclaimer filed by Ericsson to overcome the double patenting rejection was approved, correct?

A. I see that. Those words are written on what you're showing me.

Q. That was the one reason expressed by the Examiner for allowing the claims, right?

A. As I said, I can read that here. That's what it says.

Q. And you reviewed the file history and there were no other reasons expressed, right?

A. That's correct.

Q. Ericsson didn't attempt to traverse the Examiner's double-patenting rejection in its response, correct?

A. Yes. They stated that they didn't agree with it, but they just didn't -- they didn't want to bother with it, so they filed the disclaimer.

Q. Well, we saw what Ericsson did in fact say, and there was a waiver of rights language, right, it was under the subheading waiver, right, that's what you've pointed out?

A. Yes, and it said that they didn't agree with the Examiner's conclusions.

Q. It didn't acquiesce, but they never attempted to traverse the Examiner's arguments, right?

A. But they didn't acquiesce, correct.

Q. They never attempted to traverse the Examiner's arguments, yes or no?

A. They did not attempt to traverse it.

Q. Thank you.

A. They didn't agree to it.

Q. Well, the language is what it is. We saw it.

There was no substantive argument made by Ericsson in an attempt to overcome the double-patenting rejection, fair?

A. They just said that they didn't acquiesce, and they filed the terminal disclaimer. That's all --

Q. Okay. Now let's turn to Jayasinghe reference RX-822, and let's put page 1 up on the screen.

You don't dispute that Jayasinghe is prior art, right?

A. No, I don't.

Q. It's prior art to the '893 patent, correct?

A. Correct.

Q. And you made clear in your expert report and on direct the only claim elements that you dispute being taught

by Jayasinghe are the shift coefficients of claim elements 1.F and 4.F, correct?

A. I think Jayasinghe provides a lot of things.

Q. It's a simple question, sir. I'm asking you, in terms of what you are actually disputing in your expert report and in your direct testimony, the only thing that you're disputing being taught by Jayasinghe are the shift coefficients of claim elements 1.F and 4.F, yes or no?

A. Yes, that's correct.

Q. Okay. You didn't discuss any other elements of the claims during the portion of your direct that address the prior art, correct?

A. I didn't discuss the other elements, just claim 1.

Q. Thank you.

A. I'm sorry. I misspoke. Sorry. Claim 1.F and claim 4.F.

Q. Right. Let's turn to page 4 of RX-822, please.

You agree that Jayasinghe discloses the base matrix claimed in the '893 patent, right?

A. Yes, that's right.

Q. And you also agree that Jayasinghe discloses the shift sizes claimed in the '893 patent, right?

A. Yes, that's right.

Q. So if we take a look at RDX-26.16, of the three

parts of the claimed parity-check matrix, the base matrix, the shift sizes and the shift coefficients, the only part not disclosed in Jayasinghe is the shift coefficients, right?

A. Yes, that's correct.

Q. In the '724 patent that we just looked at, all three parts are missing, right?

A. I'm sorry. The '724 patent as compared to the '893 patent?

Q. Correct. The '724 patent doesn't disclose the claimed base matrix shift sizes and shift coefficients of the '893 patent, correct?

A. That's correct. They both have the same provisional application, but, you're right, yes.

Q. Okay. And, in fact, with respect to Jayasinghe, Ericsson did not disclose Jayasinghe to the Patent Office during prosecution of the '893 patent, correct?

A. That's -- well, I think that's correct, but the '893 patent discloses these things, the shift vector and the base matrix as --

Q. My question is --

A. Oh, sorry.

Q. Just focus on my question, please.

My question is, did Ericsson disclose Jayasinghe to the Patent Office during the prosecution of the '893

patent?

A. I don't believe so.

Q. We heard you talk about some of the references were in fact disclosed to the Patent Office, but you didn't mention Jayasinghe, right?

A. That's correct.

Q. And that's because Jayasinghe was not disclosed, correct?

A. Correct.

Q. Okay. The Examiner didn't consider Jayasinghe during prosecution of the '893 patent, fair statement, right?

It wasn't disclosed, it wasn't considered. I think we can make that logic.

A. I agree with you. There is a clarification that I would like to make, but I'll do it later.

Q. The Examiner did consider the '724 patent, we know that.

A. Yes.

Q. And this is during prosecution of the '893 patent, right?

A. That's correct.

Q. And even though the '724 patent claims did not disclose the base matrix and shift sizes that are disclosed by Jayasinghe, the Patent Office still found that the

asserted claims of the '893 patent were not patentably distinct, correct?

A. Well, that was what the Examiner said at that moment.

Q. Okay. Ericsson wasn't the only company that submitted proposed shift coefficients to be used with basegraph 1, correct?

A. That's correct.

Q. Various other companies also made submissions to the 3GPP standard body?

A. Yes, that's correct.

Q. And I believe you testified on direct that Ericsson's shift coefficients were, quote/unquote, the best, correct?

A. That's what their inventors testified.

Q. That's right. And in offering that opinion you cited to the testimony of the inventors, correct?

A. Yes.

Q. But to understand which of these proposals was the, quote/unquote, best solution, you'd have to look at hundreds of block-error rate curves, correct?

A. That's true.

Q. And when you formed your opinions in this case, you hadn't seen those curves, right?

A. That's true.

Q. You didn't testify during your direct about any independent comparative analysis of block-error rate curves that you did, correct?

A. That's correct.

Q. You didn't do that analysis to confirm that Ericsson's proposed coefficients were in fact the best, did you?

A. No, I didn't do that.

Q. What you cited for that best testimony was the testimony of Ericsson's own employees, correct?

A. That's correct.

MR. FRIEDMAN: I have no further questions, Your Honor. Thank you.

JUDGE MCNAMARA: Thank you, Mr. Friedman.

Ms. Chang?

MS. CHANG: No questions from the Staff, Your Honor.

JUDGE MCNAMARA: Ms. Wroblewski?

MS. WROBLEWSKI: Briefly, Your Honor.

REDIRECT EXAMINATION

BY MS. WROBLEWSKI:

Q. Could I please get RDX-26.7?

Dr. Wesel, on cross-examination you were asked whether all of the portions that were highlighted in pink were already known in the prior art.

Is portion -- a portion of the claim that is highlighted in pink an encoder that's using a particular parity-check matrix?

A. Yes.

Q. And was the particular parity-check matrix using these shift coefficients known in the prior art?

A. No.

Q. Switching gears a bit, you were asked a little bit about what counsel termed the parity check theorem, which is that equation H times X equals zero, right?

A. Yes.

Q. Is the parity check theorem included in developing the parity-check matrix?

A. No, it's not.

Q. If we could pull up RDX-26.2.

I think I was thinking of something else.

Does the language of the claims define an abstract invention?

A. No. The claims are directed towards specific transmitters and receivers that encode information bits using a specific parity-check matrix.

Q. If I could pull up RDX-26.9.

And looking at 26.9, counsel insinuated that the values of the claims are the only differences and seemed to indicate those were trivial.

Do you recall those questions?

A. Yes, I recall those questions.

Q. Do the values themselves define a different encoder and decoder?

A. Yes, they do.

Q. Now you were also asked about if Jayasinghe was disclosed during prosecution.

Do you recall that?

A. Yes I recall that.

Q. Does the patent itself disclose what is disclosed in Jayasinghe being the base matrix and the shift sizes?

A. Yes, exactly. It's disclosed in the patent as a Background of the Invention, that these were known by 3GPP.

Q. You were also asked a few questions about the various curves that can be evaluated to evaluate the performance of the parity-check matrices.

Do you recall that?

A. Yes, I recall that.

Q. Could I please get JX-43C, page 183, lines 5-22.

If you could zoom in a little bit on that.

So this is the testimony of Ms. Blankenship, one of the named inventors.

Did Ms. Blankenship speak to the submission curves that were evaluated during the 3GPP process?

A. Yes, she did.

Q. And what did she say about those curves and the performance of the Ericsson proposals for parity-check matrices?

A. That, well, this is when they were making the final decision, that the delegates from ten-plus companies were sitting in a room and they were going through all the submission curves. So pages and pages of curves when they were deciding which of the submissions was going to be selected.

Q. And why were Ericsson's selected according to Ms. Blankenship?

A. Because they were the best.

MS. WROBLEWSKI: Thank you.

I pass the witness.

JUDGE MCNAMARA: Thank you very much.

Mr. Friedman?

MR. FRIEDMAN: Yes, briefly, Your Honor.

RECROSS-EXAMINATION

BY MR. FRIEDMAN:

Q. Dr. Wesel, just to be clear, the testimony that you were just shown, that's testimony from Blankenship, an Ericsson employee, correct?

A. That's correct.

Q. So, to be clear, you did not, you, Dr. Wesel, did not do any independent analysis to verify whether Ericsson's

proposed coefficients were the best based on an analysis of the block-error rate curves, correct?

A. That's correct.

MR. FRIEDMAN: No further questions.

Thank you, Your Honor.

JUDGE MCNAMARA: Thank you very much.

Dr. Wesel, you may step down. Thank you for your testimony.

THE WITNESS: Thank you, Your Honor.

JUDGE MCNAMARA: Are we on track in terms of time? I was going to suggest we take our afternoon break.

MR. AROVAS: Your Honor, what we could do is, during the break we'll meet and confer about the updated time based on the last two witnesses, and then that way we can plan out the remaining time.

JUDGE MCNAMARA: All right. I'll see you in 15 minutes.

(Whereupon, the proceedings recessed at 3:44 p.m.)

(In session at 4:02 p.m.)

JUDGE MCNAMARA: Thank you, everyone. Please be seated.

All right. So where are we now? I know where we are sort of.

MR. HESS: Good afternoon, Your Honor. This is

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

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

MARK MAHON,

having been previously duly sworn or affirmed on his oath, was thereafter examined and testified further as follows:

JUDGE MCNAMARA: You're still under oath.

THE WITNESS: Yes, Your Honor.

MR. AROVAS: Greg Arovas, Your Honor.

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

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

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

MR. HAYNES: We agree, Your Honor.

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

DIRECT EXAMINATION

BY MR. HESS:

Q. Welcome back, Professor.

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

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

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

A. Yes, I do.

Q. What's the prefix of that deck?

A. CDX-21.

Q. Let's turn to slide 2.

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

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

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

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

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

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

the art under the parties' definitions?

A. Yes, I do.

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

A. No.

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

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

A. July 25th, 2017.

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

A. No, they do not.

Q. Who were the '817 patent inventors?

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

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

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

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

vulnerable. That was back in the '90s.

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

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

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

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

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

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

Q. Did the inventors of the '817 patent propose

their solutions to the 5G standard?

A. Yes, they did.

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

A. No.

Q. Let's go to slide 6.

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

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

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

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

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

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

We heard from Dr. Bims earlier this morning. Were you here in the court for those opinions?

A. Yes, I was.
Q. I want to go back to slide 4 for this.
Sorry, slide 5.
Can you summarize looking at the Fig. 6 here what Dr. Bims' noninfringement argument seems to be about?
A. Yes. Apparently he is saying --
MR. APPLEBY: Your Honor, I would like to lodge an objection.
JUDGE MCNAMARA: Mr. Appleby?
MR. APPLEBY: Yes. I would like to object that this is infringement evidence. This is a rebuttal case, and the issues that we should be rebutting on are validity. This is not a time to be introducing additional evidence that should have been presented in the case-in-chief.
And, also, with respect to the disclosures last night, they had indicated their wish to use an exhibit that was clearly related to infringement. We objected, and they withdrew it, leading us to believe that they had agreed that this presentation would be focused on validity only, as it should be as in the rebuttal case. Thank you.
JUDGE MCNAMARA: There is a fair point there.
Mr. Hess, can you tell me what happened last night?
MR. HESS: I'm actually not sure which exhibit it was, but, as we understand the ground rules, specifically

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

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

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

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

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

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

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

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

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

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

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

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

MR. APPLEBY: Thank you, Your Honor.

MR. HESS: May I proceed, Your Honor?

JUDGE MCNAMARA: Yes.

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

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

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

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

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

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

A. Absolutely not.

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

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

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

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

A. Okay.

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

A. I disagree.

Q. Can we pull up slide RDX-2.54?

What are we seeing here?

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

Q. Do you agree with Dr. Bims?

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

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

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

A. Yes, he has.

Q. Where are those words in the claims?

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

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

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

Q. Let's have 21.8.

Are these the claims in full?

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

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

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

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

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

A. I do not.

Q. What are you showing here with this timeline?

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

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

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

techniques of the time.

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

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

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

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

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

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

are your opinions on this reference?

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

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

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

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

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

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

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

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

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

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

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

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

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

A. No, it does not.

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

A. No, it does not.
Q. Let's go to slide 14 and turn to the Forsberg reference.
Did you hear Dr. Bims testify about this reference?
A. Yes, I did.
Q. Does Forsberg disclose all the claim elements of the '817 claimant?
A. No, it does not.
Q. What's it missing?
A. It's missing a public key identifier.
Q. Is it also missing the encryption scheme identifier?
A. It does not have an encryption scheme identifier, because, as I said, Forsberg was filed right before the first release of 4G, for example, and the 4G, 3G, 2G technology, the techniques that were used were basically pretty rigid and fixed, as far as the authentication process and encryption is concerned. So they did not disclose that.
Q. I want to clear up the record here. I think you said "public key identifier" first. What you meant to say was "encryption scheme identifier"; is that right?
A. That's correct. I'm sorry.
Q. We've got a lot of identifiers going on, I know.
What about the structural elements of Forsberg,

how did those compare to the '817 patent claims?

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

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

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

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

Q. Let's turn to slide 15 here.

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

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

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

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

Q. Can we please pull up RDX-2.49.

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

A. Yes, it is.

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

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

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

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

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

A. Absolutely not.

Q. Why not?

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

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

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

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

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

Q. Do you agree that's possible here?

A. No, I do not.

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

What's the Togawa reference?

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

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

Q. What does Dr. Bims need Togawa for?

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

scheme identifier.

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

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

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

A. No, it does not.

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

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

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

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

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

Q. Let's go to slide 20.

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

A. No, we did not.

Q. This is from Togawa, right?

A. Yes, it is.

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

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

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

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

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

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

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

Can you explain a little bit more about why?

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

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

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

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

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

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

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

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

A. Yes, he does.

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

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

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

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

A. 5G-Ensure.

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

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

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

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

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

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

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

Q. Can we jump ahead to slide 21?

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

A. Okay.

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

A. I did not.

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

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

Q. Let's turn to slide 22.

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

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

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

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

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

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

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

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

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

Q. Let's turn to slide 24.

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

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

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

A. I've heard three.
Q. How many of those three references were already considered by the USPTO for the '669 patent?
A. Two of the three.
Q. We're on slide 25 now.
When was Park '389 considered?
A. It was considered, as disclosed here on the face of the patent, it was listed on the face of the patent for consideration by the PTO.
Q. Was this one patent out of dozens and dozens that Ericsson disclosed?
A. A handful.
Q. Let's turn to slide 26.
When was 3GPP-Intel disclosed?
A. Well, Apple filed an IPR against the '669, and, as you can see, they listed Intel here, and it also dealt with the asserted claims.
Q. What was the outcome of that IPR?
A. Institution was denied.
Q. Slide 27, and I want to turn to Lenovo's third and final reference here shortly, but before we do that, can you remind the Court what claims 1 and 6 require as far as the PUCCH resource determination?
A. Yes. 1 and 6 require the determination based on the latest received one of the first or second downlink

channel messages.

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

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

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

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

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

Q. Let's go to slide 29.

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

A. Ahn.

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

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

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

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

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

Q. And what --

(Clarification requested by the court reporter.)

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

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

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

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

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

it.

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

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

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

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

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

How does Ahn describe this ARI field can be used?

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

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

A. No, he does not at all.

Q. Let's turn to slide 31.

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

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

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

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

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

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

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

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

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

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

Q. What does that select again?

A. A PUCCH format, not a resource.

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

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

A. Yes, we did.

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

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

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

A. It's the entire embodiment.

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

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

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

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

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

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

Q. Does this embodiment mention the ARI even once?

A. No, not at all. It's showing an alternative.
Q. How does this embodiment say that the PUCCH format, not the resource, but the format can be selected here?
A. Well, it discloses a couple things. One, as I have underlined here in red, according to a cell group, and we just saw an example of that, the received last DAI value, for example, and also the received last total DAI value.
Q. Do those three or four options here, the DAI values and the cell group corresponding to the DCI, do those relate to the DCI message?
A. Yes, they are contained in the DCI message also.
Q. Is the ARI in the DCI message?
A. Yes, it sure is.
Q. But this is just a different part?
A. Yes, it is.
Q. Did you hear Dr. Rangan say it would be, and I think he used the word "insane" to use something besides the ARI to make the PUCCH selection here?
A. I was here for that testimony, yes.
Q. What is Ahn using to make the PUCCH selection here?
A. Well, apparently Ahn is a little insane here, because he is not using ARI at all in this embodiment. It's actually in contention with what Dr. Rangan was saying.

Q. Let's move on to slide 33.

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

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

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

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

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

A. Yes, it certainly does.

Q. Let's go to 34.

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

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

A. Yes, it is.

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

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

Q. So in this instance it can designate both.
A. In this embodiment, yes.
Q. Well, I want to zoom out from that sentence to the paragraph just above it.
Did we see that yesterday with Dr. Rangan?
A. We did not.
Q. How does the Ahn patent describe this embodiment?
A. This is described as a reinterpretation of the ARI. So you have the disclosures for the ARI, now we look at a particular reinterpretation of the ARI in this embodiment.
Q. Has Dr. Rangan provided any reason why a person of ordinary skill in the art would combine this reinterpretation ARI embodiment from column 9 with the embodiment that doesn't discuss the ARI in column 20?
A. No, absolutely not. I have not heard any motivation to combine.
Q. And so let's turn to slide 35 and look at claim 8 again.
Why is it -- well, in your opinion, does Ahn come up short with respect to claim 8?
A. Yes, it does.
Q. Why is that?
A. Well, as claim 8 requires, is that you're doing the selection of the resource based on the selected resource

set using bits in the latest received message.

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

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

A. No, he does not.

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

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

Q. Let's move on from that element.

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

A. Yes, many.

Q. Let's go to slide 36.

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

A. No, it does not.

Q. Why not?

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

multiple resource sets.

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

A. Yes, I was.

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

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

Q. Let's turn to slide 37.

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

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

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

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

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

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

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

A. Yes, I did.

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

A. Absolutely not, no.

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

A. Yes, I do.

Q. Do you agree that the -- let me say it again.

Do you agree that that disclosure discloses the variable timing in claims 9 and 15?

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

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

Q. Let's turn to slide 39.

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

A. No, it does not.

Q. Why not?

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

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

A. Yes, I do.

Q. Can we flip through those very quickly?

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

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

What is that combination again?

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

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

A. No, he does not.

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

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

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

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

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

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

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

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

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

A. I have not heard any, no.

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

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

Q. Let's go to slide 45.

Can you remind us what ground 3 is?

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

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

A. He does not.

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

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

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

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

were very cursory at a high level.

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

A. No, he did not.

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

A. Okay.

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

A. Yes, I did.

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

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

Q. Let's turn to slide 47.

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

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

resource.

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

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

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

Did Dr. Rangan also point to these disclosures?

A. Yes, he did.

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

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

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

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

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

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

A. Ahn.

Q. For both of his obviousness grounds?
A. Yes.
Q. Does Ahn disclose basing a resource determination on the starting CCE?
A. It does not.
Q. Okay. Which references does Dr. Rangan rely on for the starting CCE elements?
A. Well, Park and Intel.
Q. Well, do either Park or Intel disclose basing a resource determination on the latest received downlink control messages?
A. They certainly do not.
Q. Do they even have two downlink control messages?
A. No, they do not.
Q. So can any of these references individually disclose this entire claim element in orange and green of the UE determining a resource based on the starting CCE index and the latest received one of the downlink control messages?
A. No, they cannot.
Q. Let's put the patents aside for now.
Dr. Mahon, I want to turn very briefly to your opinions on FRAND. Just one or two quick questions here.
Did you see that Lenovo and its counsel referenced a few third-party essentiality studies in

rebuttal to some of your FRAND opinions?

A. Yes, I did.

Q. Have you reviewed these studies referenced by Lenovo?

A. Yes, I looked at them.

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

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

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

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

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

A. That these are deficient.

Q. Are they reliable?

A. Unreliable, in my opinion.

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

A. Not that I know of, no.

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

A. Claim charts.

MR. HESS: I'll pass the witness.

JUDGE MCNAMARA: Thank you, Mr. Hess.

Mr. Appleby?

MR. APPLEBY: Thank you, Your Honor.

CROSS-EXAMINATION

MR. APPLEBY: May I proceed, Your Honor?

JUDGE MCNAMARA: Yes.

MR. APPLEBY: Robert Appleby for the Respondents.

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

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

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

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

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

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

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

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

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

A. That's correct.

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

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

A. Yes, it does.

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

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

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

A. That's correct.

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

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

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

A. Yes, it does.

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

A. That's correct.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. And as claimed, correct?

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

Q. You just anticipated my next question. The SUCI

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

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

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

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

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

A. Yes, that's what is encrypted.

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

A. That is correct.

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

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

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

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

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

A. They sure were, yes.

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

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

Now you talked about Forsberg on direct, right?

A. Yes, I did.

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

A. It's very prior art, yes.

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

A. Yes, I did.

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

A. Certainly not, sir.

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

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

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

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

A. Correct.

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

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

Q. Right. An encrypted IMSI, right?

A. That would be an IMSI, yes.

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

A. It is, yes.

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

A. That's correct.

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

A. Yes, I've seen this before.

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

A. That's correct.

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

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

encrypted IMSI.

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

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

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

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

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

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

A. I do see that on the slide.

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

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

identifier.

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

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

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

A. That's correct.

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

A. That's correct.

Q. And Forsberg teaches encrypting the MSIN, right?

A. Yes, it does.

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

A. I disagree.

Q. They are both MSINs, right?

A. Yes, they are.

Q. And they are both being encrypted, right?

A. They are.

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

A. It's certainly sent in forwards.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A. Again, it's not encrypted. It's not encrypted.
Q. It's in the clear-text part of the user identity response.
A. Again, you're referring to the claimed SUCI. You can make the comparison. Neither are encrypted. I agree with that.
Q. So we can put public key identifier within our user identity response in Forsberg, fair?
A. You can put it there.
Q. Now I think you told us on direct that Forsberg does not disclose an encryption scheme identifier, right?
A. That's correct.
Q. And that's an identifier that identifies the encryption scheme that's used to encrypt the subscription identifier, right?
A. For the transmitted SUCI, yes.
Q. And what it does is it tells the network what encryption scheme was used to decrypt the subscription identifier, right?
A. Well, to encrypt so that it can be decrypted by the network.
Q. You're absolutely right. I got ahead of myself.
So it tells the network what encryption scheme was used to encrypt its subscription identifier, right?
A. Correct.

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

A. Correct.

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

A. Yes, I did.

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

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

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

A. Yes, I did.

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

You were asked the question:

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

of the '817 patent?

"Answer. No, I do not."

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

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

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

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

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

A. Yes.

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

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

I read that correctly, right?

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

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

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

A. The user device, yes, UE.

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

A. Correct.

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

A. That is correct.

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

A. Yes, I do see that.

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

A. I would disagree with that.

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

A. That's correct.
Q. Let's bring up 122, 25, to 123, 4.
JUDGE MCNAMARA: What is the date, please, Mr. Appleby?
MR. APPLEBY: May 22, 2024.
JUDGE MCNAMARA: Thank you.
Q. Now in your deposition you were asked:
"As shown in Figure 4 of Forsberg, that server, the Visited-MME, forwards the encrypted IMSI and public key identifier to another server called the Home-MME. Correct?
"Answer. That is correct."
Were you asked that question and did you give that answer?
A. Yes, I gave that answer after the Visited-MME tries to decrypt, yes.
Q. Now Forsberg also discloses that the home and MME server will decrypt the encrypted IMSI, correct?
A. If it's contacted by the Visited-MME, yes, it will do the decryption.
Q. And then, in particular, Forsberg discloses that the Home-MME decrypts the MSIN portion of the IMSI, correct?
A. That's correct.
Q. And then Forsberg discloses that an IMSI decryption response containing the decrypted IMSI is sent back to the Visited-MME. We have highlighted that in red.

Correct?

A. Yes.

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

We can take that down.

A. Yes, I did.

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

A. That's correct.

Q. Now Nair discloses an IMSI, correct?

A. Yes.

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

A. It does, yes.

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

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

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

A. It certainly was a competing proposal for being

adopted in 5G.

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

A. Yes.

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

A. What do you mean by "areas"?

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

A. Yes.

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

A. You sure did.

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

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

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

A. Yes.

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

A. Yes.

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

A. Yes, I see that.

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

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

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

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

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

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

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

A. That's correct.

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

A. That's correct.

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

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

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

A. That's correct.

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

A. Yes.

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

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

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

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

A. It does have the AUSF listed, yes.

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

A. That's what it stands for, yes.
Q. And as we mentioned earlier, there's a UE in green on the left?
A. Yes.
Q. And Nair discloses that the authentication server AUSF in Nair receives the encrypted IMSI and forwards that encrypted IMSI to an SLF, which I'm highlighting in brown on RDX-27.19. Is that right?
A. Yes, the server location function.
Q. And Nair discloses that the SLF will decrypt the encrypted MSIN, right?
A. Yes, using the certificate, yes.
Q. Okay. Thank you. I'd like to now turn to the '669 patent.

Again, I think you mentioned this on direct, that the '669 patent is related to PUCCH or PUCCH, I think we've been calling it.
A. I call it PUCCH.
Q. PUCCH. You and I are going to get the acronyms aligned at some point.

That's physical uplink control channel, right?
A. That's correct.
Q. It's really a resource determination for that channel, right?
A. The '669, yes.

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

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

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

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

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

A. Correct.

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

A. Yes.

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

A. It does say that, yes.

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

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

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

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

A. Yes.

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

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

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

A. Correct.

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

Now you discussed the Ahn reference on direct, right?

A. Yes, I did.

Q. And you don't dispute that Ahn is prior art to the '669 patent, right?
A. I do not.
Q. Now on direct you made a point of telling us that Park '389 was cited on the face of the '669 patent, right?
A. Yes, I did.
Q. And you also told us that the 3GPP-Intel was considered by the Patent Office in an IPR, I believe you told us?
A. Yes. It was an Apple IPR.
Q. Now you were here for Dr. Rangan's presentation, right?
A. Yes, I was.
Q. And you understand that the primary reference he is relying on is Ahn, correct?
A. That is his primary reference, yes.
Q. Right. And you didn't tell us that Ahn was cited on the face of the patent, right?
A. I did not say that, no.
Q. It's not cited on the face of the patent, is it?
A. That's correct.
Q. As far as you know, it has not been considered by the Patent Office, right?
A. Not that I can recall.
Q. Okay. So let's go back to Ahn. And you would

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

A. Yes, it's related to that.

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

A. That's correct.

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

A. I have not made that.

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

A. That's reasonable.

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

A. That's correct.

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

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

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

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

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

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

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

A. Correct.

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

A. That's correct.

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

A. That's right.
Q. Okay. Now let's go to slide 27.26.
Ahn does state that a base station -- that's BS stands for base station, right?
A. Correct.
Q. -- that a base station may predetermine a plurality of candidate resources for the PUCCHy and a plurality of candidate resources for the PUCCHz through RRC signaling. That's what Ahn says, right?
A. That's correct.
Q. And you'll also agree that the base station's predetermination of a plurality of candidate resources through RRC signaling constitutes a semi-static configuration, right?
A. The RRC signal is considered a semi-static signal in the disclosure. So it's determining PUCCH formats, and it says there is a plurality of candidate resources as part of that process.
Q. Right. And that process through RRC signaling constitutes a semi-static configuration, right?
A. Yes.
Q. And Ahn also states, if we go to RDX-27.27, that which candidate resource will be used among the plurality of candidate resources may be designated by an ARI in a DCI, right?

A. In certain embodiments, yes.
Q. And designating the resource to use by an ARI in a DCI is dynamic signaling, right?
A. Yes, as understood.
Q. Okay. So if I understood your direct correctly, you dispute that Ahn discloses resource determination based on a latest received downlink control channel message, right?
A. The latest received DCI as disclosed in column 20, yes.
Q. Okay. So I want to kind of walk through some disclosures. Let's look at Fig. 17. This is RDX-27.28.
You actually show it as Fig. 17 of Ahn on direct, right?
A. Yes, I did.
Q. And Fig. 17 shows us two separate DCIs in two separate downlink control channel messages, right?
A. Yes, it does.
Q. And each of those DCIs schedules a downlink shared channel transmission, right?
A. Yes, they do.
Q. And in Fig. 17 the DCI in the downlink control channel message on the left specifies a PUCCH resource of 2, right?
A. ARI of 2. It does disclose that, yes.

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

A. Correct.

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

A. That's correct.

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

A. ARI is indicated as 0 on that slide.

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

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

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

A. Correct.

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

A. Within that PUCCHz format resource 0, as

indicated.

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

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

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

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

Q. For both downlink messages, right?

A. Correct.

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

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

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

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

A. That's what Ahn discloses, yes.

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

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

And you showed us this slide on direct, right?

A. Yes, I did.

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

A. That's correct.

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

A. That is correct.

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

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

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

opinion on this passage, right?

A. That's correct.

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

A. Could you state that again, please?

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

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

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

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

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

A. That is correct.

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

A. Correct.

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

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

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

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

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

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

So that would be a less than probably advantageous approach.

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

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

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

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

A. Yeah, just in general.

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

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

Is there much more on the PUCCH?

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

JUDGE MCNAMARA: How much do you have?

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

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

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

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

BY MR. APPLEBY:

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

A. Yes, I did.

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

A. Yes, in this embodiment it sure does.

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

A. That's correct.

Q. Okay.

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

JUDGE MCNAMARA: All right.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. AROVAS: Thank you, Your Honor.

JUDGE MCNAMARA: So choose it wisely.

MR. HAYNES: Thank you, Your Honor.

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

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

THE WITNESS: Yes, Your Honor.

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

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

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

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

THE WITNESS: Okay. Thank you, Your Honor.

JUDGE MCNAMARA: Thank you.

Is there any other witness who needs the Webex link?

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

JUDGE MCNAMARA: Yes.

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

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

MR. HAYNES: Yes, we will.

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

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

following day, July 17, 2024, at 9:00 a.m.)

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EXHIBIT LISTS SUBMITTED FOR ADMISSION:

ADMITTED TRIAL EXHIBITS AND DEMONSTRATIVES (DAY 4 7/15/24)

John Mulgrew

CDX-0045C

CX-2441

CX-2446

CX-5695C

CX-5716C

CX-5718C

CX-5837C

CX-5842C

CX-5841C

CX-5844C

CX-5870C

CX-6502

JX-0026C

RDX-0010C

RX-0067C

RX-0068C

RX-0072C

RX-0074C

RX-0077C

RX-0083C

RX-0084C

RX-0302C

RX-0306C
RX-0308C
RX-0310C
RX-0475C
RX-0570C
RX-0604C
RX-0635C
RX-0646C
RX-0657C
RX-0865C
RX-2517C
Dr. Sundeep Rangan
JX-0002
JX-0003
RDX-0006C
RX-0043
RX-0051
RX-0299
RX-0684
RX-0688
RX-0695
RX-1310
RX-1323
RX-2107C
RX-0280

RX-2293
CDX-0043
RX-2280
CX-1292
Dr. Lingjia Liu
JX-0004
JX-0014
JX-0033C
JX-0036C
JX-0037C
JX-0040C
JX-0043C
RDX-0008
RPX-0001C
RPX-0002C
RPX-0003C
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RPX-0016C
RPX-0017C
RPX-0070C

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RPX-0074C
RPX-0075C
RPX-0076C
RPX-0077C
RPX-0119C
RPX-0121C
RPX-0122C
RPX-0123C
RPX-0124C
RPX-0125C
RPX-0126C
RPX-0127C
RPX-0128C
RPX-0129C
RPX-0130C
RPX-0131C
RPX-0132C
RPX-0133C
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RPX-0146C

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RPX-0160C
RPX-0164C
RPX-0166C
RPX-0167C
RX-0044
RX-0055
RX-0318
RX-0382
RX-0384
RX-0811
RX-0822
RX-0823
RX-0825
RX-0848
RX-0849
RX-0850
RX-0888
RX-0890
RX-0892
RX-0893
RX-0895
RX-0952

RX-1244
RX-1245
RX-1307
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CX-0557
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C E R T I F I C A T E

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

INVESTIGATION NO.: 337-TA-1375

HEARING DATE: July 16, 2024

LOCATION: Courtroom B

NATURE OF HEARING: Evidentiary Hearing

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

Date: July 16, 2024

Signed:

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Signature of the Contractor or the Authorized Contractor's Representative

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.

Signed:

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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.

Signed: July 16, 2024

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