

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

3 -----
4 LENOVO (UNITED STATES) INC.,
5 Petitioner

6 vs

7 TELEFONAKTIEBOLAGET LM ERICSSON,
8 Patent Owner
9 -----

10 Case IPR2024-00702
11 U.S. Patent No. 10,425,817

12 Oral deposition of

13 HARRY BIMS, Ph.D.

14
15 WASHINGTON, DC

16 FRIDAY, NOVEMBER 22, 2024

17 9:10 a.m. EASTERN TIME
18
19

20 Job No.: 861288

21 Pages: 1 - 63

22 Reported by: Lisa V. Feissner, RDR, CRR, CLR

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3 Oral deposition of HARRY BIMS, Ph.D., held at
4 the offices of:

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1 P R O C E E D I N G S

2 HARRY BIMS, Ph.D.,

3 having been first duly sworn, was examined and
4 testified as follows:

5 EXAMINATION

6 BY MR. MICHELI:

7 Q Good morning, Dr. Bims. How are you
8 doing today?

9 A Good morning. I'm doing well.

10 Q You've offered an opinion in the IPR of
11 the '817 patent, correct?

12 A Yes.

13 Q And when I refer to the '817 patent, you
14 know that I'm referring to U.S. Patent No.
15 10,425,817, correct?

16 A Yes.

17 Q And your opinion is with respect to four
18 grounds.

19 Is that right?

20 A Yes.

21 Q What four grounds are those?

22 A They're listed in my report. There's

1 various combinations of prior art references, Nair,
2 Forsberg, Togawa, and 5G-ENSURE.

3 (Previously marked Exhibit 1002 presented
4 to the witness.)

5 BY MR. MICHELI:

6 Q I'm going to give you a copy of your
7 declaration in this matter. This is Exhibit 1002
8 from the IPR. There you are.

9 And Counsel.

10 Dr. Bims, can you confirm that this is
11 the declaration that you provided in support of the
12 IPR of the '817 patent?

13 A Yes, it is.

14 Q Can you please confirm for me what the
15 four grounds that you've provided an opinion on are?

16 A Ground 1 is Nair in combination with
17 Forsberg. Ground 2 is Nair in combination with
18 Forsberg and Togawa. Grounds 3 and 4 are grounds 1
19 and 2 in further combination with 5G-ENSURE.

20 Q This isn't the first time that you've
21 offered an opinion on the '817 patent, is it?

22 A That's correct.

1 Q You offered an opinion in an ITC
2 investigation involving the '817 patent?

3 A Yes.

4 Q And did you testify during the ITC
5 investigation?

6 A Yes.

7 Q Did you offer testimony during a
8 deposition in the ITC investigation?

9 A Yes.

10 Q And in both of those instances, you were
11 under oath the same way you are today?

12 A Yes.

13 Q Do you stand by all of the opinions that
14 you provided during that investigation?

15 A Yes.

16 Q Is there anything about the opinions you
17 provided during that investigation that you would
18 change or correct?

19 A I don't recall anything that I would
20 change or correct, no.

21 Q Everything you said during your
22 deposition and when you gave testimony at the ITC

1 hearing was true, right?

2 A Thinking back, I think there was some
3 discrepancy in the deposition testimony and
4 testimony at trial that was questioned. I don't
5 believe I was given an opportunity to clarify. But
6 I believe it was some controversy over that.

7 Q Well, help me understand what you're
8 referring to, Dr. Bims. What are you specifically
9 referring to?

10 A I don't remember exactly, but I believe
11 at some point there was some question about what was
12 in my deposition testimony which came up at trial.

13 Q But you don't recall what that particular
14 discrepancy was?

15 A No.

16 Q I want to ask you about the grounds that
17 you've offered an opinion on in this IPR.

18 First of all, you said that 5G-ENSURE was
19 in combination with grounds 1 and 2 for grounds 3
20 and 4, correct?

21 A Yes.

22 Q You looked at 5G-ENSURE because none of

1 the other references in the other grounds teach
2 elliptical curve cryptography, right?

3 A Elliptic curve cryptography is mentioned
4 in the Nair reference. The 5G-ENSURE reference
5 is -- provides more detail about how that works.

6 (Previously marked Exhibit 1004 presented
7 to the witness.)

8 BY MR. MICHELI:

9 Q Dr. Bims, I'm going to give you a copy of
10 Exhibit 1004 from the IPR. This is the Nair
11 application. Can you please look at that and
12 confirm that that is indeed the Nair application?

13 A Yes.

14 Q And Dr. Bims, where in the Nair
15 application is elliptic curve cryptography
16 mentioned?

17 Dr. Bims, would it be helpful for you to
18 have an electronic copy that you could search?

19 A No. This is fine.

20 So the term "elliptic curve" is not
21 expressly disclosed in the Nair reference.

22 Q Is it still your belief that the Nair

1 reference discloses elliptic curve cryptography,
2 despite the term "elliptic curve" appearing nowhere
3 in that reference?

4 A So the Nair reference includes a
5 description of privacy features, and those privacy
6 features, to a person of ordinary skill, would
7 include elliptic curve features.

8 Q Dr. Bims, I'd like you to look at your
9 declaration, which you have there in front of you.

10 Turning to page 85, paragraph 144. Let
11 me know when you've arrived there.

12 A Okay.

13 Q In paragraph 144, you explain that it
14 would have been obvious to a POSITA to use elliptic
15 curve integrated encryption scheme in light of the
16 combination of grounds 1 and 2, in further
17 combination with 5G-ENSURE, right?

18 A Yes.

19 Q Isn't it true that the reason you attempt
20 to combine 5G-ENSURE with these other grounds
21 because none of those other grounds teach elliptic
22 curve cryptography?

1 A The other grounds, grounds 1 and 2, do
2 not expressly mention the elliptic curve integrated
3 encryption scheme.

4 However, in their description, they
5 include the description of the use of encryption
6 schemes, which a person of ordinary skill would
7 understand to include elliptic curve as one of the
8 encryption schemes as part of grounds 1 and 2.

9 Q But nowhere in your declaration do you
10 cite something from grounds 1 or 2 that you would
11 say discloses that particular elliptic scheme,
12 right?

13 A That particular encryption scheme is not
14 expressly disclosed in grounds 1 and 2.

15 Q Each one of your grounds makes use of the
16 Nair reference.

17 Isn't that right?

18 A Yes.

19 Q And you have the Nair reference in front
20 of you. What is the filing date of Nair?

21 A October 26th, 2017.

22 Q But Nair claims priority to a provisional

1 application, right?

2 A Yes.

3 Q What is the filing date of that
4 provisional application?

5 A May 5th, 2017.

6 (Previously marked Exhibit 1008 presented
7 to the witness.)

8 BY MR. MICHELI:

9 Q I have here a copy of that provisional
10 application. I'm going to provide that to you.
11 This is Exhibit 1008 in the IPR. Here you are.

12 Counsel.

13 Can you confirm for me that that is a
14 copy of the Nair provisional application?

15 A Yes.

16 Q And the filing date of Nair,
17 October 26th, 2017, that's after the priority date
18 of the '817 patent, isn't it?

19 A I believe, as I stated in my expert
20 report on page 9, that the time of the alleged
21 invention of the '817 patent was around July 25th,
22 2017. And July 25th, 2017 is prior to October 26th,

1 2017.

2 Q So you rely, then, on the claim of
3 priority to the provisional application for Nair,
4 right?

5 A I rely on disclosures in both Nair and
6 the Nair provisional application.

7 Q You agree with me that because
8 October 26th, 2017 is after the priority date of the
9 '817 patent, anything that you rely on in Nair must
10 be present also in the Nair provisional application,
11 correct?

12 MR. BAKER: Objection, form.

13 A Well, as you see in my report, in most
14 places I cite to both Nair and the Nair provisional.
15 There are occasional places where I cite to the Nair
16 reference. But that portion of the report doesn't
17 necessarily mean that it is my opinion that the
18 person of ordinary skill would not understand that
19 what I'm citing to in Nair would not be present in
20 the Nair provisional.

21 Q Not everything that's in the Nair
22 application is disclosed in the Nair provisional,

1 right?

2 A Yes. There are differences between the
3 Nair reference and the Nair provisional application,
4 yes.

5 Q Describe the Nair reference for me at a
6 high level, please.

7 MR. BAKER: Objection to form.

8 A Well, the Nair reference is titled
9 Privacy Indicators for Controlling Authentication
10 Requests. And at a high level, Nair includes in its
11 description, along with the Nair provisional that
12 includes in its description, most of the teachings
13 of the '817 patent.

14 Q You said that Nair relates to privacy
15 indicators, right?

16 A Privacy indicators are described in both
17 the Nair reference as well as the Nair provisional.

18 Q What is a privacy indicator in the
19 context of the Nair reference?

20 A Part of the description of a privacy
21 indicator is included in the abstract of the Nair
22 provisional when it says, in part, The privacy

1 indicators may comprise an indication of whether the
2 communication network is configured for handling
3 privacy-protected subscription identifiers.

4 (Previously marked Exhibit 1001 presented
5 to the witness.)

6 BY MR. MICHELI:

7 Q Dr. Bims, I'm also now handing you a copy
8 of the '817 patent. This is Exhibit 1001 from the
9 IPR. Here you are.

10 Does this look right to you, Dr. Bims,
11 that's the '817 patent?

12 A Yes.

13 Q And if you turn with me to exhibit
14 page 24, excuse me, 23, you see there at the bottom
15 right there is the beginning of the first claim of
16 the '817 patent, right?

17 A Yes.

18 Q This is one of the claims that you
19 contend is invalid, right?

20 A Yes.

21 Q This claim doesn't talk about privacy
22 indicators, though, does it?

1 MR. BAKER: Objection to form.

2 A The claim 1 of the '817 patent describes,
3 in column 21, starting at line 13, an encryption
4 scheme identifier that identifies an encryption
5 scheme used by the UE to encrypt the subscription
6 identifier in the SUCI.

7 And when claim 1 describes that
8 encryption scheme identifier, it is describing what
9 the privacy indicator in Nair is doing.

10 Q It's your opinion that Nair's privacy
11 indicators are the same as the '817 patent's
12 encryption scheme identifier.

13 Is that right?

14 A So it's my opinion that when a person of
15 ordinary skill reads the Nair provisional, and in
16 particular the portions of the Nair provisional in
17 which it describes privacy indicators, a person of
18 ordinary skill would understand that a privacy
19 indicator would indicate the encryption scheme that
20 is being used.

21 Q Nair's privacy indicator is a flag, isn't
22 it, a bit flag?

1 A In the Nair provisional, it provides in
2 multiple places a description that the privacy
3 indicator can comprise one or more flags and one or
4 more bits.

5 Q Where in the Nair provisional is there a
6 description that a privacy indicator can comprise
7 one or more flags or one or more bits?

8 MR. BAKER: I'll object because you asked
9 him a question about the Nair provisional, and a
10 location of a passage, and he didn't doesn't have
11 the Nair provisional in front of him.

12 Q Dr. Bims, I gave you a copy of the Nair
13 provisional, did I not, Exhibit 1008?

14 MR. BAKER: We withdraw our objection.

15 A For example, on page 15 of the Nair
16 provisional, the abstract says, Techniques provide
17 one or more privacy indicators for authentication
18 requests in communication systems. For example,
19 such privacy indicators can be controlled, e.g.,
20 set, by using one or more bits in an information
21 element or flag that is transmitted to elements of a
22 communication system.

1 And it goes on to say that, Furthermore,
2 methods and mechanisms are provided that address how
3 the home network of user equipment and other
4 elements/functions in the core network, e.g., a
5 server location function, can efficiently process
6 the one or more privacy indicators.

7 Advantageously, the one or more privacy
8 indicators save wasted computing resources in the
9 one or more network configurations in which they are
10 implemented.

11 Q So Dr. Bims, just to make sure I
12 understand, you're saying that because the Nair
13 provisional discloses one or more privacy
14 indicators, it doesn't disclose only a bit flag
15 privacy indicator?

16 A I'm saying a person of ordinary skill,
17 when reading this abstract, would understand that
18 the Nair provisional is teaching one or more privacy
19 indicators which could be implemented using one or
20 more bits.

21 Q So that's the part I want to make sure
22 that we parse out.

1 Are you saying that each individual
2 privacy indicator disclosed by Nair could be
3 implemented using one or more bits, or are you
4 saying that because there are multiple privacy
5 indicators, you would need one or more bits to
6 collectively include all of those privacy
7 indicators?

8 A So the one or more bits could be
9 organized in more than one way. A person of
10 ordinary skill would understand that the one or more
11 bits could be organized such that each individual
12 bit identifies a particular privacy indicator.

13 The one or more bits can also be
14 organized such that the collective value of the bits
15 represents a particular privacy indicator.

16 In that respect, the number of privacy
17 indicators would be the range of values possible by
18 the combination of one or more bits.

19 Q The Nair provisional talks about three
20 types of privacy indicator, right?

21 A From what I understand in the summary of
22 the Nair provisional, the one or more privacy

1 indicators are for controlling authentication
2 requests in communication systems.

3 And you're saying there are three
4 different types?

5 Q Well, I'm asking you, Dr. Bims.

6 How many types of privacy indicator does
7 Nair disclose?

8 A So in the Nair provisional, there are
9 multiple embodiments described in which privacy
10 indicators are contained in the embodiment.

11 The privacy indicators in the various
12 embodiments within the Nair provisional are
13 nonetheless for controlling authentication requests
14 in communications systems.

15 Q I'd like you to look at page 6 of the
16 Nair provisional. That will be page 26 of the
17 overall exhibit.

18 A Yes.

19 Q You see how there's two different page
20 numbers?

21 A Yes.

22 Q You see starting on line 17, there's a

1 first illustrative embodiment that adds an identity
2 privacy flag, i.e., privacy indicator, to indicate
3 that the MSIN the provided encrypted.

4 Do you see that?

5 A Yes.

6 Q This is one of the embodiments of privacy
7 indicator that you just mentioned, right?

8 A Yes.

9 Q And do you contend that this particular
10 privacy indicator described here is coextensive with
11 the '817 patent's encryption scheme identifier?

12 MR. BAKER: Objection, form.

13 A In paragraph 73 of my declaration, I cite
14 to Exhibit 1008 on page 6, lines 17 and 18, the
15 sentence that you recited, as a basis for my opinion
16 that Nair teaches the limitation that clear-text
17 part comprises an encryption scheme identifier.

18 Q So looking at this portion of the Nair
19 provisional that we've just read describing an
20 identity privacy flag, would you agree with me an
21 identity privacy flag is a single bit?

22 A In this Exhibit 1008 on page 6 at

1 lines 17 to 18, the sentence describes an identity
2 privacy flag, and in parentheses, it says, i.e.,
3 privacy indicator.

4 In the Nair provisional, a privacy
5 indicator is not necessarily a single bit.

6 Q You're familiar with the term "flag" as
7 it's used in a programming context, right?

8 A Yes.

9 Q What does "flag" normally mean in a
10 programming context?

11 A A flag is an indication of a condition.

12 Q It's a Boolean, right?

13 A Not necessarily.

14 Q The flag described in Nair indicates that
15 the MSIN is provided encrypted, right?

16 A Yes.

17 Q It indicates whether or not the MSIN has
18 been encrypted, right?

19 A The sentence says -- it indicates that
20 the MSIN is provided encrypted.

21 Q So is it your opinion that the flag
22 doesn't indicate when the MSIN has not been

1 encrypted?

2 A What I'm saying is that in this
3 particular sentence, it is merely saying that an
4 identity privacy flag can be used to indicate that
5 the MSIN is provided encrypted.

6 Q You've read the Nair provisional in its
7 entirety, right?

8 A Yes.

9 Q You understood it, you've internalized
10 what it's talking about, right?

11 A I have read it, and I do understand it,
12 yes.

13 Q So taking in context the contents of the
14 Nair provisional, can the privacy flag disclosed in
15 the Nair provisional have a value when the MSIN has
16 not been encrypted?

17 MR. BAKER: Objection to form.

18 A For example, in another embodiment in the
19 Nair provisional, it describes on page 7, starting
20 at line 24, referring to a privacy indicator, it
21 says, The indicator on the 4G/5G network side would
22 be to indicate regulation needs per country/region,

1 i.e., switch on/off privacy.

2 So Nair teaches that an indicator can be
3 used to indicate that there is no privacy in the
4 communication, i.e., there is no encryption scheme
5 being used.

6 Q Let's talk about that. So what you're
7 looking at on page 7 of the Nair provisional is the
8 second illustrative embodiment, if you look at
9 line 19 there, right?

10 A Yes. It's a different embodiment than on
11 page 6.

12 Q It's actually a different privacy
13 indicator, right?

14 A It's a privacy indicator that fits the
15 description that I mentioned in the summary of the
16 Nair provisional.

17 Q But it's not a privacy indicator that
18 fits the encryption scheme identifier claimed in the
19 '817 patent, is it?

20 MR. BAKER: Objection, form.

21 A The privacy indicators described in the
22 Nair provisional, to a person of ordinary skill,

1 would indicate the encryption scheme that is being
2 used.

3 Q Continuing to look at the second
4 illustrative embodiment on page 7, how does the
5 privacy indicator described in the second
6 illustrative embodiment indicate the encryption
7 scheme that is being used?

8 A A person of ordinary skill reading this
9 paragraph on page 7, starting at line 19 in the Nair
10 provisional would understand that the privacy
11 indicator described in this paragraph is describing
12 the use of an encryption scheme to provide privacy
13 as part of a configure policy in the network.

14 Q You said that looking at this
15 description, a POSITA would understand this to
16 describe the use of an encryption scheme to provide
17 privacy as part of a configure policy in the
18 network, right?

19 A Yes.

20 Q The use of an encryption scheme to
21 provide privacy as part of a configure policy in the
22 network by whom? What entity would make use of

1 privacy in this context?

2 A The configure policy that provides
3 privacy would be used by the UE and the network as
4 part of the encryption scheme.

5 Q This second illustrative embodiment in
6 the Nair provisional is describing a privacy
7 indicator that is used for the network to signal to
8 a UE that it expects to be able to handle privacy,
9 right?

10 A So in this embodiment, it describes how a
11 4G/5G network can advertise that it is either
12 expecting privacy or that it's possible or desired
13 to provide privacy to a UE.

14 The paragraph goes on to say that as a
15 result of this, the -- when the UE is roaming in a
16 visited network, the UE can decide to attach to a
17 network even if this indicator is not sent to the
18 UE.

19 Q So just to clarify, this is an indicator
20 possessed by the network that would be sent to the
21 UE, right?

22 A This is another privacy indicator

1 described in the Nair provisional for this
2 particular embodiment.

3 Q And this privacy indicator that's
4 described in the Nair provisional, the one in the
5 second illustrative embodiment, is describing an
6 indicator that the network could send to the UE,
7 right?

8 A Yes. This is an indicator that the 4G/5G
9 network could send to a 5G UE.

10 Q There's another example of a privacy
11 indicator in Nair, right? If you go to page 8 at
12 line 4, there's a third illustrative embodiment.

13 Do you see that?

14 A Yes.

15 Q So this is a privacy indicator that's
16 managed by the UE, right?

17 A Yes.

18 Q This is a privacy indicator that controls
19 the UE to not accept a request to join a network if
20 the network doesn't want to use privacy.

21 Isn't that right?

22 A What this is describing is that this

1 privacy indicator would prohibit the 5G UE from
2 responding to IMSI paging from the network.

3 Q Is there more to it? It's IMSI paging
4 from the network in the event that the network
5 doesn't want to use privacy, right?

6 A This is a privacy indicator in the UE
7 that can be set to prohibit the UE from responding
8 to the network.

9 This paragraph then goes on to say, if
10 the UE wants to attach to a network that it would
11 not answer the network if this privacy indicator is
12 set.

13 Q You're reading from the line that says,
14 Thus, if the UE wants to attach to the network and
15 the network requests its real identity, a
16 privacy-configured 5G UE configured with this
17 privacy indicator would not answer.

18 Right?

19 A That's what the sentence says, yes.

20 Q And is your understanding of that
21 sentence that it is saying if the network is
22 requesting its real identity, that it won't answer?

1 A What the paragraph is saying is that if
2 the privacy indicator is set, then the 5G UE will
3 not respond to IMSI paging. And IMSI paging is used
4 by the network to request the real identity of the
5 UE.

6 Because of that, because -- the UE will
7 not answer the network because it is not responding
8 to IMSI paging.

9 Q This third illustrative embodiment is
10 describing a privacy indicator for the UE, right,
11 but not one that the UE is going to send to the
12 network.

13 Is that correct?

14 A That's correct.

15 Q I want to look back at that first
16 illustrative embodiment that we were talking about
17 earlier. It's on page 6 of the Nair provisional.
18 It starts on line 17.

19 A Okay.

20 Q This is the only privacy indicator
21 described in Nair that actually gets sent from the
22 UE to the network, right?

1 A On page 9, starting at line 22, as well
2 as on page 13, starting at line 5 are examples
3 where, in the Nair provisional, it describes privacy
4 indicators sent to the network.

5 Q Let's talk about page 9 first.

6 The portion of page 9 that you just
7 referred me to is describing actions by the MME/AMF,
8 right?

9 A It's describing the MME/AMF in the
10 context of other network elements and also in the
11 context of the UE 102.

12 Q It's actually talking about the home
13 network of the UE 102, isn't it?

14 A It's talking about forwarding information
15 that is encrypted to the home network of the UE.
16 And a person of ordinary skill would understand that
17 the encrypted information that is being forwarded to
18 the appropriate home network of the UE came from the
19 UE.

20 Q What this doesn't describe is a UE
21 sending a privacy indicator to the network, though,
22 right?

1 MR. BAKER: Objection, form.

2 A What it describes, for example, starting
3 at line 24, it says, As described above, SLF 107 may
4 decrypt a subscriber identity or simply forward the
5 encrypted information to the appropriate home
6 network of UE 102, depending on the one or more
7 privacy indicators.

8 This sentence informs a person of
9 ordinary skill that the subscriber identity or
10 encrypted information coming from the UE would
11 include the one or more privacy indicators used by
12 the network to determine the appropriate home
13 network of the UE.

14 Q Dr. Bims, Nair does not expressly
15 disclose an encryption scheme identifier, right?

16 MR. BAKER: Objection, asked and
17 answered.

18 A The term "encryption scheme identifier"
19 is not expressly disclosed in the Nair provisional.

20 Q Nair doesn't expressly disclose public
21 key identifiers either, does it?

22 A So the Nair provisional discusses the use

1 of public keys but does not discuss expressly public
2 key identifiers.

3 Q Where does the Nair provisional discuss
4 the use of public keys?

5 MR. BAKER: We've been going about an
6 hour. After this answer, can we take a break?

7 MR. MICHELI: Yeah, that's fine with me.

8 A For example, in one of the many locations
9 in the Nair provisional, on page 4, starting at
10 line 28, it says, In the home network public key
11 based solution, the home operator provides its
12 public key to all home network subscribers.

13 MR. MICHELI: Thank you, Dr. Bims. We
14 have been going for about an hour. So would you
15 like to take a break?

16 THE WITNESS: Sure.

17 MR. MICHELI: All right. Let's go off
18 the record.

19 (Recess from 10:11 a.m. until 10:26 a.m.)

20 BY MR. MICHELI:

21 Q Dr. Bims, during the break, we were
22 talking about Nair, but I want to talk about the

1 '817 patent with you now.

2 You have that in front of you, don't you?

3 A Yes.

4 Q Let's start with a discussion of
5 cryptography. You're an expert in cryptography,
6 right?

7 A Yes.

8 Q What does it mean to encrypt something?

9 A Generally speaking, encryption is a
10 cryptographic technique that is used to make it
11 difficult to decode information.

12 Q And what is an encryption scheme?

13 A Generally speaking, an encryption scheme
14 would be a cryptographic process for making it
15 difficult to decode information.

16 Q Put more simply, an encryption scheme is
17 the type of encryption that's been applied to
18 something, right?

19 A It's not necessarily limited to that.

20 Q How is encryption scheme different from
21 the type of encryption that's been applied to
22 something?

1 A An encryption scheme is not necessarily
2 limited to simply encrypting information. There are
3 many aspects of a cryptographic system that are
4 defined to ensure that information is difficult to
5 decode. And those other aspects do not relate
6 specifically to encrypting information.

7 For example, the Diffie-Hellman public
8 key exchange is a method for making it difficult to
9 decode information. And of course, the Hellman in
10 Diffie-Hellman is actually a friend of mine who was
11 a Stanford professor who invented the public key
12 cryptography system.

13 Q Diffie-Hellman public key exchange is a
14 method of creating a shared secret between two
15 devices, right?

16 A It's a way to exchange public keys so
17 that they can be used in a cryptographic system, and
18 oftentimes, it's the exchange of the keys that is
19 the vulnerable aspect of an encryption scheme, not
20 the encryption algorithm that is used.

21 Q How can the exchange of keys be the
22 vulnerable aspect of an encryption scheme?

1 A So oftentimes the encryption algorithm is
2 extremely difficult for the hackers to break into.
3 However, if the cryptographic scheme is not --
4 cryptographic method is not established correctly,
5 then a hacker can get access to the keys used to
6 encrypt the information, and based on that, they can
7 exploit vulnerabilities to hack into the system
8 without ever cracking the encryption algorithm
9 itself.

10 Q Key exchange is a potential vulnerability
11 because it's an opportunity for a hacker to capture
12 the key, right?

13 A That's one of many ways you can exploit a
14 key exchange. There are many other techniques that
15 can be used to hack into the system using the key
16 exchange sequence.

17 Q Do you know what asymmetric encryption
18 is?

19 A I remember the term, yes.

20 Q What is asymmetric encryption?

21 A So with asymmetric encryption, there is a
22 difference in the amount of effort required to

1 encrypt a message than to decrypt the message.

2 Q Do you know what symmetric encryption is?

3 A I would have to go back and look, but I
4 think symmetric -- one example of symmetric
5 encryption is the ECIES system.

6 Q What is ECIES? What does that stand for?
7 Let's start with that.

8 A ECIES is a type of elliptic curve
9 encryption scheme.

10 Q Does it stand for elliptic curve
11 integrated encryption scheme?

12 A Yes.

13 Q And what is -- when we talk about
14 elliptic curves in the context of encryption, what
15 are we talking about there? What's the elliptic
16 curve encryption method?

17 A So an elliptic curve encryption method
18 uses an ellipse to compute geometric points using a
19 one-way function.

20 Q ECIES is an example of an encryption
21 scheme, right?

22 A Yes.

1 Q ECIES is one of the encryption schemes
2 that's contemplated by the '817 patent, right?

3 A It's mentioned in the '817 patent, yes,
4 it is.

5 Q The '817 patent contemplates more schemes
6 than just ECIES, though, doesn't it?

7 A Not always.

8 Q Isn't it true that the '817 patent
9 describes a second example of encryption scheme that
10 is the null scheme?

11 A Yes. The null scheme is an example of an
12 encryption scheme as taught by the '817 patent.

13 Q So the '817 patent talks about ECIES as
14 one encryption scheme, null scheme as another. But
15 it contemplates more than those two as well, doesn't
16 it?

17 A Not necessarily.

18 Q Dr. Bims, you've got the '817 patent
19 right there. Can you look at Figure 4.

20 A Okay.

21 Q You see the portion of Figure 4, the
22 third block from the top, that says, encryption

1 scheme identifier?

2 A It says, scheme identifier.

3 Q Excuse me. You're right.

4 Scheme identifier: e.g. zero, the null
5 scheme, 1 ECIES, et cetera.

6 Right?

7 A That's what it says.

8 Q Most folks know that et cetera means
9 there's more than just those two, right?

10 A For that particular block in this figure,
11 yes.

12 Q Could you look at Figure 5.

13 A Okay.

14 Q If we look at the top block there, it
15 says the same thing, doesn't it?

16 A Yes.

17 Q Can you look at Figure 15. You see on
18 the right-hand side of Figure 15 towards the top is
19 what appears to be Figure 4, just embedded in
20 Figure 15?

21 A It's similar to Figure 4. That's
22 correct.

1 Q And that third block from the top, that
2 portion that's similar to Figure 4, once again says,
3 encryption scheme identifier, e.g., zero, null
4 scheme, 1, ECIES, et cetera, right?

5 A Yes.

6 Q So the '817 patent, when it's talking
7 about encryption schemes, it's not talking about
8 just those two, right; it's talking about more than
9 that.

10 Do you agree?

11 A Not necessarily.

12 Q Why do you not agree, Dr. Bims?

13 A For example, if we turn to column 22,
14 claim 14 says, The method of claim 10, wherein the
15 encryption scheme is an elliptic curve integrated
16 encryption scheme.

17 Q Claim 14 is a dependent claim to
18 independent claim 10, right?

19 A Yes.

20 Q And you're familiar with independent
21 claims and dependent claims, right?

22 A Yes.

1 Q So is it your understanding of what
2 claim 14 is saying with respect to method -- the
3 method of claim 10 is that the encryption scheme is
4 specifically the ECIES scheme that we were just
5 talking about?

6 A Claim 14 is saying, the encryption scheme
7 described in claim 10 is the elliptic curve
8 integrated encryption scheme.

9 Q Do you know what claim differentiation is
10 as a concept?

11 A Generally. I believe that is a legal
12 term.

13 Q Is it your understanding that given that
14 claim 14 is a dependent claim of claim 10, that the
15 encryption scheme identifier of claim 10 must
16 encompass ECIES but also more than just ECIES?

17 MR. BAKER: Objection, calls for a legal
18 conclusion.

19 A Well, again, I'm not trying to reach a
20 legal conclusion. I'm simply saying that reading
21 claim 14, claim 14 is limited to an encryption
22 scheme that is the elliptic curve integrated

1 encryption scheme.

2 Q Can you look at claim 8, please.

3 A Okay.

4 Q Claim 8 is making the same limitation on
5 claim 1 that claim 14 does for claim 10, right?

6 A Claim 8 depends on claim 1, and claim 1
7 is different than claim 10, which is what claim 14
8 is dependent on.

9 Q The encryption scheme identifier
10 described in claim 1 can identify ECIES as one
11 possible scheme, right?

12 A In claim 1, the encryption scheme
13 identifier can be the elliptic curve integrated
14 encryption scheme.

15 Q It can also be the null scheme, can't it?

16 A It could be the null scheme.

17 Q It could also be a scheme other than the
18 elliptic curve scheme and the null scheme, can't it?

19 MR. BAKER: Objection. The question
20 calls for a legal conclusion.

21 A I don't have an opinion on the scope of
22 claim 1, so I can't answer the question as to

1 whether or not the scope of claim 1 includes other
2 encryption schemes other than what is expressly
3 disclosed in the patent.

4 Q Can you look at column 10 of the '817
5 patent, please.

6 You see starting at line 17 where it's
7 describing Figure 5?

8 A Okay.

9 Q Figure 5 is that figure we were talking
10 about just a moment ago, right?

11 A That's one of the figures we talked about
12 earlier, yes.

13 Q It says that, Each scheme adopted as
14 standard may be assigned a specific identifier. For
15 example, the null scheme may be assigned a zero,
16 ECIS may be assigned a 1, and so on.

17 Right?

18 A Yes.

19 Q Do you understand that another scheme
20 could be adopted as a standard and given a
21 corresponding value for the encryption scheme
22 identifier from this section that we've just looked

1 at, Dr. Bims?

2 MR. BAKER: Objection, form.

3 A So what this passage that we're
4 discussing says to a person of ordinary skill is
5 that a single bit can be used as the encryption
6 scheme identifier, as I've stated in paragraph 29 of
7 my declaration.

8 Q This paragraph includes a line at 20 that
9 says the identifier can be a 4-bit identifier,
10 doesn't it?

11 A That's what it says.

12 Q The priority date of the '817 patent is
13 July 25th, 2017, right?

14 MR. BAKER: Objection, asked and
15 answered.

16 A Yes.

17 Q You don't challenge that, do you,
18 Dr. Bims?

19 A I have not challenged it in my
20 declaration.

21 Q Do you have any experience working with
22 wireless standards, Dr. Bims?

1 A Yes.

2 Q What experience do you have working with
3 wireless standards?

4 A Going back to 1992, my Ph.D. dissertation
5 at Stanford was about trellis coding for partial
6 response continuous phase modulation with precoding.
7 Continuous phase modulation technique that was the
8 focus of that research was used in the GSM cellular
9 networking standard.

10 That was the first activity that I
11 performed relating to a wireless standard.

12 From there I worked as VP of engineering
13 at Symmetry Communications building core network
14 infrastructure for the GPRS cellular network, which
15 we called 2.5G.

16 And from there, I spent a significant
17 amount of time developing the IEEE 802.11 standard,
18 which we call Wi-Fi, starting in 2005 with the
19 802.11e amendment and continuing up until today as a
20 voting member of the 802.11 working group.

21 In addition to that, the 802.16 wireless
22 standard, I've been involved in that development

1 since 1999. And I'm listed on the website as one of
2 half a dozen technical experts on that U.S.-based
3 cellular standard that is the alternative to LTE and
4 5G.

5 I've also developed over a dozen patents
6 relating to 802.11 standard technology. And I'm
7 also a voting member of the 802.15 working group
8 which develops wireless standards for various
9 industrial uses.

10 Q You mentioned 5G just now. What is 5G,
11 Dr. Bims?

12 A 5G is a marketing term that relates to an
13 evolution of the 3GPP standards for cellular
14 communication that are developed in Europe.

15 Q 5G is a marketing term for a body of
16 standards that describes the operation of a
17 particular telecom system, right?

18 A They are a compendium of standards
19 documents that run into the tens of thousands of
20 pages that collectively are referred to as the 5G
21 standard.

22 Q There's a 4G as well, isn't there?

1 A Yeah. The 4G standard, which is kind of
2 the colloquial name, refers to the long-term
3 evolution version of the 3GPP standards, which is
4 the basis for the development of 5G.

5 Q 4G refers to a different body of
6 standards that were advanced upon to arrive at 5G,
7 right?

8 A The 4G and 5G and 3G and 2G, et cetera,
9 standards are all developed under the European
10 Telecommunications Standards Institute within which
11 the 3GPP organization has developed standards
12 starting with 3G into 4G and 5G collectively, which
13 means that the 4G standard is developed by the same
14 organization that developed the 3G standard, and, in
15 fact, is a mere evolution of the standard for 3G,
16 which is why it's called long-term evolution.

17 From there, the 5G standard has evolved
18 out of the 4G standard.

19 Q I want to talk about the grounds that
20 you've alleged invalidate the '817 patent again.

21 So we covered that every one of your
22 grounds is based on Nair, right?

1 A Yes. Every ground includes Nair. That's
2 correct.

3 Q But none of those grounds are solely
4 Nair, are they?

5 A That's correct.

6 Q Ground 1 includes also a patent you
7 referred to as Forsberg, doesn't it?

8 A Yes.

9 MR. MICHELI: I believe I have a copy of
10 Forsberg here for you.

11 (Previously marked Exhibit 1005 presented
12 to the witness.)

13 BY MR. MICHELI:

14 Q Here you are, Dr. Bims. This is
15 Exhibit 1005 to the IPR.

16 Here's a copy for you folks.

17 Dr. Bims, is this a copy of Forsberg?

18 A Yes.

19 Q And I may have misspoken previously.

20 This is a patent application, right,

21 Dr. Bims?

22 A Yes.

1 Q What does the Forsberg application teach,
2 generally?

3 A It teaches generally an identifier
4 containing at least one encrypted part that is
5 received at a first network entity, and a second
6 network entity may then be determined based on the
7 identifier.

8 A request for assistance in decryption of
9 the identifier from the second network entity may be
10 sent from the first entity to the second network
11 entity, and the second network entity may then
12 assist the first network entity in an appropriate
13 manner.

14 Q You've just read the abstract of
15 Forsberg.

16 Is that right?

17 A Yes.

18 Q Forsberg does not expressly disclose an
19 encryption scheme identifier, does it?

20 A I have not identified an encryption
21 scheme identifier in Forsberg.

22 MR. MICHELI: Dr. Bims, I want to show

1 you some testimony that you provided previously in
2 the ITC investigation related also to the '817
3 patent.

4 I'm going to give you Exhibit 2001 to the
5 IPR. This is a segment of a deposition that you
6 gave in relation to the ITC investigation.

7 (Previously marked Exhibit 2001 presented
8 to the witness.)

9 BY MR. MICHELI:

10 Q Dr. Bims, can you turn to page 123.

11 MR. BAKER: Excuse me, Counsel. Do you
12 have a copy for us?

13 MR. MICHELI: Unfortunately, I have a
14 single copy of that. I apologize.

15 Q Dr. Bims, I'm going to read to you from
16 page 123, if you arrive there.

17 A Okay.

18 Q Question: Do you agree that Forsberg
19 does not expressly disclose an encryption scheme
20 identifier?

21 Answer: Yes.

22 Did I read that correctly?

1 A Yes.

2 Q I'm also going to read another section
3 from this same page, starting at line 12.

4 Question: Do you agree that Nair does
5 not expressly disclose an encryption scheme
6 identifier?

7 Answer: Yes.

8 Did I read that correctly?

9 A Yes.

10 Q Do you stand by that testimony that
11 neither Nair nor Forsberg expressly disclose an
12 encryption scheme identifier?

13 Is that right?

14 A That's what I said in my deposition.

15 And for example, if you turn to
16 paragraph 86 in my declaration, I describe that
17 Forsberg discloses a SUCI with an encrypted
18 subscription identifier.

19 So although Forsberg does not expressly
20 use the term "encryption scheme identifier," it
21 still discloses to a person of ordinary skill the
22 use of an encrypted subscription identifier.

1 Q Nair doesn't disclose what encryption
2 scheme is used when privacy is enabled, and that's
3 why a POSITA would look at Togawa to bring an
4 express description of the encryption scheme, right?

5 MR. BAKER: Objection, form.

6 A So in Nair, the term "encryption scheme
7 identifier" is not expressly disclosed. However, as
8 I've said earlier, a person of ordinary skill would
9 understand that a privacy indicator would indicate
10 that an encryption scheme is being used.

11 MR. MICHELI: I'm going to give you
12 another document, Dr. Bims. This is a copy of the
13 transcript from the ITC hearing in which you
14 testified.

15 MR. RHINE: Can we have a copy of this?

16 MR. MICHELI: Here you are.

17 And I should say this is a copy of one
18 day during which you testified, and only the open
19 session.

20 MR. BAKER: Is that currently an exhibit
21 in the IPR?

22 MR. MICHELI: It is not. I'd like to

1 mark that as Exhibit 1.

2 (Exhibit Bims-1 marked for identification
3 and attached to the transcript.)

4 BY MR. MICHELI:

5 Q Dr. Bims, I'd like you to turn to
6 page 1280 of the transcript marked as Exhibit 1.

7 During your testimony at this hearing,
8 you testified, Nair does not disclose what
9 encryption scheme is used when privacy is enabled,
10 and that's why a person of ordinary skill would look
11 to Togawa to bring an express description of the
12 encryption scheme that is used.

13 Right?

14 A Where are you reading this?

15 Q I'm reading this from line 11 to line 14
16 on page 1280.

17 A Yes, that's what I said.

18 Q And on page 1317 in the same hearing, at
19 line 13 to 14, you testified that -- excuse me. You
20 were asked, Nair does not expressly disclose an
21 encryption scheme identifier, right?

22 And you said, That's correct.

1 Right?

2 A Yes.

3 Q That's the same testimony that you gave
4 in your deposition that we just looked at?

5 A Yes.

6 Q And you stand by that today, that's true,
7 isn't it?

8 A Yes.

9 Q Further down on the same page, at
10 line 19, you were asked, And Forsberg also does not
11 expressly disclose encryption scheme identifiers?

12 And you answered, That's correct.

13 Did I read that correctly?

14 A Yes.

15 Q That's the same testimony that you gave
16 in your deposition that we just looked at?

17 A Yes.

18 Q And you stand by that today, what that
19 says right there is correct, correct?

20 A Yes.

21 Q Forsberg was considered by the patent
22 examiner during prosecution of the '817 patent,

1 wasn't it?

2 A Yes.

3 Q Dr. Bims, is a flag the same thing as an
4 identifier?

5 A I would not say that a flag and an
6 identifier are synonymous terms.

7 MR. MICHELI: Let's go off the record.

8 (Recess from 11:14 a.m. until 11:31 a.m.)

9 BY MR. MICHELI:

10 Q Dr. Bims, prior to our break, you told me
11 that encryption is a method of making something
12 difficult to decode, right?

13 A Yes.

14 Q Let's formalize that a little.

15 When you say "difficult to decode," what
16 do you mean?

17 A Well, the object typically of developing
18 a cryptographic system is to make it more expensive
19 to crack the system than the value of the
20 information contained in the transmission.

21 So once it becomes less expensive to
22 crack the system than the value of the information,

1 then you invite attacks.

2 But when the reverse is true, then
3 hackers tend to not try to attack the system.

4 Q When encryption is applied to data, the
5 result is something that appears random, right?

6 A Not necessarily, no.

7 Q The objective of encryption is to take
8 well-ordered data and create from it something that
9 would require a great deal of effort to reorder,
10 right?

11 A So in a cryptographic system, there's not
12 a loss of information, so the entropy of the
13 transmission is not really affected.

14 The issue is that if a person wants to
15 hack into the system, the idea is to make sure that
16 the amount of resources required to accomplish that
17 would be an order of magnitude roughly more
18 expensive than the value of the information.

19 Q When inspecting encrypted data, is it
20 typically possible to discern the encryption method
21 that was used to encrypt that data?

22 A There are many techniques that can be

1 used to deduce that, yes.

2 Q Does Nair teach any technique by which
3 the form of encryption used can be deduced?

4 A So Nair describes an implicit privacy
5 indicator in which the system can deduce how the
6 data has been -- it can deduce the -- you can deduce
7 the privacy indicator through trial and error.

8 Q When you say that Nair can deduce the
9 privacy indicator through trial and error, you mean
10 that Nair can attempt to decode the information that
11 it has sent, and if that is successful, it can
12 deduce that it was encrypted.

13 Is that right?

14 A That's one method that Nair teaches, yes.

15 Q Does Nair teach any other methods of
16 deducing the privacy indicator implicitly?

17 A That's the only one that I've seen,
18 sitting here today.

19 Q And to be clear, when we talk about
20 implicit deduction of a privacy indicator, that's
21 only disclosed in the Nair application, right, not
22 in the Nair provisional?

1 A In the Nair provisional, on page 6,
2 starting at line 19, it says, It could be suggested
3 that the HSS or SLF, even without this privacy
4 indicator, will figure out after the first attempt
5 to solve the request and, if encrypted, to attempt
6 the decryption. But one key reason to have such an
7 indication specified is that this saves processing
8 time and less resources are needed.

9 So in the provisional, it does describe a
10 scenario in which a privacy indicator is not
11 transmitted.

12 MR. MICHELI: I pass the witness.

13 MR. BAKER: We're going to need 10 or
14 15 minutes.

15 MR. MICHELI: Sure thing.

16 (Recess from 11:43 a.m. until 12:00 p.m.)

17 EXAMINATION

18 BY MR. BAKER:

19 Q Dr. Bims, do you recall being asked about
20 the elliptic curve integrated encryption scheme
21 during cross-examination?

22 A Yes.

1 Q So does TR 33.899 version 1.1.0 disclose
2 the elliptic curve integrated encryption scheme?

3 A Yes.

4 Q Do you discuss that in your declaration?

5 A Yes.

6 Q And where in your declaration do you
7 discuss that?

8 Let's take a look at paragraph 111.

9 A So in paragraph 111, I'm describing
10 TR 33.899 with respect to the ECIES scheme.

11 Q Okay. And does Nair incorporate by
12 reference that disclosure of the ECIES scheme from
13 TR 33.899?

14 A Yes, it does.

15 Q And in your opinion, do grounds 1 and 2
16 teach the use of an ECIEC [sic] -- I'm sorry, let me
17 say that again. I'm going to strike that question
18 and start over.

19 In your opinion, do grounds 1 and 2 teach
20 the use of an elliptic curve integrated encryption
21 scheme?

22 A Yes. Through the document 33.899, which

1 was incorporated by reference.

2 Q Incorporated by reference --

3 A Into Nair.

4 Q Into Nair. Thank you.

5 Dr. Bims, do you recall being asked
6 during cross-examination if Nair expressly discloses
7 the term "encryption scheme identifier"?

8 A Yes.

9 Q In your opinion, does Nair teach the
10 subject matter of an encryption scheme identifier?

11 A Yes.

12 Q And what in Nair teaches that encryption
13 scheme identifier?

14 A The privacy indicator.

15 MR. BAKER: We have no further questions
16 on redirect.

17 EXAMINATION

18 BY MR. MICHELI:

19 Q Dr. Bims, you stated that Nair
20 incorporates by reference TR 33.899, correct?

21 A Yes.

22 Q Is TR 33.899 incorporated by reference

1 into the Nair provisional?

2 A Yes. On page 2, lines 4 through 9.

3 Q And on page 2, lines 4 through 9, does
4 the term "ECIES" appear anywhere?

5 A The term "ECIES" is not expressly
6 disclosed at lines 4 through 9 on page 2.

7 Q Lines 4 through 9 on page 2 simply state
8 that privacy is an important security area to be
9 addressed in 5G networks based on TR 33.899, right?

10 A Yes. This passage says that privacy is
11 broadly addressed in that technical report that
12 we've been describing. And then it says in
13 particular how it identifies subscription, i.e., UE
14 privacy, as an important security area.

15 Q Nair's privacy indicator is a flag,
16 right?

17 MR. BAKER: Objection, outside the scope
18 of redirect.

19 A Not necessarily.

20 MR. MICHELI: Pass the witness.

21 MR. BAKER: We have no further questions.

22 COURT REPORTER: Anything else for the

1 record?

2 MR. MICHELI: No further questions.

3 (Transcript orders discussed.)

4 COURT REPORTER: Thank you. That's all I
5 need.

6 (Off the record at 12:10 p.m.)

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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2 I, Lisa V. Feissner, Certified Reporter and
3 Notary Public within and for the State of Virginia
4 do hereby certify:

5 That HARRY BIMS, Ph.D., the witness whose
6 deposition is hereinbefore set forth, was duly sworn
7 by me before the commencement of such deposition and
8 that such deposition was taken before me and is a true
9 record of the testimony given by such witness.

10 I further certify that the adverse party,
11 LENOVO (UNITED STATES) INC., was represented by
12 counsel at the deposition.

13 I further certify that the deposition of
14 HARRY BIMS, Ph.D., occurred virtually via Zoom on
15 Friday, November 22, 2024, commencing at 9:10 a.m.
16 to 12:10 p.m.

17 I further certify that I am not related to
18 any of the parties to this action by blood or
19 marriage, I am not employed by or an attorney to any
20 of the parties to this action, and that I am in no way
21 interested, financially or otherwise, in the outcome
22 of this matter.

1 IN WITNESS WHEREOF, I have hereunto set my
2 hand this 1st day of December, 2024.

3 My commission expires:
4

5 
6

7 Lisa V. Feissner, RDR, CRR, CLR

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A			
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Transcript of Harry Bims, Ph.D.
Conducted on November 22, 2024

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