

# EXHIBIT 2010

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

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TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED  
TCT MOBILE INTERNATIONAL LIMITED  
TCT MOBILE, INC.  
TCT MOBILE (US) INC.  
TCT MOBILE (US) HOLDINGS, INC.,

Petitioner(s),

VS.

mitsubishi electric corporation,

Patent Owner(s).

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CASE NO.: IPR2023-00997  
U.S. PATENT NO. 10,200,976

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ORAL DEPOSITION OF  
MARK R. LANNING  
FEBRUARY 16, 2024  
(Reported Remotely)

\*\*\*\*\*

ORAL DEPOSITION of MARK R. LANNING, produced as a witness at the instance of the Patent Owner, and duly sworn, was taken in the above-styled and numbered cause on the 16th day of February, 2024, from 9:00 a.m. to 11:11 a.m., via Zoom video conference, before Dicie Lee Eytcheson, CSR in and for the State of Texas, reported by machine shorthand, at the offices of TELECOM ARCHITECTS, INC., 4 Eagles Nest, Greenville, Texas 75402, pursuant to the Federal Rules



1 of Civil Procedure and the provisions stated on the  
2 record or attached hereto.

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1 A P P E A R A N C E S  
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\* \* \* \* \*



1 COURT REPORTER: We're on the record.

2 This begins the oral deposition of Mark R. Lanning in  
3 the matter of TCL Communication Technology Holdings  
4 Limited, Et Al versus Mitsubishi Electric Corporation,  
5 Case No. IPR2023-00997, in the United States Patent and  
6 Trademark Office before the Patent Trial and Appeal  
7 Board. Today is February 16th, 2024. The time is 9:00  
8 a.m. Central. This deposition is being taken remotely  
9 via Zoom at the request of XSensus, LLP. My name is  
10 Dicie Eytcheson, Texas CSR #5392, with Magna Legal  
11 Services.

12 Would counsel and all parties present  
13 please state their appearance and whom they represent.

14 MR. WEINSTEIN: I'm Marc Weinstein and I  
15 represent Mitsubishi Electric, the Patent Owner.

16 MR. SNODGRASS: This is Jacob Snodgrass  
17 with PV Law on behalf of Petitioners and the Witness.

18 MARK R. LANNING,  
19 having been first duly sworn on his oath to state the  
20 truth, the whole truth and nothing but the truth,  
21 testifies as follows:

22 EXAMINATION

23 BY MR. WEINSTEIN:

24 Q. Good morning, Mr. Lanning. Good to see you  
25 again.



1 A. Good morning.

2 Q. I -- I know we just went through this a couple  
3 days ago but just a reminder of a couple things.

4 If -- when I ask a question if you don't  
5 hear it clearly or don't quite understand it, please ask  
6 me to repeat or to clarify. If you -- when I ask a  
7 question, please do answer unless you're instructed  
8 otherwise by your attorney. And again, if you need a  
9 break at any time, please let me know and, in general,  
10 we'll -- we'll go, you know, to somewhere about ten  
11 minutes before the hour and take breaks; okay?

12 A. Okay.

13 Q. And like last time, if you can, tell me what  
14 you did to prepare for today's deposition.

15 A. Very similar to the answer I gave a couple days  
16 ago for the other IPR. But in summary, I read through  
17 my declaration and the petition, reviewed the patent  
18 and -- and also the prior art references that I have  
19 used in my declaration.

20 Q. And when you say "the prior art references"  
21 does that include not just the references used in the  
22 grounds, but the other references that are cited in your  
23 declaration; did you review all of them?

24 A. I don't believe I reviewed all the exhibits  
25 that I have listed in my declaration. Mainly, I



1 reviewed the -- the exhibits or the prior art references  
2 that I have used in the grounds of my declaration.

3 Q. Okay. And -- and I'm sorry, what -- with whom  
4 did you meet in preparation for today's deposition?

5 A. I had about a two-hour phone call with Jacob  
6 Snodgrass yesterday from PV Law.

7 Q. Okay. And, you know, just to confirm, like I  
8 did last time as well, there -- there's no medication or  
9 illness that you're suffering through today or have any  
10 other reason why you can't answer your questions  
11 accurately and truthfully?

12 A. No, there's not.

13 Q. Good. I didn't expect otherwise but needed to  
14 confirm.

15 Just one moment. There was one exhibit I  
16 had planned to introduce that I hadn't downloaded  
17 previously and so I'm just quickly downloading it now to  
18 have a clean copy for everybody to share.

19 I -- I'll -- so you can look, I'm -- the  
20 first thing I'm going to introduce is Exhibit 1001 which  
21 is the patent at issue U.S. Patent 10-200 -- I -- I'm  
22 sorry -- 10,200,976.

23 A. And I have a paper copy in front of me.

24 Q. Very good. Okay. Just bear with me one moment  
25 and I will open that up and share it. Okay. Please let



1 me know when you see it being shared.

2 A. I see it now.

3 Q. Very good. And -- and just before I start  
4 going into that is my feed coming across clearly today?  
5 I did reset the -- the WiFi network ahead of time so  
6 hopefully it's all good.

7 A. So far so good for me.

8 MR. WEINSTEIN: And everybody else?  
9 Dicie?

10 COURT REPORTER: (Indicating.)

11 MR. WEINSTEIN: Great.

12 Q. (BY MR. WEINSTEIN) Okay. I am just going to  
13 go down to Claim 2. Just confirming for your  
14 understanding, Claim 2 is the only claim being  
15 challenged in the IPR; correct?

16 A. Yes.

17 Q. And you spent a good amount of time, I assume,  
18 reviewing Claim 2 both in preparation for this  
19 deposition as well as for the preparation of the  
20 declaration in the petition when it was filed; is that  
21 correct?

22 A. Yes. That's correct.

23 Q. So according to your understanding of Claim 2  
24 what makes a cell an associated cell?

25 A. The associated cell and -- and I go into detail



1 in my declaration for what the patent describes as  
2 associated cell. So --

3 Q. Uh-huh.

4 A. -- I -- I guess I stand by my -- my declaration  
5 and all the text I provided.

6 But here as high level, the associated  
7 cell is what is also referred to as a primary cell that  
8 provides the main control for setting up any other links  
9 that are called secondary cells or non-associated cells.  
10 So it's the main cell (or the primary cell) that  
11 initially sets up the connection and then also tells the  
12 communication terminal what other resources will be  
13 assigned.

14 Q. And the same question, what makes a cell a  
15 non-associated cell?

16 A. Well, I guess, the first obvious ans- -- part  
17 of the answer would be a non-associated cell is not an  
18 associated cell in that the non-associated cell doesn't  
19 perform the initial control and set up of the resources  
20 and so it's -- it's a secondary type resource or a  
21 secondary cell.

22 Q. Okay. And -- and you were saying before so, in  
23 your -- your opinion, all secondary cells are  
24 non-associated cells?

25 A. I -- yes. I -- I -- I believe I have many



1 different paragraphs in my analysis. One of the  
2 challenges is the patent uses different terminology in  
3 the claim and in its specifications. So I've equated an  
4 associated cell in the claim with a primary cell, a  
5 non-associated cell in the claim with a secondary cell.  
6 And then if different terminology is used in some of the  
7 prior art references I've used, I've equated the  
8 terminology across.

9                   So an associated cell has, at least, two  
10 different descriptions that are used to mean the -- the  
11 same thing and same for the non-associated cell.

12           Q. All right. And -- and in Claim 2 is it correct  
13 the Claim 2 requires that the non-associated cell is  
14 configured with downlink resources only?

15           A. At a high level. Again, I've gone to a lot of  
16 detail in my declaration to describe the -- the  
17 configurations, but at a high level the non-associated  
18 cell has just a downlink resource and no uplink  
19 resource.

20           Q. And in the claim does the -- in the non- -- so  
21 you're -- you agree then for the non-associated cell in  
22 Claim 2 there is downlink resource only and no uplink  
23 resource; correct?

24           A. Again, my declaration speaks for itself in a  
25 lot of the detail, but at a high level I would agree



1 with that characterization, yes.

2 Q. And according to Claim 2 does the base station  
3 configure the non-associated cell to have downlink  
4 resources only or does the mobile terminal configure it  
5 that way?

6 A. The mobile terminal does not configure either  
7 cell. The base station is the master for this  
8 relationship. So the base station configures both the  
9 associated cell and the non-associated cell.

10 Q. So for the non-associated cell in Claim 2 the  
11 base station configures the non-associated cell to have  
12 downlink resources only; correct?

13 A. That's correct.

14 Q. If the base station configured a -- a  
15 non-associated cell to have both uplink and downlink  
16 resources, can the mobile terminal then ignore that  
17 configuration so that it only uses downlink resources?

18 A. You've lost me a --

19 MR. SNODGRASS: Objection.

20 A. In relation to --

21 MR. SNODGRASS: Excuse me, Mr. Lanning.  
22 Objection to form. You can answer.

23 THE WITNESS: Sorry. Yeah.

24 A. You lost me a little bit. I -- we switched  
25 from the claim. Now, are you asking me a hypothetical



1 or -- or --

2 Q. (BY MR. WEINSTEIN) Yes. I'm asking --

3 A. -- what --

4 Q. I'm asking a hypothetical.

5 A. Okay.

6 Q. If a base station configures a non-associated  
7 cell to have both uplink and downlink resources, in  
8 configuration to the mobile terminal, can the mobile  
9 terminal ignore and figure itself to use the uplink  
10 resources?

11 MR. SNODGRASS: Objection to form.

12 You can answer.

13 A. I'm try -- I -- I'm processing your question.  
14 I don't think I understand the details of your  
15 hypothetical. You've lost me. So if we get -- on your  
16 hypothetical, if you can, tell me what the base station  
17 configures for the associated cell, and then what it  
18 configures for the non-associated cell I'll be able to  
19 stay with you, I think, and -- and understand your  
20 question.

21 Q. (BY MR. WEINSTEIN) Okay. Well, a -- a base  
22 station configures the associated cell to have both  
23 uplink and downlink resources; correct?

24 A. Okay. Well, it's your hypothetical, but that's  
25 what I understand you're asking, yes.



1           Q.    And for that associated cell, the receive --  
2   the assoc- -- or let me start over.

3                   The mobile terminal receives the uplink  
4   resource and downlink resource configurations from the  
5   base station; correct?

6           A.    Yes.

7           Q.    And when it receives those configurations, it  
8   then has to do the processing to configure itself to use  
9   those resources; correct?

10          A.    If it acknowledges the configuration then it's  
11   acknowledging that it has the capability to -- to use  
12   the configuration as -- as it was sent from the base  
13   station.

14          Q.    Okay.   And --

15          A.    And I'm clarifying -- I -- I need to probably  
16   explain.

17                   I'm clarifying that not all mobile phones  
18   or communication terminals are capable of -- of  
19   receiving from both an associated cell and a  
20   non-associated cell concurrently.   So that's why I was  
21   making that distinction.

22          Q.    Okay.   Would it be correct, for example, if you  
23   have had a third-generation mobile phone it could not  
24   receive from both an associated cell and a  
25   non-associated cell?



1           A.    No.  That's not what I'm saying.  There were --  
2   there were third-generation (or UMTS) phones that were  
3   capable of receiving --

4           Q.    Okay.

5           A.    -- or configuring both an associated cell and a  
6   non-associated cell, and those were the more expensive  
7   or -- phones.  Some of the less expensive phones did not  
8   have that capability.

9           Q.    But my understanding, based on what you just  
10   said, is that when the base station sends the uplink and  
11   downlink resource configuration to the mobile terminal,  
12   the mobile terminal does not use them until it  
13   acknowledges those configurations and configures itself  
14   to use them; is that correct?

15          A.    That would be the typical process in the  
16   signaling control process.  There's always a handshake  
17   for these type of configurations.

18                    So the base station would send the  
19   request, mobile terminal would validate the request that  
20   it was able to do the configuration as requested, and  
21   then would send the appropriate response back to the  
22   base station.  After that occurred, then -- then a  
23   condition figuration would proceed passing information  
24   in both directions.  And I say that it -- both  
25   directions --



1 Q. Okay.

2 A. -- would be -- for this claim, it would be in  
3 both directions for the associated cell.

4 Q. Right. Is it possible for a base station to  
5 send uplink and downlink resource configurations for a  
6 non-associated cell to the mobile terminal and then the  
7 mobile terminal configures itself to use only the  
8 downlink resources?

9 A. I don't know of that hypothetical where the --  
10 the terminal -- communication terminal would configure  
11 itself based -- based on the configuration requested by  
12 the base station. And it would -- so the answer to your  
13 hypothetical is: The communication terminal, if it  
14 acknowledges the request from the base station, is going  
15 to configure itself the way the request was stated.

16 Q. Okay. I'm going to introduce what is  
17 Mr. Lanning's declaration.

18 A. I see it on screen and I have a hard copy.

19 Q. Very good. Thank you. I'm going to go down to  
20 paragraph 45. I think that fills the screen and you get  
21 to see all of it.

22 In this paragraph you make reference to  
23 3GPP LTE, Release 10 requirements, and that those  
24 requirements disclose functionality relevant to the  
25 challenged claim -- the challenged claim being Claim 2.



1 And then you indicate, for example, "a feature called  
2 carrier aggregation was defined in Release 10 in some of  
3 the detailed specs for this release." Am I correct in  
4 characterizing, you're saying that features relating to  
5 carry -- carrier aggregation is among the functionality  
6 relevant to the challenged claim?

7 A. Also, as I explain in my declaration, the  
8 carrier aggre- -- aggregation is the feature of the  
9 challenged claim as defined by the specification of the  
10 patent as well -- of the '976 patent.

11 Q. Okay. So it's correct to say that the carrier  
12 aggregation is functionality relevant to the challenge  
13 to Claim 2; correct?

14 A. Yes.

15 Q. Are there other functions that are relevant  
16 that are disclosed in this 3GPP LTE, Release 10; are  
17 there other requirements that are also relevant to the  
18 challenged claim?

19 A. At a high level the -- the challenged claim  
20 requires that -- well, the channels be set up, that a  
21 channel be set up both in the downlink and uplink  
22 direction, data is transferred in downlink and uplink.  
23 So the 3GPP specifications provide all of the specifics  
24 for how that's done. Even though the specifics are not  
25 listed in the challenged claim, they are part of the



1 challenged claim as far as a person of ordinary skill  
2 understanding the process that would happen for --  
3 specifically for 3GPP, Release 10 specifications.

4 Q. Okay. What is "carrier aggregation"?

5 A. Again, I spent quite a bit of time in my  
6 background technology of -- of -- of my declaration  
7 explaining that with some diagrams.

8 But a high level, carrier aggregation, as  
9 it applies to the challenged claim, is where a carrier  
10 is provided to the UE for more than one cell. So  
11 there's -- and it's typically referred to as a primary  
12 or a serving cell. And then a secondary cell can then  
13 provide either a -- a downlink and uplink or just a  
14 downlink to the UE.

15 Q. Okay. What -- what is a "component carrier"?

16 A. That is a part of the carrier's, meaning it  
17 is a -- a component of the carrier's is one of the  
18 carriers.

19 Q. So when you -- you said that the carrier is  
20 provided to the UE the -- is there a difference between  
21 a carrier and a component carrier?

22 A. I need to look to see if I've distinguished or  
23 made a contrast to that other than what I've already  
24 just answered.

25 Well, I'm -- I'm reading from page 28 of



1 my declaration, Exhibit 1003, paragraph 62. I -- I  
2 describe it more, but I think it's appropriate to  
3 describe a -- or answer your question with how the '976  
4 patent answers carrier aggregation. I'm reading the  
5 quote that I've included from the '976 patent on page --  
6 top of page 29. "Carrier aggregation is studied in an  
7 LTE-A system, in which two or more component carriers  
8 are aggregated to support wider transmission Bandwidths  
9 of up to 100 megahertz."

10 So to answer your question, carrier  
11 aggregation has two or more component carriers. So a  
12 singular component carrier is one of the component  
13 carriers used in the aggregation for carrier  
14 aggregation.

15 Q. Okay. And so is there a distinction between  
16 component carrier and carrier?

17 A. There are carriers that are available in an LTE  
18 system, in general, but the component carriers are the  
19 specific carriers that are being used to form a group of  
20 carriers for carrier aggregation.

21 Q. I -- I'm sorry. Could you repeat that answer?  
22 My apologies?

23 A. Maybe -- in other words, a component carrier is  
24 referring to one of the group of carriers that perform  
25 carrier aggregation between a base station and a UE.



1 Q. So would it be fair to characterize then that  
2 multiple carriers are available from a base station, if  
3 you're doing carrier aggregation then the carrier that  
4 is used in carrier aggregation is a component carrier?

5 A. Yeah. I believe the definition is clear that  
6 I've used and described, but I would agree, in general,  
7 with -- with your definition that you just made.

8 Q. Okay. Obviously in -- in ground 1, the  
9 petition relies on TS 36.300. Are there other TS 36  
10 documents that would be relevant to implementing carrier  
11 aggregation?

12 A. To understand your question, are you then just  
13 asking for -- in regard of the third-generation UMTS  
14 specifications or are you including the 4G LTE in your  
15 question?

16 Q. I'm including 4G.

17 A. Well, you -- let's start with 3G. There  
18 is the -- as -- there is a set of specifications for the  
19 3G UMTS standard, and there are multiple specifications  
20 that would include information and/or requirements for  
21 the carrier aggregation functionality. The same answer  
22 for -- for 4 Generation LTE, there would be a group of  
23 specifications but they would start with a different  
24 prefix number. For instance, the 3G specifications  
25 start with the 25, dot, and then a three-digit number.



1 The LTE specifications --

2 Q. Yeah.

3 A. -- would start with a 36, dot, three-digit  
4 number.

5 Q. Right. And so for the -- the 4G with the  
6 TS 36, dot, besides 300 (dot 300) are there other 36,  
7 dot, technical specifications that would be relevant to  
8 understanding how to implement carrier aggregation?

9 A. I think the easiest way to -- to answer your  
10 question is: You referred to the -- the technical  
11 specification TS 36.300, if I turn to page 12 of  
12 Exhibit 1012, Section 2 lists 37 other references, and,  
13 as I quickly look, most of those are technical  
14 specifications that may have some functionality defined  
15 that's for carrier aggregation. In other words, the way  
16 the specifications are all broken up, if you need to  
17 look at carrier aggregation for what a UE does or is  
18 required to do, that would be a different technical  
19 specification than maybe what a -- looking at what the  
20 base station's functionality needs to be. So those are  
21 spread across multiple technical specifications.

22 Q. So since you reference it, I'm just going to  
23 introduce now TS -- this is Exhibit 1012, TS 36.300,  
24 Version 10.0.0. Are you seeing it?

25 A. Yes, I am.



1 Q. Okay. And can you direct me to what you were  
2 just quoting to, the 37 other --

3 A. Sure.

4 Q. Okay. What page -- and it's -- you can see how  
5 it's -- right now, I'm at page 12 of 184 so if you could  
6 refer me to that page.

7 A. So it would be -- I believe it's going to be  
8 page 13, it starts with Section 2, References.

9 Q. Okay.

10 A. So I -- I -- I don't know which for sure. Is  
11 that page 14 or -- no. It's 13. So there's -- there's  
12 increments.

13 Q. Yeah.

14 A. So it starts on page 13, it lists the  
15 references, and it has numbers in square brackets the --  
16 on this page and it continues on the next page.

17 Q. Uh-huh.

18 A. And it lists all of the references that may --  
19 that -- that this specification uses or -- or references  
20 that -- that -- that hits or doves tail -- dovetails  
21 together with these other specifications.

22 Q. And are these the -- the specifications that  
23 are directed more toward the base station or does it  
24 also include UE functionality?

25 A. It cover -- these references cover both. And



1 again, is it -- I -- I could start going through and  
2 explain what many of these specifications are, but they  
3 typically will cover -- like, I'm looking at some of  
4 these references, if I look at square brackets in [4]  
5 36.211 --

6 Q. Uh-huh.

7 A. -- the Physical Channels and Modulation, that  
8 is defining for both the UE and the base station in that  
9 case what the physical channels are and how they're  
10 processed.

11 The next one, square bracket [5] is  
12 36.212, that is also describing how the channels are  
13 multiplexed and how they're coded for -- and that would  
14 be relevant for both the base station and the UE.

15 Then if you go down in contrast to square  
16 bracket [11] --

17 Q. Uh-huh.

18 A. -- which is TS 36.304, that title is User  
19 Equipment Procedures in Idle Mode. So that  
20 specification is specifically for user equipment.

21 Q. Okay. Do you understand this to be an  
22 exhaustive list, or are there other tech specs that  
23 could be relevant to understanding how to implement  
24 carrier aggregation beyond the ones listed here?

25 A. I can -- I -- again, proving a negative is very



1 difficult. But, in my experience, I have -- I don't  
2 recall finding a specification that was referenced or  
3 relevant to the specification I'm looking at that the  
4 3GPP standards group didn't include in these references.

5 Now, it doesn't mean there -- there isn't  
6 one. I just don't recall, in all the years I've been  
7 looking at them, that the list isn't fair -- almost  
8 complete, if not fully complete.

9 Now, I would say this reference list is  
10 listing technical requirements and technical  
11 specifications. Change documents that occur after this  
12 version of the specification is published would not be  
13 in this references section; those are separate and  
14 happen after the -- this document is published.

15 Q. Okay. So -- well, you may not know an example,  
16 but if there were tech specs that reference carrier  
17 aggregation requirements, would you agree that that is  
18 relevant to implementing carrier aggregation even if  
19 it's not listed here?

20 A. I would need to look at the specification or  
21 the type of specification you're referring to, but, in  
22 general, I would say if the technical specification says  
23 it's for UMTS and it's for a specific release then I  
24 would definitely consider it a specification that's part  
25 of carrier aggregation functionality.



1 Q. So you -- you just referenced UMTS. How -- how  
2 does that relate to or distinguish from E-UTRA?

3 A. E-UTRA is the enhanced, so that would be LTE.

4 Q. Uh-huh.

5 A. I would give you the same answer I answered for  
6 the UMTS series of documents. It would be the same  
7 answer for the LTE series of technical specifications  
8 and requirements. As I explained earlier, most of those  
9 begin with the two-digit number 36.

10 Q. Okay. So just, in general, is it correct to  
11 say that UMTS refers to 3G and E-UTRA refers to 4G (or  
12 LTE)?

13 A. Yeah.

14 Q. I'm going to move down to Section 7.5, and --  
15 and this is a section relating to Carrier Aggregation;  
16 is that correct?

17 A. That's the title of the section, yes. And I  
18 believe I've actually cited this section in my  
19 declaration.

20 Q. I believe you did. The -- this section has a  
21 discussion of primary cell (or PCell) and secondary  
22 serving cells (or SCells); do you see that?

23 A. Yes.

24 Q. And I know you -- you talked a little bit about  
25 it before relative to Claim 2, but based -- for this



1 document, Exhibit 1012, what is your understanding of  
2 the difference between the primary cell and a secondary  
3 cell?

4 A. Well, the primary cell sets up the connections  
5 for -- for both or they -- let me rephrase that.

6 The primary cell sets up the uplink and  
7 downlink resources for the primary cell and for the  
8 secondary cell.

9 Q. Okay. And this section also makes reference to  
10 uplink and downlink component carriers. And we -- we've  
11 talked a bit already about component carriers relative  
12 to carriers that are available and that component  
13 carriers again -- I'm going to characterize it this way.  
14 "Component carrier" is a term -- is that a term used  
15 exclusively with respect to carrier aggregation or is it  
16 used in other contexts?

17 A. Sitting here right now, I'm thinking that the  
18 only thing I can think of for component carrier, that  
19 terminology is for carrier aggregation. There may be  
20 other usages for component carrier; I'm just not  
21 recalling them sitting here today.

22 Q. Okay. We -- we -- we've talked a little bit  
23 about carriers and component carriers. Is it correct  
24 that carriers have a relationship to frequency ranges;  
25 is that correct?



1           A.     There is a relationship to frequency ranges. I  
2     just paused just wondering how much I should go into all  
3     the detail. We're looking at LTE. But I think just to  
4     answer your question, yes, there is a frequency  
5     associated with the carrier assignments.

6           Q.     So when a carrier assignment is made is it a  
7     specific frequency that's assigned or is there a  
8     frequency range that's assigned?

9           A.     Well, a specific carrier is a specific  
10    frequency that's to be used for the connection between  
11    the cell and a UE.

12          Q.     So the -- it's just one frequency value not a  
13    frequency range; is that correct?

14          A.     If -- if the cell assigns an uplink in LTE it  
15    assigns a specific frequency for that component carrier.

16          Q.     All right. We -- we've also talked a little  
17    bit about cells; obviously, primary cell, secondary  
18    cell. Is it correct that a cell can have only one  
19    uplink component carrier and only one downlink component  
20    carrier?

21          A.     Our -- now -- now, we're looking at an LTE  
22    document, so am I correct to assume that you're  
23    referring for LTE specifically the carrier aggregation  
24    for this version? Because I -- I need to be -- we need  
25    to be specific --



1 Q. Yeah.

2 A. -- because --

3 Q. Yes.

4 A. -- it evolved over time and the carrier  
5 aggregation specifically has changed from one release to  
6 another.

7 Q. So for -- for this release, for this particular  
8 tech spec document, which is 36.300, Version 10.0.0, is  
9 it correct that a cell can only have one uplink  
10 component carrier and one downlink component carrier?

11 A. It would have a maximum of one uplink component  
12 carrier and one downlink component carrier.

13 Q. Okay. I'm going to move back to Section 5.5  
14 which is another section regarding carrier aggregation.  
15 And in that first sentence it says "In carrier  
16 aggregation two or more -- more component carriers are  
17 aggregated in order to support wider transmission  
18 bandwidths up to 100 megahertz"; do you see that?

19 A. Yes.

20 Q. So if you have two component carriers  
21 aggregated it means you have to have two cells; is that  
22 correct?

23 A. Yes. That's correct. Now, we need -- again,  
24 you -- this is what I was referring to, we need to be a  
25 little careful here. In the two bullets right



1 underneath the -- the first paragraph, it's --

2 Q. Yeah.

3 A. -- describing what Release 10 capabilities are,  
4 and then what Release 8 and 9 UE capabilities are. So  
5 with that caveat, they're describing what the  
6 restrictions were. Frankly, what this is describing  
7 that -- what Release 8 and 9 UE could do, and then what  
8 the change is for Release 10 UE and what they can do.

9 Q. Okay. And here it says "Release 8-9 UE can  
10 receive on a single CC and transmit on a single CC  
11 corresponding to one serving cell only." Does that mean  
12 that UE Releases 8 and 9 were only capable of  
13 communicating via a single serving cell and not multiple  
14 cells?

15 A. Only one per serving cell is what they're  
16 saying there. So they're saying that the Release 8-9 UE  
17 it -- this was the initial roll out of this  
18 functionality, so they made it fairly basic or  
19 restricted. So there was only that -- for each serving  
20 cell there could only be one transmit and a single --  
21 well, let me just read it. "The UE can receive on a  
22 single CC and transmit on a single CC corresponding to  
23 one serving cell only." So that's what this sentence  
24 says so that's what the restriction was for the  
25 Release 8-9 UEs.



1 Q. Okay. So I -- and -- and I'm just trying to  
2 understand what that restriction means in the context of  
3 carrier aggregation. When it says that a UE Release 8  
4 or 9 can receive on a single CC or transmit on single CC  
5 corresponding to one serving cell only, does that mean  
6 it could not receive on a different CC or transmit on a  
7 different CC corresponding to another serving cell?

8 A. Well, that's in contrast to the bullet above,  
9 which states "a Release 10 UE with reception and/or  
10 transmission capabilities for CA can simultaneously  
11 receive and/or transmit on multiple CCs corresponding to  
12 multiple serving cells."

13 Q. Okay.

14 A. So -- so they've added in Release 10 the  
15 capability for multiple serving cells.

16 Q. Okay. So for Release 8 and 9 it could only  
17 have a single serving cell and not multiple serving  
18 cells; is that correct?

19 A. That's the way I interpret it. I believe  
20 that's right. My analysis was for Release 10 and so I'm  
21 just going from memory for Release 8 and 9.

22 Q. So at -- or to ask a -- an analogous question,  
23 a Release 10 UE was capable of receiving data from the  
24 base station across two component carriers at the same  
25 time; in contrast, a UE Release 8 or 9 could only



1 receive data on a single component carrier from the base  
2 station at one time.

3 A. Sorry. I was trying to understand. Is there a  
4 question or I -- I --

5 Q. I was just asking for your confirmation.

6 So we -- you had said -- my prior question  
7 was that confirming a Release 8 or 9 UE can only  
8 communicate with one serving cell. Whereas, a  
9 Release 10 UE could communicate with multiple serving  
10 cells. And you, I believe, said that that's correct  
11 according to this definition in Section 5.5.

12 A. Right. And I'm just -- and -- and I'm vaguely  
13 remembering. Again, my analysis for this declaration  
14 wasn't in regard to the Release 8 and 9. It's for  
15 Release 10 of this specification which I use. So I'm  
16 now going back and -- and trying to remember. I'm just  
17 going from memory, sitting here today, but there were  
18 some restrictions in Release 8 and 9 regarding the  
19 different frequency bands that Release 8 and 9 UE could  
20 use.

21 And so I don't want to just really say  
22 that that statement says it's only one serving cell,  
23 but, I believe, there -- that this is in regard to the  
24 different frequency bands or whether they were --  
25 frequencies were what they referred to as noncontiguous.



1 So I -- that's the best I can answer.

2 Again, it wasn't part of my analysis. I'm  
3 just going from memory from a few years back of -- of  
4 studying the Release 8 and 9 UE.

5 Q. Okay. So you just introduced a term that we  
6 haven't used previously. Frequency band. What do you  
7 mean by "frequency band"?

8 A. Well, I've described it. I guess, the easiest  
9 way is to go to my description of carrier aggregation in  
10 my declaration.

11 Q. Let -- let me know what page --

12 A. Okay.

13 Q. -- or paragraph you're referring to.

14 A. And I start on page 20 -- my page 23 of the  
15 declaration. It might be a different page number for  
16 the -- it's 20 -- page 25 in the --

17 Q. Yeah.

18 A. -- exhibits.

19 Q. Yeah.

20 A. But --

21 Q. It's paragraph 50.

22 A. -- paragraph 50 is the easiest way, maybe, to  
23 get everything synchronized.

24 Q. Okay.

25 A. And without reading paragraph 50, I've defined



1 what the component carriers are. And then I'm turning  
2 the page to the next page, paragraph 51, I define what  
3 component carriers are. And then at the top of page --  
4 it would be 27 of the exhibit, I have, I think, the  
5 answer to your question, where there is a frequency band  
6 for carriers defined. And the different carrier  
7 aggregation there's different terms depending on --  
8 depending upon whether the carriers are assigned in the  
9 same frequency band, which is a range of frequencies --

10 Q. Uh-huh.

11 A. -- or they're assigned in different frequency  
12 bands. And then there's one other characterization  
13 that's important, that I just referred to, for Release 8  
14 and 9 UEs. If I look at the top row of Figure 3 --

15 Q. Uh-huh.

16 A. -- it shows that there's two carriers next to  
17 each other. The two shaded boxes that are next to each  
18 other, those are contiguous component carriers, meaning  
19 they're next to each other in the frequency allocation.

20 Q. So that --

21 A. And that is the intra-band and it is also  
22 contiguous.

23 Q. Okay.

24 A. Now, the middle function is intra-band, it's  
25 still in the same frequency band, but you notice the gap



1 between the left and the right shaded boxes. That means  
2 they are not next to each other in the frequency  
3 allocation, so they are noncontiguous allocation. That  
4 is a harder situation for a UE to process --

5 Q. Uh-huh.

6 A. -- than that first one where they're  
7 contiguous.

8 Then you have the third, which is the most  
9 complex case for a UE, which the -- each component  
10 carrier is assigned in a different frequency band, as  
11 shown in the bottom. The first box is in band A, and  
12 the second shaded box is in band B. So it's -- it -- it  
13 is actually requiring the UE to be able to tune in and  
14 communicate on two different frequency bands at the same  
15 time.

16 Q. So it -- in the -- the distinction between  
17 contiguous and noncontiguous, as you had answered  
18 previously, when the carrier assignment is made it's a  
19 specific frequency. Just to throw out a value, let's  
20 just say 800 megahertz. The -- for it to be contiguous  
21 what -- what is the separation to make it contiguous and  
22 what is the separation that makes it noncontiguous with  
23 a second frequency?

24 A. Well, the -- the frequency band is a range of  
25 frequencies. The frequency assignments for a channel



1 are the actual frequency. So instead of 800 megahertz  
2 it might be 800 megahertz plus 20 megahertz if you have  
3 20-megahertz channel separation. So let's just use an  
4 example. I'll use your 800 megahertz. The first  
5 band -- the first channel was assigned, let's say,  
6 820 megahertz, the next channel if you use -- if LTE is  
7 using 20-megahertz channel spacing, it would start at  
8 840 megahertz.

9 Q. Uh-huh. So 840 megahertz -- 820 megahertz and  
10 840 megahertz, if the spacing is 20 megahertz, those two  
11 are contiguous. If it was 820 megahertz and  
12 860 megahertz and spacing is 20 megahertz, those would  
13 be noncontiguous; is that correct?

14 A. That's correct.

15 And now going back to the --

16 Q. Yeah.

17 A. -- Release 8 and 9 mobiles, the Release 9 -- 8  
18 and 9 UEs, I believe -- again, I'm going from memory,  
19 but I believe --

20 Q. Uh-huh.

21 A. -- the only carrier aggregation that they were  
22 capable of performing was intra-band contiguous, which  
23 is the first row in this figure.

24 Q. Okay.

25 MR. WEINSTEIN: I think this may be a good



1 time for our first break. Does that work for everybody.

2 THE WITNESS: That's good.

3 MR. WEINSTEIN: All right. Very good.

4 COURT REPORTER: We're off the record 9:50  
5 Central.

6 (Break 9:50 a.m. to 10:00 a.m.)

7 COURT REPORTER: We are back on the record  
8 at 10:00 a.m. Central.

9 Q. (BY MR. WEINSTEIN) Just a quick question.  
10 Mr. Lanning, did you have any conversation with  
11 Mr. Snodgrass during our break?

12 A. No. Didn't have a conversation with anyone.

13 Q. Okay. I'm going to introduce Exhibit 1023, the  
14 Malladi reference (or Malladi). I'm not sure how -- the  
15 proper pronunciation, but I -- I'll go with Malladi.

16 A. I have a paper copy.

17 MR. WEINSTEIN: And, Dicie, for your  
18 information, the spelling is M-A-L-L-A-D-I.

19 COURT REPORTER: (Indicating.)

20 Q. (BY MR. WEINSTEIN) Okay. I am going to share  
21 that with everyone and --

22 A. I see it --

23 Q. -- it should be --

24 A. -- now.

25 Q. -- showing.



1                   Okay. And I want to focus your attention  
2 to paragraph 61 and, in particular, the second sentence  
3 starting with the -- the base transceiver stations 120a.  
4 So in this paragraph it says "The base transceiver  
5 stations 120a and 120b are part of the site 120a and  
6 correspond to different sectors or cells of this site";  
7 do you see that?

8           A.     Yes.

9           Q.     So is it correct that -- that 120a is one cell  
10 and 120b is a different cell?

11          A.     That's correct.

12          Q.     Okay. And referring back to your declaration,  
13 looking at paragraph -- it's, I believe, 159, it's on  
14 page 81 of 97, paragraph 159.

15          A.     I'm getting there with my hard copy.

16          Q.     Uh-huh.

17          A.     Okay. I'm there.

18          Q.     Okay. And I'm going to highlight a sentence.  
19 Do you see my highlighting?

20          A.     Yes.

21          Q.     And that sentence says that "the 120a BST box  
22 is a claimed associated cell, and then 120b BST box is a  
23 claimed non-associated cell"; do you see that?

24          A.     Yes.

25          Q.     And when you say that the claimed associated



1 cell and non-associated cell you mean as they are  
2 recited in Claim 2 of the '976 patent; correct?

3 A. That's what I'm referring to here, yes.

4 Q. And in Malladi, in paragraph 62, it refers to  
5 "the base transceiver station is configured to send data  
6 to a UE device 130 through one or more downlink wireless  
7 carriers 141a, 141b and 141c, and is further con- -- the  
8 transceiver 120a of base transceiver station 120a is  
9 further configured to receive data from the UE 130  
10 through one or more uplink wireless carriers 142a and  
11 142b"; do you see that?

12 A. Yes.

13 Q. And returning back to your declaration, in  
14 paragraph 157 you show in the top part of Figure 1 of  
15 Malladi; is that correct?

16 A. Yes. I didn't include the network part. So  
17 it's the top portion of Figure 1.

18 Q. Right. And as I was just reading from  
19 paragraph 62 of Malladi, the BST 120a has three downlink  
20 carriers (141a, 141b and 141c) and two uplink carriers  
21 (142a and 142b); is that correct?

22 A. That's what's drawn on the figure, yes.

23 Q. So in -- in our earlier discussion regarding  
24 TS 36.300 about cells and component carriers we -- you  
25 had answered that for each cell there is one uplink --



1 there's, at most, one uplink component carrier and, at  
2 most, one downlink component carrier; do you recall  
3 that?

4 A. I recall, in general, the discussion, but we --  
5 I -- I want to be careful specifically of what we were  
6 referring to. We'll need to look back at that before I  
7 can answer that question.

8 Q. Okay. Well, we can go back to Section 7.5 of  
9 TS 36.300. I'm just going to bring that up.

10 Are you -- you seeing it Section 7.5 --

11 A. Yes, I am.

12 Q. -- of --

13 A. I -- I see it now.

14 Q. -- Exhibit 1012.

15 In -- in this discussion about primary  
16 cells and secondary cells is it correct that each cell  
17 can have, at most, one uplink component carrier and, at  
18 most, one downlink component carrier?

19 A. Okay. Give me just a minute. Because I see  
20 Release 8 and 9 in that paragraph, I just want to make  
21 sure I'm answering for Release 10.

22 Q. Yes.

23 A. I'm -- so to answer your question, I believe  
24 that this is describing that each cell can have one --  
25 can have the -- at most, one downlink component carrier



1 and one uplink component carrier. Then, of course,  
2 the --

3 Q. Okay.

4 A. -- the names of the component carriers change  
5 with -- either beginning with a P or an S, depending on  
6 whether it's connected to the primary serving cell or  
7 the secondary cell.

8 Q. Okay. Just to confirm, according to what's  
9 described here in Section 7.5 of Exhibit 1012, each  
10 cell, whether it's a primary cell or a secondary cell,  
11 each cell can have, at most, one uplink component  
12 carrier and, at most, one downlink component carrier;  
13 correct?

14 A. I believe that's correct, yes.

15 Q. Returning to the Malladi reference -- well,  
16 actually let's return to your declaration showing the  
17 top portion of Figure 1 of Malladi.

18 So here Malladi shows a cell of 120a BST  
19 having three downlink resources or down -- three  
20 downlink carriers and two uplink carriers; is that  
21 correct?

22 A. That's what it shows on the figure, yes.

23 Q. So is it fair to say that the system described  
24 in Malladi is different than the system required by  
25 TS 36.300, Version 10.0.0?



1           A.    I wouldn't characterize it as different. I'm  
2    saying the system of Malladi is simply saying there can  
3    be more than one uplink or downlink component carrier  
4    per cell. That's the distinction.

5           Q.    Okay.

6           A.    However, Malladi does disclose that it can be  
7    as -- at most, one and even less than one as far as the  
8    uplink carriers are concerned.

9                        So this -- I agree this figure shows  
10   multiple component carriers between cell 120a in both  
11   directions, but Malladi is clear that that configuration  
12   could just show one in each direction for cell 120a and  
13   it would only show one in the downlink direction for  
14   cell 120b.

15          Q.    Uh-huh. Okay. And -- and in this example, we  
16   see there's BST 120a, BST 120b, BST 125a. In each of  
17   those examples there are two uplink carriers for each  
18   cell; is that correct?

19          A.    That's what's shown on the figure. Again, the  
20   text of Malladi says it can be less, but he's show --  
21   also saying it can be as many or even more than what  
22   this figure shows.

23          Q.    Okay. Returning to Exhibit 1012, TS 36.300,  
24   Version 10.0.0, I'm going to go to -- close to the end  
25   there's an Annex J., I think it's page 176. And again,



1 when I say "page 176" that's of the total pages --

2 A. Okay.

3 Q. -- 176 of 184; do you see that?

4 A. Yes.

5 Q. Here it says at the top, Annex J (informative).

6 What -- what's your understanding of what it means when

7 it says that it's informative?

8 A. My -- my short answer is, it's just what it  
9 says. It's to inform the person of ordinary skill the  
10 different situations. It's an example or it's  
11 informative scenarios that -- that can happen.

12 Q. Okay.

13 A. And I've used this -- I use this table or  
14 something very similar in my declaration to -- for --

15 Q. Uh-huh.

16 A. -- technology background as well.

17 Q. Great. I -- I just wanted to understand if  
18 "informative" here has some special meaning in 3GPP  
19 technical specs or if it's just a general description  
20 that this is informative?

21 A. I don't recall the definition of informative,  
22 if there is one for 3GPP. But I think it is important  
23 to note that if you start reading at the -- at the  
24 beginning of the paragraph, under the Section  
25 labeled J.1, it shows some of the potential deployment



1 scenarios for carrier aggregation in Release 10 for the  
2 uplink. So this is only showing some of the potential  
3 deployment scenarios which, in my mind, means there can  
4 be others, but here are some examples. So it's  
5 informing a person, here is, at least, some of the  
6 different configurations for Release 10 for carrier  
7 aggregation.

8 Q. So by "informative" they really mean here are  
9 some up examples or scenarios that would be helpful to  
10 understand?

11 A. Helpful to understand and would be valid  
12 configurations for Release 10, but it's not exhaustive.

13 Q. Sure. In that first sentence under Annex J, it  
14 also refers to Stage 3 specifications. What's a  
15 "Stage 3 specification"?

16 A. The different -- there were high-level groups  
17 that were started for -- excuse me -- for functionality  
18 and they were defined at high level stages, and started  
19 at Stage 1, then Stage 2 and then Stage 3. There's a  
20 higher level document that describes the different  
21 stages or what functionality is in Stage 3.

22 Q. Okay. In the -- the table there is reference  
23 to F1 in Scenario No. 1, it says the bands, for example,  
24 2 gigahertz, 800 megahertz. What are those -- what's  
25 that mean exactly? The -- the bands that it's referring



1 to?

2 A. Those are the different allocated bands.

3 For -- for cellular networks the cellular network  
4 carriers bid on different frequency bands that they're  
5 provided by the FCC to use for their cellular networks.

6 And so the 800 megahertz band is a band  
7 that goes back to actually second and third generations,  
8 but then there also is what higher frequency band that's  
9 also been allocated for cellular use and it's in the  
10 2 gigahertz area.

11 Q. Okay. And I see in some of the other scenarios  
12 there's also reference to a 3.5 gigahertz. So that's  
13 another band that's allocated, at least, at that time --

14 A. Yes.

15 Q. -- for example?

16 A. There -- there is a whole series of bands and  
17 so the challenge for the UEs is to be able to have a  
18 transceiver that can operate on the different bands.  
19 Again, the more sophisticated UEs (or cell phones) can  
20 do it. The less sophisticated are restricted to just  
21 using certain frequency bands.

22 Q. And when it refers to a band, obvious -- it's  
23 giving, for example, band for 800 megahertz. I assume  
24 that's the low end of the band; is that correct?

25 A. That would be the lower bound of the band, yes.



1 Q. And do you know how big the upper -- or what  
2 the upper bound is for any of these bands?

3 And if -- if you can't answer --

4 A. It's been a few years, but, in general, the  
5 800 megahertz band -- again, I'm just going back years  
6 from just --

7 Q. Okay.

8 A. -- citing the detail bands, but it's around 800  
9 to a little less than 900 megahertz, so it's about a  
10 hundred megahertz band if I -- and again, I'm going from  
11 memory.

12 Q. And just from memory, do you recall what --  
13 does -- is the -- is the 2 gigahertz band bigger and is  
14 the 3.5 band bigger than the 800 megahertz?

15 A. I think, in general, the band sizes are about  
16 the same. It's just the base frequency of the bands  
17 that -- that change. But that also differs even in  
18 different geographical areas of what's available for the  
19 bands. And so --

20 Q. Uh-huh.

21 A. -- like I mentioned earlier, there's so many  
22 frequency bands available that are licensed for cellular  
23 network use by the FCC, and each cellular provider bids  
24 on those frequency bands and the highest bidder gets the  
25 frequency band. So even part of an 800 megahertz



1 frequency band could be separated or -- between two  
2 different carriers.

3 Q. Okay. So just as an example, if the  
4 800 megahertz band, if the upper band was 900 megahertz,  
5 you could have one carrier that's assigned 800 to 850 or  
6 849.9 and then 850 to 900 to a different carrier?

7 A. I -- I don't know. I wouldn't know exactly  
8 if -- if your frequencies are right, but in the concept  
9 that's -- that's correct.

10 Q. And is it -- and let me first ask, at -- at the  
11 timing of this tech spec, which is around June of 2010,  
12 are you aware of about how many bands were available for  
13 cellular communications? There's, at least, these  
14 three, the -- that are described here. Do you know if  
15 there are others?

16 A. I think these three were the main ones of --  
17 and I don't recall. This is 14 years ago, thinking  
18 back, I remember, as -- as we discussed the other day,  
19 as the networks -- 2G networks were assigned these  
20 frequencies and there's -- and the frequencies were a  
21 fixed amount of resource.

22 So as the cellular network providers  
23 rolled out 3G they had to start taking some of the 2G  
24 frequency bands away from the 2G so it could be used by  
25 3G. Now, the same thing's happening for 4G taking away



1 from 3G and now 5G's coming out and 5G's taking away  
2 from 4G. So for each carrier the bands that are  
3 assigned to each network generation and in each  
4 geographic area change, and so it's a -- quite a complex  
5 management issue just to manage all the different  
6 frequency bands that a base station in a specific  
7 geographic area can use.

8 Q. Okay. And, in general, from generation to  
9 generation is the -- are the number of op- -- of bands  
10 available increasing?

11 A. For the last -- I'm just pausing because I'm  
12 trying to remember whether 5G allocated a new frequency  
13 band area. But, in general, before 5G the amount of  
14 frequency bands available for cellular was pretty well  
15 fixed; it was a fixed resource and that's why the  
16 different --

17 Q. Uh-huh.

18 A. -- carriers would -- would bid on licenses for  
19 the different bands, because that was very important for  
20 being able to supply coverage to their users.

21 Q. So we -- we've used the term band, frequency  
22 band. Is the term "operating band" is that equivalent  
23 to that term -- those terms?

24 A. Frankly, I don't know what the words "operating  
25 band" would be without providing a specific description



1 of what we're discussing.

2 I'm open to using the word operating band,  
3 but if you're referring to that they're the bands that  
4 are available for a base station to use or a UE to use,  
5 then I would accept that terminology. I don't have any  
6 issue with it.

7 Q. Okay. Are the -- when a band is assigned or  
8 available to be used is the frequency range for uplink  
9 the same as or different than the frequency range for  
10 downlink?

11 A. It depends. And in the specifications there  
12 are several sections that refer to two different  
13 terminologies or two different acronyms.

14 Q. Uh-huh.

15 A. One acronym is FDD.

16 Q. Uh-huh.

17 A. The other acronym is TDD. In FDD, which stands  
18 for frequency division duplex, all of the uplink --

19 Q. Uh-huh.

20 A. -- channels are in one frequency band and all  
21 of the downlink channels are in a different frequency  
22 band.

23 In TDD (time division duplex) it takes  
24 turns or the -- all of the uplink and downlink channels  
25 are in the same frequency band. So there's time



1 division duplex or time division multiplexing in that  
2 there's a period of time when all of the downlink  
3 channels are transmitted, then they stop, and then  
4 another period of time where all of the uplink channels  
5 are transmitted.

6 I will add, and I think I've included it  
7 in my declaration, that the majority -- the -- the vast  
8 majority of networks in the United States are  
9 FDD-oriented networks.

10 Q. Do you know why is -- that's the case?

11 Let me ask it differently. Is there an  
12 advantage to FDD versus TDD?

13 A. Yes. Definitely. TDD is really there and was  
14 put in for countries that had very limited bandwidth  
15 where they couldn't allocate a band for uplink and a  
16 separate band for downlink.

17 If you have frequency division duplex then  
18 you can transmit on the uplink and downlink  
19 concurrently, where in time division duplex only one can  
20 transmit in any one direction at a time.

21 Q. Okay. It certainly seems like an advantage to  
22 be able to transmit both at the same time.

23 A. Yes. So FDD, and for what we're discussing  
24 here and I've included FDD descriptions, the uplink and  
25 downlink are transmitting concurrently on different



1 frequency bands at the same -- or concurrently on  
2 different frequency bands.

3 Q. Let me go back to -- so if we're in the context  
4 of TS 36.300 where a cell, whether it's a primary cell  
5 or secondary cell, has only one component carrier for  
6 uplink and only one for downlink is that cell able to  
7 service more than one mobile terminal at the same time?

8 A. Yes. Definitely. The whole idea of the cells  
9 are to service for these large cells there could be well  
10 over a hundred mobiles that are communicating to the  
11 base station or that cell in an area. So --

12 Q. Okay.

13 A. -- that's why all of these uplink transmissions  
14 are always requested and then a grant is given, because  
15 these channels have to be reused for other mobile  
16 terminals that are in the cell as well.

17 Q. Okay. So if -- if -- just to make it as simple  
18 as possible, if there is a first mobile terminal and a  
19 second mobile terminal on the same cell and they both  
20 want to do an uplink transmission to the base station  
21 they have to share that carrier; is that correct?

22 A. They can use the same carrier and the same  
23 HS -- same high-speed link, uplink or they --

24 Q. Okay.

25 A. -- could use a different one. So it's all



1 depending on all of the allocations and what links are  
2 there. But the base stations are the master, again,  
3 that manage all that. They're the traffic cop that  
4 tells all the mobile terminals how much they can  
5 transmit and what they can transmit after that grant is  
6 used up by the mobile terminal. The base station  
7 typically would then receive other requests to transmit  
8 from other mobile terminals and then allow them to -- to  
9 transmit too. This all happens very fast, but it is a  
10 request-grant system in a -- in a base station.

11 Q. So if the -- the first mobile terminal in this  
12 one cell has been granted an uplink resource to transmit  
13 it to the base station and it's holding onto that grant  
14 while it's transmitting data, and the second mobile  
15 terminal also wants to send data to the -- the base  
16 station, what options are available to the base station  
17 to allow the second mobile terminal to send data?

18 A. The base station for the uplink has time  
19 division multiplexing so it can assign slots. So even  
20 though the same high-speed uplink is being used, it  
21 could assign, say, slot 1 to the first terminal, slot 2  
22 of that same link to the second terminal, and both of  
23 those terminals could transmit almost at the same time.  
24 When I say -- the reason why I say "almost" is because  
25 they have to wait for their time slot to occur before



1 they can transmit.

2 Q. I am going to introduce Exhibit 1013, it's the  
3 R2-104515 reference.

4 A. Okay. I have it.

5 Q. Very good.

6 A. And I'm seeing it on my screen.

7 Q. Sorry. Okay.

8 A. Okay. I see it.

9 Q. I want to go -- so in -- in the R2 reference  
10 it -- it is directed to these different options for  
11 indicating that the absence, deletion or addition of  
12 uplink resources; is that correct?

13 A. I would consider it at a higher level, this is  
14 a -- a discussion document for the standards group  
15 that -- where the standards -- someone in the standards  
16 group, specifically, the -- the source of this document,  
17 at least, these people, realized that there was an  
18 ambiguous definition to the UE, there was an explicit  
19 definition to the UE when there was no uplink on the  
20 secondary cell; and so this group is just simply saying  
21 there's options that we can do, but here's what we  
22 recommend of changing information, it would all refer to  
23 as a signaling message, it's referred to as a SIB that  
24 is telling the UE whether it has an uplink or not in the  
25 secondary cell.



1 Q. And is -- is it correct that of the three  
2 options in this discussion document that they  
3 recommended using Option 3?

4 I think you could say that here it says  
5 here in Conclusions.

6 A. So Option 3, the proposal, RAN2 defines a new,  
7 i.e., ul-PresenceIndicator to indicate UL presence,  
8 slash, absence for secondary cells. So that's the  
9 conclusion or the -- what the proposal is proposing is  
10 the new indicator.

11 Q. But what is an "i.e."?

12 A. That's an information element. I -- I tried to  
13 explain it as a high level as a controller signaling  
14 message. But there is a set of signaling messages that  
15 go between the -- that are transmitted from the base  
16 station to the mobile terminal of the UE to explain to  
17 the UE what the configuration of that base station is or  
18 other specific information. Those are called system  
19 information blocks, the acronym that is for those is  
20 SIB, S-I-B. Now, an element or a piece of data in the  
21 system information block is called an information  
22 indicator and that's the i.e.

23 So this is a -- what they're saying here  
24 is what a person of ordinary skill would understand in 3  
25 in the Conclusions, they're saying we need a new element



1 or a new piece of data that's added in the system  
2 information block to tell the UE whether it has or does  
3 not have an uplink on the secondary cell.

4 Q. Okay. And in -- in this box right here where  
5 it says ul-PresenceIndicator -- do you see that box?

6 A. Yes.

7 Q. It says that "when the parameter is set to  
8 false" -- so the -- and the parameter this new i.e.  
9 ul-PresenceIndicator. When that is set to false that UE  
10 ignores any UL resource configurations of the secondary  
11 cell; do you see that?

12 A. UL resources will not be configured by the UE.  
13 It's telling the UE don't configure an uplink on the --  
14 it will not be configured if it's set to false, right.

15 Q. Yeah.

16 A. So it's meaning the absence of those.

17 Q. So when it -- and it -- it says then in the  
18 first line after that box "when that  
19 ul-PresenceIndicator i.e. is set to false UL resources  
20 will not be configured by the UE or the UE deletes any  
21 existing UL resource configurations of the cell"; right?

22 A. Yes.

23 Q. So when we were having the -- the discussion  
24 earlier today about the base -- about associated cells  
25 and non-associated cells according to Claim 2 and the



1 configuration information being provided by the base  
2 station to the UE, you had indicated that the UE  
3 receives the configuration information from the base  
4 station and then acknowledges and configures itself  
5 according to that configuration information; do you  
6 recall that?

7 A. Yes.

8 Q. And -- and that's -- that's accurate?

9 A. Yes. And that's what is happening, exactly  
10 what's happening here.

11 Q. Right.

12 A. The UE is being told to configure a certain  
13 way. So the -- the sentence that says "or the UE  
14 deletes any existing UE -- UL resources -- resource  
15 configurations of this cell," what that's saying to the  
16 UE, if you have a configuration that existed before you  
17 received this message, delete it, because you no longer  
18 have an uplink resource.

19 So the UE is exactly doing what I said,  
20 it's configuring based on the command it's receiving  
21 from the base station.

22 Q. So if the base station sends a signal for the  
23 secondary cell that it's configuring a secondary cell  
24 for the mobile terminal, it's going to second  
25 information about the secondary cell, including any



1 uplink or downlink resources and, according to this  
2 Option 3, it will include this additional information  
3 element, ul-PresenceIndicator; is that correct?

4 A. That's correct. And it's -- to be more  
5 specific those commands are in the form of these SIB  
6 messages I referred to that go from the base station to  
7 the UE.

8 Q. So the -- if the secondary cell is being  
9 created that includes both and -- and the base station  
10 wants to configure it so that both uplink and downlink  
11 resources are used or are configured, and it's using  
12 this ul-PresenceIndicator element, it would send a SIB  
13 message saying this is the resource for uplink, this is  
14 the resource for downlink, and the ul-PresenceIndicator  
15 would say sure; is that correct?

16 A. Yes. That's correct.

17 Q. So my question is: In the situation where it  
18 does not have or -- or the ul-PresenceIndicator is going  
19 to be false, the base station in the SIB message would  
20 send this is UL resource, this is the download resource,  
21 but the ul-PresenceIndicator would say false, because  
22 now we're going to say, even though here's configuration  
23 information for the uplink resource, don't configure  
24 yourself with that, or delete it; is that fair?

25 A. I -- I don't think that's correct. I don't



1 think -- what's -- what's explained here is that the  
2 base station would not send to the UE a resource or  
3 uplink on the secondary cell if it did not intend for  
4 the UE to use a resource -- an uplink resource on the  
5 secondary cell.

6                   So it's not like the -- the base station  
7 is supplying an uplink resource for the secondary cell  
8 and then this ul-PresenceIndicator overrides that. This  
9 is a condition where the uplink resource might have  
10 disappeared or it may never have been -- well, there's  
11 two or three different situations here that's being  
12 covered by that paragraph.

13                   The first case is that an uplink resource  
14 for the prime -- or for the secondary cell was never  
15 allocated and this is set to false, the presence  
16 indicator is set to false that just confirms that.

17                   As I mentioned earlier, there could have  
18 been a situation where there was an uplink resource that  
19 was allocated on the secondary cell by the base station  
20 and that was working and then the base station dropped  
21 that secondary uplink resource because it was no longer  
22 needed, and so this presence indicator is saying to the  
23 UE, if you have a configuration from something that  
24 existed earlier, delete it, because there is no longer  
25 an uplink resource allocated on the secondary cell.



1 Q. So according to your -- the way you answered  
2 that, if the base station is configuring a new secondary  
3 cell for the mobile terminal and it wants to configure  
4 it so that there is no uplink resource why would the  
5 information element, ul-PresenceIndicator, be needed,  
6 because when the SIB message was -- is received by the  
7 mobile terminal there is no UL resource to configure?

8 A. And so the introduction is describing for the  
9 change they're -- they're describing in the situation,  
10 and I'm reading from -- from Section 1 of Exhibit 1013,  
11 it says "According to the current agreements" -- I'll  
12 let you get there.

13 Q. Uh-huh.

14 A. Okay. And -- and I'm reading the paragraph  
15 right below 1. Introduction, it says "According to  
16 current agreements, when configuring a secondary cell,  
17 the uplink and downlink resources of this cell should  
18 obey the relationship indicated in SIB2." As I  
19 explained earlier, this is one of the system information  
20 blocks that's sent from the base station to the UE. So  
21 if there is no uplink resource for the secondary cell  
22 SIB2 will not include that resource, okay. And then  
23 they're addressing an issue that may occur.

24 "Meanwhile, it is permitted that only  
25 downlink resources are configured to secondary cells.



1 Then there comes a question on how to indicate uplink  
2 absence of secondary cells. This contribution mainly  
3 focuses on the detailed schemes of uplink absence  
4 indication for secondary cells."

5 So the way I interpret this, the way a  
6 person of ordinary skill would -- would interpret this  
7 paragraph, they are wanting to add an explicit  
8 information element in the SIB to make sure there's no  
9 confusion between the base station and the UE that no  
10 uplink is being allocated for the secondary cell.

11 Q. So in a standard SIB when it's a primary cell  
12 or a secondary cell in which both uplink and downlink  
13 resources are configured, and that information is  
14 provided in the SIB and the mobile terminal receives it,  
15 acknowledges and configures itself to have both uplink  
16 and downlink on the secondary or primary cell --

17 A. And it's --

18 Q. -- and it --

19 A. And if I may interrupt you, I think before you  
20 finish your quest- -- maybe I should let you finish your  
21 question then I can actually add to it. Sorry. I  
22 apologize for interrupting. I shouldn't have done that.

23 Q. That's okay. That's okay. I'll just start  
24 again.

25 So in the -- except for this special



1 circumstance of a -- the DL resource -- excuse me -- the  
2 uplink resource not being needed, the default situation  
3 for the base station is to provide a SIB that indicates  
4 this is a primary cell or secondary cell and here are  
5 the uplink resources to configure yourself with and --  
6 and your downlink resources to configure yourself with;  
7 correct?

8 A. For the secondary cell this is specifically  
9 referring to here. But --

10 Q. Okay.

11 A. -- the base station could allocate resources  
12 for the secondary cell that has both an uplink and a  
13 downlink.

14 Q. This system would work, what is proposed in  
15 this discussion document, if the base station configured  
16 a secondary cell to have uplink resources or provided  
17 information in the SIB about how to configure the uplink  
18 resources and downlink resources but then just sent  
19 the -- the i.e. in Option 3 of the ul-PresenceIndicator  
20 saying false, it would send -- let me back up.

21 A. I -- I was going to say you confused me with --

22 Q. Yeah. I'm confusing myself, so I'm going to  
23 start again.

24 A. Okay.

25 Q. The base station could have a default system of



1 communicating through a SIB to a -- a mobile terminal of  
2 configuring secondary cells of, here are the UL  
3 resources for this cell, here are the -- the DL  
4 resources for the cell, when you receive it, configure  
5 yourself according to this information, correct; that  
6 could be the -- the default message sent from the base  
7 station?

8 A. No. Not at all.

9 Matter of fact, the default for any base  
10 station would not allocate anymore channels than were  
11 absolutely necessary because the channels, as I  
12 explained in the cell, there's not enough of them to go  
13 around for all of the mobile terminals, they're a  
14 valuable resource, so the base station is not going to  
15 allocate a resource until it's needed. And let me  
16 explain how this works.

17 The base station knows whether uplink or  
18 downlink secondary resources are needed based on a  
19 higher level function. So what's happening here, let's  
20 say that the mobile terminal, an application, say, for  
21 streaming data, requests a specific size of connection  
22 that can't be accomplished with just one component  
23 carrier, the base station would then determine, based on  
24 that higher level request, whether the secondary cell  
25 needed to have just a downlink resource or whether it



1 needed an uplink resource as well. So based on the  
2 higher level request for this specific type connection  
3 the base station would then move forward to make the  
4 allocations.

5                   So some applications would require the  
6 secondary cell to have a downlink resource and an uplink  
7 resource, other applications -- say, if someone's  
8 watching a moving and it's downlink streaming, the  
9 secondary cell would only need a downlink resource to  
10 transmit that streaming movie, or whatever it was, and  
11 then no uplink resource because there's very little data  
12 going from the UE to the base station.

13           Q.    The -- the SIB that's sent from the base  
14 station to the mobile terminal, are the -- is the  
15 structure and format for the SIB is it a standard --  
16 standardized structure or format or can it be changed  
17 depending on whether it's -- well, let me withdraw the  
18 question.

19                   When -- when the base station is  
20 establishing a new secondary cell or establishing a  
21 secondary cell for a mobile terminal to use, is the  
22 structure of the SIB standardized or does it depend --  
23 is it altered depending on if it's using uplink and  
24 downlink resources both or only downlink?

25           A.    The -- the structure and all the information



1 elements into each SIB -- I think there's, at least, 13  
2 different SIBs defined, and I -- I know you're probably  
3 going to love to hear this, they're all defined in  
4 another technical specification, and they have each SIB  
5 for each situation and which information elements are  
6 relevant for the action going on and the possible  
7 values. And that way the people programming the UEs  
8 will know exactly how to program the -- the UE to  
9 receive the message and what functions the message is  
10 going to include. Same thing for the base station  
11 suppliers.

12 Q. Okay. So at -- at the time of TS 36.300,  
13 Version 10.0.0, which, at least, in the document, refers  
14 to in June of 2010, was there a different SIB available  
15 for the base station to use where they used one SIB if  
16 they want to assign both uplink and downlink and a  
17 different SIB to assign downlink only?

18 A. I don't believe so. I think SIB2 was the SIB  
19 that was designated for the carrier aggregation. So all  
20 the carrier aggregation configuration would be in a  
21 single SIB and that was SIB No. 2.

22 Q. So in SIB --

23 A. Go ahead.

24 Q. In -- in the normal circumstance of a secondary  
25 cell being assigned with both uplink and downlink in



1 that SIB there would be one information element  
2 providing uplink configuration information and a  
3 different information element providing information  
4 about the downlink configuration; is that correct?

5 A. I would think so. But there's a lot of SIBs  
6 with a lot of data and I sure haven't memorized them.  
7 So I would say, in general, I would anticipate seeing  
8 that. But if we really wanted to know exactly what that  
9 SIB looked like, I would look up the technical  
10 specification for SIB2 for Release 10 and it would tell  
11 us all that, and it's many pages to describe all the  
12 different SIB parameters.

13 Q. Okay. If we investigated that and found that  
14 at the time of TS 36.300, Version 10.0.0, that there was  
15 only one SIB configuration used to provide configuration  
16 information about the secondary cell to the mobile  
17 terminal, that SIB would necessarily have one  
18 information element providing UL configuration  
19 information and another for download configuration  
20 information; is that correct?

21 A. I'm -- again, I'm taking a guess there. It's  
22 an educated guess, but the best I can give you is that  
23 would be a guess. I -- I can't really go into any  
24 further detail without actually turning to that  
25 technical spec.



1           Q.    Fair enough.  If -- if that is the case, that  
2    there was only one SIB configuration available to inform  
3    a mobile terminal of the configuration information for  
4    the secondary cell then in the circumstance that the  
5    base station only wanted to assign downlink resources  
6    there would still be an information element provided  
7    regarding uplink, but it's either blank or, if it  
8    provides configuration information, it would eventually  
9    be ignored by the mobile terminal; is that correct?

10          A.    Well, the situation with the information  
11    elements for allocations, usually there is a buoy (an  
12    indicator) meaning a zero or one whether there's an  
13    allocation, and then if it's positive that there is an  
14    uplink allocation then the actual allocation information  
15    would be supplied.

16                    So if -- I guess to answer you I -- I'm  
17    trying best to understand your question.  So if a base  
18    station -- I can give you both situations.

19                    If a base station wanted to allocate a  
20    second -- both an uplink and a downlink to a secondary  
21    cell, it would send a system information block (a SIB)  
22    to the UE and that UE would have the appropriate  
23    information.  So the UE would understand that there was  
24    a downlink allocation on the secondary cell and what  
25    that -- that component carrier would be, and then the



1 next allocation would be there would be an uplink  
2 allocation specified and -- and what specifically the --  
3 the component carrier for that uplink would be.

4 Now, if there's no uplink carr- -- that  
5 would be the first where both uplink and the downlink  
6 are allocated by the base station on the secondary cell.

7 Now, if the base station only wanted to  
8 allocate a downlink --

9 Q. Yeah.

10 A. -- resource on the secondary cell, it would  
11 send a SIB with the downlink resource information, and  
12 typically it's a buoy (an indicator) in there that  
13 there's a downlink allocation present for the secondary  
14 cell, but for the uplink it would not include any  
15 allocation. The -- the allocation would be absent  
16 typically. It's not going to leave residue in a SIB for  
17 a past configuration. It would be here's your current  
18 configuration and that information would be absent for  
19 the uplink resource for the secondary cell.

20 Q. Okay. And if that's the case and there's a  
21 Boolean operator saying there is downlink here and  
22 there's a separate Boolean operator saying there's  
23 uplink here or -- or absence of it, what is the point of  
24 the new information element ul-PresenceIndicator  
25 discussed in this document, in the R2 document that's



1 Exhibit 1013?

2 A. I would say that would be for the standards  
3 group, but I think you have some subject matter experts  
4 here. Typically, it's a supplier of a UE where the UE  
5 implementer or suppliers are concerned that there may be  
6 an ambiguous situation, so they wanted to include this  
7 additional parameter to -- to explicitly tell the UE  
8 whether it had or did not have an uplink resource on the  
9 secondary cell.

10 And, I guess, I think we should probably  
11 pop up to a higher level. The reason why I'm using this  
12 contribution isn't really as much for the indicator as  
13 much as for the fact that the -- the standards group,  
14 the subject matter experts are acknowledging that there  
15 does not need to be an uplink resource on the secondary  
16 cell. That's the main reason I used this contribution.

17 I didn't go into any justification whether  
18 it really was important to be there or not, but  
19 definitely the subject matter experts wanted to bring it  
20 before the standards committee and it's very clearly  
21 supporting the fact that a secondary cell does not need  
22 an uplink resource.

23 Q. Right. And the point I'm trying to get to is,  
24 the -- while the base station can make a determination  
25 that an uplink resource may not be needed, the -- the



1 issue is about which part is configuring what  
2 information.

3 And in the R2 reference at the top --  
4 let's just go back -- and, you know, I know that's  
5 discussed quite a bit in your declaration and in the --  
6 the petition itself. It's saying that's permitted that  
7 DL resources are configured -- only DL resources are  
8 configured, but there's the configuration information  
9 that's provided from the base station to the mobile  
10 terminal, and then there's the mobile terminal  
11 configuring itself for that configuration information.  
12 So there configuring done by the base station, there's  
13 configuring done by the mobile terminal. Do you  
14 agree --

15 A. Without --

16 Q. -- with that?

17 A. Without a doubt, as I've said multiple times,  
18 the base station is the master in this relationship.  
19 The terminal does not (or the UE) does not control any  
20 of this configuration. The mobile terminal (the UE) is  
21 told what the configuration is, and then when the UE  
22 wants to send data it has to send a request and receive  
23 a grant even before it can send data on any of the  
24 configured resources.

25 Q. Right. The -- so where -- where obviously



1 we're having a -- a disagreement and -- is -- you see,  
2 again, from this discussion document, the  
3 ul-PresenceIndicator box and the indication of it, and  
4 says "The UE ignores any UL resource configurations when  
5 that i.e. is set to false."

6                   So I read it, and I think it's a  
7 reasonable thing, that by ignoring UL resource  
8 configurations it has to have received UL resource  
9 configurations. If it doesn't receive any UL resource  
10 configurations there's nothing to ignore. So I think  
11 it's a reasonable interpretation that when the UE  
12 ignores any UL resource configurations, when the  
13 ul-PresenceIndicator is set to false, that means it has  
14 information about the UL resource configurations it  
15 received from the base station and then ignores it and  
16 doesn't configure itself to use it.

17           A.    Okay. Now, that's your view. My view is  
18 strongly opposite of that and I explain this, that this  
19 could be not the -- the -- the mobile terminal does not  
20 make any configuration decisions.

21                   This is a clarification by the people  
22 submitting this discussion document that if there is  
23 some residue in an uplink resource configuration that  
24 was used for the secondary cell that they -- UE ignore  
25 that, and I explained the situation. This could easily



1 happen if you have a situation where the application  
2 being used initially needed an uplink and a downlink on  
3 the secondary cell, that was used for a period of time,  
4 and then --

5 Q. Uh-huh.

6 A. -- when the uplink configuration or additional  
7 uplink bandwidth wasn't required, the base station would  
8 send a new SIB to the UE dropping the UL resources --  
9 uplink resources for the secondary cell, but the UE  
10 would still have in its memory the residue from the  
11 previous configuration. And they're simply saying  
12 delete any of that information that's there because you  
13 have -- no longer have an allocation for the uplink  
14 resource.

15 Q. Right. And so the -- the situation you  
16 described, you know, in the following sentence to that  
17 box is, when the ul-PresenceIndicator is set to false  
18 the UL -- the UE will take one of two actions.

19 The situation you described is the UE  
20 deletes any existing UL resource configurations, but it  
21 also says, in the first part of it, the UL resources  
22 will not be configured by the UE. And if it's to not  
23 configure itself with the UL resources it means that  
24 there is no UL resource configuration existing because  
25 that's -- the second option is deleting it.



1                   But in this first option it's saying don't  
2   configure yourself with UL resources, so there has to be  
3   UL resource information available to the UE and it's  
4   told by this -- by the base station with this indicator  
5   don't configure yourself with it.

6           Q.    I know that's what you're interpreting. I  
7   strongly disagree. That's not the way this works.  
8   That's all I can tell you. This is not how it works.  
9   If there is no uplink resource to be allocated from the  
10   eNB (a base station) it is surely not going to second  
11   and uplink resource in a SIB.

12          Q.    Okay. And is there anything in TS 36.300 that  
13   says that it would not send that information in the SIB?

14          A.    I will represent that this is one that  
15   understands the basics of a 3G network, a 4G network of  
16   ordinary skill.

17                   Again, you've got to look at the higher  
18   level functionality that's going on; the base stations  
19   control all of the resources. A base station is not  
20   going to include uplink resources for a secondary cell  
21   if uplink resources are not required.

22          Q.    Is there anything in your declaration that  
23   says -- when the base station doesn't want to provide  
24   uplink resources in the secondary cell, is there  
25   anything in your declaration that says the base station



1 will necessarily not include that information in the  
2 SIB?

3 A. I haven't in -- I haven't included that in my  
4 declaration. Instead, I've made multiple statements  
5 that the base station allocates the secondary resources  
6 that are required. So if a base station does not  
7 require uplink resources on the secondary cell it will  
8 not allocate those.

9 Q. Is there anything you can point to in this R2  
10 reference that says the base station, when it wants to  
11 configure with no UL resource that the SIB will not  
12 include information about the uplink resource?

13 I -- I understand it's -- it's several  
14 pages and it's a difficult question to answer just  
15 looking at it now, but -- so if you're uncertain you can  
16 just say you're uncertain.

17 A. I'm looking at -- I'm actually reading through  
18 the detailed code that -- that's been provided to see if  
19 there's something in there. Still, I -- I mean, 36.300,  
20 the documentation, this is the way it works. I'll --  
21 I'll just stand by my statements, I strongly disagree.

22 The -- the UE does not configure anything  
23 on its own. It -- it does it based on -- what it's told  
24 to do based on the base station. Because even -- and it  
25 just -- it doesn't even -- it wouldn't work, the network



1 wouldn't work and operate properly if the UEs were able  
2 to decide anything autonomously as far as configurations  
3 for channels, it would be chaos in the cellular network.  
4 So that's why I'm being very strong -- have a strong  
5 opinion about it, is, all of these configurations are  
6 controlled by the base station.

7 Q. When the base station is configuring a  
8 secondary cell to have both uplink and downlink  
9 resources and they're selecting specific carrier and a  
10 specific frequency for the uplink and a specific one for  
11 the downlink, are they usually paired together, meaning  
12 that if they choose this uplink carrier that there is a  
13 paired or connected downlink carrier to use, or do  
14 those -- is there no fixed pairing? Does that make  
15 sense?

16 A. I think I understand your question.

17 And it depends on whether you have a  
18 symmetrical or asymmetrical uplink and downlink  
19 allocation between both the associated cell and the  
20 non-associated cell, or to use this terminology, primary  
21 cell and secondary cell.

22 Q. Uh-huh.

23 A. So where there is typically a -- there's, at  
24 least, one downlink and uplink on the primary cell those  
25 two links are a paired link where the control



1 information in both directions resides on that pair of  
2 uplink and downlink.

3 Q. Uh-huh.

4 A. Now, if you have a situation where there is  
5 only a downlink on your secondary cell, the question is,  
6 is, how does the UE acknowledge receipt of each packet,  
7 and so because there's no uplink on the secondary cell  
8 it sends those acknowledgments on the uplink for the  
9 primary cell.

10 Q. Okay. But in the -- in the situations where  
11 there is uplink and downlink on both the primary and  
12 secondary cells the -- that pairing of the uplink and  
13 downlink frequency for a specific cell, is that  
14 pairing -- is a -- a fixed relationship that when it  
15 chooses one frequency for uplink there is a necessary  
16 corresponding one for the downlink?

17 A. I --

18 Q. Does that apply both for the primary and  
19 secondary cells?

20 A. Well, I -- I've read multiple details. There's  
21 a lot of details because it's quite sophisticated on how  
22 this works.

23 So if there's -- I've already described,  
24 for the primary cell you have a typical uplink/downlink  
25 pairing or relationship. Now, if a secondary cell or a



1 secondary serving cell is referred to has both a  
2 downlink and uplink then that secondary cell has a --  
3 a -- a relationship where that secondary cell's uplink  
4 and downlink are also a pair. So the control  
5 information is carried on the uplink and downlink for  
6 the secondary cell. But then it --

7 Q. Uh-huh.

8 A. -- comes into -- and then you can also have  
9 multiple secondary cells and get into the -- and get  
10 involved, and those multiple secondary cells can either  
11 have uplink and a downlink or just the downlink, and so  
12 all of the control information and which specific  
13 channel is used is all specified in the specification.

14 MR. WEINSTEIN: I -- I know we went a  
15 little long, so maybe we can just take a -- a short  
16 break right now.

17 THE WITNESS: Okay.

18 COURT REPORTER: We're off the record at  
19 11:05 Central.

20 (Break 11:05 a.m. to 11:10 a.m.)

21 COURT REPORTER: The time is 11:10  
22 Central. We are back on the record.

23 MR. WEINSTEIN: Okay. So actually I have  
24 no further questions.

25 Thank you for your time, and I'm -- unless



1 Mr. Snodgrass has anything, we are all done.

2 MR. SNODGRASS: I do not have any  
3 questions. We'll review and sign.

4 MR. WEINSTEIN: Very good. Well, thank  
5 you -- well, let us go off the record.

6 COURT REPORTER: We are off the record at  
7 11:11 Central.

8 \* \* \* \* \*

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|----|--------------------------|------|------------------|--------|
| 1  | CHANGES AND SIGNATURE    |      |                  |        |
| 2  | WITNESS: MARK R. LANNING |      | DATE: 02/16/2024 |        |
| 3  | PAGE                     | LINE | CHANGE           | REASON |
| 4  | -----                    |      |                  |        |
| 5  | -----                    |      |                  |        |
| 6  | -----                    |      |                  |        |
| 7  | -----                    |      |                  |        |
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| 22 | -----                    |      |                  |        |
| 23 | -----                    |      |                  |        |
| 24 | -----                    |      |                  |        |
| 25 | -----                    |      |                  |        |



1 I, MARK R. LANNING, have read the foregoing  
2 deposition and hereby affix my signature that same is  
3 true and correct, except as noted above.

4

5 MARK R. LANNING, Witness

6 THE STATE OF \_\_\_\_\_ )

7 COUNTY OF \_\_\_\_\_ )

8 Before me, \_\_\_\_\_, on this day  
9 personally appeared MARK R. LANNING, known to me (or  
10 proved to me under oath or through \_\_\_\_\_ )  
11 (description of identity card or other document) to be  
12 the person whose name is subscribed to the foregoing  
13 instrument and acknowledged to me that they executed  
14 the same for the purposes and consideration therein  
15 expressed.

16 Given under my hand and seal of office this \_\_\_\_\_  
17 day of \_\_\_\_\_, \_\_\_\_\_.  
18

19 \_\_\_\_\_  
20 Notary Public in and for the  
21 State of \_\_\_\_\_.  
22  
23  
24  
25



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

-----

3 TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED  
4 TCT MOBILE INTERNATIONAL LIMITED  
TCT MOBILE, INC.  
5 TCT MOBILE (US) INC.  
6 TCT MOBILE (US) HOLDINGS, INC.,

Petitioner(s),

VS.

8 MITSUBISHI ELECTRIC CORPORATION,

9 Patent Owner(s).  
-----  
-----

11 CASE NO.: IPR2023-00997  
12 U.S. PATENT NO. 9,635,656  
13 REPORTER'S CERTIFICATION  
14 DEPOSITION OF MARK R. LANNING  
FEBRUARY 16, 2024  
(Reported Remotely)

15  
16 I, DICIE LEE EYCHESON, a Certified Shorthand  
17 Reporter in and for the State of Texas, do hereby  
18 certify that the foregoing deposition is a full, true  
19 and correct transcript;

20 That the foregoing deposition of MARK R. LANNING,  
21 the Witness, hereinbefore named was at the time named,  
22 taken by me in stenograph on February 16, 2024, the  
23 said Witness having been by me first duly cautioned  
24 and sworn to tell the truth, the whole truth, and  
25 nothing but the truth, and the same were thereafter



1 reduced to typewriting by me or under my direction.

2 ( ) That upon request by the witness and/or  
3 counsel, the Witness shall have 30 days after being  
4 notified by certified mail, return receipt requested,  
5 by the deposition officer that the original deposition  
6 transcript is available in Kim Tindall & Associates'  
7 office for review and signature by the Witness and if  
8 any corrections made are attached hereto;

9 ( ) That upon request by the witness and/or  
10 counsel, a reading condensed copy of the deposition  
11 transcript along with the full-sized original Changes  
12 and Signature Sheet has been sent to \_\_\_\_\_  
13 on \_\_\_\_\_ for review and signature within 30  
14 days and if any corrections returned are attached  
15 hereto;

16 ( ) That upon request by the witness and/or  
17 counsel, the deposition officer is instructed to  
18 release the original deposition transcript to  
19 \_\_\_\_\_ on \_\_\_\_\_, for  
20 review and signature, and the deposition officer is  
21 thereafter released of any further responsibility with  
22 regard to the original.

23 ( ) That upon request by the Witness and/or  
24 counsel, the Witness shall have thirty (30) days for  
25 review and signature of the original transcript and if



1 any corrections returned are attached hereto.

2 ( ) That the signed transcript ( ) was ( ) was not  
3 received from the Witness within 30 days.

4 That the amount of time used by each party at the  
5 deposition is as follows:

6 Mark Weinstein - 1hr:46min

7 That before the completion of the deposition, the  
8 Deponent, and/or the Plaintiff/Defendant did request  
9 to review the transcript.

10 I further certify that I am neither counsel for,  
11 related to, nor employed by any of the parties in the  
12 action in which this proceeding was taken, and further  
13 that I am not financially or otherwise interested in  
14 the outcome of the action.

15 WITNESS MY HAND, this the 21st day of February,  
16 A.D., 2024.

17 *Dicie Lee Eytcheson*  
18 \_\_\_\_\_

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