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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AT&T SERVICES, INC.,
CELLCO PARTNERSHIP D/B/A/ VERIZON WIRELESS,
GOOGLE LLC, and T-MOBILE USA, INC.,
Petitioner,

v.

PEGASUS WIRELESS INNOVATION LLC,
Patent Owner.

IPR2025-00083
Patent 10,638,463 B2

Record of Oral Hearing
Held: March 5, 2026

Before KRISTEN L. DROESCH, JASON M. REPKO, and
STEPHEN E. BELISLE, *Administrative Patent Judges.*

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The above-entitled matter came on for hearing on Thursday, March 5, 2026, commencing at 10:00 a.m. EST, at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

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JUDGE DROESCH: Good morning, everybody. We're convened for oral arguments for IPR2025-00083. The issue at hand is the patentability of the claims of patent 10,638,463. I'm Judge Droesch. Joining me are Judge Belisle and Judge Repko. We'll get started with appearances for both parties, and if anybody else is attending in-person or remotely, but will not be speaking, please identify them also. For example, by stating if they're in-house counsel or another corporate representative. Okay. We'll start with appearances for Petitioner. Petitioner, go ahead.

MR. KOOPMAN: Thank you, Your Honor. My name is Andy Koopman on behalf of Petitioner. I'll be arguing today. Joining me are my co-counsel, Patrick Keane; Roger Lee; our paralegal, Amy Latrell; and joining remotely, a client representative for Google, LLC, Timur Engin (PHONETIC).

JUDGE DROESCH: Okay. Thank you, Counsel. Patent Owner's Counsel?

MR. HELGE: Morning, Your Honors. Thank you. Wayne Helge from Bunsow De Mory Law Firm for Pegasus Wireless Innovation. With me is co-counsel, James Wilson, the same firm. We also have joining us in-person here, Mr. Yoon, corporate representative for Pegasus Wireless. And I'm not aware of anybody else that's on the line.

JUDGE DROESCH: Okay, great. Thank you very much. All righty. And following the hearing, please make sure the Court Reporter has accurate spellings of your names, and any other inaccuracies that could possibly occur due to like reference names, et cetera. Okay.

Per the order for the oral hearing, each party has 60 minutes for its presentation. Petitioner will make its presentation first. Petitioner will have the opportunity to reserve some time for rebuttal, but that cannot exceed 30 minutes. Patent Owner will also have time to reserve for surrebuttal, and that will also not be able to exceed 30 minutes and should only respond to Petitioner's rebuttal arguments. All right.

One last -- a couple reminders before we proceed. To aid in the preparation of the hearing transcript, please do your best to identify the demonstrative slides by the slide number, as well as exhibits or papers. That would be helpful for the record. And then just remember that your hearings -- your arguments are limited to only those that have been presented in the briefs. And if anybody has any objections, please wait until it's your time at the podium to note your objections.

All right. I'm going to ask about any time that you would like to reserve for rebuttal time. Counsel for Petitioner, would you like to reserve some time for rebuttal?

MR. KOOPMAN: We would, Your Honor. We'll reserve half an hour for rebuttal.

JUDGE DROESCH: Okay. Counsel for Patent Owner, would you like to reserve some time for rebuttal?

MR. HELGE: Just five minutes, please, Your Honor.

JUDGE DROESCH: Okay. All right. I'm going to maintain a clock, which should be displayed behind us to help you keep track of your time. We will be ready to begin whenever you are, Counsel for Petitioner.

MR. KOOPMAN: May it please the Board. Again, my name is Andy Koopman on behalf of Petitioners. I'll be referring today to

Petitioner's demonstrative slides, which are Exhibit 1051. To begin with, I'd like to give you an overview of the points I plan to address today. First, I'll begin with an overview of the '463 patent at issue in this proceeding, then a brief background and timeline of the technology at issue in the case, specifically relating to 4G and the later 5G telecommunication standards. I will go over an overview of the prior art references relied on in the invalidity grounds in this case; a discussion of Ground 1, Ground 2; and then a brief comparison of the technical experts relied on by the parties.

The '463 patent is owned by KT Corporation, a Korean telecommunication entity. It is directed to a method of transmitting uplink information, and I will briefly go over the subject matter of the claim. But I'd like to begin first and foremost -- and here, I refer to Slide 3 -- with a discussion of what is and is not covered by the claim at issue in this case. And let me be clear that Claim 1 is the only claim disputed by Patent Owner with respect to all of the claims in the '463 patent. So, the '463 patent recites nine claims, three independent, but it's our understanding that all of Patent Owner's arguments are directed to Claim 1. So, if the Board finds that Claim 1 is invalid based on either grounds, it can find so with respect to all of the disputed claims -- Claims 1 to 9 -- of the '463 patent.

Now, the '463 patent, as noted on Slide 2, was filed September 28th, 2018. It actually has an earlier priority date in 2017. What this means is that the '463 patent pre-dates the 5G telecommunication standard. Claim 1 of the '463 patent is not a 5G method. In fact, the experts didn't do any analysis to determine whether or not the method recited in Claim 1 would be satisfied by the requirements of the 5G telecommunication standard. Instead, as we'll discuss, Claim 1 is directed to aspects of existing 4G

telecommunication systems at that time.

So, what is the alleged invention? We sort of discussed the elements of Claim 1 in two parts. You'll see here elements 1A through 1D relate to resource allocation, and in fact, recite a notorious and well-known resource allocation method that was already in use in 4G systems. So, what's added are the highlighted limitations here -- 1E and 1F. These limitations relate to bandwidth parts. Element 1E indicates that resources have to be configured for each bandwidth part, and element 1F says that each bandwidth part is activated through downlink control information.

Now, why is this allegedly important? Referring to Slide 4, we look at the problem and solution described by the '463 patent. And the issue allegedly addressed by the '463 patent is so-called ambiguity between communications from the base station, your cell phone tower, and the user equipment, which is your cell phone. When we introduce bandwidth parts, the base station needs some way to know where to find information. Essentially, which bandwidth part the cell phone is going to be using to transmit information. In this case, what's known as uplink communication information, which I may abbreviate as UCI.

The alleged solution identified by the '463 patent is by using communications from the base station through downlink control information, which I may call DCI, to activate a particular bandwidth. So, you can see how that would work. The base station tells your cell phone which bandwidth part to use, and then the base station knows which bandwidth part to check for the uplink control information. The issue here, Your Honors, is that that solution was well known at the time of filing the '463 patent.

JUDGE DROESCH: Counsel, could I interrupt you for a quick question? Since we're -- you mentioned elements 1E and 1F.

MR. KOOPMAN: Yes, Your Honor.

JUDGE DROESCH: In the briefing, there was a dispute about the meaning of for each uplink bandwidth part, and then the each uplink bandwidth part. Can you explain to us how that should be interpreted?

MR. KOOPMAN: Absolutely, Your Honor. And I will jump to Slide 15 of Petitioner's demonstrative exhibit, where we outline this argument raised by the Petitioner. In Petition Owner's response, the Petitioner took the position that each uplink bandwidth part in element 1E means something different than the each uplink bandwidth part in element 1F. And in particular, I'll refer to the testimony of Dr. Sharony, Patent Owner's expert, during his deposition. On Slide 17 here, we see that with respect to element 1E, it's Patent Owner's position that "each uplink bandwidth part" means not only that the claim requires more than one, but that it's each and every bandwidth part that must be configured.

Now, despite element 1F saying "the each bandwidth part", so that there's antecedent basis here, Patent Owner took a different position with respect to element 1F. Instead, as noted here on Slide 18, Dr. Sharony testified that "the each uplink bandwidth part" in element 1F means that only one bandwidth part is activated.

Now, Your Honors, Petitioner can test that interpretation, which seems to apply inconsistent meanings to each. Particularly unusual since element 1F refers to using antecedent basis, "the each bandwidth part." Properly interpreted, "each" should mean the same thing in element 1E as it means in 1F, and what that means is that each bandwidth part on the UE, on

the cell phone, is configured, and each is active, whether that's one bandwidth part or more than one bandwidth part. However many it has, they have to -- they all have to be configured, they all have to be activated. Did that address your question, Your Honor?

JUDGE DROESCH: Thank you. Yes.

MR. KOOPMAN: I'll jump back then to the overview of the technology, because I -- it's relevant with respect to the motion to combine, which we expect to be Patent Owner's primary focus in this case. I should note, Your Honor, that Patent Owner did not address that "each" interpretation in the surreply. It's not clear whether Patent Owner is maintaining that argument or not. It also doesn't appear to be addressed in Patent Owner's demonstratives. So, instead, we focus on the timeline here, which is relevant to understanding what the motivation of one of ordinary skill in the art would be at the time of the invention.

So, bookending this timeline -- and here, I refer to Slide 7 of Petitioner's demonstrative -- are the approximate dates of adoption of the 4G LTE standard, which was back in 2008, and then the later adoption of the 5G standard in 2021. What's important to note from this timeline then is that we are focusing on a pre-5G era. All of the references -- that's Takeda, Marinier, Yan, and R1. These are all 4G references. They may anticipate or they may have been published while certain aspects of 5G were being developed, but these are all references that apply to 4G. And the same is true of the '463 patent. It's not a 5G patent. It couldn't be. 5G standard wasn't adopted for years at that point. So, what that tells us, Your Honors, is that all of the references relied on in Petitioner's invalidity grounds are closely related references that were developed in the same timeframe. The

timeframe when 4G was the accepted telecommunications protocol.

JUDGE BELISLE: Counsel?

MR. KOOPMAN: Yes, Your Honor.

JUDGE BELISLE: This is Judge Belisle. And can you just explain to me why you keep emphasizing that it's not 5G or that it came about in the 4G realm?

MR. KOOPMAN: I'm happy to explain, Your Honor. We believe that Patent Owner's arguments with respect to motivation address the question from the improper timeframe, from the notion that the combinations of reference, as cited in the petition, rely on an established 5G phone, for example, being combined with -- combined with some historical 4G standard, and that's just not the case. When we're looking at the time of the invention, there was no 5G phone. There was no 5G tower. It would be like me standing here telling you I'm holding a 6G phone. You would be rightly skeptical, because there is no 6G yet, right?

So, we emphasize this here, Judge Belisle, to show that the motivation to combine here should be focused on at the time of the invention when 4G was the adopted protocol, not 5G. Were there aspects that were expected to be adopted in 5G? Absolutely. But at that time, we were working with 4G systems, and all of these references apply to those existing 4G systems. Does that answer your question?

So, then let me move to the overview of the particular references relied on in the petition. The primary reference of Ground 1, we refer to as Takeda. And here I'll emphasize, again, Your Honors, with respect to paragraph 239 of Takeda -- and I'm referring to Slide 8 of Petitioner's demonstrative -- it's clear that the embodiments disclosed apply to both 4G

LTE systems that existed at that time, and Takeda expected the future 5G systems.

Now, what was it that Takeda disclosed? Here I'll remind you, we talked about elements 1E and 1F of Claim 1 -- the bandwidth part elements. Well, that's exactly what Takeda tells us. Looking at paragraph 120 here on Slide 8, you can see that Takeda discloses one or more uplink bandwidth parts, and it discusses how they can be activated or deactivated. Low and behold, Takeda discloses the same solution that is allegedly created in the '463 patent, that uplink bandwidth parts can be activated or deactivated through explicit indication information, which Takeda notes, may, for example, be a DCI. There's our downlink control information. So, you can see right here, the solution of the '463 patent, element 1F is recited in paragraph 120 of Takeda. Referenced, as noted, applies to 4G systems then existing at that time.

Your Honors, Takeda is very merely an anticipatory reference here. The only issue and the only reason Petitioners rely on a secondary reference here is that Takeda doesn't focus on other aspects of 4G that were very well known at the time. Mainly, resource allocation methods. Takeda's focus is on bandwidth parts. If I filed a patent for a new and improved engine for a vehicle, you wouldn't necessarily expect me to go into detail about the tires. It's well known. The same is true here with Takeda. Takeda focuses on the bandwidth part implementation, and while it acknowledges that resource allocation is also necessary, it leaves it to -- one of ordinary skill in that time -- to look to 4G -- existing 4G systems.

And in fact, directs those reading Takeda to look to 4G systems to implement the well-known notorious resource allocation schemes. So, I'll

move on to the primary reference of Ground 2, and it's -- they're much the same. Marinier -- and here, I refer to Slide 9 of Petitioner's demonstrative -- referring to paragraph 130 on the right-hand side of this slide, you see that Marinier discloses bandwidth parts. And in fact, it notes that the band -- the frequency band can be divided into a plurality of bandwidth parts. And there towards the bottom of that slide, it tells us that each bandwidth part may include corresponding PUCCH and PUSCH resources. What does that mean? These are physical uplink channels. A shared channel and a control channel. These are our resources. What Marinier is telling us here is that you have bandwidth parts and that each of these bandwidth parts is configured. Turns out they're also activated in the same way as the '463 patent.

When we look at paragraph 62, we can see that the -- our cell phone abbreviated here is a WTRU in Marinier, receives dynamic grants. That's our DCI. It's received via physical downlink control channel, so it's information received on the downlink control channel. And what does that do? It directs our cell phone to transmit over a particular uplink channel. This is the same solution of the '463 patent. The base station sends downlink control information to the cell phone, telling the cell phone where to transmit the uplink control information. So, both Takeda and Marinier disclose the solution of the '463 patent. This idea of having multiple configured bandwidths and activating what you want to use to transmit the uplink control information back to the base station, so that the base station knows where to find them.

Now, I've mentioned resource allocation a few times and here is where we touch on our secondary reference, which is Yan. Yan discloses a

well known and notorious method of allocating resources in a particular frequency band. Yan is a 4G reference and thus, one of ordinary skill in the art reading the 4G embodiments of Takeda, the 4G embodiments of Marinier, would naturally have looked to Yan to understand how resource allocation can be performed in the existing 4G telecommunication standard.

Now, Petitioners rely on Yan as disclosing elements 1A through 1D of Claim 1, and I think it's important to note here for the Board, the Patent Owner doesn't dispute any of that. Patent Owner does not dispute -- not in the Patent Owner's response or in the surreply -- that Yan discloses 1A through 1D of Claim 1. So, Your Honors, if we accept that Takeda and Marinier disclose elements 1E and 1F and Yan discloses elements 1A through 1D, we have, in these prior art references, in these grounds, every element recited in Claim 1.

I'll touch briefly on the last reference relied on in Ground 2. This is a reference with something of a confusing name, but for the record, I'll state it. R1-1711853. I'll refer to this reference as R1. This is a proposal from the 3GPP organization. During the development of 5G, but before the adoption of 5G. Again, this is in our pre-5G era, and R1 establishes that yes, at that time, it was anticipated that one way of activating or deactivating uplink bandwidth parts would be by means of DCI, using downlink control information. So, to the extent it's argued by Patent Owner that Marinier is not explicitly clear on element 1F, that hole is filled by R1. And in fact, Patent Owner doesn't dispute the disclosure of R1 or that it would've been obvious to combine R1 with Marinier. In fact, Patent Owner's arguments on motivation to combine are strictly based on Yan, and as I noted before examiner, they're based on the notion that we are combining a later

developed 5G phone with an older 4G telecommunication standard, which is simply not the case.

So again, walking through the elements, elements 1A, 1B are disclosed by Yan. This isn't disputed, and so Your Honors, I won't spend any time on it here. The same is the case for 1C and 1D. All I'll note here, Your Honors, is that Takeda discloses at a very high level -- not just 4G systems -- but resource allocation. It talks about the same kinds of resources that existed in 4G telecommunication standards. These long abbreviations -- PUSCH, PUCCH -- that already tells one of ordinary skill in the art reading Takeda that it's employing this kind of 4G resource allocation scheme. But to the extent it was -- we anticipated that Patent Owner would argue that Takeda was not explicit about these steps 1A through 1D, Yan is just relied on to demonstrate that yes, these resource allocation steps were well known at the time, existing in 4G, and explicit in Yan.

JUDGE BELISLE: Counsel, this is Judge Belisle. Is there any challenge to R1 as being prior art?

MR. KOOPMAN: I don't believe there is, Your Honor. What --

JUDGE BELISLE: So, there's no challenge as it being a printed publication?

MR. KOOPMAN: That's correct, Your Honor. I -- Petitioner submitted evidence at the time that these 3GPP publications were available to the public as of the time they were released, and I don't believe Patent Owner disputed that.

Your Honors, I've touched on Patent Owner's inconsistent -- each argument with respect to 1E and 1F, and in Patent Owner's response, they indicated that these elements were not disclosed because of this inconsistent

"each" interpretation. Again, in the surreply, Patent Owner seems to have dropped that argument. What I'll make clear is under any interpretation of the claim or any reasonable interpretation of the claim, these elements are disclosed by Takeda. Takeda, in fact, discloses two different embodiments, each of which would satisfy this. An embodiment with one bandwidth part and an embodiment with multiple bandwidth parts. And you can see here the highlighting on Slide 22 makes clear, you've got a bandwidth part highlighted in purple and you've got resources configured for that bandwidth part highlighted in green and yellow. These resources can be activated by DCI, as disclosed by Takeda.

If the claim were -- now, to be clear, Your Honors, Petitioners contend that the claim does not require multiple bandwidth parts. That it says, each bandwidth part envisions that the claim could apply to systems that have just one, but to the extent Patent Owner argues that multiple are required, Takeda also discloses that scheme. Takeda discloses, as you see here on Slide 23, which includes Figure 9, multiple uplink bandwidth parts, showing dashed line -- dashed rectangles, I should say. Now, Takeda -- you can see the same types of resources are configured for these uplink bandwidth parts. Takeda teaches that you can, in some cases, activate only one bandwidth part. Here is a quote. The user terminal may deactivate bandwidth part one and activate bandwidth part two, but Takeda also envisions that you can activate both. Simultaneously, even. Even when uplink bandwidth part two is activated, uplink bandwidth part one may be kept active. What this tells us is that under any definition of each, in elements 1A and 1F, Takeda discloses configuring and activating bandwidth parts.

I'll proceed, Your Honors, to motivation to combine. And here, a lot of my discussion so far today with respect to the technical background is to make clear that the overly rigid approach of Patent Owner to -- the need for motivation to combine just doesn't reflect the reality of the technology that was in place at this time. And in fact, contradicts the Supreme Court's holding in KSR that motivation to combine is not a rigid approach.

As we've discussed, Takeda discloses concepts that apply to 4G and that Takeda believed would apply to future 5G systems, but it's enough that the concepts and embodiments disclosed by Takeda apply to 4G. Takeda explicitly directed those of ordinary skill in the art to look to other 4G systems to implement the systems disclosed, and that's all that Yan is here. There's no dispute that Yan is a 4G reference. There's no dispute that Yan discloses a resource allocation method, including all of the steps of Claim 1, elements 1A through 1D. So, it's a simple combination of taking the direction -- the explicit directions in Takeda -- to look and apply this to 4G systems, and then taking what the known resource allocation methods from 4G systems at that time and disclosed in Yan.

I will note that Yan discloses one frequency band. Takeda, as we discussed, has embodiments with one bandwidth part, which we would contend satisfies the claim, and embodiments with multiple bandwidth parts, but it should be clear that there would be no difficulty to one skill in the art combining this resource allocation from Yan in an embodiment that has multiple bandwidth parts, like Takeda. In Yan, there is a single frequency band, and Yan walks through steps to allocate resources within that frequency band. The only difference with Takeda is that in some embodiments, there are multiple frequency bands. These are the bandwidth

parts, but one could allocate resources within each band according to the exact teachings of Yan. And in fact, we understand we need to allocate the resources in each band so that that band can be usable to communicate with the base station. So, it's -- this combination of Takeda and Yan is no more than applying Yan's teachings of allocating resources in one frequency band to allocating resources in -- for certain embodiments of Takeda -- multiple frequency bands. Your uplink bandwidth parts one and two in the embodiment we've discussed.

JUDGE REPKO: Just a moment. Just with the 5G and R, so that supports the multiple UCI formats, right? And you're just saying you're focused on 4G here. Can you just explain that, kind of those first two bullet points where you're focused on 4G?

MR. KOOPMAN: Yeah. It is not Petitioner's argument that the combination is solely in the context of 4G. Takeda, when properly read, applies to 4G and thus, the combination could be satisfied by just the existing 4G features that were around at that time, but Takeda also looks to what it calls future 5G system, and Takeda anticipates, Your Honor, that those systems would have bandwidth parts. That's all Takeda is saying there, that 5G systems may need these -- may employ multiple bandwidth parts. And Your Honor, when we talk in the petition, some aspects of motivation to combine look to additional advantages that could be employed with, you know, future 5G systems. Does that make sense?

JUDGE REPKO: So, you're not relying on that 5G standard, but because it's backward compatible -- is that what you're thinking -- is it works in 4G and in 5G?

MR. KOOPMAN: Yes. There would have been natural

advantages to forthcoming 5G systems. You're right, Your Honor, that we're not relying on a 5G standard because at the time of the invention, there was no 5G standard, but it was recognized at that time that the future 5G standard would potentially include bandwidth parts. Where backwards compatibility comes in, Your Honor, is we want a phone that is capable of operating on the existing 4G standard, but also, potentially capable of operating on the future 5G standard. When the 5G standard is adopted, you want a phone that can employ both.

As I'm sure Your Honor can imagine, day one, you turn on your first 5G tower and you've got your brand new 5G phone, but if you go too far from the tower, you're back in 4G land and there's no service. So, it's going to be important to have the ability for a user equipment, a cell phone, to be able to communicate according to both protocols. The 5G protocol that's just been adopted that that is going to grow and provide, you know, maybe certain other advantages, but also the existing 4G standards at that time.

In fact, the experts in this case, and Dr. Sharony in his deposition recognized, yes, that kind of backwards compatibility would be useful. So, how do we make it easier to implement that kind of backwards compatibility? It's by using existing aspects of 4G. It was recognized at the time, and Your Honors, this is described in the petition on paragraph 14. At the time of the invention, again, before 5G, it was recognized that there can be advantages with respect to backwards compatibility if the 5G standard isn't completely different from the 4G standard. If we use the same resource allocation methods from 4G in 5G and just map it to multiple bandwidth parts, if that's how -- what 5G employs.

So, the reason why backwards compatibility factors into this at all, Your Honor, is we want to make it easier to design base stations, to design cell phones, that can work with both. There are obvious advantages to having a cell phone that can work with both standards, and one way to facilitate the implementation of those systems is to -- where it makes sense -- incorporate existing aspects from 4G into the new 5G standard. One clearly recognized place where that can be done is with this resource allocation method.

So, at the time it was recognized that it makes sense to have a tight integration of 4G and 5G -- they call it common resource management, and here I'm citing from the bottom of page 14 and the top of page 15 in the position -- what they recognized at the time is, we can make it easier on ourselves if we reuse the stuff from 4G that works. We have resource allocation methods already. They work. They provide, in fact, advantages with respect to power efficiencies and avoiding mismatch between uplink resources and control information. So, why do we need an entirely new resource allocation methodology when we already have one that works? We have this motivation to reuse an existing 4G scheme when we implement 5G, and that is, I'll say, a further motivation to combine here, Judge Repko. But I don't want us to ignore the fact that Takeda also applies explicitly to 4G. So, we don't even need to get to 5G if we don't want to.

There's a clear motivation in 5G with respect to simplifying the implementation of backwards compatibility, but we don't need to get there because Takeda also applies explicitly to 4G. It discloses bandwidth parts in the concept of 4G. And then between the bandwidth parts of Takeda and the more explicit resource allocation methodology of Yan, you have, in the

context of 4G, every element of Claim 1.

JUDGE REPKO: Thank you.

JUDGE BELISLE: Counsel, Judge Belisle, again. I'm going to come back to this 4G/5G stuff.

MR. KOOPMAN: Sure.

JUDGE BELISLE: And Patent Owner can answer this perhaps themselves, but is -- are we talking 4G and 5G because this Claim 1 is being said to apply in a 5G world?

MR. KOOPMAN: Yes, Your Honor. Well, I believe that's the case. I believe that's the source of Patent Owner's argument, and as you said, they can clarify, but certainly the claims at issue in parallel litigation were being applied to 5G devices and in that context, would've been applied to cover 5G. But what the facts -- what the evidence in the context of this proceeding show is that Claim 1 is not necessarily -- and maybe not at all -- a 5G method. Dr. Sharony, Patent Owner's expert, admitted during his deposition he didn't do that analysis. He couldn't say for sure whether or not this was a 5G method. It stands to reason, Your Honor -- again, back to Slide 7 in our timeline, it stands to reason that it may not be since the patent was filed years before the adoption of 5G. Where the petition addresses 5G is with respect to this motivation, that if we anticipate certain features are going to be aspects of 5G, then it becomes desirable to use them, right? But we don't necessarily need to go there because as we've discussed, these are all 4G references here. They all were published around the same time. They're closely related, and it would've been well within the level of ordinary skill in the art to combine the 4G teachings of Takeda with the 4G teachings of Yan, and the same I'll say is true for the Ground 2, Marinier.

Your Honors, I believe I've used a half hour, so at this point, unless there are any questions, I'll reserve the remainder of my time for rebuttal.

JUDGE DROESCH: I don't believe there's any questions. Thank you, Counsel.

MR. KOOPMAN: Thank you.

MR. HELGE: Your Honors, I'm ready when you are.

JUDGE DROESCH: I believe we are ready.

MR. HELGE: Thank you. May it please the Board. Your Honors, thank you for your time this morning. Again, Wayne Helge for Patent Owner, Pegasus Wireless. Your Honor, there are two irreconcilable tensions that exist in this case that I think we should focus on, and I'd like to address these before I get into any specific slides. We didn't get to Petitioner's final slide, or the final, I think it's three slides, of their demonstratives, but there's a tension that comes out in how Petitioner wants to talk about the expert's relative qualifications. As you'll see in their final three slides of their demonstratives, they say that their expert, Dr. Roy, is far more qualified to talk about the topics at issue here today than Patent Owner's expert, Dr. Sharony.

Now, let's take you through what happened in the case a little bit because following the institution of this case, Patent Owner -- well, first, we took a deposition of Dr. Roy, we included a declaration from Dr. Sharony, and we filed our Patent Owner response. Now, along with Patent Owner response, in that response, we raised issues -- specific issues -- about Petitioner's specific arguments on motivation. In particular -- well, really with both grounds -- but with the Yan and Takeda combination, and then the Yan and Marinier combination. And in particular, with the Yan and Takeda

combinations, the three reasons that they argued for combining these two references, we included testimony from Dr. Roy that undercut their arguments.

Now, that deposition was the last we have heard from Dr. Roy in this case, because after our Patent Owner response was filed, Petitioner did not include another declaration from Dr. Roy explaining the problems that he had, explaining the things that he couldn't answer, explaining the technology that he wasn't prepared to talk about. If he is, in truth, the most qualified expert in this case, he should've been there with the reply declaration explaining things. Explaining why he was right. Explaining the problems that he -- the things he couldn't answer during deposition, but you don't get that. And because you don't get that declaration with his reply, you also don't get another deposition from Patent Owner from Dr. Roy. You know, I don't know why they did this.

Again, they could probably answer this better than I could. There's some problem with Dr. Roy's testimony and the fact that the last things that he said on record are more favorable to Patent Owner than the Petitioner, for each of the arguments. The backwards compatibility, which Petitioner's argument does not make one bit of sense in terms of backwards compatibility, and I will get to that, Your Honors. In terms of energy efficiency at the UE, the user equipment, which Dr. Roy said, well it's really hard to compare when you're using bandwidth parts and when you're not using bandwidth parts, he didn't come in and clarify that. He didn't make a calculation and say, this is why my statements about energy efficiency were right. We don't have that.

The issue with UCI mismatch, which is in essence, the difference

between the resources allocated by the base station for the UCI -- the uplink control information -- and the amount of UCI bits that the UE -- the user equipment -- has to send back to the base station -- we're going to call that UCI mismatch for the purposes of today, and I'm happy to go back and revisit it, if Your Honors need it -- but that idea of UCI mismatch, when I showed Dr. Roy the Takeda figures and I pointed him to Takeda and I said, can you tell whether Takeda suffers from a UCI mismatch, he said he couldn't tell. He couldn't tell whether Takeda had that problem.

So, what we have with backwards compatibility, energy efficiency at the UE, and UCI mismatch, the three reasons that Petitioner asserted in their petition for combining Yan and Takeda, we have Dr. Roy undercutting each of those reasons and we don't have him coming back with a reply declaration to explain why his original statements were right, or why, in fact, the arguments we made were wrong. We don't have Dr. Roy doing that. All you have is attorney argument after the Patent Owner response.

So, there's a tension in this case. They want you to believe that he's the most technical person to explain this technology to you -- the 4G and 5G -- and yet, he's silent when it matters. When the questions are raised, he's silent. That's a problem. That's a real tension in this case, because if you're supposed to believe him more than our expert, then what's wrong with his testimony that he said was favorable to Patent Owner? I don't understand how Petitioners can win under that tension of this case.

Now, Judge Belisle, you raised another really interesting issue, which is why are we talking about 5G, and my best answer to that is, that's another tension because the whole backwards compatibility argument, the Petitioners put first in their petition -- first -- as a reason to combine Yan and

Takeda is for backwards compatibility between 5G and 4G standards. So, if they say that, you know, there's a problem or something is or isn't a 5G standard, what are we talking about? They come in today with a slide that says, well look, 5G wasn't adopted until long after even our patent was filed, and yet the R1 reference in the third -- or in the second ground -- the third reference in the second ground -- the R1 reference is about trying to develop the 5G standard. We can't put blinders on and pretend that the 5G development wasn't happening.

Now, there's another issue here in terms of -- boy, I could really nitpick the whole 4G/5G issue for a long time. I don't want to spend our time on that, Your Honors, but bandwidth parts were not used in 4G. So, the idea that Takeda somehow applies to 4G, I mean, Takeda says, look -- there's this paragraph, I think is it 120 or 105 -- but yes, Takeda has statements about 4G, but it was well known that bandwidth parts were not used in 4G. And I think they know that because they're saying one of the reasons to combine Yan with Takeda is to provide this backwards compatibility -- they're treating, at that point, Takeda as a 5G device that also needs some sort of 4G aspects in it. It's very confusing. I think it's in the weeds. Honestly, it's a tension again, that I think undercuts their backwards compatibility argument, whether it references 5G or not.

In fact, I would say -- you know, if we look at what Dr. Roy said about whether even Yan itself was incorporated into 4G standard, he said, I don't know, I didn't do that analysis. So, getting into the weeds in the 5G versus 4G issue is probably not worth our time, and frankly, I think it muddies the case, but it is a tension in Petitioner's case. They raised it. They brought it up and now they're backing away from it. Counsel keeps on

saying this future 5G issue, they think it's going to be used. Well, that's not true. Standards were being developed. People knew that bandwidth parts were the trend. So, I think it just creates a real tension that causes issues. And even if we have, you know -- petition page 11 says Takeda relates to 5G technology. Why are they backing away from that now? I don't understand it. It's just a tension in their case.

So, Your Honors, again, in terms of that first tension with Dr. Roy's testimony and the fact that he made very favorable testimony to Patent Owners that wasn't resolved, that is, I think, a shadow that hangs over Petitioner's entire case, at least with respect to the three issues that we'd like to talk about for motivation for Yan and Takeda. But before I get to that, I do have one other brief issue I'd like to raise, and that is, I do think that Petitioner, whether they meant to or not, I do think Petitioner made a new argument this morning in their first presentation. Petitioner's Counsel said that Takeda -- and I'm not quoting exactly, but I think I've got the paraphrase right -- Takeda explicitly teaches to look to 4G references or 4G technology for how to perform resource allocations.

Petitioners do not have -- from pages 13 to 17 of their petition where they talk about motivation for Yan and Takeda -- they do not have an argument that Takeda explicitly instructs a POSITA to look back to 4G to figure out how to do resource allocation. That's not an argument they've made. The arguments they've made are the ones I've already enumerated, which is backwards compatibility to solve UCI mismatch, and to improve the power consumption or the energy efficiency of the UE. So, I'm going to address those three points first, Your Honors.

JUDGE REPKO: Before you move on, I just --

MR. HELGE: Yes.

JUDGE REPKO: -- wanted to point out that they did say, "Since Takeda relates to 5G technology" -- comma, and then they say that 5G incorporates allocation methods of 4G, like that seems to be their position. At least on page 11 in a way, right? Because like maybe it doesn't go into detail in 5G, but it does incorporate previous methods. Do you agree with that sentiment or that statement there?

MR. HELGE: I don't think I would, Your Honor. Well, I mean, it's a very broad umbrella to say that Takeda is working in a 5G environment, but incorporates 4G, right? We're talking about two different standards.

JUDGE REPKO: One builds on the other and incorporates earlier, is I guess their point.

MR. HELGE: So, Your Honor, I would say in particular, I mean, if that was a statement that they made on page 11 -- I apologize, I don't have page 11 sitting in front of me -- I mean, their motivation of arguments are pretty explicit on page 13 to 17. I think that's where they include their motivation. Is Takeda consistent with 4G? I would say no, because we're talking about bandwidth parts.

Now, in 4G, you had a component carrier, which was not divided, right? You had a component carrier, which is basically the entire frequency band. 5G says, hey, we're going to expand that frequency band, but that's too much, right? That's going to be way too much for the devices to monitor and to use for transmission, so now we incorporate this concept of bandwidth parts. So, at least with respect to resource allocation, I would say very specifically, Your Honor, at least the arguments in pages 13 to 17, the

explicit arguments they made about motivation do not call back to that page 11. They make different arguments, and so I would say, Your Honor, we're specifically responding to those arguments.

JUDGE REPKO: Okay.

MR. HELGE: So, Your Honor, I'm jumping to Slide 9, and this is sort of our module here talking a little bit about backwards compatibility. Now, there's some statements in the reply that I think distort Dr. Sharony's testimony -- Dr. Sharony, our expert. I think Dr. Sharony fully understands backwards compatibility. His deposition testimony explains -- when he was talking to counsel for Petitioner, he explains what backwards compatibility is. It is, in effect, a device that complies with standard one and standard two. Now, in this case, let's say it's 5G and 4G, right? A cell phone that it complies with both, 5G and 4G. That can be a device that has the software to comply with both, the 5G standard and the 4G standard. And maybe it needs certain hardware, you know, radio, for example, that might have to have dual bands or however the case may be. It has all the hardware and software to comply with both, 5G and 4G.

Now, the argument they make about modifying Takeda with Yan is that it would allow for backwards compatibility. That makes no sense. Zero sense. Now, first, Dr. Roy said I have no idea whether Yan's methodology was ever incorporated into the 4G standard. Now, if we don't even know if Yan is 4G compliant, how can you say that practicing Yan is necessary to communicate with a 4G base station? You can't.

And even if Yan -- the small piece of, you know -- as we know, standards are massive, you know? Cell standards are massive. They encompass probably -- I'm going to guess -- thousands of pages, you know,

hundreds of documents, many different sections. Even if you had one small section of a standard, which I don't think they have that based on Dr. Roy's testimony. But even if you had one small section of that standard incorporated into Yan, taking that and dropping that into a 5G related technology like Takeda, does not make Takeda both, 4G and 5G, compliant. You don't get full standard compliance by just taking one little piece and dropping it into another type of technology.

As we put into our -- both our POR and our surreply, what you wind up with there is very likely a product that won't comply with either standard, because now you're mixing things up. Unless you have testimony, which they don't have, that somehow Yan was 4G compliant, and when you dropped it in, it still remained 5G compliant. The backwards compatibility argument they've made, it sounds good, it sounds appealing, it sounds like there's some engineering thought behind it. The logic does not hold up. It just doesn't hold up.

And again, as I have here on Slide 11, Dr. Roy's testimony. He didn't know whether Yan's solution, whether Yan's methodology, was ever adopted within the 4G LTE standard. He does not know. How can he say that adopting Yan into Takeda would then therefore create a dual connectivity device? There's no evidence for it. And again, he didn't come in with a reply declaration and clean this up. This is the last word that Dr. Roy has on backwards compatibility. It doesn't work.

Now, as another point, this is very -- just very quickly, Your Honor. Slide 13. This comes back to that second tension issue, as well. In the petition, page 11, you have Petitioner saying that Takeda relates to 5G technology. Now, you have in the reply, page 13, Petitioner disputing

whether Takeda adhered to all aspects of the 5G new radio framework in the first place. Once again, if you don't know yet whether Yan is 4G compliant or whether it's been adopted in the standard, if you don't know whether Takeda is 5G compliant, how can you say that combining those two would give you a device that complies with both, 5G and 4G? It doesn't make sense. It's their lead argument. It doesn't make sense. As we have on Slide 14, Your Honor, it's just a quick demonstrative here. This backwards network compatibility argument does not work. It fails.

JUDGE BELISLE: Counsel, this is Judge Belisle. Again, with the 4G and the 5G, when I look at Claim 1, it does not say anything about 4G, 5G, it doesn't identify a network type. It is a method that describes certain steps and as I understand Petitioner's case, they have a reference that teaches bandwidth parts -- the technique for using bandwidth parts. But if I understood their case correctly, they tell me, but that reference doesn't get into the details of the resource allocation.

But good news, I have another reference that does lay out how to do resource allocation, and with those two references, I have all the steps of Claim 1 and why would I put them together. It sounds -- my understanding of their case is that resource allocation was a well known technique at the time of this application, so can you help me understand, what is this fight right now about all this 4G/5G and why you would put these two things together, when it sounds to me like they're bringing in the reference for resource allocation simply to provide those steps that were well known at the time?

MR. HELGE: Certainly, Your Honor. So, I do want to take a step back and say, though, I recognize your point. I agree with your point. The

claim does not say whether it is a 4G specific invention, 5G specific invention. I mean, there is some background that talks about bandwidth parts, the idea that bandwidth parts are going to be incorporated into 5G, right? And that this is the trend we're heading towards. I think the use of bandwidth parts here certainly suggests that we're talking about a 5G environment, and that's something that Dr. Sharony confirmed, and I don't think Dr. Roy disputed that either. I think everybody thinks bandwidth parts in the industry -- they think 5G standard, right? Whether it's in development or that we actually have a standard, that's what we're thinking. We're thinking future.

Beyond that, and I think this is the key point that I'd like to raise, Your Honor, and it kind of gets to the topic we have coming up, which is UCI mismatch. 4G may have had a problem with UCI mismatch and Yan proposes to have solved that. Now, again, we don't know whether Yan was ever incorporated into 4G. We don't have evidence on that point, but the question is do you still have UCI mismatch in 5G? Once you start using bandwidth parts, and now we're taking from this -- you know, we're going from the full component carrier in 4G, which is the full spectrum that we're operating in, to 5G, which again, is larger, but now we're breaking it up into smaller parts, and in fact, the bandwidth parts in 5G tended to be smaller than the component carriers.

We had some deposition testimony with Dr. Roy on that point, as well. So, the question becomes, do you need to worry about UCI mismatch once you get to a situation where you're using bandwidth parts. And I think, Your Honor, the issue that I would say is sure, according to Yan resource allocation in 4G was known, it was known. 4G was out. They had this

issue, resource allocation, here's one potential way of dealing with it. But do you have that problem once you've divided the component carrier into bandwidth parts? What we would say is no because the 5G idea and how they were dealing with resource allocation within bandwidth parts was totally different.

It's not all resources. It's just resources for the uplink control information. And 5G had a different approach, and we have testimony on this, and this is actually getting into sort of our next point here, which is resource allocation is only an issue in 4G and Yan really if the user equipment is making a decision about how much data it wants to transmit up to the base station, and that's not how 5G works, right? Once you get into bandwidth parts, you have very smart people sitting in meetings saying, let's have the base station ask the UE -- I'm sorry -- let's have the base station tell the UE, this is how much I want, this is how much you need to send me, and here's your resources for what I'm asking for.

So, in that regard, Your Honor, when we look -- once we get into this idea of bandwidth parts, we're kind of changing the environment. We're not really in the same situation where we say who knows how much the UE is going to send up. We're in an environment where we say, the base station is going to ask for X number of bits and that's what the UE is going to send. So, I don't think it's a simple solution to say just go back and do what we did before, right? That's trending backwards within the technology. We've got a better idea and that's what people were using and that's what people have used. And we raised that point. And again, we don't have Dr. Roy coming in and saying, no, you're wrong, that's not how UCI allocation worked once you get into bandwidth parts, right? That -- he would've been the guy. If

he's the one who's most qualified to say it, he would've been the guy to come in and clear this up for us, but he's not here.

So, the last word you have from Dr. Roy is I don't know if Takeda has a UCI problem, right? Takeda bandwidth parts. I don't know if there's a UCI mismatch problem. You have Dr. Sharony saying, well yeah, you wouldn't have gone back to this old way of doing things because there's a better way that everybody knew about and that is to transmit -- for the UE to transmit the UCI using the exact number of bits that the base station is allocated to it. Your Honor, it's a really long-winded answer. I apologize for that, but I hope I did answer your question on that point.

JUDGE BELISLE: Well, I would encourage both parties, since you're each going to have another round here, to stay very focused on the terms in Claim 1, and we're here to decide whether Claim 1 is invalid or not. Not all this other stuff about 4G and 5G, which is creating a huge cloud in my mind over this case. I think the question is, are those steps in Claim 1 obvious, and we have only two references and then sort of a third, I guess, in play. So, rather than me asking more questions or talking more about this issue, I would just encourage you to stay very focused on what those steps are right there on that Claim 1 and explain to us why they're not -- for one, why they're obvious and for the other, why they're not obvious. If all those steps exist, then I guess the issue is why it would've been obvious to combine them at the time of this. And, I mean, if it involves 4G/5G, well, so be it, and -- but I'd like to hear a clear explanation as to why that matters to us.

MR. HELGE: Understood, Your Honor. And I would say -- I would prefer not to come up here and belabor 4G and 5G points, but I would

point out that the backwards compatibility issue they raised, it directly hinges on what is 4G, what is 5G, how do you comply with these standards. And they need -- I think we do -- we have this point in our surreply -- they do need the combination, right? They have Takeda, they need to look to Yan because they don't have resource allocation under using bandwidth parts, so the question is, why would you go backwards in time and adopt something that's outdated, inconsistent with the way people were doing things. Now, Your Honor, there's -- as I said, we have the UCI mismatch, we have the power usage that Dr. Roy testified, he couldn't really compare whether there would be power savings if you incorporated Yan into Takeda, and you have the first issue, which was the backwards compatibility.

One other point that I'd like to raise that was unrebutted by Petitioner in the reply, and that is we argued in our POR that you would not have made this combination. I think maybe this goes to Your Honor's point a little bit more. One of the things that Yan does is it pushes these decisions down to the UE. Here are all these resources. Now, you've got to go through and pick which ones suit the UCI -- the character and the color of the UCI that you have, that you need to transmit back up. We said Takeda has a specific purpose of avoiding overprocessing the UE, right? Basically, don't shift the decisions down to the UE -- the base station controls -- and that's consistent with our testimony about how UCI resource allocation was handled under the bandwidth part scenario.

We said, in fact, given Takeda's teachings about conserving power, given the fact that Yan pushes these decisions down, a POSITA would not have made this combination. That was an affirmative statement. Again, no further testimony from Dr. Roy, no further declaration. Dr. Roy -- and even

the Petitioners do not respond to that argument in their reply. I don't know if they missed it, but --

JUDGE BELISLE: Doesn't it help their case, though? I mean, if it's pushed to the base station, you have to have some way of communicating with the UEs that don't have 5G capabilities, right? So, wouldn't that kind of further their backwards compatibility argument that you need to reuse these 4G principles for resource allocation at that base station in order to communicate with these other devices.

MR. HELGE: Well, Your Honor, I would respectfully disagree. I mean, once we're dealing with bandwidth parts, you're not going to be communicating with a UE using 4G standards with bandwidth parts. It --

JUDGE BELISLE: I'm not --

MR. HELGE: At this point, we're talking about, you know, a device that doesn't know what is being sent, right? It's got to be on the 4G network.

JUDGE BELISLE: I guess my question is, do you agree with the fact that if you have a 5G standalone operation, do you want to reuse those 4G principles of resource allocation in some way to communicate with these devices. Is that something you agree with? No?

MR. HELGE: No, no. No, because 5G only cares about communicating with 5G devices.

JUDGE BELISLE: You don't care about -- okay.

MR. HELGE: Right? I mean, once you get into, you know -- again, like a base station may have a 5G radio or a 4G radio, right? And that's why you switch. Hey, you can't recognize bandwidth parts. You can't respond to my command for transmitting the UCI that I'm asking for, right?

There's a mismatch. There's a software. It's just -- it's not connecting -- shift back over to 4G, and now we can talk using the Yan technique or you -- it's not really Yan because we don't know about that, but we can use older techniques to communicate.

JUDGE BELISLE: Isn't that kind of -- you feel like that undercuts their backwards compatibility argument essentially? You would not want to do this -- there's no benefit to that -- I mean, there's benefit to the backward compatibility maybe, but you would not want to do this as 5G standalone?

MR. HELGE: Well, backwards compatibility, again, Your Honor, is you can communicate by 5G. If 5G doesn't work, for some reason, if there is an issue with that device or the 5G signal isn't strong, you switch to 4G, right? But now, you're talking about fully complying with 5G standard or fully complying with 4G standards. You're not taking aspects of 4G and saying, hey, this would be great, we're going to drop this into 5G. That's not how we do things in 5G, but hey, if the 5G communication doesn't work, let's start mixing and matching standards. You don't do that, right? It's 5G or 4G. It's not a little piece of 4G dropped into 5G somewhere to sort of shore our problems, right? That's why the backwards compatibility argument doesn't work.

JUDGE BELISLE: Okay.

MR. HELGE: Your Honors, I think it's this issue about failing to rebut our express reason. This is our Slide 23 and this goes to the point that I was making a moment ago, which is in effect -- we made an argument why you would not have combined Yan and Takeda. This went unrebutted in the reply. No further testimony from Dr. Roy to say that we're wrong on this point or why you would have beyond what he had in his original declaration.

And this unrebutted point, I think, is pretty strong here.

Your Honors, I'm doing all right on time here, but I'd like -- unless Your Honors have other questions about Takeda and Yan, I feel it might be a good time to move on to the Yan and Marinier problem, as well.

JUDGE BELISLE: Counsel, Judge Belisle. Let me just ask one question. So, on this first combination of art, in Claim 1, is there any step in Claim 1 that Patent Owner is arguing isn't taught by a reference that's part of this combination?

MR. HELGE: So, Your Honor, we did have arguments in our POR. I know at one point, Petitioner's Counsel had said that we've given up on all those arguments, and that's not true. I mean, in our surreply, we do say we continue to believe that the arguments we presented in the POR stand, and really, the argument goes to this problem of each -- now, Judge Droesch, you had asked, do we construe each the same in both elements, and of course we do. We have each and the each. There's an antecedent basis there. We don't think "the each" is somehow referring to something different.

We did feel, Your Honors, that in the petition, they were a little unclear about how they defined "each". What "each" were they talking about? How do you know what all of the configured bandwidth parts are? Because the claim requires each and it requires handling of each, so I would simply say that we think that was a deficiency in the petition. At this point, Your Honor, we're happy to stand on the paper as the POR deals with it. It really comes back -- I think it ties in more closely to the motivation problem because it really comes into this idea of when you combine these, do you satisfy these requirements 1E, 1F for every configured bandwidth part. It

may make more sense, Your Honor, if I could explain it with respect to Marinier.

JUDGE BELISLE: Well, let's just stay on the first --

MR. HELGE: Um-hum.

JUDGE BELISLE: -- combination. Which -- just to sort of drive down on this, which step in Claim 1 do you believe is missing from the art that's being asserted in the first combination?

MR. HELGE: Well, Your Honor, if I can point you to 1E, this idea of resource sets configured for each bandwidth part, configured for the UE, I think this requires an identification of each bandwidth part that's configured for the UE, and then you have to have resource sets configured for each of those bandwidth parts. You don't get that unless you believe their combination of Yan and Takeda, right? They need both references combined to get to that element, and I think if you have a problem with the combination, that element is not satisfied. But I do think that that argument hinges on a lack of motivation.

JUDGE BELISLE: So, if we agreed there was a reason to combine them, then the art shows all of these steps?

MR. HELGE: Your Honor, I'd strongly encourage you not to, but I agree if that's the way you went, I think that that element would be satisfied.

JUDGE BELISLE: Okay, thank you.

MR. HELGE: Yeah. Your Honor, Slide 24, very quickly, just again. There's no rehabilitation testimony or declaration from Dr. Roy. The last word we have from him on each of the arguments for combination in Ground 1 are favorable to Patent Owner. They haven't been fixed. Very

quickly, Your Honors, moving on to Slide 26, Marinier is an interesting reference as Petitioners acknowledge in the petition, Marinier was still dealing with -- I apologize, Your Honor -- still dealing with 4G type technology. It included some division of the component carrier. We aren't talking about bandwidth parts in the 5G context. I don't think it matters. We are talking about the component carrier, and then Marinier will have simultaneous transmissions on each of those parts in order to avoid collisions and conflicts in those transmissions.

Now, the reason that Petitioners put in there for combining Yan and Marinier -- and this is at the bottom of Slide 27, it's the bolded language down here. They say that a POSITA would have looked to Yan to avoid the mismatch of UL -- uplink -- channel resource capacity and UCI size, which could result in such conflicts in Marinier. The oddity of this argument is that Marinier has a solution for avoiding conflicts. Marinier does not have a problem with resource allocation -- at least none that Petitioners talk about. They say you could look to Yan to avoid mismatch that could result in conflicts in Marinier. No, Marinier has a solution for conflicts. You don't need to look to Yan to deal with conflicts at all.

So, the question is, why would you look to Yan at all? They don't have an answer for it. It's really wrapped up in this idea of what Yan does for using bandwidth parts without ever really getting into the idea -- they don't say you need to look to Yan to figure out how to do resource management in Marinier. That's not their argument. It's that somehow, the data that Yan sends could cause collisions. Well, no, because Marinier avoids that problem. So, frankly, Your Honors, as we put on Slide 28, we don't think that that combination works either. It's really the only

combination they -- or the only reason they present for combining Marinier and Yan. And once again, I think it's dressed up to try to sound important, but it just doesn't make sense. Marinier avoids a problem. Why are you looking at Yan in the first place? They don't have an answer.

So, Your Honors, I have about 20 minutes left. I don't expect to use all of that for my rebuttal, but unless Your Honors have other questions, I would ask if I could just use that to go towards the original five minutes I requested.

JUDGE REPKO: Yeah. Just your view of obviousness here, you're thinking that it has to solve a problem in the base reference -- Yan has to solve some sort of problem in Marinier.

MR. HELGE: Well, Your Honor, if I can say real quickly, I did hear Counsel say one statement about -- that our arguments about obviousness don't comply with KSR. I mean, we're responding to the arguments they presented in their petition, right? They were very specific in their petition. They didn't say, these are related technologies, just lump them together. They said, here's what you're trying to do.

You're trying to achieve backwards compatibility -- solve UCI mismatch, create efficiencies of the UE, avoid collisions in Marinier. And those arguments don't hold water. Those are the only arguments they have to stand on because those are the Petitioner's arguments. When we get to the reply, they don't come in with new arguments -- not that they should. They didn't try to, you know, seek Board permission to file new arguments or anything. They stood on what they had in the petition, so I would say, Your Honor, those arguments that they presented don't work, for the reasons we've gone through.

JUDGE REPKO: And the reason you gave me is it didn't solve a problem in Marinier, so I'm just -- my question, I guess, is does it have to? Does that undercut their reasoning? The fact that if it doesn't a problem in Marinier, the reasoning -- the obviousness rationale is --

MR. HELGE: Well, Your Honor, that's the only reason they advanced.

JUDGE REPKO: Right.

MR. HELGE: But I'm hesitant to get into a discussion of what they could have said, right? Could I have written the petition better? Maybe.

JUDGE REPKO: But it's under your view of obviousness, though, right? I guess that's my question to you is like, in your view, the obviousness case law says it has to explicitly solve a problem.

MR. HELGE: No, I don't think that's right, but I think that's what they said in their petition.

JUDGE REPKO: Okay.

MR. HELGE: Right? I think they didn't make a broader statement of obviousness. They simply went in and said, you would've looked to Yan because the data that Yan transmits could have caused collisions. I don't understand that. Doesn't make sense when you read Marinier, which already has a solution for collisions. What's being achieved by Yan? They don't say it's to do resource management. They say it's to transmit data that might cause collisions.

JUDGE REPKO: Okay. Thank you for --

MR. HELGE: That --

JUDGE REPKO: -- clarifying that. Thank you.

MR. HELGE: Thank you, Your Honor.

JUDGE REPKO: No further questions.

JUDGE DROESCH: Thank you, Counsel.

MR. KOOPMAN: Your Honors, unless there are any questions you want to get to right off the bat, I'm going to start where Patent Owner invited me to, with a brief discussion of the differences between the technical experts in the case. Here, I'm referring to Slide 44 of Petitioner's demonstrative exhibit, with respect to Dr. Sharony, Patent Owner's expert.

We learned during the deposition of Dr. Sharony that he really has very, very little relevant telecommunications experience during the timeframe that we're considering here. And remember, the relevant timeframe, we look at the time of the invention -- this would've been around the 2017 era, the pre-5G era, when 4G was still the adopted standard, and when we were starting to develop aspects of 5G. Well, Dr. Sharony has authored no publications in the field of telecommunications since 2012. He last consulted in telecommunications role in 2015. When we get to the point where we're starting to develop 5G, Dr. Sharony is not attending any of the conferences relating to the development of 5G. In fact, his primary communications and experience since 2015 is teaching a single course on 5G, which he believed he had done about four times. That's it.

Referring to Slide 46, I'm going to contrast that with Dr. Roy's experience here. Dr. Roy has authored more than a dozen publications relating to the 5G telecommunication protocol. He's continuously conducted funded research on 5G and in fact, served as program lead for the U.S. Department of Defense, and the Innovate Beyond 5G program, where he had responsibility for monitoring the commercial 5G evaluation, from the 3GPP

group.

The takeaway here, Your Honor, is so many of Patent Owner's arguments you heard relate to what's required by the 4G standard or the 5G standard, and the support for those arguments is thin, Your Honor. To the extent that the Board is looking at these arguments and finding that the experts contradict each other with respect to these standards, 4G and 5G. The Board should credit Petitioner's expert, Dr. Roy, as having more experience and more credible experience during the relevant timeframe.

Now, Patent Owner made some issue as to the fact that Petitioner didn't submit a further declaration from Dr. Roy with the reply, and the fact of the matter is, Patent Owner far overstates the degree to which they believe they undermined the arguments from Dr. Roy in the declaration. Everything you heard me say in the first 30 minutes when I was up here is entirely supported by Dr. Roy's original declaration and is not undermined by any statement he made during his deposition, nor did I hear Patent Owner point out any particular point that would undermine our arguments, and I will address those particular arguments, as well.

But before I do, I heard Patent Owner say that bandwidth parts are not used in 4G, and I think the evidence of record plainly shows that that's not the case. Let's refer back to Slide 8 of Petitioner's demonstrative -- the one discussing Takeda. And you can see right here, explicitly in Takeda -- we don't need to consult the experts on this -- Takeda tells you that aspects and embodiments can be applied to a system using LTE and 4G technology, and that those embodiments include one or more than one uplink bandwidth parts. So, we don't need to go beyond the four corners of Takeda to see that here is an application of bandwidth parts in a 4G system.

JUDGE REPKO: Does Takeda actually incorporate into the 4G standard? Do you have evidence about that?

MR. KOOPMAN: I don't believe either party submitted evidence as to what does or doesn't comply with the standard, but to Judge Belisle's point, the claim isn't about the standard. The claim is about what was known at the relevant timeframe here. And what we can see here is that Takeda is clearly directing one of ordinary skill in the art to implement these kinds of features and saying that they can be implemented in 4G systems. Whether they would, you know, comply with a particular regulatory document is beside the point and beyond where the Board needs to get to, to be able to reach the conclusion of obviousness in this case.

JUDGE REPKO: Well, that's your rationale, though, is this backwards compatibility thing, right? So, that's where the standard is going to come into play.

MR. KOOPMAN: So, that's one rationale, Your Honor, but I'm happy to turn to the exact quote you pointed out, which is the inter-relationship between the development of the 5G standard and the existing 4G standard. Let's go to the petition, and here I have this on screen. This is paper 7, and I'll go right to page 11 that Judge Repko, you quoted. And Patent Owner quoted the first part of the sentence, but then omitted the second part, which we would've pointed out if you hadn't beat us to it.

Takeda relates to 5G technology, and it does. It anticipates that its teachings regarding bandwidth parts may become part of a 5G standard, but at that time, it was understood that 4G elements of the claims are also taught because you're reusing these particular features, specifically with respect to resource allocation, in the development of the 5G standard. At the time of

the invention, there is no 5G standard. So, you are looking at what you have available and building from that.

I'll proceed to page 14 of the petition where this is reiterated. You heard Patent Owner characterize this as a new argument, but that's simply not the case. You can see right here, citing 14 of the petition, Takeda states that its teachings are applicable to both, 4G and 5G. Citing, again, paragraph 239, which I've been talking to you about.

Farther down, it would've been beneficial to allow 5G UEs to reuse 4G principles of resource allocation, but from these UEs that did that were not 5G. This is the heart of the backwards compatibility argument, Your Honor, that at the time of the invention, before the adoption of 5G, it would've been obvious to one of ordinary skill in the art to reuse what you already had. It was recognized citing Exhibit 1035. This tight integration of LTE -- that's 4G -- and the new 5G era interface to fulfill the requirements. You're just taking what's already there, and this is the heart of Petitioner's Ground 1 of invalidity that Takeda is focused on these bandwidth parts -- how to configure and how to activate bandwidth parts. And the well-known 4G resource allocation methods, it would've been clear and straightforward for one of ordinary skill in the art to go and implement those well-known standards.

And to the extent Takeda didn't say so explicitly, which we still contend it does and that we've highlighted in the petition, there are independent documents establishing that this notion in bold here, at the top of page 15 of the petition, common resource management. It just made sense to use known beneficial methods that were already in place in the development of 5G, and that would've facilitated creating UEs, creating cell

phones that can be backwards compatible. That can comply with the 5G standard, but can also comply with the 4G -- the older 4G standard when necessary, because they have common protocols, they have common elements, specifically with respect to resource allocation.

Now, let me go back to the slides because I want to make clear that this notion of bandwidth parts was well known in 4G. Not just in Takeda, as we see here, but in Marinier, as well. I'm here referring to Slide 9 of Petitioner's demonstrative. It plainly -- paragraph 130 talks about dividing the band into a plurality of bandwidth parts. We think this is 4G. You don't need to take my word for it. I'll go to Patent Owner's response.

The bottom of page 4. Marinier and Yan, which are 4G LTE technologies. This is Patent Owner telling you that Marinier, which discloses bandwidth parts, is a 4G LTE technology. So, bandwidth parts were not new. They didn't spring into existence upon the adoption of 5G in 2021. They had been known for years before, and Takeda and other references specifically direct you to implementing them in 4G systems.

JUDGE REPKO: Even if they say they're implementing them in 4G systems doesn't necessarily mean that that complies with the 4G standard, though. That's a separate issue. We're talking about --

MR. KOOPMAN: Correct. It may comply. It may not. Your Honor, we don't have -- the 4G standard, to my knowledge, is not an exhibit in this case. But more to the point, and Judge Belisle, turning to your exact question, whether it's part of the 4G standard is not what's relevant here. What's relevant is you have Claim 1, which Petitioners contend recite well known 4G features. Whether Claim 1 complies with 4G, whether it complies with 5G, is not a question the Board needs to answer. The Board

simply needs to answer whether it would've been obvious to take all six of those arguments, 1A through 1F, and implement them in a single system. And as Petitioners have demonstrated, you have 4G references, which are commonable, that include each one of these claim elements.

You heard Patent Owner say that if there's a motivation to combine here, then all elements of the claim would be present, and we've walked through already how elements 1E and 1F are taught into Takeda and Marinier, and that there's no dispute that elements 1A through 1D are taught by Yan.

Patent Owner focused on UCI mismatches, one of the particular motivations outlined in the petition, and it is one, in fact, as I'll explain, applies to both grounds. But I think this is a good example to show why -- where the examiners -- or where the experts in this case are consistent. And where contrary to Patent Owner's arguments, there was a clear motivation here.

Now, you know, at a very high level, it's Petitioner's position that the combination of the 4G elements of Takeda, the 4G elements of Marinier, with the 4G elements of Yan, doesn't require some manufactured rigid problem solving solution that Patent Owner is proposing here, but we have that, too. You can combine these 4G elements because, at least in the case of Takeda, it explicitly tells you to do so. But beyond that, let's look at this notion of UCI mismatch, and here, I will take us to Slide 34.

What is UCI mismatch? It is a problem identified explicitly in Yan, so identified in 4G, where you want to send your uplink control information for UCI to the base station. Well, you need an uplink resource to do so, but you want to use a resource that makes sense based on the size

of your UCI. If you use one that's too big, you're not transmitting very efficiently. You're not using your power, you're not using your bandwidth efficiently. If you use one that's too small, you're cutting off some of your UCI. Not all of it is being transmitted because you don't have enough room in your resource.

So, what do you do? Yan teaches the steps to allocate a particular resource for your uplink transmission based on the size of your UCI. Now, why would that have been obvious to implement in Takeda, aside from the fact, as we discussed, that Takeda already tells you that its teachings apply to 4G systems and that, you know, to the extent there are any areas that Takeda doesn't focus on, it would've been natural to just build them with 4G teachings anyway, especially well known ones like the resource allocation methodology of Yan. But beyond that, Yan identifies the specific advantage of its resource allocation methodology.

Matching resource size to UCI promotes efficiency. It avoids the potential for mismatch, and what you heard Patent Owner say is that combination doesn't make sense because it would be going back to the old way. Going back to the old way. This is why -- and forgive me, Judge Belisle -- I spent so much time on the timeline, right? Because we're not going back to the old way. We look at obviousness at the time of the invention. 5G doesn't exist here. It's not going back to the old way. It's figuring out how to solve the problem at the time.

Takeda doesn't have the 5G solution to this UCI mismatch problem, because there's no 5G yet. So, what is -- what does Takeda actually teach about a UCI mismatch? It turns out, the answer is nothing. UCI Takeda is silent on how to resolve this problem. You heard Patent

Owner say that Dr. Roy said Takeda was silent on it. Well, Dr. Sharony says the same thing. Takeda is silent. Here, I'm referring to Slide 34. Takeda is silent on the issue of handling UCI of different sizes. You can see quotes from the deposition. No mention of how Takeda deals with the UCI of different sizes. No mention. We don't know how it deals with different sizes of UCI. Right.

What that means is Yan is filling a recognized gap in the teachings of Takeda. Takeda does not explicitly tell you how to deal with -- how to efficiently deal with UCI of different sizes. The reason? Because that's not the focus of Takeda. The focus of Takeda is the implementation of this bandwidth parts scheme. But we have Yan that not only teaches a well-known 4G resource allocation method, but specifically solves a problem that Takeda doesn't address. So, this is an independent motivation. It stands alone, that you have both experts recognizing this mismatch issue Takeda doesn't address, that 5G solves it years later. Great. That doesn't help us at the time of the invention. We need a solution now, and we have one in Yan. And in fact, Patent Owner doesn't dispute that Yan solves that problem -- that Yan does specifically address and resolve the issue of UCI mismatch. So, let's turn to another -- an additional --

JUDGE BELISLE: This is Judge Belisle.

MR. KOOPMAN: Yes, Your Honor.

JUDGE BELISLE: So, in Claim 1 in this Takeda combination, if Takeda is disclosing the bandwidth parts, I understand your argument to be that it's focusing on that disclosure and just doesn't talk about resource allocation; is that correct?

MR. KOOPMAN: At a very --

JUDGE BELISLE: And --

MR. KOOPMAN: At a very high level, Your Honor. But you're right, it doesn't get into the details of resource allocation, I think it would be correct to say.

JUDGE BELISLE: But Takeda is not saying like -- that it somehow doesn't know how to do it or that there's a problem preventing it from doing it? It just doesn't talk about; is that --

MR. KOOPMAN: That's correct, Your Honor.

JUDGE BELISLE: And so, you're going to Yan, which does talk about it and does explain resource allocation?

MR. KOOPMAN: That's correct, Your Honor.

JUDGE BELISLE: Okay.

MR. KOOPMAN: Now, let's talk about a further motivation. This is transmission power, and here, Your Honor, it's our position that Patent Owner mischaracterizes what the teaching is in Takeda. Is Takeda concerned with power consumption? Yes, it is. But Patent Owner improperly focuses on power consumption from processing received data. That's actually not Takeda's concern. I'm referring now to Slide 32 of Petitioner's demonstrative, which includes an image of Takeda, in which we've highlighted -- excuse me -- paragraph 13 of Takeda. And it talks about future wireless communication systems, such as 5G. Takeda knows 5G is in the future. It's not here. But what they're concerned about is when the user terminal always uses the entire carrier, power consumption may be enormous.

Takeda is focused not on processing received information. Takeda's concern is about power, focusing on how to transmit information

efficiently. Takeda recognizes the need for these future 5G systems that involve multiple BWPs -- bandwidth parts -- to reduce power consumption during transmission. That's where Yan provides the solution. Not because we're pushing processing to the UE or to the base station. But it's transmission. How do we transmit efficiently? This is the concern of Takeda, naturally, because Takeda is trying to anticipate a system where we have multiple bandwidth parts, and they want to know, how do we transmit efficiently on those multiple bandwidth parts.

Well, Yan has a solution, which is use only as much resource as you need for the transition. Look at the size of your UCI, allocate enough resource to transmit it, but not too much or you're being inefficient. So here, again, on top of solving this issue of mismatch -- solving this issue that you might accidentally cut off your UCI if you don't allocate a sufficiently large resource -- it's also addressing an explicit concern in Takeda that you don't want to spend too much power transmitting.

Now that you have multiple bandwidths, you need to be efficient or your cell phone battery is going to drain, trying to transmit all of this on all of the bands. So, what do we do? We allocate resources based on what we need. Not just statically allocating resources and if you don't use it all, who cares. So, that's a further motivation for doing this.

I heard Patent Owner suggest that this would be like dropping something different into 5G, but again, there is no 5G at the time of the invention. The combinations we're talking about here, we're not creating Frankenstein's monster. We're not taking a head from one telecommunication standard and an arm from another. 5G was built on the foundation of 4G. It was recognized at the time that there are advantages to

reusing, to building on things that exist -- things with advantages. Resource allocation methods that are well known and address problems, such as UCI mismatch. We don't need to reinvent the wheel. We can take what's already there at the time of the invention in 2017 and use that as we develop our new 5G standard. We're not going back to the old ways. We're not taking things from something completely separate.

There was a brief discussion of each issue and Patent Owner suggested that their interpretation is consistent. Let me just revisit briefly, Your Honors, while we have time. Dr. Sharony's own words on Slide 17 of Petitioner's demonstrative. Each means that each and every BWP has to be configured. This is with respect to element 1E and 1F. Dr. Sharony testified that only one BWP is activated, and this isn't just a theory that was invented by Dr. Sharony.

Let me go to the Patent Owner's response here. This was advanced as a claim construction argument. You'll see the heading here on page 11 of Patent Owner's response as claim construction. And in this section, Patent Owner discusses an issue that bears on claim construction. It says that each bandwidth part must be configured, but only one bandwidth part may be activated for the user equipment under 5G. Here, this was Patent Owner transparently attempting to incorporate this 5G concept into claim language. The problem being, this was just inconsistent with the actual claim language used, you might naturally expect, as that claim was drafted before the 5G standard was adopted. And here I was citing page 13 of Patent Owner's response.

Going back to the claim -- here I'm on Slide 3 of Petitioner's demonstrative -- it doesn't require any particular telecommunication

protocol. Not 4G, not 5G. It includes steps 1A through 1D that relate to resource allocation methods for which there is no dispute, where known in 4G. And for which Yan explicitly identifies benefits to those steps, years before the filing of the '463 patent. Benefits including promoting transmission efficiency, avoiding UCI mismatch, benefits that, in the case of promoting transmission efficiency, were explicitly sought after in Takeda, and with respect to UCI mismatch, were in no way addressed in Takeda.

So, even if it were not the case that Takeda already explicitly directs one to look and apply its teachings to 4G systems, Yan gives you a reason to go and bring these features in, entirely on its own. These features had known advantages. They weren't coined in the '463 patent, but years before. The same is the case with the use of bandwidth parts, configuring bandwidth parts. You saw Takeda has a great illustration of how bandwidth parts are configured. You've got -- again, referring to Slide 12 -- our bandwidth part in purple, our uplink resources in green and yellow, configured for that bandwidth part. Takeda does it for one bandwidth part. Takeda does it for multiple bandwidth parts. And Takeda tells you that these teachings can be applied to existing 4G systems.

Do Your Honors have any questions regarding the specific motivations at issue in the case here, either the general motivation to look at existing 4G systems, all of these references having been issued, you know, during the pre-5G era, or the specific backwards compatibility reusing aspects of 4G, or following Takeda's teachings with respect to promoting transmission power efficiency -- not processing efficiency -- or employing Yan's clear teachings, avoiding UCI mismatch, an issue that Takeda did not otherwise offer a solution for?

JUDGE DROESCH: I don't have any further questions.

MR. KOOPMAN: Okay. Thank you very much, Your Honor.

JUDGE DROESCH: Thank you.

MR. HELGE: Your Honors, once again, thank you very much for your time. I don't plan on using the full rebuttal time. I'll be very brief. One very quick point. Petitioner had almost 30 minutes of rebuttal time. He didn't explain why Dr. Roy didn't come back in with the reply declaration, why he didn't sit for another deposition. We don't have an answer for the argument that they failed to rebut or even address in their reply, which is that a POSITA would not have combined Takeda and Yan as they proposed.

And lastly, you heard a lot more about 5G, a lot more about 4G, and Your Honors, I think it's probably a bit of a shell game, frankly, at this point. Does Takeda comply with 5G or not? We don't know, but you go back in the petition, see what they said. And Judge Belisle, you know, one of the issues here on page -- I've got on my screen here, page 11 of the petition and paragraph 104 from Dr. Roy's original declaration, and I've highlighted a sentence. Both of these documents recite back elements 1E and 1F from the patent, and they say in quotes here, "These elements involve 5G BWPs and the remaining elements of the independent claims were previously implemented in 4G."

If they were only looking at 5G BWPs and Counsel up here has been telling you for the last hour and a half that 5G didn't exist until many years after the patent was filed, where's their case? And I'd submit to you they have -- I'm not sure if they're trying to play a shell game with you and try to tell you what 5G is and what 5G isn't, but here, you have very clearly -- you have to find elements 1E and 1F within 5G BWPs and they don't have

it. That's not been the argument before, but I think I have to say it based on the presentation you've been given.

In truth, why is 4G and 5G important? Because their motivation to combine the backwards compatibility hinges entirely on what's 4G and 5G compliant, and you don't have anything in this case that's 4G and 5G compliant. How can that be a basis to combine? We've addressed each of their motivation arguments in our surreply. We've addressed each of them in our Patent Owner response. We think those papers speak for themselves and shoot these arguments down. They didn't have a broad statement of combination like they're asserting today. And at that point, Your Honor, unless you have any questions, I'll submit my case.

JUDGE DROESCH: I don't believe there's any questions. Thank you, Counsel.

MR. HELGE: All right. Thank you, Your Honor.

JUDGE DROESCH: All right. And thank you. We're adjourned for the day.

(Whereupon the above-entitled matter went off the record at 11:41 a.m.)

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