

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,

Petitioner,

v.

UMBRA TECHNOLOGIES LTD.,

Patent Owner.

Case No. IPR2024-00497
U.S. Patent No. 10,630,505

PATENT OWNER'S REQUEST FOR DIRECTOR'S REVIEW

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I. INTRODUCTION

Pursuant to 37 CFR §§ 42.75 and 42.71(d), Patent Owner UMBRA Technologies Ltd. (“PO”) submits this Request for Director Review of the Board’s final written decision (Paper 32, “FWD”) invalidating claims 1-20 of U.S. Patent No. 10,630,505 (“’505 patent”) as obvious over Hankins alone or in combination with Munger and/or Treuhaft. The Board’s unpatentability decision rests on erroneous findings of material fact and erroneous conclusions of law and is an abuse of discretion and violation of the APA at least because the Board ignored highly relevant intrinsic and extrinsic evidence and arguments that did not support the Board’s construction of the term “end-to-end tunnels,” misunderstood the claims at issue, and engaged in fact-finding unsupported by substantial evidence. Consequently, the FWD should be reversed and claims 1-20 upheld as valid.

II. LEGAL STANDARD FOR DIRECTOR REVIEW

“Requests for Director Review of a Board’s [FWDs] . . . shall be limited to decisions presenting (a) an abuse of discretion, (b) important issues of law or policy, (c) erroneous findings of material fact, or (d) erroneous conclusions of law.” USPTO, *Director Review Process*, § 2.B, available at <https://www.uspto.gov/patents/ptab/decisions/director-review-process> (last updated March 18, 2025). The Board’s FWD is an abuse of discretion if it “(1) is clearly unreasonable, arbitrary, or fanciful; (2) is based on an erroneous conclusion of law; (3) rests on

clearly erroneous fact finding; or (4) involves a record that contains no evidence on which the Board could rationally base its decision.” *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

III. ARGUMENT

A. **The Board Wrongly Issued a New Construction of “*End-to-End Tunnel*,” an Admittedly Dispositive Issue, Rendering “*End-to-End*” Superfluous, and Misreading the Term’s Introduction by Amendment as *Synonymous with*, Rather than *Narrowed from*, the Original Term, “*Communication Path*”**

In the FWD, the Board admits that “[t]he meaning of the term ‘*end-to-end tunnels*’ is dispositive of our Decision here.” (FWD at 17.) During oral argument, APJ Anderson stated that the term “*end-to-end tunnels*” required a new construction beyond that given in the Institution Decision. (Paper 31 at 30:21-22; *see also* FWD at 17 (acknowledging that “there was a consensus that the term should be construed[.]”).) In response, the Board wrongly issued a new construction without the benefit of further briefing from the parties. *See Axonics, Inc. v. Medtronic, Inc.*, 75 F.4th 1374, 1381 (Fed. Cir. 2023) (“[B]efore the Board decides a case under a construction adopted after the institution decision, it must give a petitioner an opportunity to respond to the new construction, whether that construction was first proposed by the patent owner or the Board.”).

Not only did the Board violate due process by issuing an unbriefed, new misconstruction of this term, it violated the basic tenets of claim construction in

two fundamental ways. One, it rendered superfluous the descriptor “*end-to-end*” modifying “*tunnel*.” Two, it failed to apply critical intrinsic evidence because it misunderstood that amendments to overcome a rejection narrow a claim.

The Board adopted the following erroneous, new construction in its FWD:

an “*end-to-end tunnel*”¹ is not required to include an uninterrupted path that provides encapsulated communications between two devices, but instead may include separate segments between intermediate access point servers or control servers that connect two devices.

(FWD at 22.)

First, this construction renders superfluous the “*end-to-end*” descriptor that appears before “*tunnel*” in the claims at issue. “It is the usual (though not invariable) rule that, in patent claims as elsewhere, the construction of a clause as a whole requires construction of the parts, with meaning to be given to each part so as to avoid rendering any part superfluous.” *Frans Nooren Afdichtingssystemen B.V. v. Stopaq Amcorr, Inc.*, 744 F.3d 715, 722 (Fed. Cir. 2014); *see also, e.g., SSI Techs., LLC v. Dongguan Zhengyang Elec. Mech.*, 59 F.4th 1328, 1335 (Fed. Cir. 2023) (construction that does not render superfluous the modifier “measured” in “measured volume”). Not only did the Board fail to include the words *tunnel* and *end* in its construction, but it also failed to explain how an *end-to-end tunnel* differs from a *tunnel*. Instead, the Board’s construction merely stated what is “not

¹ Unless specified otherwise, emphasis added throughout this brief.

required” and what it “may include,” without ever addressing how an end-to-end species of tunnel differs from the broader genus of a tunnel, thus rendering “*end-to-end*” superfluous.

Second, the phrase “*end-to-end tunnel*” was initially introduced during prosecution (along with other words) in place of the stricken phrase “*communication path*,” in order to narrow the claim and overcome a rejection in view of a prior art reference identified as “Chen.” (FWD at 21 (citing Ex-1002 at 145-51).) The Board fundamentally misunderstood that a claim amendment like this, offered to overcome a rejection, is intended to narrow the scope of a claim rather than to create synonymy between the newly added and stricken phrases. *Seachange Int’l, Inc. v. C-COR Inc.*, 413 F.3d 1361, 1372-73 (Fed. Cir. 2005) (“Where an applicant argues that a claim possesses a feature that the prior art does not possess in order to overcome a prior art rejection, the argument may serve to narrow the scope of otherwise broad claim language.”). This misunderstanding was evident from the following statement by APJ Anderson during the hearing:

So Judge Zecher asked a very good question, I thought, earlier. Is there really—is ***communication path*** and ***end to-end tunnels*** essentially the same thing. As it would appear from this, one was stricken, and one was added.

(Paper 31 at 34:24-32:1.) This portion of the prosecution history is discussed again below, to show how the Board wrongly disregarded this intrinsic evidence in its

new construction. (*See infra* Part III.D.) Here, this statement is recited to show that the Board has continually misread and downplayed the importance of a **tunnel** in comparison to the more generic concept of a *communication path* or *segment*. (FWD at 17 (citing Paper 9 at 21).)

Finally, while not prohibited, the Board’s construction in the negative is disfavored, as such constructions are often inadequate to sufficiently understand a claim for the comparison step of patent analysis that follows claim construction. *Sound View Innovations, LLC v. Hulu, LLC*, 33 F.4th 1326, 1336 (Fed. Cir. 2022) (“But [a]lthough there is no per se rule against negative constructions, which in some cases can be enough to resolve the relevant dispute, the court’s construction here was inadequate for the second step of an infringement analysis—comparison to the accused products or methods.”) (internal quotation marks and citation omitted). Here, the Board did not attempt to understand what the phrase “*end-to-end tunnel*” included that made it distinguishable over Chen, and thus to understand why it is also distinguishable over art like Hankins, the primary prior art at issue.

B. The Board Failed to Substantively Address PO’s “*Third Layer of Logic*” Proposal for the Admittedly Dispositive Claim Construction of “*End-to-End Tunnel*” Despite Soliciting This Proposal During Oral Argument

The Board’s new construction in its FWD fails to even consider, let alone analyze, the construction solicited from PO at the hearing. (FWD at 18; Paper 31

at 32:16-22.) This is clear legal error because “[t]he Board must consider the entirety of the record and provide a satisfactory explanation for its findings, with a rational connection between the facts and conclusion.” *CQV Co., Ltd. v. Merck Pat. GmbH*, 130 F.4th 1344, 1346 (Fed. Cir. 2025).

After soliciting a construction from PO at the hearing (Paper 31 at 32:16-17), the FWD entirely ignored this proposed construction (FWD at 18). Specifically, PO offered this response to APJ Anderson’s request that PO “fine tune” its construction: “*an end-to-end tunnel is defined by **a third layer of logic** that is separate from layers of logic that define any intermediate tunnels from which the end-to-end tunnel is comprised or formed.*” (Paper 31 at 32:16-22; see also *id.* at 27:12, 27:17, 28:1, 28:6, 28:13, 31:2, 32:3, 32:21, 33:21 (noting “*third layer of logic*” on at least nine other occasions at the hearing).) Yet the Board—despite repeatedly acknowledging the import of “**third layer**” logic (FWD at 4, 8, 19, 27)—failed to even consider (let alone analyze) whether “**a third layer of logic**” should or should not define “an end-to-end tunnel.”

The ’505 patent repeatedly describes the innovative third layer of the global virtual network (“GVN”) in terms of the “**perspective**” of a client device, *i.e.*, how it is “**seen**” or “**viewed**.” For example, at the end of the Background section, the ’505 patent ties the third layer to a path that is “**seen by client devices**” as having fewer hops. (Ex-1001 at 3:48-55; see also *id.* at 41:49-59 (“from the client

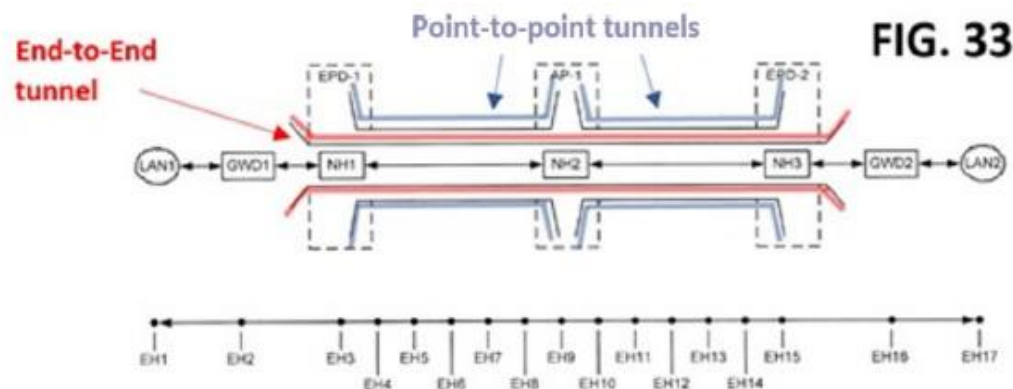
perspective”), 47:49-63 (“[f]rom the perspective of the host client”).) In describing Figure 28, the ’505 patent explains: “**Layer three** is the GVN network layer that **client** devices **see** as a partial or complete path to destination.” (*Id.* at 27:21-23; *see also id.* at 34:1-5.) And in describing Figure 42, the ’505 patent ties “the GVN tunnel” to what is “**seen**” by the client or how the client “**will view**” traffic transiting the network. (*Id.* at 37:19-35; *see also id.* at 39:10-23, 41:49-59, 47:49-63.)

Most critically, the FWD failed to address the following passage cited by PO in its papers and at oral argument, revealing that a client device operating at the GVN’s **third layer** logic will ‘**view**’ the end-to-end tunnel illustrated in each of Figures 33, 34, and 35 as a “**singular**” tunnel:

While FIGS. 33, 34 and 35 all illustrate the joining of tunnels at AP hops, this is **viewed as a single tunnel by client** devices within LAN1 and LAN2. This **singular tunnel** represents the neutral **Third Layer** of the GVN, within which it is possible to run on traffic that would normally transit over the internet

(Ex-1001 at 34:1-6; *see also* Paper 24 at 4; Paper 30 at 73-74; Paper 31 at 27:20-26.) In fact, even Petitioner noted the importance of this passage. (Paper 22 at 14; Paper 31 at 17:24-18:3.) Notably, this “**singular tunnel**” is expressly and repeatedly identified—in the descriptions of Figures 33, 34, and 35—as “end-to-end GVN tunnel(s).” (Ex-1001 at 33:8-10, 33:25-27, 33:34-38.)

As shown in the following reproduction of Figure 33, outer point-to-point tunnels (blue) stand in contrast to the single, uninterrupted internal end-to-end tunnel (red):



(Id. fig.33 (annotated).)

The FWD ignored the singular end-to-end tunnel (red) shown in Figure 33. Likewise, it ignored PO’s fine-tuned construction APJ Anderson requested, let alone substantively address this tunnel’s “*third layer of logic*,” as a construction issue. Instead, the Board addressed a prior construction proposal (invoking the concept of “uninterrupted”)—which was not offered by PO at the hearing—and concluded that the ’505 patent taught “that a tunnel may be interrupted” (FWD at 19) and for the second time *sua sponte* applied its new construction (quoted above) for the term “end-to-end tunnel.” (See *supra* Part III.A (quoting FWD at 22).) Considering the Board’s position that the meaning of this term was case-dispositive (FWD at 17), its erroneous construction and underlying findings warrant reversal of the FWD.

The Board purposely ignored highly material and un rebutted evidence and argument that an end-to-end tunnel is viewed by the client devices at both ends as a single tunnel, and that this single tunnel represents the neutral third layer overlay. (Ex-1001 at 33:11-13, 34:1-5.) The Board also ignored the '505 patent's characterization of end-to-end tunnels as "internal" tunnels formed within and running through intermediate point-to-point tunnels. (*Id.* at 36:44-47, 39:13-14, fig.39 ("INT TUN 39-P20").)

PO raised these points throughout its briefing. (*E.g.*, Paper 21 ("POR") at 2 ("[T]he tunnel can represent a neutral third layer of a virtualized network")) (quoting Ex-1001 at 34:1-11); POR at 9-13; Paper 24 ("Sur-Reply") at 4-14.) PO addressed the third layer in its Sur-Reply in great detail. (Sur-Reply at 4-5.) And at oral argument PO's counsel again explained that "it's [the] third layer . . . that establishes an end-to-end tunnel across the collection of intermediate tunnels[]" (Paper 31 at 28:3-15; *see also id.* at 27:11–28:16, 31:22–32:5), and that "an end-to-end tunnel is defined by a third layer of logic that is separate from layers of logic that define any intermediate tunnels from which the end-to-end tunnel is comprised or formed[]" (*id.* at 32:20-22; *see also id.* at 31:1-3).

The Board's FWD decision acknowledged that the '505 patent's specification discloses the third layer (FWD at 4, 8 (in connection with figs. 33 & 34), 19, 27), but nowhere did the Board grapple with the significance of the '505

patent's disclosure that *an end-to-end tunnel is viewed as a single tunnel by client devices and represents network communications at the neutral third layer* (Ex-1001 at 34:1-5). Nor did the Board explain why it would not consider PO's proposed construction with respect to the third layer.

Not only did the Board ignore PO's fine-tuned construction—highlighting the significance of the third layer—but the Board also mischaracterized PO's solicited and fine-tuned construction proposal as follows: “[PO] argues that the ’505 patent supports a construction requiring an ‘end-to-end tunnel’ to provide an ‘uninterrupted’ path between two devices.”² (FWD at 18.) Similarly, the FWD ignored PO's Sur-Reply discussion about the third layer, merely concluding that “[PO's] Sur-reply arguments do not change our determination.” (*Id.* at 29.)

The third layer concept is dispositive because there is no dispute that Hankins does not disclose the third layer overlay. Indeed, Petitioner went as far as to **deny** that the third layer taught in the ’505 patent was different from the third

² PO merely pointed out that in the ’505 patent's figures, a tunnel was illustrated by an uninterrupted pair of parallel lines, in order to aid the Board in understanding what was and was not depicted as a tunnel. The hallmark of a tunnel is the encapsulation applied at one end and removed at the other. The GVN third layer neutral hops do not disturb such encapsulation. (*See infra* Part III.D.)

layer of the conventional seven-layer network topology. (Paper 31 at 36:16-18; *see also id.* at 36:21-23, 37:1-3, 37:11-12.) But the '505 patent makes clear that the third layer overlay is undisputably different from the seven-layer stack. For example, the '505 patent's descriptions of Figures 42 to 45 compare and contrast the elements of the GVN stack (which includes three layers) to the TCP/IP stack and OSI model (which are part of the seven-layer stack of conventional network topology). (See Ex-1001 at 36:65- 39:16.)

C. The Board Disregarded the Importance of the Prosecution History Cited by PO in Support of Its Construction Because It Misread This History as “Contraven[ing]” the '505 Patent's Specification

The FWD also disregarded the importance of the prosecution history cited by PO in support of its construction because it misread this history as “contraven[ing]” the '505 patent's specification. (FWD at 22.) As noted above, the third layer of logic is not only an important concept in the '505 patent—it reconciles the alleged inconsistency the Board found between PO's position and its cited prosecution history evidence.

As the Board acknowledged (FWD at 21), during prosecution of the '505 patent, the patentees distinguished the prior art reference Chen on the grounds that it does not teach “***encapsulat[ing] communications between*** pairs of Smart Device Clients 101,107, or 109 (i.e., ***the purported endpoint devices***).” (Ex-1002 at 150-51; POR at 17-18.) Oddly, the Board found PO's “arguments regarding Chen's

purported intermediate tunnel made during prosecution . . . not persuasive because they contravene the intrinsic evidence, specifically Figure 33 and it [*sic*] corresponding description” (FWD at 22.) However, statements made during prosecution are part of the intrinsic record bearing on claim construction. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (*en banc*). Thus, summarily dismissing this evidence as “not persuasive” was also an abuse of discretion.

Moreover, the Board is flatly wrong. This passage of the prosecution history explains that the claimed end-to-end tunnel enables pairs of “***client***” devices to transmit encapsulated communications between them. In view of the fact that the third layer of logic yields a different perspective (or view) for a client device than that of another layer, the Board’s alleged contravention theory falls apart. Simply put, the mere fact that the GVN’s third layer *uses* underlying communication layers (Ex-1001 at 34:1-7) to effect transport is not a contradiction. For example, at the GVN’s second layer, the end-to-end tunnel traffic is carried within a series of intermediate³ tunnels and each junction between those intermediate tunnels may be

³ The Board found that PO asserted “that a single end-to-end tunnel cannot include multiple tunnels joined together at intermediate points.” (FWD at 29.) That assertion mischaracterizing PO’s position belonged to Petitioner (Reply at 14), and anyway PO quoted it in the Sur-Reply to show that Petitioner improperly

viewed as an ‘*interrupted*’ path, which stands in contrast to when a client sees a singular, end-to-end tunnel over the third-layer’s “neutral hop” logic. (Ex-1001 at 3:55-62; 27:19-24; 47:61-63.)

D. The Board Disregarded that Petitioner’s Expert Admitted an End-to-End Tunnel Requires End-to-End Encapsulation, Which Is Not How the Primary Reference Hankins Operates

The Board disregarded an admission by Petitioner’s expert, Dr. Reddy, regarding “encapsulation,” that reveals a fatal flaw in the Board reliance on the prior art Hankins reference that cannot operate as claim 1 of the ’505 patent requires.

Dr. Reddy’s admission relates to a fundamental concept of how tunnels work, specifically, that tunnels work by applying a tunnelling protocol (often referred to as “encapsulation”) at the tunnel entrance and the reverse of that protocol at the exit. (Ex-2002, ¶¶ 33-34.) As Dr. Reddy admitted, re-encapsulation after de-encapsulation of arriving traffic indicates that a packet is entering a second tunnel. (Ex-2001 at 17:18-24.) Thus, Hankins could not invalidate the challenged claims because it discloses multiple intermediate tunnels, each respectively encapsulating and de-encapsulating packets as they enter and

attempted to shift its claim construction burden (Sur-Reply at 15). *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378-79 (Fed. Cir. 2015).

leave each successive tunnel, rather than a single end-to-end tunnel in which the packets remain encapsulated throughout their transit. (Ex-1004 at 13:8-15; POR at 13-14; Sur-Reply at 17-18.)

Notably, the Board declined to consider PO's encapsulation arguments because, according to the Board, "'encapsulation' arguments have little relevance to either construction or patentability of limitation 1.3. Independent claim 1 only requires 'communication between the first and second devices.'" (FWD at 28.) First, this is nonsensical because it ignores that claim 1 requires a **tunnel**-based communication between the first and second devices. Second, this rejection is an abuse of discretion and APA violation because it fails to consider the evidence presented to the contrary. Not only the aforementioned expert testimony, but the aforementioned prosecution history distinguishing the prior art from the claimed end-to-end tunnels based on the absence of an end-to-end encapsulation.

PO's argument was supported not only by its expert Dr. Beck (Ex-2002, ¶¶ 33-34), but also by Petitioner's expert Dr. Reddy who agreed that a "tunnel" contemplated in the '505 patent is a **connection between two devices with encapsulated traffic** therebetween, wherein an encapsulated data packet is not unencapsulated until the packet exits the tunnel. (Ex-2001 at 14:25-17:24, 39:3-11, 67:10-22, 69:5-9.) Because the Board's conclusion was contradicted by experts for both sides, the Board's fact finding was not supported by substantial evidence. See

Sierra Wireless v. Sisvel S.P.A., 130 F.4th 1019, 1023-24 (Fed. Cir. 2025).

Further, at oral argument PO's counsel clarified that encapsulation/de-encapsulation spanning the entire length of the tunnel is "inherent in the word [']tunnel[']" (Paper 31 at 29:1-7; *see also id.* at 30:12-18.) The Board failed to address this inherent disclosure argument.

IV. CONCLUSION

In sum, the Board abused its discretion and violated the APA by: (A) treating "*end-to-end*" as superfluous and failing to include "*tunnel*" in its construction, revealing a lack of understanding of *tunnel* compared to a *communications path* or *segment*; (B) failing to even address the "*third layer of logic*" construction proposed by PO for "*end-to-end tunnel*"; (C) mischaracterizing the prosecution history as contravening the '505 patent, leading the Board to disregard key intrinsic evidence supporting PO's construction; and (D) ignoring expert evidence contradicting its assessment that "*encapsulation*" was irrelevant to the understanding of an "*end-to-end tunnel*."

For these reasons, the FWD should be reversed and all challenged claims (1-20) upheld as valid.

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CERTIFICATE OF SERVICE

The undersigned certifies that on September 29, 2025, pursuant to 37 C.F.R. § 42.6(e), a copy of **PATENT OWNER’S REQUEST FOR DIRECTOR’S REVIEW** was served via email (as consented to by counsel) to counsel of record for Petitioner as follows:

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