

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Case IPR2024-00438
Patent 11,399,206

PATENT OWNER'S SUR-REPLY

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2003	PTAB Multiple Petitions Study [Multiple-Petitions-Study]
2004	PTAB Multiple Petitions Study Executive Summary [Executive-Summary]
2005	FreeWheel About Webpage (www.freewheel.com/about)
2006	Declaration of Kenneth K. Wang [Wang-Decl.]
2007	Pro Hac Vice Declaration of Nathan Lowenstein [PHV-L]
2008	Pro Hac Vice Declaration of Colette Woo [PHV-W]
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2011	European Patent Application No. 02759732.7.2415 Communication From Examining Division [EPO-Communication-Annex]
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2013	European Patent Application No. 02759732.7.2415 Intent To Grant European Patent [EPO-Grant-Intent]
2014	Reserved
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2018	David Lett 1 st Deposition Volume I [Lett-1 st -Depo.-Volume-I]
2019	David Lett 1 st Deposition Volume II [Lett-1 st -Depo.-Volume-II]
2020	Reserved
2021	David Lett 2 nd Deposition [Lett-2 nd -Depo.]

I. INTRODUCTION

The Patent Owner Response (“POR”) demonstrated why Petitioner’s grounds fail. For independent claims 1, 25, 51 and their dependents, the POR (at 8-35) demonstrated that Petitioner failed to show “selecting each ... desired channel[] from the input signal without selecting any ... undesired channels.” For independent claims 13, 38, 64 and their dependents, the POR (at 36-50) demonstrated that Petitioner failed to show “a plurality of digital channel outputs” that meets all claim limitations.

In reply, Petitioner conflates the analysis for these two distinct sets of claims in an effort to obscure the specific deficiencies in each set. But upon even a cursory comparison of Petitioner’s grounds to the express terms of the claims, Petitioner’s arguments collapse under their own weight.

II. PETITIONER FAILS TO SHOW “SELECTING EACH ... DESIRED CHANNEL[] FROM THE INPUT SIGNAL WITHOUT SELECTING ANY ... UNDESIRED CHANNELS” (CLAIMS 1-12, 25-37, 51-63, ALL GROUNDS).

Limitation 1[d] recites “selecting each of the plurality of desired channels from the input signal without selecting any of the plurality of undesired channels.” Ex. 1001 [’206] cl. 1. Independent claims 25 and 51 recite identical limitations. *Id.*, cls. 25 (limitation 25[d]), 51 (limitation 51[d]). Petitioner alternatively relies upon Zhang’s channels C_1 - C_n and D_1 - D_m as the claimed “desired channels,” but as

the POR (at 8-35) explained, both alternatives fail. The Reply fails to rebut this showing, as explained in the following sections.

A. Zhang’s Channels C_1 – C_n Do Not Disclose the Claimed “Desired Channels.”

Petitioner’s first alternative theory relies on Zhang’s channels C_1 – C_n as the claimed “desired channels” that are selected “without selecting any ... undesired channels.” Pet., 24. This theory fails because it contradicts Zhang’s express disclosures and conflicts with Petitioner’s own mapping for other claim limitations.

1. Petitioner’s Assertion That Zhang Channels C_1 – C_n Are The Claimed “Desired Channels” Contradicts Zhang’s Express Disclosures And Prosecution History, And Petitioner’s Expert.

Petitioner’s assertion that Zhang’s channels C_1 – C_n are the claimed “desired channels” is irreconcilable with the reference’s plain disclosures, system structure, and prosecution history, as well as with Petitioner’s own expert’s testimony. POR, 8-25.

Zhang expressly defines “n” as the number of channels “in an entire signal band,” not just some of the channels or just the “desired” channels. Ex. 1013 [Zhang] [0027]. That is the *only* disclosure in Zhang that addresses the meaning of “n.” Petitioner’s own expert, Mr. Lett, confirmed this point in deposition, acknowledging that “n” “refers to both desired *and undesired* channels within the

entire band.” Ex. 2018 [Lett-1st-Depo.-Volume-I] 78:14-22.¹ After Zhang demultiplexes all n channels C_1 – C_n in the entire signal band, a selector selects the desired channels D_1 – D_m for transmission to demodulator(s). Ex. 2009 [Russ-Decl.] ¶¶ 41-45. As the POR (at 14-16) explained, Zhang’s prosecution history confirms that Zhang’s demultiplexer outputs all channels indiscriminately and that only Selector 240 performs selection. In fact, Petitioner’s expert expressly confirmed in his declaration in the co-pending IPR2024-00432 that channels C_1 – C_n are all the channels, and channels D_1 – D_m are the channels desired by the user:

A digital channel demultiplexer 230 ... separates signals of ***all the content channels*** in the digital RF signals (e.g., channels C_1 to C_n), while a nxm digital ***selector 240 selects and forwards only signals for a subset of content channels selected by a subscriber*** (e.g., channels D_1 to D_m) to one or more of demodulators

Ex. 2020 [Petitioner’s Expert In IPR2024-00432] ¶ 79; *see also* Ex. 2019 [Lett-1st-Depo.-Volume-II] 7:6-10 (similar); POR, 46.

In reply, Petitioner first asserts that Zhang and the ’206 patent use “the same circuitry.” Reply, 2, 10. Not so. As the POR (16-17) explained, although both Zhang and the ’206 patent use complex mixers and filters to extract channels from the digitized RF input signal, their architectures are decisively different. In Zhang,

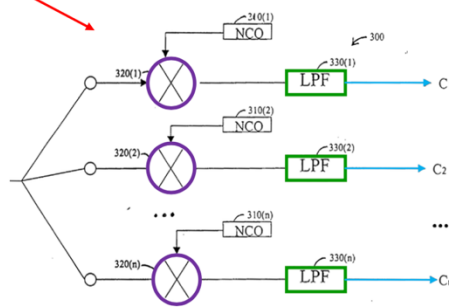
¹ All emphases added unless noted otherwise.

mixers and filters extract all channels, both desired and undesired. Ex. 2009

[Russ-Decl.] ¶ 51. In contrast, the '206 patent extracts only desired channels. *Id.*

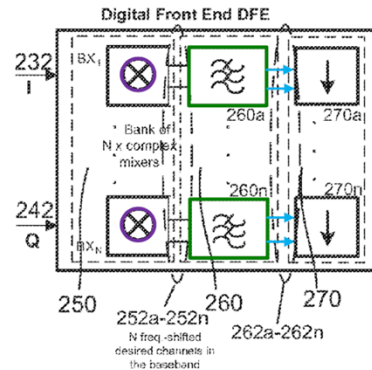
This distinction is illustrated in a side-by-side comparison of their architectures:

In Zhang, “n” mixers in Digital Channel DeMux 230 extract all channels C_1 – C_n , both desired and undesired, from the digitized input RF signal.



Ex. 1013, Fig. 3 (annotated)

In the '206 patent, N mixers select N desired channels without selecting any undesired channels from the digitized input RF signal



Ex. 1001, Fig. 2 (excerpted/annotated)

Ex. 2009 [Russ-Decl.] ¶ 51.

Petitioner also points to Zhang’s use of the phrase “desired” or “target” frequency, asserting that “it defies common sense for a POSITA to read Zhang’s reference to C_1 – C_n as ‘desired channels,’ and believe that they must include undesired channels.” Reply, 15–16. First, such an assertion contradicts Petitioner’s own expert’s testimony both in his declaration and at deposition. Ex. 2020 [Petitioner’s Expert In IPR2024-00432] ¶ 79 (“digital channel demultiplexer 230 ... separates signals of all the content channels in the digital RF signals”); Ex. 2018 [Lett-1st-Depo.-Volume-I] 78:14-22 (agreeing that n “refers to both desired and

undesired channels in the entire band”); Ex. 2019 [Lett-1st-Depo.-Volume-II] 7:6-10 (“as Zhang discloses, desired and undesired channels come in and desired channels are output the demodulator as a digital data stream.”).

Second, as the POR (at 19–22) explained, Petitioner’s argument is misleading because it disregards the context in which Zhang uses those terms. Zhang demultiplexes the n channels C_1 – C_n from the digitized input by providing n circuit paths, each responsible for extracting one channel. Ex. 2009 [Russ-Decl.] ¶¶ 55–57. Within each path, the signal of interest is downconverted to baseband and passed through a filter that suppresses all others. Ex. 2009 [Russ-Decl.] ¶ 57. It is in this narrow, path-specific context that Zhang refers to the target signal as “desired,” and the others as “undesired.” But at the system level, all n channels are extracted indiscriminately.

This localized usage has no bearing on whether C_1 – C_n , as a set constitute the claimed “desired channels.” Petitioner makes no attempt to show or analyze why a target frequency of one circuit element within the overall circuit is the claimed “desired channel” beyond relying on the coincidental use of similar phrasing. Zhang’s Demultiplexer 230 does not output only some of the channels C_1 – C_n . It outputs all of them—collectively representing every channel in the entire signal band, both desired and undesired. Ex. 1013 [Zhang] [0027]. The fact that one circuit element within that larger structure coincidentally refers to the specific

signal it is tasked with processing as “target” or “desired” does not change the fact that Demultiplexer 230 as a whole outputs all channels. Taken to its logical conclusion, Petitioner’s argument removes all meaning from “desired channels” because all circuit elements always have a “target” or “desired” signal that they process.

Petitioner’s misleading reliance on Zhang’s localized use of the phrase “desired” is also refuted by the ’206 patent specification. Television channels are modulated on RF channels for transmission. Ex. 1002 [Lett-Decl.] ¶ 56. If a user desires to watch a specific television channel, that television channel must be demodulated when the user receives the RF channel. *Id.*; *see also* Ex. 2021 [Lett-2nd-Depo.] 76:4-8. The ’206 patent explains that the RF spectrum received at the user end contains not just the desired channels that, for example, a user may wish to watch, but also undesired channels. Ex. 1001 [’206] 1:41-46; *see also* Fig. 1. In the ’206 patent’s prior art systems, the entire frequency spectrum, containing both desired and undesired RF channels, was transmitted to the demodulator. *Id.*, 1:39-46. In such systems, the demodulator would need to identify the desired channels and filter out undesired ones before demodulating desired channels. *Id.* This imposed a substantial hardware burden on the demodulator, “require[ing] a very expensive digital processing circuitry such as very high-speed analog to digital conversion and high-speed processor in the demodulator.” Ex. 1001 [’206] 2:34-

37; Ex. 2019 [Lett-1st-Depo.-Volume-II] 28:17-29:2 (confirming same). In part to address this issue, the '206 patent embodiments implement an architecture that transmit only “desired channels” to the demodulators. *See, e.g.*, Ex. 1001 ['206] 6:3-15. The '206 patent explains that its architecture confers multiple advantages:

First, it eliminates the need of expensive data conversion, filtering and channel selection on the demodulator side. Second, it removes undesired channels from the signal path at an early stage, thus relieves the large dynamic range requirement in the demodulator.

Ex. 1001 ['206] 7:14-19. Nothing in the '206 patent specification supports the notion that the claimed “desired channel” refers merely to a frequency assigned to one of n data paths in a demultiplexer as a part of the circuit element task allocation, where the demultiplexer as a whole indiscriminately extracts all channels across the entire signal band. Nor does Zhang transmit channels C_1 - C_n to demodulators or otherwise consider them desired as a set. Rather, Zhang expressly explains that it is channels D_1 - D_m , selected by Selector 240, that are transmitted to demodulators because, for example, a user desires to view them. Ex. 1013 [Zhang] [0039]; *see also id.*, [0028].

Petitioner next argues that the circuit elements within each Demultiplexer 230 path can be tuned to extract a specific frequency, and from that asserts that “had Zhang demultiplexed all channels, programmable frequencies would not have

been needed.” Reply, 17. This reasoning is flawed. Even in a system that extracts all n channels indiscriminately, each demultiplexer path must be configured to extract a different one of those n channels—*i.e.*, each must be tuned to a distinct frequency. Zhang’s programmable tuning simply enables each identical path to be assigned to a different target frequency. That is entirely consistent with a brute-force demultiplexing architecture. Moreover, Zhang contemplates that the input signal may vary across implementations or over time, and programmable tuning allows the system to adjust accordingly. In any event, Zhang is clear that n is all the channels in the entire signal band, regardless of the specific choice of circuit elements. Ex. 1013 [Zhang] [0027].

Petitioner also relies on the language of Zhang’s own claims, but this effort is equally unavailing. As a threshold matter, this is not a claim construction exercise focused on identifying the broadest reading of Zhang’s claims. Rather, the question is what Zhang—including its claims, read in context—teaches a person of ordinary skill in the art. As the POR (at 22-23) explained, Zhang’s claims mirror its embodiments and do not disclose a fundamentally different architecture. The POR (at 23) provided a detailed mapping of Zhang’s claims to its embodiments, and the Reply makes no effort to rebut it.

Instead, Petitioner now relies on specific circuit elements in Zhang’s claims, arguing that, for example, because the claims require “at least one” multiplier or

filter, Zhang must not demultiplex all channels C_1 - C_n . Reply, 16. A claim recitation of “at least one” says nothing about whether Zhang’s system uses one, ten, or hundreds of such elements—and certainly does not imply that each element is limited to processing only a single channel. This reading is unsupported by Zhang’s disclosure and conflicts with how the system is described in all of its embodiments. Petitioner’s argument is not a serious response to the POR’s showing—it is an after-the-fact inference, divorced from the technical record.²

The Reply (at 17) next contends that “ n is a variable that can be equal to or less than all channels in the signal band.” But that is flatly inconsistent with Zhang’s express disclosure. Zhang defines n as the number of channels in “an entire signal band.” Ex. 1013 [Zhang] [0027]. That is the only place in Zhang where n is defined—and it unambiguously refers to *all* channels.

Petitioner tries to dilute this express definition by citing a later statement that “the exact number” of channels C_1 - C_n “depend on the specific application.” Ex. 1013, [0042] (cited at Reply, 18). But that language merely reflects that the overall number of channels in the signal band may vary by system implementation; it does

² For similar reasons, the Reply’s criticism (at 19) that Patent Owner’s expert had not based his opinion of Zhang on its claim 21 is misplaced, as claim 21 does not address whether Zhang extracts all channels.

not suggest that n ever refers to anything less than the full set of channels in the entire signal band. Petitioner conflates variability in signal size with selective channel extraction—something Zhang never teaches.

Petitioner's misreading also contradicts Zhang's architecture. For example, if C_1 – C_n did not include all channels, Zhang does not explain how it would ensure that Selector 240 could access a desired channel. Petitioner never explains how Zhang's system could reliably select a channel that was never demultiplexed to begin with.³

The POR (at 14-15) further explained that Zhang's European prosecution confirms that C_1 – C_n represents all the channels in the signal band. The Reply offers no substantive response. Petitioner simply complains that Patent Owner

³ To the extent the Reply relies on a system that modifies Zhang's express disclosures by, for example, extracting less than all channels in the entire signal band, such an argument is both untimely and unsupported. *See* Ex. 2021 [Lett-2nd-Depo.] 106:9-13 (Petitioner's expert has not relied upon any modification of Zhang for grounds relying only on Zhang). Petitioner fails to present any motivation why a POSITA would extract less than all channels C_1 – C_n in Zhang, where Zhang's architecture is based on extracting all channels and then using a selector to quickly switch between them.

failed to submit additional European prosecution documents. Reply, 21. But Petitioner identifies no document that contradicts the cited statement, nor does it submit any documents of its own. *Id.*; *see also* Ex. 2021 [Lett-2nd-Depo.] 112:5-14 (Petitioner’s expert did not attempt to locate or review any other European prosecution documents). Petitioner’s hollow objection is meritless and does not diminish the clear import of Zhang’s own admission.

For the foregoing reasons, Petitioner’s assertion that Zhang channels C_1 – C_n are the claimed “desired channels” fails.

2. Petitioner Has No Response To Its Inconsistent Claim Mapping When Relying On C_1 – C_n As The Claimed “Desired Channels.”

Even setting aside what Zhang actually discloses, Petitioner’s reliance on C_1 – C_n as the claimed “desired channels” is internally inconsistent with its own mapping for limitation 1[e], which cannot be disclosed by channels C_1 – C_n . The Reply offers no response to this point.

For example, claim 1 requires that the same “plurality of desired channels” be (1) selected “from the input signal without selecting any of the plurality of undesired channels” (limitation 1[d]), and (2) provided “via a serial interface” (limitation 1[e]). POR, 24–26. For limitation 1[e], Petitioner maps Zhang’s Data Bus 1, within Selector 240, as the claimed “serial interface” that provides the

plurality of desired channels. Pet., 27. But Selector 240 only outputs channels D_1 – D_m —not channels C_1 – C_n —on the serial interface:

Figure 5 “selects one or more RF channels D_1 to D_m from the digital RF channels C_1 to C_n and then sends them to appropriate demodulators or outputs ports ... through different data buses ...” Ex. 1013 [Zhang] [0039]

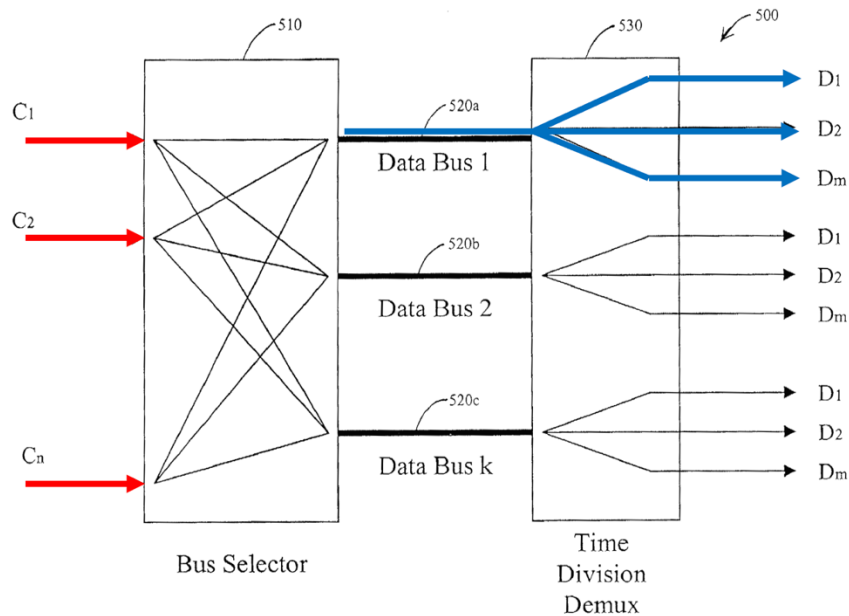


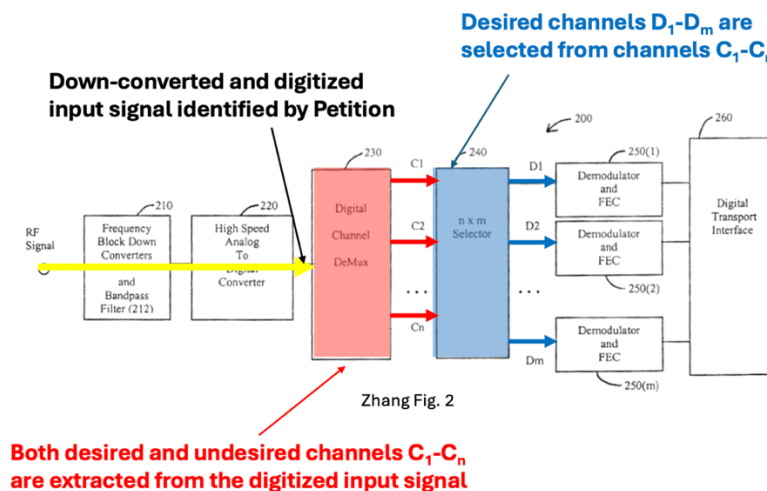
Fig. 5

Thus, to the extent Petitioner’s mapping of limitation 1[d] relies on channels C_1 – C_n as the “plurality of desired channels,” that mapping directly contradicts its mapping for limitation 1[e], which relies on channels D_1 – D_m as the same “plurality of desired channels” provided via a serial interface.

B. Petitioner’s Own Construction Confirms That Zhang’s Channels D_1 – D_m Are Not Selected “From The Input Signal.”

As the POR (at 27–36) explained, Petitioner’s fallback reliance on channels D_1 – D_m as the claimed “desired channels” fails because channels D_1 – D_m are not selected “from” the “input signal” identified by Petitioner for limitations 1[b]–1[c].

POR, 27–33. This discrepancy is shown in Zhang’s annotated Figure 2 below, where yellow highlights the “input signal” Petitioner maps to limitations 1[b]–1[c], and blue indicates channels D_1 – D_m , which are selected from channels C_1 – C_n —not from the input signal identified by Petitioner:



Ex. 2009 [Russ-Decl.] ¶ 73.

As explained below, Petitioner’s Reply only confirms the failure of its reliance on D_1 – D_m .

1. Petitioner’s Reliance On Channels D_1 – D_m Fails Under Petitioner’s Own Proposed Construction.

First, Petitioner’s reliance on channels D_1 – D_m fails because those channels are not “selected from the input signal” under Petitioner’s own proposed construction of “selecting.” In two co-pending IPRs challenging two patents from the same specification as the ’206 patent at issue here, Petitioner argues that the

plain and ordinary meaning of “[s]election is simply extracting a channel from the plurality of frequencies in the digitized RF signal.” IPR2024-00432, Paper 28, 24; *see also* IPR2024-00435, Paper 28, 17-18 (“[s]election and generation of a digital channel output is simply extracting a channel from the plurality of frequencies in the digitized RF signal.”). Petitioner conspicuously omits this proposed construction from the Reply in this case—because it readily defeats Petitioner’s mapping here. But Petitioner cannot escape its inconsistent arguments.

Limitation 1[d] requires “***selecting*** each of the plurality of desired channels ***from the input signal*** without selecting any of the plurality of undesired channels.” But channels D_1 - D_m are ***not*** extracted from the input signal, as Petitioner’s construction of “selecting” requires. The inputs to the Selector 240 that selects D_1 - D_m are channelized channels C_1 - C_n , which have already been extracted into in discrete RF channels. The extraction was performed by Channel Demultiplexer 230, which outputs the individual demultiplexed channels C_1 - C_n .⁴ Thus, Petitioner’s proposed construction of “selection” readily rejects Petitioner’s reliance on channels D_1 - D_m as the claimed “desired channels.”

⁴ For reasons stated in section I.A, *supra*, Zhang’s Demultiplexer 230 also fails to disclose this limitation under Petitioner’s construction because it does not “select ... desired channels ... without selecting any ... undesired channels.”

Petitioner's expert confirmed the same at deposition. Mr. Lett expressly agreed that, under Petitioner's proposed construction, Zhang's Selector 240 "does not" perform any selection; rather, "[t]he selection is done by [Demultiplexer] 230." Ex. 2021 [Lett-2nd-Depo.] 82:16-18. Thus, Petitioner's theory fails because it does not disclose the claims under Petitioner's own proposed construction.

Google LLC v. Neonode Smartphone LLC, IPR2021-01041, Paper 52, 26 (Jan. 11, 2023) ("Because [the petitioner] has the burden of persuasion, [the patent owner] has no obligation to precisely define the [claim] term gliding . . . away or explain how the term differs from the term flick in [the reference].") (citing 37 C.F.R. § 42.104(b)(3); 35 U.S.C. §316(e)); *DISH Network LLC v. Sound View Innovations LLC*, IPR2020-01035, Paper 19, 14 (Jan. 19, 2021) (denying institution because Petitioner had failed to show that the claims are obvious based on the construction proposed by Petitioner).

Accordingly, Petitioner's case fails under its own proposed construction.

2. Petitioner's Black-Box Strategy Of Ignoring Zhang's Details Does Not Save Its Theory Based On Channels D₁-D_m.

At a high level, because Zhang does not fit the claimed invention, Petitioner alleges that two different devices together (Demultiplexer 230 and Selector 240) perform the step of "selecting from the input signal without selecting any of the plurality of undesired channels." But neither ill-fitting piece works, and this

produces fatal flaws in the case set forth in the Petition. Demultiplexer 230 channelizes all channels without regard to what is being selected. Selector 240 connects some of the discrete channels for output, but it is not working upon the “input signal” which form the case for elements 1[b]-1[c]. This misfit cannot be escaped.

Petitioner’s Reply attempts to ignore the misfit jigsaw pieces. Petitioner argues that it maps the claimed “digital circuitry” to both Zhang’s Channel Demultiplexer 230 and Selector 240, and contends that this combined circuitry performs the claimed “selecting” function. Reply, 8-9. But this framing only highlights the problem. Petitioner has to throw a cloak over the true workings of Zhang by pretending different circuits performing very different steps are really just one big magic box precisely because neither 230 nor 240 performs the actual claimed step. The issue is whether Zhang channels D_1 - D_m relied upon for limitation 1[d] are selected “from the input signal” relied upon for limitations 1[b]-[c]. They are not, no matter how broadly the box is drawn. Again, in Zhang, channels D_1 - D_m are selected by the Selector 240 from channels C_1 - C_n —which is not the “input signal” Petitioner relies upon for limitations 1[b]-[c]. POR, 27-28. Selector 240 also does not “select from the input signal” under Petitioner’s proposed construction of “selecting” discussed in Section I.B.1, *supra*, regardless of how broadly the box is drawn.

Petitioner’s black-box approach surfaces again when the Reply argues that because the input to the Demultiplexer 230 is the digitized RF signal and the output of the Selector 240 are channels D_1 – D_m , “[i]t necessarily follows that the relied-upon digital circuitry is selecting ... the desired channels (D_1 – D_m) ... ‘from the input signal.’” Reply, 9. But the claims do not merely require an input and an output; they require a very specific claimed selection step: “selecting from ... from the input signal” of the prior limitations. As explained above, Zhang’s channels D_1 – D_m are not shown to meet this limitation. Petitioner’s rationale would render the “select” limitation superfluous. Limitation 1[d] requires:

concurrently ***selecting*** each of the plurality of desired channels ***from the input signal*** without selecting any of the plurality of undesired channels; and

providing the plurality of desired channels via a serial interface.

If, as Petitioner contends, selection “from the input signal” “necessarily” occurs merely by outputting (providing) the desired channels (Reply, 8), then there would have been no need for the claim to separately recite both “select” and “providing.” The claim could have required only providing the desired channels. But the claim expressly requires both and Petitioner’s interpretation improperly collapses them. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 810 (Fed. Cir. 2021) (quoting *Wasica Finance GmbH v. Continental Automotive Systems, Inc.*, 853 F.3d

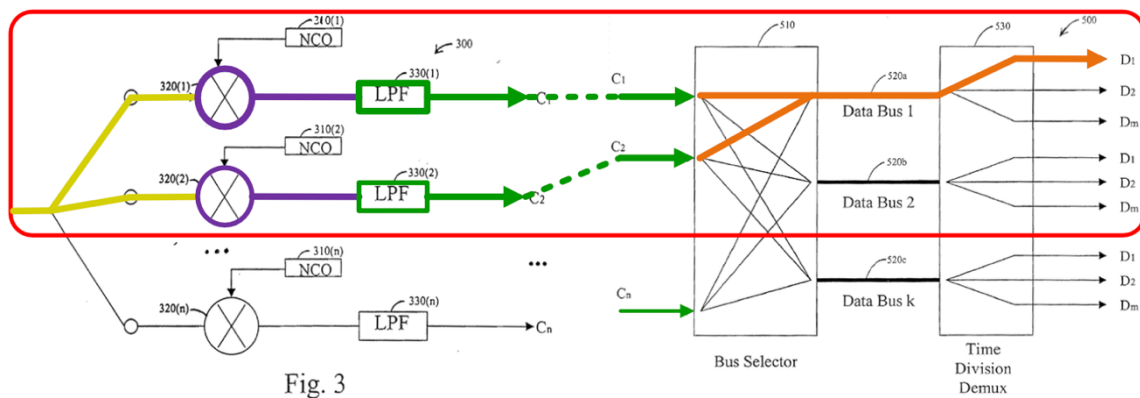
1272, 1288 n.10 (Fed. Cir. 2017)) (“It is highly disfavored to construe terms in a way that renders them void, meaningless, or superfluous.”); *see also Dell Inc. v. Accelaron, LLC*, 818 F.3d 1293, 1300 (Fed. Cir. 2016). Again, Petitioner incorrectly asks the Board to avoid peeking behind the curtain at the actual details of Zhang.

The impropriety of Petitioner’s maneuver is further confirmed by claim differentiation. Other claims arising from the same specification recite selection without specifying that the selection must occur “from the input signal.” POR, 34–36. The claims at issue here, by contrast, include the express requirement that selection occur “from the input signal.” Petitioner’s interpretation would erase that distinction.

Petitioner also asserts that Patent Owner “admits that the ’206 patent and Zhang both ... use similar complex mixers to extract the desired channels, and achieve the same result by outputting just desired channels.” Reply, 11. That assertion is both inaccurate and irrelevant. Yet again, the details matter and are fatal to the Petition. First, as explained above, even though both the ’206 patent and Zhang use complex mixers, they use them differently. The ’206 patent uses mixers and filters to select and extract desired channels. Zhang uses multipliers and filters to indiscriminately demultiplex all channels in the entire signal band. Ex. 2009 [Russ-Decl.] ¶¶ 33–35. Zhang performs no selection at the mixer stage.

Second, that both systems may “achieve the same result” by outputting desired channels is irrelevant. The claims are not satisfied by results alone. They require that the desired channels be selected “from” a specific signal. “[T]he very details regarding how” a result is achieved are “at the heart of a process patent.” *Amgen, Inc. v. Hoechst Marion Roussel*, 126 F. Supp. 2d 69, 101 (D. Mass. 2001) *aff’d* in relevant part, 314 F.3d 1313, 1346-1347 (Fed. Cir. 2003).

Petitioner also provides an annotation of Zhang’s Figures 3 and 5 that is misleading. Reply, 10. Petitioner’s annotation is produced below:



Reply, 10 (annotation Petitioner’s).

On the left side of the annotation, Petitioner depicts circuitry from Zhang’s Demultiplexer 230 (Figure 3). On the right side, Petitioner shows circuitry from Zhang’s Selector 240 (Figure 5). The annotation appears to imply that two channels (depicted in purple) are selected by Demultiplexer 230 from the input

signal (yellow), and then output by Selector 240 (orange). That implication is incorrect.

As explained above, Zhang's Demultiplexer 230 does not perform any selection. It indiscriminately demultiplexes all channels in the input signal. Any selection is performed by Selector 240. If the purple channels in the annotation represent the two channels ultimately selected and output by Selector 240 (orange), then that selection occurs at the Selector 240—not at the Demultiplexer 230 stage. Moreover, Selector 240 does not select from the yellow input signal. It selects from the full set of demultiplexed channels C_1 – C_n , which were previously separated by Demultiplexer 230.

For the foregoing reasons, Petitioner's reliance on Zhang's channels D_1 – D_m fails to satisfy the “select from” requirement of claim limitation 1[d].

III. PETITIONER FAILS TO SHOW “A PLURALITY OF DIGITAL CHANNEL OUTPUTS” AS CLAIMED (CLAIM 13-24, 38-50, 64-76, GROUNDS A-H).

Limitation 13[d] recites “digitally *down converting each desired channel*, of the plurality of desired channels, *to generate a plurality of digital channel outputs.*” Ex. 1001 ['206] cl. 13. Independent claims 38 and 64 recite identical limitations. *Id.*, cls. 38 (limitation 38[d]), 64 (limitation 64[d]). Petitioner again relies, in the alternative, on Zhang channels C_1 – C_n or D_1 – D_m as the claimed “desired channels.” Pet. 32 (“Zhang thus discloses element 13[d]”); 34 (limitation

38[d]); 45 (limitation 38[d]); 50 (limitation 64[d]); 69 (limitation 13[d]). As the POR (at 36-49) explained both alternatives fail. The Reply fails to rebut this showing.

A. Petitioner’s Reliance On Channels C_1 - C_n As The Claimed “Plurality Of Digital Channel Outputs” Fails.

As discussed below, Petitioner’s Reply fails to remedy either of two independently sufficient reasons why its reliance on channels C_1 - C_n fails.

1. Petitioner Has No Response To Its Inconsistent Claim Mapping When Relying On C_1 - C_n As The Claimed “Desired Channels.”

Petitioner’s reliance on channels C_1 - C_n for limitation 13[d] contradicts its mapping for limitation 13[e], where Petitioner relies on Zhang’s channels D_1 - D_m . Petitioner’s Reply does not even attempt to address this fatal flaw.

Claim 13 requires that the same “plurality of digital channel outputs” generated in limitation 13[d] be provided via a serial interface in limitation 13[e]. POR, 38-39. For limitation 13[e], Petitioner maps the output of Zhang’s Data Bus 1 within Selector 240 to the claimed “plurality of digital channel outputs” provided via a serial interface. Pet., 27. However, as shown in Zhang’s annotated Figure 2, the “plurality of digital channel outputs” provided on Data Bus 1 are channels D_1 - D_m (blue), not channels C_1 - C_n (red):

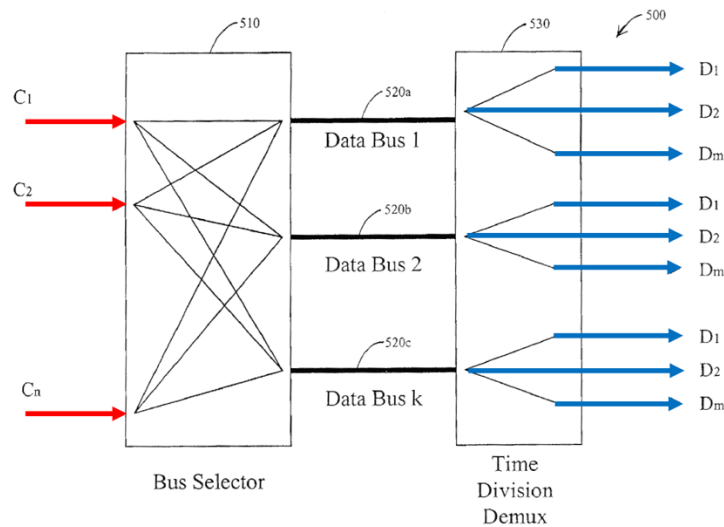


Fig. 5

Ex. 2009 [Russ-Decl.] ¶¶ 89-91. Therefore, to the extent Petitioner relies on channels C₁-C_n for limitation 13[d], it fails to show limitation 13[e].

2. Zhang Channels C₁-C_n Are Not Shown To Disclose The Claimed “Plurality of Digital Channel Outputs.”

Even setting aside the fatal inconsistency in its claim mapping, Petitioner’s reliance on channels C₁-C_n as the claimed “plurality of digital channel outputs” also fails for a second independently sufficient reason. Claim 13 is a method claim, reciting, in limitation 13[d], that the “plurality of digital channel outputs” is “generate[d]” by “digitally down converting each desired channel.” As the POR (at 45-47) explained, however, Zhang’s down converting of all channels, both desired and undesired, without regards to, or even knowledge of, any desirability does not teach or suggest a method of “down converting each desired channel ... to generate a plurality of digital channel outputs.” POR, 45-47.

In response, Petitioner argues that “PO has effectively conceded that Zhang’s demultiplexer 230, which down converts desired channels C_1 – C_n , meets element [13D].” Reply, 25. But, contrary to what this sentence in the Reply says, channels C_1 – C_n are not “desired channels.” They represent all channels in the entire signal band, which Zhang down converts indiscriminately, without regard to or knowledge of desirability. Ex. 2009 [Russ-Decl.] ¶ 97.

Petitioner next asserts that Zhang’s process “is identical to how each path in the ’206 patent works to down convert and generate a digital channel output. Reply, 25-26. But it is not. In all embodiments of the ’206 patent, the “plurality of digital channel outputs” is generated by downconverting each of the desired channels, not by indiscriminately downconverting all channels without regards to any desirability. Ex. 2009 [Russ-Decl.] ¶ 96. In contrast, Zhang downconverts all channels C_1 – C_n in the entire signal band without regards or knowledge of any desirability. Ex. 2009 [Russ-Decl.] ¶ 97.

Petitioner further mischaracterizes Patent Owner as arguing that “extracting even one undesired channel and hundreds of desired channels is excluded from element [13D].” Reply, 21-22. But Patent Owner did not address, and did not need to address, such a scenario. Claims need to be construed “only to the extent necessary to resolve the controversy.” *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). Here, Zhang does not describe a system that

downconverts “one undesired channel and hundreds of desired channels.” Reply, 22. It describes a system that indiscriminately downconverts all channels in the entire signal band, without regards or knowledge of any desirability. That distinction matters in a method claim. “[T]he very details regarding how such ‘useful result’ has come about are at the heart of a process patent.” *Amgen, Inc. v. Hoechst Marion Roussel*, 126 F. Supp. 2d 69, 101 (D. Mass. 2001) aff’d in relevant part, 314 F.3d 1313, 1346-1347 (Fed. Cir. 2003). Patent Owner has demonstrated that a method that indiscriminately down converts all channels, both desired and undesired, without regards to or knowledge of any desirability, as in Zhang, does not teach or suggest a method of “down converting each desired channel ... to generate a plurality of digital channel outputs.” POR, 45-47. Petitioner does not show otherwise.

Finally, Petitioner invokes a sentence from the ’206 specification stating, in passing, that “[i]n one embodiment, N can be equal to the number of all available channels that exist in the licensed frequency spectrum.” Ex. 1001 [’206] 5:58–59 (cited in Reply, 23). But that is a reference to an alternative embodiment—contrasted with the core disclosures, which specify that “N is an integer value corresponding to the number of desired RF channels.” *Id.* at 5:53–54. Thus, if anything, the ’206 patent confirms that downconverting “all available channels” is different from downconverting “each desired channel.” In fact, down converting

desired channels instead of demultiplexing all channels is a main focus of the '206 patent. In its lead embodiment (Figure 2), the number of available channels is ten, but only four are designated as desired. Ex. 1001 ['206] 4:42-51. The system then selects and down converts only those four desired channels—not all ten. POR, 3-4. While the patent acknowledges that other configurations may be possible, every embodiment discussed in the specification involves selection of desired channels, not indiscriminate demultiplexing. Moreover, “[t]he mere fact that there is an alternative embodiment disclosed in the [asserted patent] that is not encompassed by [our] claim construction does not outweigh the language of the claim, especially when the court’s construction is supported by the intrinsic evidence.” *August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1285 (Fed. Cir. 2011) (*quoting TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008)).

B. Petitioner’s Reliance On Channels D₁-D_m As The Claimed “Plurality Of Digital Channel Outputs” Also Fails.

Petitioner also relies in the alternative on Zhang channels D₁-D_m to disclose the claimed “plurality of digital channel outputs” in limitation 13[d], reciting “digitally down converting each desired channel ... to generate a plurality of digital channel outputs.” Pet., 32. As the POR explained, however, the output D₁-D_m in Zhang is not “generate[d]” by “down converting each desired channel” as

required by the claims. Instead, the output D_1 - D_m is generated by selecting desired channels D_1 - D_m from the already down converted channels C_1 - C_n . Ex. 2009 [Russ-Decl.] ¶ 101.

In response, Petitioner argues that it maps the claimed “digital circuitry” to both Zhang’s Channel Demultiplexer 230 and Selector 240, and asserts that this combined circuitry performs the claimed “down converting” function. Reply, 8–9. But Petitioner again misses the point.

As explained in Section II.B.2, *supra*, the question is not whether Zhang performs *some* down conversion generating some output somewhere in the system, nor whether Petitioner can draw a box large enough to encompass that down conversion circuitry. Rather, the issue is that, if Petitioner points to D_1 - D_m as the claimed “plurality of digital channel outputs,” that output is not “generated” by “down converting each desired channel” as required by the claims. Rather, it is generated by selecting channels D_1 - D_m from the already down converted set C_1 - C_n . Petitioner cannot remedy this fundamental mismatch.

Petitioner’s attempt to invoke both Demultiplexer 230 and Selector 240 as a single functional unit is just another iteration of the “black box” strategy discussed in section II.B.2 above. It is not enough to identify input and output terminals. The claimed method step—here, generation of the claimed output by “digitally

down converting each desired channel”—must disclosed or suggested by the reference. Petitioner fails to show that it is.

Accordingly, Petitioner cannot remedy this fundamental mismatch between what Zhang does and what the claim requires.

IV. CONCLUSION

For the foregoing reasons, Petitioner has failed to demonstrate that any of the claims are unpatentable.

Respectfully submitted,

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Date: May 30, 2025

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Sur-Reply (the “Sur-Reply”) consists of 5,423 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The Sur-Reply complies with the type-volume limitation of 5,600 words as mandated in 37 C.F.R. § 42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

Respectfully submitted,

/ Parham Hendifar /

Date: May 30, 2025

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served
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EXHIBIT 2021

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