

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUALCOMM INCORPORATED and
SAMSUNG ELECTRONICS CO., LTD.,
Petitioners

v.

NETWORK SYSTEM TECHNOLOGIES, LLC,
Patent Owner

Case: IPR2024-00343
U.S. Patent No. 7,594,052

**PETITIONERS' PRELIMINARY REPLY TO PATENT OWNER
PRELIMINARY RESPONSE**

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Petitioners' Exhibit List

Exhibit	Description
Ex-1001	U.S. Patent No. 7,594,052
Ex-1002	File History of U.S. Patent No. 7,594,052
Ex-1003	Declaration of Dr. Marwan Hassoun
Ex-1004	Curriculum Vitae of Dr. Marwan Hassoun
Ex-1005	A. Rădulescu, et al. " <i>An Efficient On-Chip Network Interface Offering Guaranteed Services, Shared-Memory Abstraction, and Flexible Network Configuration</i> ," Proceedings of the Design, Automation and Test in Europe Conference and Exhibition, 2004 ("Rădulescu2004")
Ex-1006	Open Core Protocol Specification, Release 1.0, OCP-IP Association (2001) ("OCP")
Ex-1007	U.S. Patent Publication No. 2002/0129173 A1 ("Weber")
Ex-1008	U.S. Patent No. 5,948,089 ("Wingard")
Ex-1009	Networks on Chip; Axel Jantsch, Hannu Tenhunen (Eds.). Kluwer Academic Publishers, Boston (2003) ("Jantsch")
Ex-1010	A. Rădulescu, et al. " <i>Communication Services for Networks on Chip</i> ," Philips Research Laboratories, Eindhoven, The Netherlands, SAMOS, II(), 275–299 (2002) ("Rădulescu2000")
Ex-1011	J. Dielissen, et al. " <i>Concepts and Implementation of the Philips Network-on-Chip</i> ," Philips Research Laboratories, Eindhoven, The Netherlands (2003) ("Dielissen")
Ex-1012	Declaration of Nikil Dutt, Ph.D. Under 37 C.F.R. § 1.68
Ex-1013	Affidavit of Nathaniel E. Frank-White, Records Request Processor at the Internet Archive
Ex-1014	Declaration of Sylvia Hall-Ellis, Ph.D.
Ex-1015	Plaintiff Network System Technologies, LLC's Responses to Qualcomm's First Set of Requests for Admission (Nos. 1-9), <i>Network System Technologies, LLC v. Qualcomm Inc. et al.</i> , 1:22-cv-01331 (W.D. Tex.)
Ex-1016	Defendant's Opening Claim Construction Brief, <i>Network System Technologies, LLC v. Qualcomm Inc. et al.</i> , 1:22-cv-01331 (W.D. Tex.)
Ex-1017	Network System Technologies, LLC's Response to Defendants' Joint Opening Claim Construction Brief, <i>Network System Technologies, LLC v. Qualcomm Inc. et al.</i> , 1:22-cv-01331 (W.D. Tex.)

Exhibit	Description
Ex-1018	Declaration of Gordon Macpherson, Director, Board Governance & Policy Development of The Institute of Electrical and Electronics Engineers, Incorporated (“IEEE”)
Ex-1019	Declaration of Nathaniel E Frank-White, Records Request Processor at the Internet Archive
Ex-1020	U.S. Patent No. 7,366,818 (“Rădulescu”)
Ex-1021	P. Guerrier et al., " <i>A generic architecture for on-chip packet-switched interconnections</i> ," Proceedings Design, Automation and Test in Europe Conference and Exhibition 2000 (2000)
Ex-1022	William J. Dally et al., " <i>Route Packets, Not Wires: On-Chip Interconnection Networks</i> ," Proceedings – Design Automation Conference (2001)
Ex-1023	Shashi Kumar et al., " <i>A Network on Chip Architecture and Design Methodology</i> ," IEEE Computer Society Annual Symposium (2002)
Ex-1024	José Duato et al., Interconnection Networks, An Engineering Approach. Revised Printing (2003)
Ex-1025	Luca Benini et al., " <i>Powering Networks on Chips, Energy-efficient and reliable interconnect designs for SoCs. Proceedings of the International Symposium on Systems Synthesis</i> " (2001)
Ex-1026	Andrew S. Tanenbaum, Computer Networks, Third Edition (1996)
Ex-1027	Network System Technologies, LLC’s Sur-Reply Claim Construction Brief, <i>Network System Technologies, LLC v. Qualcomm Inc. et al.</i> , 1:22-cv-01331 (W.D. Tex.)

Petitioners file this Reply pursuant to email authorization of April 25, 2024.

I. Claim Construction

Good cause exists to consider these arguments. For all three terms Patent Owner (“PO”) identified, PO failed to explain how its proposed constructions are material to the issues raised in the Petition. Moreover, PO relies on expert testimony that Petitioners should be provided an opportunity to respond to.

“Interconnect means” (Claims 1, 6-7). PO disputes the construction of “interconnect means,” but nothing in PO’s argument favors non-institution. First, resolution of the dispute cannot be dispositive, as the Petition alternatively applies PO’s construction. Petition 26-27, 56-58, 62, 71. Second, Petitioners should have the opportunity to fully respond, including the opportunity to depose PO’s expert.

“Mapping means” (Claims 1, 7). PO contends that “mapping means” is not governed by § 112, ¶ 6 or, alternatively if § 112, ¶ 6 applies, that the corresponding structure is simply a “circuit.” Paper 7, 17. Notably, PO’s proposed constructions are *broad*er than Petitioner’s and, therefore, clearly disclosed by the asserted art for the reasons explained in the Petition. *See* Petition, 34-36, 66.

PO’s proposed constructions are also incorrect. Claims 1 and 7 recite a “mapping means,” followed by functional (not structural) language. It is true that the § 112, ¶ 6 presumption can be rebutted where “the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure.” *Skky Inc.*

v. MindGeek s.a.r.l., 859 F.3d 1014, 1019 (Fed. Cir. 2017). That was the situation in *Skky*, where the term was “wireless device means” and there was evidence that “wireless device” was a known structural term. That is not the case here. “Mapping” is a functional word. And in *Skky* “the claims [did] not recite a function”; here they do. *See* 859 F.3d at 1019; *see also* Petition, 11. Finally, *Skky* applied the “broadest reasonable” standard; the narrower *Phillips* standard is the one that applies now. PO also cites a series of inapposite cases regarding the term “circuit.” Paper 7, 20-21. The term at issue here is “mapping means.” PO has not overcome the § 112, ¶ 6 presumption.

Regarding corresponding structure, PO argues that it should be just a “circuit,” but PO also concedes that the specification describes the “adapter unit A” as the mapping means. Paper 7, 19 (“the specification...describes the ‘adapter unit A,’ i.e., the ‘mapping means (A)’ ...”). This acknowledgement confirms that the ’052 patent identifies the adapter unit as the corresponding structure.

“Connection” (Claims 1, 3-7). PO identifies a claim construction dispute from the district court case with Petitioner Qualcomm, but PO does not explain how it is material to this IPR. Indeed, PO’s proposed construction is *broad*er than the construction Qualcomm seeks in the district court case. *See* Paper 7, 23. There is no need in this IPR to expressly construe “connection.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (Board

need not expressly construe term if unnecessary to resolve dispute before it).

II. The Board Should Not Discretionarily Deny Review Under § 325(d)

None of the Petition's Grounds and none of the references was previously before Office. And three of the four Grounds (including the two based on Weber) are undisputedly new. On this basis alone discretionary denial is inappropriate. PO's only argument is that one of the four references, Rădulescu2004, is cumulative. But as explained below, Rădulescu2004 is not cumulative, and the Petition also presents additional new evidence in the form of expert testimony.

A. With Respect to Ground 1 (Rădulescu2004), Discretionary Denial Is Not Appropriate Under *Advanced Bionics*

1. Rădulescu2004 Is Not Cumulative (*Advanced Bionics*, Part I)

PO contends that Rădulescu2004 is cumulative because Dielissen discloses use of a "connid" signal and a port that can allow differentiated traffic classes, and Rădulescu2000 "discloses narrowcast connections where a network interface performs mapping based 'on an address space.'" Paper 7, 42-43.

This does not make Rădulescu2004 cumulative or substantially the same. As the Petition noted, Rădulescu2004 "contains additional disclosure." Petition, 16-17. For example, Rădulescu2004 describes the slave for which a transaction is destined being "selected based on the address" and explains that an "address range" is assigned to a slave. Ex-1005, 4. Rădulescu2004 also includes a new illustration, Figure 3, to help explain this:

In Figure 3, we show an example of a narrowcast shell. Narrowcast connections are connections between one master and several slaves, where each transaction is executed by a single slave selected based on the address provided in the transaction [23]. Narrowcast connections provide a simple, low-cost solution for a single shared address space mapped on multiple memories. It implements the splitting/merging of data going to/coming from these memories.

We implement the narrowcast connection as a collection of point-to-point connections, one for each master-slave pair. Within a narrowcast connection, the slave for which the transaction is destined is selected based on the address (Conn block). The address range assigned to a slave is configurable in the narrowcast module. To provide in-order response delivery, the narrowcast must also keep a history of connection identifiers of the transactions including responses (e.g., reads, and acknowledged writes), and the length of these responses. In-order delivery per slave of request messages is already provided by the point-to-point connections.

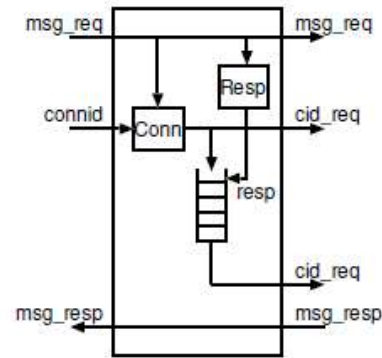


Figure 3. Narrowcast shell

Id. This description and Figure 3 from Rădulescu2004 are not in Dielissen or Rădulescu2000 (the Dielissen Figure 6 cited by PO is different than Rădulescu2004 Figure 3). This disclosure is material and the Petition points to it, for example, as evidence Rădulescu2004 discloses the “*communication thread or...address range*” limitation that was added to obtain allowance. Petition, 22-25, 30-32. Rădulescu2004 is not cumulative.

2. If Rădulescu2004 Is Cumulative, then the Examiner Materially Erred (*Advanced Bionics, Part II*)

If Rădulescu2004 is cumulative of Rădulescu2000 and/or Dielissen, then the Examiner materially erred (*Becton* factor (e)). During prosecution, the Applicant amended the independent claims to obtain allowance by adding a single limitation: the communication service identification “*comprises at least one communication thread or at least one address range*” Ex-1002, 137-139; *see also id.*, 140, 143 (Applicant arguing that “the cited portions of [Rădulescu/Dielissen]...fail to disclose or suggest” the added limitation). The Examiner then allowed the claims without

comment. Ex-1003, 152. As the Petition shows, the added limitation is exactly what Rădulescu2004 discloses. Petition at 24-25, 30-31 (citing, *e.g.*, Rădulescu2004 disclosing a narrowcast connection where the slave for which a transaction is destined is “selected based on the address (Conn block)” and the “address range assigned to the slave is configurable in the narrowcast module”). So if, as PO now apparently contends, Dielissen and/or Rădulescu2000 disclose the same thing, then the Examiner materially erred by allowing the claims.

Petitioners also offer new evidence (*Becton* factor (f)) that was not available to the Examiner, such as the testimony of Dr. Hassoun regarding Rădulescu2004’s teachings (Ex-1003). This new evidence provides important additional context for the disclosures of Rădulescu2004. This is particularly true given that the claims were allowed without comment after the single “*communication thread or...address range*” amendment. Ex-1002, 152. The additional evidence explains, among other things, how Rădulescu2004 specifically discloses the limitation added to obtain allowance. *E.g.*, Ex-1003, ¶¶90, 100-102, 124.

Further, it is unclear the extent to which Dielissen or Rădulescu2000 were evaluated regarding the new claim limitation (*Becton* factor (c)), because the Examiner allowed the claims after amendment without comment. And additional detail provided by Rădulescu2004, including the specific discussion of mapping according to an address range, was certainly not evaluated at all.

3. PO's Contentions that the References Teach a Configuration that Must be Set Up "Prior to" Mapping Are Not a Basis to Deny Institution

PO argues that Rădulescu2004, Dielissen, and Rădulescu2000 disclose a "fixed hardware configuration" that "is required to be set up...prior to mapping communication service requests." Paper 7, 43-44; *see also id.* 46-50. PO then contends that it "overcame" rejections based on Dielissen and Rădulescu2000 for these reasons, and "for the same reasons...Rădulescu2004 does not anticipate or render obvious claim 6." Paper 7, 43-44. This is not a reason to defer to prosecution.

First, the prosecution history does not support PO's argument that the Applicant overcame the Dielissen and Rădulescu2000 rejections based on these arguments. To the contrary, in response to the first rejection in view of Dielissen and Rădulescu2000, the Applicant made these arguments *without* amending the claims, but the Examiner was unpersuaded and again rejected the claims. EX1002, 110 (Applicant arguing "Rădulescu is silent with respect to mapping. Rădulescu merely disclosed that in the prior art, [a]n Athereal connection must be created with the desired properties, before being used"); *id.* 119 (Examiner again rejecting the claims). It was only after the Applicant then amended all independent claims to add the "*communication thread or...address range*" limitation, and argued that neither Rădulescu2000 nor Dielissen disclosed the added limitation, that the claims were allowed. Ex-1002, 140, 143. Given this amendment, the fact that the Applicant also

repeated its already-rejected argument at the same time is no basis to conclude that the already-rejected argument “overcame” any rejections.

Second, the PO does not explain how this argument relates to what is actually recited by the claims. The Petition clearly maps Rădulescu2004 to each element of claim 6, including the “mapping” step. Petition, 20-32. While the PO repeats the “prior to” argument several times in response to Ground 1 (Paper 7, 46-50, 52), it never clearly or coherently explains how or why the *recited claim elements* contain such a requirement. And if PO wishes to contend that the claim has been narrowed based on prosecution history, it must make that claim construction argument expressly so that Petitioners can fairly respond. PO has not proposed any specific construction for the “mapping” step of claim 6.

Third, PO’s attempt to use the “prior to” argument from the prosecution history against Radulescu2004 (Paper 7, 43-44) also ignores portions of Rădulescu2004 that the Petition cites. For example, PO’s preliminary response regarding the “mapping” step of claim 6 reiterates the same “prior to” argument from prosecution but tellingly does not address or even acknowledge significant portions of Rădulescu2004 that the Petition pointed to as disclosing the “mapping” step. *Compare* Petition, 30-32 (*citing, e.g.,* Ex-1005, pp. 4-5 and Figs. 3-6) *with* Paper 7, 46-50 (discussing Ex-1005, pp. 1-3 and a different portion of p. 4).

B. Discretionary Denial Is Also Not Appropriate Because Grounds 2–4 Were Undisputedly Never Previously Presented

The Board does not even need to reach PO’s arguments about Rădulescu2004, because it is undisputed that Grounds 2–4 were not previously before the Office. Thus *Advanced Bionics* Part I is indisputably not satisfied for three of the four Grounds, and discretionary denial would be inappropriate for this reason alone. *E.g.*, *Fusion Orthopedics, LLC v. Extremity Medical, LLC*, IPR2023-00894, P15, 34-35 (Nov. 17, 2023) (instituting review, finding Section 325(d) not sufficiently implicated because the primary reference for four of the seven grounds was not previously presented to the Office).

Grounds 3 and 4 each rely on Weber as the primary reference.¹ Weber is particularly compelling and anticipates all challenged claims. Weber was never previously considered, and it is strongly in the public interest that it be considered.

PO argues that Grounds 2 and 4 include Rădulescu2004, but each also includes another reference (OCP and Weber, respectively) that was never before the Office. Such obviousness grounds are new and are not a basis for discretionary denial. *K/S HIMPP v. BRAGI GmbH*, IPR2023-01205, P8, 19-20 (Mar. 19, 2024).

The Petition identifies new challenges supported by new evidence, and PO identifies no compelling reasons to discretionarily decline review.

¹ PO incorrectly asserts Rădulescu2004 is primary for Ground 4. *See* Paper 7, 41.

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Respectfully submitted,

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CERTIFICATION OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e) and the agreement of the parties, the undersigned certifies that on May 2, 2024, a true and correct copy of the foregoing Motion was served via electronic mail upon the following:

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