

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QUALCOMM INCORPORATED
Petitioner,

v.

NETWORK SYSTEM TECHNOLOGIES, LLC
Patent Owner.

REPLY DECLARATION OF NIKIL DUTT, PH.D. UNDER 37 C.F.R. § 1.68

I, Dr. Nikil Dutt, hereby declare and state as follows:

1. I make this Declaration in conjunction with the Reply brief I understand is being submitted by the Petitioner, Qualcomm, in the matter of the *Inter Partes* Review of U.S. Patent No. 7,594,052 (“the ’052 patent”).

2. I provided an earlier declaration in this matter, the Declaration of Nikil Dutt, that I understand was filed as Exhibit 1012. I will refer to this as my “First Declaration,” and I incorporate paragraphs 1 to 4 of that declaration here.

3. I provided an overview of my technical background and qualifications in my First Declaration, including an overview of my 34-year long career working in the area of computer chip design. This included explaining that I have both Masters and Ph.D. degrees in computer science. I also explained that I am a Fellow of the IEEE and of the ACM. I also explained that I have worked for 34 years in the fields of Electrical Engineering and Computer Science, and that my primary focus has been on embedded systems and computer-aided design, with a specific focus on “domain-embedded systems spanning both software and hardware.” This includes things such as domain-specific processor designs built as systems-on-chip.

4. As my CV also indicates, my work over the last 34 years has included advising many students and co-authoring many book chapters, journal articles, and conference paper publications regarding “system-on-chip” and “network-on-

chip”/“NoC” designs. For example, see Ex-2061, at pp. 18, 38, 39, 40, 42, 48, 49, 51, 61, 66, 69, 71, 72, 75, 76, 77, 86. This work involved having an understanding of system-on-chip (“SoC”) interconnects and concepts of large-scale networks. For example, Publications C120 (from DATE 2004) and C126 (from FPL 2004) explored the codesign of on-chip network topology exploration and interconnect-aware mapping of applications to coarse-grained reconfigurable SoCs that deploy a mesh-based NoC interconnect architecture. Ex-2061, 66. I was involved with work on SoC design at least as early as 2001, and continuing through long after 2004. See, for example, Ex-2061, 38 (BC9, 2001 book chapter regarding “Embedded System-On-Chip”), 42 (J25, 2000 journal article regarding a tool for “System-On-Chip Exploration), 69 (C170, 2006 conference proceeding publication regarding “System-on-Chip”).

5. I understand that for this matter, a POSA would typically have had “*at least either a Master’s degree in Electrical Engineering or a related field (such as computer science or computer engineering), as well as at least three years of work experience in the field of SoC design, or a Bachelor’s degree in Electrical Engineering or a related field, as well as at least five years of work experience in the field of SoC design. This POSA would have had an understanding of SoC interconnects, as well as the concepts of large-scale networks.*” I currently meet

this definition, and I also met this definition of a POSA by 2004, for the reasons I explained above and in my First Declaration .

6. In my First Declaration, I also explained the significance of the annual Design, Automation and Test In Europe (DATE) Conference. As of 2004, the DATE Conference was known as the premier design, automation, and test conference in Europe. *See also* Ex-1040, 1, 3 (showing over 1,000 conference visitors for DATE 04). The DATE conference was also a well-known and highly respected conference worldwide. A POSA in early 2004 would have known about the annual DATE conference. SoC design is (and was in early 2004) a part of the “*design, automation, and test*” field . For example, the title of the DATE 2004 session 7A where the Radulescu2004 paper was presented was “Networks on Chip Design.” Ex-1012, 18; see also Ex-1065, 8 (same) and Ex-1066, 6 (same).

7. DATE 2004 was also specifically publicized to POSAs in the field of SoC design in other ways. Some examples are:

- Ex-1031 (the Welcome message for DATE 2004, stating that DATE was “the pre-eminent European conference addressing research and development activities in the field of design technology,” where “technological developments are brought to the public,” noting that

“Design automation is a strategic technology for...large systems on chip...communicating via on-chip networks”);

- Ex-1033, 1, 2 (the call for papers for DATE 2004, noting that DATE 2004 “is the main European event bringing together design automation researchers, users, and vendors,” offering “a wide variety of opportunities to meet and exchange information,” and that one of the specific areas of focus is track “D2 VLSI and Systems-on-Chip”);
- Ex-1065, 12 (“Foreword” from the DATE 04 proceedings, describing itself to the public as “the pre-eminent European conference addressing research and development activities in the field of design technology,” where the “latest scientific and technological developments are brought to the public from the leading players in the field,” noting that “design automation is a strategic technology for modern electronic systems, from simple ASICs...to large systems on chip made of heterogeneous processors communicating via on-chip networks,” and referencing “System-on-Chip Technologies”)
- Ex-1036 (press release posted in February 2004, noting that DATE 04 received a record number of submissions (over 780 papers), and that the a “special focus day” of the conference would be on

“new trends and challenges in the design of Systems-on-Chips and embedded systems for multimedia applications ”)

8. As I explained above and in my First Declaration, the 2004 DATE Conference, which happened on February 16-20, 2004, was at that time a well-known , premier conference to POSAs and that remains the case for DATE conferences even today. The physical copy of the DATE 04 conference proceedings that was handed out to the 500-plus attendees of the conference (and which I explained in my First Declaration included all papers accepted for the conference—including Radulescu2004) was available such that POSAs exercising reasonable diligence could locate it, for example by registering for and attending the conference. Various other sources that I and POSAs like myself would consider reliable also show this, including that the DATE 04 conference took place on February 16-20, 2004 and that the Radulescu2004 paper was included in the conference proceedings that were handed out. These include:

- Exhibit 1062, 1 and 14-15 (the “Publications Page” of Kees Goossens, a co-author of the Radulescu2004 paper, listing Radulescu2004 as having been published in “Proceedings of Design, Automation and Test Conference in Europe, February 2004” and providing a “bibtex” link);

- Exhibit 1063, 1 and 6 (the “BibTex Page” of Kees Goossens, listing Radulescu2004 with a “booktitle” of “Proc. Design, Automation and Test in Europe Conference and Exhibition (DATE)”, “pages” as “878-883,” “year” as 2004,” “month” as “feb”, “volume” as “2”, “publisher” as “IEEE Computer Society,” and “ISBN” of “0-7695-2085-5-2”);
- Exhibit 1064, 1, 2 (the “Research Page” of Kees Goossens, listing Radulescu2004 as having “booktitle” of “Proc. Design, Automation and Test in Europe Conference and Exhibition (DATE)”, “pages” as “878-883,” “year” as 2004,” “month” as “feb”);
- Exhibit 1065 (the DATE conference’s own online Archive, which I discuss further in paragraph 9 below);
- Exhibit 1066 (what I understand to be, and appears to be, an excerpt of a Library of Congress copy of Volume 2 of the DATE 2004 proceedings, which shows the DATE conference occurring on February 16-20, 2004 in Paris, France and contains the Radulescu2004 paper (Exhibit 1066, pp. 6 (table of contents entry) and 15-20 (Radulescu2004 paper itself, showing page numbers 878-883); this copy also looks just like the DATE conference Archive

copy I reference at paragraph 9 below and also in paragraphs of my First Declaration);

- Exhibit 1067 (IEEE Computer Society Digital Library page showing the Table of Contents for the “ Design, Automation & Test in Europe Conference & Exhibition. Feb 16 2004 to Feb. 20 2004 Paris France”, and showing Radulescu2004 contained in the published proceedings at Exhibit 1067, page 3);
- Exhibit 1070 (the Library of Congress catalogue for the “Design, Automation and Test in Europe Conference and Exhibition 2004: proceedings,” in “Paris, France, February 16-20, 2004,” also showing that the conference occurred February 16-20, 2004);
- Exhibit 1059 (United States Copyright Office registration record for the “Design, Automation and Test in Europe (DATE) conference and exhibition : proceedings,” showing a “Date of Publication” of “2004-02-16,” which matches the first day of the DATE 04 conference).

9. A POSA in early 2004 would have also been aware of the DATE Conference website (<http://date-conference.com>) and would have ordinarily used and relied on the information contained in that website, given that it was from the reputable DATE Conference organizers. For example, Ex-1065 is a true and correct copy of the Date Conference online archive of the proceedings for DATE

2004, showing the cover of the proceedings, the Table of Contents with linked conference papers from that year's proceedings, the Foreword to the proceedings, and the linked copy of the Radulesu2004 paper that was part of the DATE 2004 conference proceedings.

10. As I also noted in my First Declaration, I am an IEEE Fellow. IEEE is a long-standing, very well-regarded professional organization in my field. It is the premier society for electrical and electronic engineers, including those who work with SoC design, and has been since before 2004. Any POSA in early 2004 would have certainly been familiar with IEEE.

11. IEEE's electronic publication service, IEEE Xplore, was also well-known to POSAs by early 2004. Most (if not all) major research universities in the United States at the time would have had a subscription to IEEE Xplore, and students, researchers and professors affiliated with the university would have commonly used IEEE Xplore to access IEEE publications, including IEEE-published conference Proceedings. Based on my recollection, and as also confirmed to me by a librarian at the University of California-Irvine (who I would ordinarily rely on), my university (University of California-Irvine) has had access to IEEE Xplore since sometime in the year 2000. I also understand that IEEE Xplore launched approximately in approximately May 2000. *See*

<https://innovate.ieee.org/ieee-xplore-celebrates-15-years-of-information-driving-innovation/>, a true and correct copy of which is being filed as Exhibit 1069.

12. I explained during my deposition that I have been involved in the technical program committee of multiple IEEE-sponsored conferences over the years (including DATE). I have also been involved in organizing other IEEE technical conferences. Based on my experience with IEEE and IEEE-sponsored conferences, it was the practice of IEEE to publish conference proceedings from conferences it sponsored on IEEE Xplore shortly after the conference concluded.

13. I understand that Radulescu2004 was uploaded to IEEE Xplore on March 8, 2004. Ex-1018, 2, 4. In that timeframe (early 2004) a POSA, including myself, would have commonly perused conference proceedings via IEEE Xplore for information and updates on relevant technologies including System-on-Chip soon after those proceedings became available on IEEE Xplore, including particularly the proceedings of the prestigious and well-known DATE conference,.

14. I recall that at the time conference proceedings digitally published on IEEE Xplore were easily searchable. For example, one could pull up the conference by title, and then peruse the Proceedings of that conference. The IEEE Xplore website from as early as 2001 also shows this. *See* Ex-1035. Conference proceeding papers such as Radulescu2004 that were uploaded to IEEE Xplore were

available such that POSAs like myself using reasonable diligence could locate them.

15. A POSA in early 2004 would have been very familiar with IEEE conference proceedings specifically. To a POSA at the time, IEEE-sponsored conferences, and specifically the papers presented at those conferences, were regarded as one of the best sources of reputable, reliable information regarding technological developments. A POSA in the early 2004 time frame would have frequently reviewed IEEE conference paper publications on IEEE Xplore, and also attended IEEE conferences, for information on relevant technologies including SoC design.

16. The 2004 DATE conference specifically was sponsored by IEEE. Given that the DATE 2004 conference was sponsored by IEEE, and that it was one of the premier annual conferences in the field at the time, a POSA at the time would have looked to the DATE 2004 conference Proceedings for information regarding advances in chip design technologies such as SoC, such as by registering and attending. If a POSA had not personally attended the DATE 2004 conference in Paris, France, he or she would have likely reviewed the Proceedings from that conference as soon as they were electronically available from IEEE Xplore. I myself commonly perused conference proceedings paper titles from conferences I

did not attend using IEEE Xplore, and pulled up and reviewed papers that interested me.

17. As I explained in my First Declaration, I personally attended the DATE 2004 conference in Paris, France. I flew to Paris on February 14, 2004, departing from John Wayne Airport in Orange County, California. I then attended sessions of the DATE conference on at least February 17, 18, and 19, 2004. I then flew back to the United States, landing at John Wayne Airport in Orange County on February 20, 2004. I confirmed these flight dates with my diary/planner entries from that year.

18. I am familiar with the Open Core Protocol specifications, including the 2001 version 1.0 specification provided as Exhibit 1006. In late 2003 and early 2004, the OCP 2001 version 1.0 specification was available such that POSAs exercising reasonable diligence could locate it. For example, the Open Core Protocol specifications, including the 2001 version 1.0 specification, were available from the ocpip.org website in the late 2003 and early 2004 timeframe. One could easily obtain a copy of the OCP specification by going to the website, and completing the click-through license agreement. Ex-1019, 5.

19. I also understand that the OCP 2001 version 1.0 specification was also publicly available from the website url of http://www-micrel.deis.unibo.it/~benini/NOC/OCPIP_OpenCoreProtocolSpecification-1.0.pdf.

Ex-1013. This is the website of Dr. Luca Benini, a Professor at the University of Bologna in Italy. Ex-1032. I am familiar with Dr. Benini, and I was familiar with him in late 2003 and 2004. Dr. Benini and I have also co-authored several papers. Dr. Benini was at that time (and still is today) a well-known professor in the field of SoC design who had published extensively in that area and would have been familiar to POSAs.

20. In the late 2003 and early 2004 timeframe (and before) I also used the OCP specification for papers I authored and projects I was working on. For example, *Fast Exploration of Bus-based On-Chip Communication Architectures* (Ex-1039) is a true and correct copy of a September 2004 paper I co-authored, that notes that OCP was a “popular choice[.]” for on-chip communication in SoC designs at the time, and cites the “Open Core Protocol” and the OCP datasheet from <http://www.ocpip.org>.

21. In my First Declaration, I noticed several typographical errors in citations, which I clarified during my deposition. I also clarify that again here. In my First Declaration, there are the following corrections:

- Paragraph 20 – the citation to Exhibit 1 should be: “*Exhibit 1, at pp. 11, 12, 14, 20, 30*”
- Paragraph 21 – the citation to Exhibit 1 should be: “*Exhibit 1, at p. 18*”
- Paragraph 23 – the citation to Exhibit 2 should be “*Exhibit 2 at p. 60*”

I declare under the penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed on January 17, 2025

A handwritten signature in black ink that reads "Nikil Dutt". The signature is written in a cursive, flowing style.

Nikil Dutt, Ph.D.