UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MURATA MANUFACTURING CO., LTD

Petitioner,

Case IPR2025-00384

U.S. PATENT NO. 7,489,914

DECLARATION OF SYLVIA D. HALL-ELLIS, PH.D. UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW

I. INTRODUCTION

1. My name is Sylvia D. Hall-Ellis. I have been retained as an expert by Haynes and Boone LLP, Counsel for Murata Electronics North America, Inc. and Murata Manufacturing Co., Ltd. (referred to herein as "Murata").

2. I have written this declaration at the request of Murata to provide my expert opinion regarding the authenticity and public availability of two publications. My declaration sets forth my opinions in detail and provides the basis for my opinions regarding the public availability of these publications.

3. I reserve the right to supplement or amend my opinions, and basis for them, in response to any additional evidence, testimony, discovery, argument, and/or other additional information that may be provided to me after the date of this declaration. If called to testify in the above-captioned matter, I will testify with regard to the opinions and bases set forth below.

4. I am being compensated for my time spent working on this matter at my normal consulting rate of $400 per hour, plus reimbursement for any additional reasonable expenses. My compensation is not in any way tied to the content of this declaration, the substance of my opinions, or the outcome of this proceeding. I have no other interests in this proceeding or with any of the parties.

5. All of the materials that I considered are discussed explicitly in this declaration.

II. QUALIFICATIONS

6. I am currently an Adjunct Professor in the School of Information at San José State University. I obtained a Master of Library Science from the University of North Texas in 1972 and a Ph.D. in Library and Information Science from the University of Pittsburgh in 1985. Over the last fifty years, I have held various positions in the field of library and information resources. I was first employed as a librarian in 1966 and have been involved in the field of library sciences since, holding numerous positions.

7. I am a member of the American Library Association ("ALA") and its Association for Library Collections & Technical Services ("ALCTS") Division, and I served on the Committee on Cataloging: Resource and Description (which wrote the new cataloging rules) and as the chair of the Committee for Education and Training of Catalogers and the Competencies and Education for a Career in Cataloging Interest Group. I also served as the Chair of the ALCTS Division's Task Force on Competencies and Education for a Career in Cataloging. Additionally, I served as the Chair for the ALA Office of Diversity's Committee on Diversity, as a member of the REFORMA National Board of Directors, and as a member of the Editorial Board for the ALCTS premier cataloging journal, *Library Resources and Technical Services,* as a Co-Chair of the Membership Committee for the Library Research Round Table (LRRT) of the American Library

Association, and as a member of the LRRT Nominating Committee. Currently I serve as a member of the CORE Margaret Mann Citation Committee.

8. I have also given over one-hundred presentations in the field, including several on library cataloging systems and Machine-Readable Cataloging ("MARC") standards. My current research interests include library cataloging systems, metadata, and organization of electronic resources.

9. I have been deposed thirty-eight times: (1) *Symantec Corp. vs. Finjan*, *Inc.,* Petition for *Inter Partes Review* of U.S. Patent No. 7,613,926, May 26, 2016, on behalf of Symantec Corp.; (2) *Symantec Corp. vs. Finjan*, *Inc.,* Northern District of California, 14-cv-299-HSG, on behalf of Symantec Corp., September 14, 2017; (3) one deposition for ten matters: *Intellectual Ventures I LLC vs. AT&T Mobility LLC*; AT&T Mobility II LLC, New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Wayport, Inc., and Cricket Wireless LLC, C.A. No. 12-193 (LPS); *Intellectual Ventures II LLC vs. AT&T Mobility LLC*; AT&T Mobility II LLC, New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Wayport, Inc., and Cricket Wireless LLC, C.A. No. 13-1631 (LPS); *Intellectual Ventures I LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.,* C.A. No. 13-1632 (LPS); *Intellectual Ventures II LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.,* C.A. No. 13-1633 (LPS); *Intellectual Ventures I LLC, vs. Nextel Operations, Inc., Sprint Spectrum L.P., Boost Mobile, LLC and Virgin Mobile USA, L.P.,* C.A. No. 13-1634

(LPS); *Intellectual Ventures II LLC vs. Nextel Operations, Inc., Sprint Spectrum L.P., Boost Mobile, LLC and Virgin Mobile USA, L.P.,* C.A. No. 13-1635 (LPS); *Intellectual Ventures I LLC, vs. United States Cellular Corporation*, C.A. No. 13-1636 (LPS); *Intellectual Ventures I LLC vs. United States Cellular Corporation*, C.A. No. 13-1637 (LPS); *Intellectual Ventures II LLC vs. AT&T Mobility LLC*, *AT&T Mobility II LLC, New Cingular Wireless Services, Inc.,* C.A. No. 15-799 (LPS); *Intellectual Ventures I LLC vs. T-Mobile USA, Inc. and T-Mobile US, Inc.,* C.A. No. 15-800 (LPS), on behalf of AT&T Mobility LLC; AT&T Mobility II LLC, Boost Mobile, LLC Cricket Wireless LLC, Nextel Operations, Inc., New Cingular Wireless Services, Inc., SBC Internet Services, Inc., Sprint Spectrum L.P., T-Mobile USA, Inc., T-Mobile US, Inc., United States Cellular Corporation Virgin Mobile USA, L.P., and Wayport, Inc., November 15, 2016; (4) *Hitachi Maxell, LTD., v. Top Victory Electronics (Taiwan) Co. Ltd., et al.,* Eastern District of Texas, 2:14-cv-1121 JRG-RSP (E.D. Texas), on behalf of Top Victory Electronics (Taiwan) Co. LTD, *et. al.,* January 20, 2016; (5) *Sprint Spectrum, L.P. vs. General Access Solutions, Ltd*., Petition for *Inter Partes Review* of U.S. Patent No. 7,173,916, on behalf of Sprint Spectrum L.P., July 13, 2018; (6) *Nichia Corporation vs. Vizio, Inc*., Central District of California, 8:16-cv-00545; on behalf of Vizio, Inc., October 12, 2018; (7) *Intellectual Ventures I LLC, vs. T-Mobile USA, Inc., T-Mobile US, Inc., Ericsson Inc., and Telefonaktiebolaget LM Ericsson*,

Middle District of Florida, 2:17-cv-00557 (JRG), on behalf of T-Mobile USA, Inc., T-Mobile US, Inc., Ericsson Inc., and Telefonaktiebolaget LM Ericsson, October 19, 2018; (8) Pfizer, Inc. vs. Biogen, Inc., Petition for *Inter Partes Review* of U.S. Patent No. 8,821,873, on behalf of Pfizer, November 3, 2018; (9) *Finjan, Inc. vs. ESET, LLC and ESET SPOL. S.R.O.,* Southern District of California, 3:17-cv-00183-CAB-BGS, on behalf of ESET, January 15, 2019; (10) *Finjan, Inc. vs. Cisco Systems, Inc.,* Northern District of California, 5:17-cv-00072-BLF-SVK, on behalf of Cisco Systems, Inc., September 6, 2019; (11) *Facebook, Inc., Instagram, LLC and Whatsapp Inc. vs. Blackberry Limited*, Petition for *Inter Partes Review* of U.S. Patent No. 9,349,120 B2, on behalf of Facebook, Inc., Instagram, LLC and Whatsapp Inc. December 20, 2019; (12) *3Shape A/S and Shape Inc. v. Align Technology, Inc.,* Petition for *Inter Partes Review* of U.S. Patent No. 7,156,661, IPR2020-00222 and IPR2020-00223, August 10, 2020, on behalf of 3Shape A/S and 3Shape Inc.; (13) *Finjan Inc. v. Rapid7, Inc. and Rapid7 LLC*, District of Delaware, 1:18-cv-01519-MN, September 15, 2020; (14) *VLSI Technology LLC v. Intel Corporation*, Western District of Texas, 6:19-cv-00254, 6:19-cv-00255, 6:19-cv-00256, on behalf of Intel Corporation, September 23, 2020; (15) *Finjan Inc. v. Sonicwall, Inc.,* Northern District of California, 5:17-cv-04467-BLF-HRL, on behalf of Sonicwall, Inc., October 27, 2020; (16) *VLSI Technology, LLC v. Intel Corporation*, District of Delaware, 1:18-cv-00966-CFC-CJB, February 5, 2021, on

behalf of the Intel Corporation; (17) *Unified Patents, LLC v. Good Kaisha IP Bridge 1*, Petition for *Inter Partes Review* of U. S. Patent 7,817,868, February 11, 2021, on behalf of Unified Patents; (18) *Finjan, Inc. v. Qualsys, Inc.,* Northern District of California, 4:18-cv-07229-YGR, March 1, 2021, on behalf of Qualsys, Inc.; (19) *Qualcomm, Inc. v. Monterey Research LLC*, Petition for *Inter Partes Review* of U. S. Patent 6,534,805, May 6, 2021, on behalf of Qualcomm, Inc.; (20) *Hulu, LLC v. Sound View Innovations, LLC*, Petition for *Inter Partes Review* of U. S. Patent 5,806,062, May 14, 2021, on behalf of Hulu, LLC; (21) *VLSI Technology LLC v. Intel Corporation*, Western District of Texas, 6:19-cv-00254, 6:19-cv-00255 and 6:19-cv-00256, August 3, 2021, on behalf of Intel Corporation; (22) *Liquidia Technologies, Inc. v. United Therapeutics Corporation*, Petition for *Inter Partes Review* of U. S. Patent 10,716,793 B2, October 20, 2021, on behalf of Liquidia Technologies, Inc.; (23) *EcoFactor, Inc. v. Google, Inc.,* Western District of Texas, 6:20-cv-00075 (ADA), 6:20-0078-ADA, and 6:20-cv-00080 ADA, October 27, 2021, on behalf of Google, Inc.; (24) *Liquidia Technologies, Inc. v. United Therapeutics Corporation*, Petition for *Inter Partes Review* of U. S. Patent 10,716,793 B2, March 11, 2022, on behalf of Liquidia Technologies, Inc.; (25) *Juniper Networks, Inc. v. Swarm Technology LLC*, Petition for *Inter Partes Review* of U. S. Patent 9,852,004, May 5, 2022, on behalf of Juniper Networks, Inc.; (26) *ParkerVision, Inc. v. Intel Corporation*, Western District of Texas, 6:20-cv-108

(ADA), October 26, 2022, on behalf of the Intel Corporation; (27) *CommScope v. TQ Delta*, Petition for *Inter Partes Review* of U. S. Patents 9,094,348 and 10,833,809, February 16, 2023, on behalf of CommScope; (28) *WSOU Investments d/b/a Brazos v. Salesforce.com, Inc.* for Western District of Texas, 6:20-cv-01164-ADA and 6:20-cv-01170-ADA, April 18, 2023, on behalf of Salesforce; (29) *Regents of the University of Minnesota v. AT&T Mobility LLC*, District of Minnesota, 14:cv-4999-JRT-TNL & 14-cv-4669-JRT-TNL, May 18, 2023, on behalf of AT & T Mobility LLC; (30) *VLSI Technology LLC v. Intel Corporation*, Northern District of California, 5:17-cv-0571-BLF-NC, July 11, 2023, on behalf of Intel Corporation; (31) *Trustees of Purdue University v. ST Microelectronics*, Western District of Texas, 6:21-cv-00727-ADA, July 27, 2023, on behalf of ST Microelectronics; (32) *Advanced Micro Devices, Inc. v. Realtek Semiconductor Corp.,* Petition for *Inter Partes Review* of U. S. Patents 7,936,245 & 9,590,582, August 10, 2023, on behalf of Advanced Micro Devices, Inc.; (33) Motif Foodworks, Inc. v. Impossible Foods, Inc., Petition for *Inter Partes Review* of U. S. Patent 9,943,096, August 24, 2023, on behalf of Motif Foodworks, Inc.; (34) *Network System Technologies, LLC v. Texas Instruments, Inc.*, Eastern District of Texas, 2:22-cv-00482-RWS, March 20, 2024, on behalf of Texas Instruments, Inc.; (35) *Pardalis Technology Licensing, LLC v. International Business Machines, Corporation*, Eastern District of Texas, 2:22-cv-00452, May 23, 2024, on behalf of

International Business Machines, Corporation; (36) *Pardalis Technology Licensing, LLC v. International Business Machines, Corporation*, Eastern District of Texas, 2:22-cv-00452, May 23, 2024, on behalf of International Business Machines, Corporation; (37) *Meta Platforms, InstaGram, Inc., Whatsapp LLC, Facebook Technologies LLC, and Giphy, Inc. v. VL Collective IP LLC*, Petition for *Inter Partes Review* of U. S. Patent 7,436,980, July 18, 2024, on behalf of Meta Platforms, InstaGram, Inc., Whatsapp LLC, Facebook Technologies LLC, and Giphy, Inc.; and, (38) *LCY Biotechnology Holding, Inc. v. RadiciChimica S.p.A*, Petition for *Inter Partes Review* of U. S. Patent 11,781,148, August 6, 2024, on behalf of LCY Biotechnology Holding, Inc. I have testified at trial three times: (1) *Advanced Micro Devices, Inc. v. Realtek Semiconductor Corp.,* U. S. Patents 7,936,245 & 9,590,582, October 20, 2023, International Trade Commission, Washington, DC, on behalf of Advanced Micro Devices, Inc.; (2) *Trustees of Purdue University v. ST Microelectronics*, Western District of Texas, 6:21-cv-00727-ADA, November 29, 2023, on behalf of ST Microelectronics; and, (3) *Certain Power Converter Modules and Computing Systems Containing the Same*, Investigation ITC-337-TA-1370, International Trade Commission, May 1, 2024, on behalf of Delta Electronics, Inc.

10. My full *curriculum vitae* is submitted herewith as Appendix A.

III. PRELIMINARIES

A. Scope of this declaration.

11. I am informed by counsel to assume a priority date for the patent at issue of April 23, 2004. As I will explain below, it is my opinion that the publications discussed in my declaration were publicly accessible at least one year before April 23, 2004 (i.e., before April 23, 2003).

12. I am not an attorney and will not offer opinions on the law. I am, however, rendering my expert opinion on the authenticity of the documents referenced herein and on when and how each of these documents was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the documents at least one year before April 23, 2004.

13. I am informed by counsel that an item is considered authentic if there is sufficient evidence to support a finding that the item is what it is claimed to be. I am also informed that authenticity can be established based on the contents of the documents themselves, such as the appearance, contents, substance, internal patterns, or other distinctive characteristics of the item, taken together with all of the circumstances. I am further informed that an item is considered authentic if it is at least 20 years old, in a condition that creates no suspicion of its authenticity, and in a place where, if authentic, it would likely be. Lastly, I have been informed

that a document's authenticity can be established by comparison with an authentic specimen.

14. I am informed by counsel that a printed publication qualifies as publicly accessible as of the date it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

15. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an individual publication, I also understand that a printed publication is rendered "publicly accessible" if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as publicly accessible). One manner of sufficient indexing is indexing according to subject matter category. I understand that the cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient, even if the single library is in a foreign country. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the

cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

16. I understand that routine business practices, such as general library cataloging and indexing practices, can be used to establish an approximate date on which a printed publication became publicly accessible.

B. Person of Ordinary Skill in the Art

17. I am told by counsel that the subject matter of this proceeding relates generally to a ”multi-band RF transceiver” device, and “more particularly to the chip-package” that uses “embedded passive components in organic substrates for use in radio frequency (RF) applications.” ’914 Patent, Title (54), 1:23-27.

18. I am informed by counsel that a “person of ordinary skill in the art at the time of the invention” (“POSITA”) is a hypothetical person who is presumed to be familiar with the relevant field and its literature at the time of invention. This hypothetical person is also a person of ordinary creativity, capable of understanding the scientific principles applicable to the pertinent field.

19. I was told by counsel that a POSITA in 2003 – 2004 timeframe would have had a working knowledge of RF communications that is pertinent to the ’914 Patent, including RF transceivers. POSITA would have had a bachelor’s degree in

electrical engineering or an equivalent, and three years of professional experience relating to communication systems. Additional education, such as a master's or doctorate degree, can substitute for professional experience.

20. It is my opinion that such a person would have been engaged in research, learning through study, and practice in the field and possibly through formal instruction the bibliographic resources relevant to his or her research. By no later than the early 2000s (and more specifically, before April 23, 2003), such a person would have had access to a vast array of long-established print resources in the field, as well as to a rich set of online resources providing indexing information, abstracts, and full text services for publications relevant to the field of this dispute, including at least the publications discussed in this declaration.

C. Authoritative Databases

21. In preparing this declaration, I used authoritative databases, such as the OCLC WorldCat, the Library of Congress Online Catalog, the U. S. Copyright Office database, and the *IEEE Xplore* database, to confirm citation details of the publications discussed.

22. *OCLC WorldCat Database.* The OCLC was created "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such

objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."[1] Among other services, OCLC and its members are responsible for maintaining the WorldCat database,[2] used by independent and institutional libraries throughout the world.

23. *U. S. Copyright Office.* Created by Congress in 1897, the Copyright Office is responsible for administering a complex and dynamic set of laws, which include registration, the recordation of title and licenses, a number of statutory licensing provisions, and other aspects of the *1976 Copyright Act* and the *1998 Digital Millennium Copyright Act*. The public catalog in the Copyright Office includes information filed since 1978.[3] Individuals can search by title, personal or corporate name, key word, registration number, and document number. Works filed before 1978 can be located through the Copyright Public Records Reading

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[1] Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Incorporated (available at https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf)

[2] http://www.worldcat.org/

[3] https://cocatalog.loc.gov/cgi-bin/Pwebrecon.cgi?DB=local&PAGE=First

Room.[4] A researcher can find the date on which an item was published and deposited for copyright.

24. *The Institute of Electrical and Electronics Engineers (IEEE).* IEEE and its members inspire a global community to innovate for a better tomorrow through highly cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted "voice" for engineering, computing, and technology information around the globe.[5]

25. The American Institute of Electrical Engineers (AIEE) traces its history to 1884. Its rival, the Institute of Radio Engineers (IRE) was founded in 1912. In 1963 the two professional organizations merged to form the Institute of Electrical and Electronics Engineers.[6] As of 2023, IEEE has over 460,000 members in 190 countries, of whom more than two-thirds live outside of the United States.[7]

26. IEEE claims to produce over 30% of the world's literature in the electrical, electronics, and computer engineering fields, publishing approximately 200 peer-reviewed journals and magazines in addition to more than 1,700

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[4] https://www.copyright.gov/circs/circ23.pdf

[5] https://www.ieee.org/

[6] https://ethw.org/Formation_of_IEEE_by_the_Merger_of_AIEE_and_IRE

[7] https://en.wikipedia.org/wiki/Institute_of_Electrical_and_Electronics_Engineers

conference proceedings every year.[8] Published content in the journals, magazines, and IEEE sponsored conference proceedings are available in the IEEE Electronic Library (IEL)[9] are available through *IEEE Xplore* by subscription-based access and individual publication purchases.

27. *IEEE Xplore database.* Librarians in academic, special, and large public libraries are familiar with the *IEEE Xplore* database. In working with undergraduate and graduate students, researchers, scientists, and the public, librarians are intimately familiar with the *IEEE Xplore* database and rely on its content for access to reliable, accurate publications. Established to serve as a database for the IEEE's ebooks, standards, conference papers, technical reports, and journal articles, and related documents dating from 1988 to the present and selectively from 1913 to 1987, *IEEE Xplore* is a scholarly research database that includes 6.5 million documents which is known for its reputable curation and maintenance of documents and publication information. The *IEEE Xplore* database accurately reports dates of publications and events and accurately reports locations of events in accordance with standard practices for major industry journals. Approximately 20,000 new documents are added to *IEEE Xplore* each month.

[8] https://www.ieee.org/about/at-a-glance.html

[9] https://ieeexplore.ieee.org/Xplorehelp/overview-of-ieee-xplore/about-ieee-xplore

Abstracts are free to access, but access to full text requires a subscription or institutional login.

28. The *IEEE Xplore* requires peer review before publishing content. I have used IEEE publications in print and online for nearly 50 years. Currently I have access to IEEE documents as part of the resources for faculty through the King Library at San José State University. In addition to covering material from the IEEE, the *IEEE Xplore* also covers materials from the Institution of Engineering and Technology. The *IEEE Xplore* digital library provides Web access to more than 5.3-million full-text documents from some of the world's most highly cited publications. Approximately 20,000 new documents are added to *IEEE Xplore* each month. Abstracts are free to access, but access to full text requires a subscription or institutional login.

D. Indexing

29. A researcher may discover material relevant to his or her topic in a variety of ways. One common means of discovery is to search for relevant information in an index of periodical and other publications. Having found relevant material, the researcher will then normally obtain it online, look for it in libraries, or purchase it from a publisher, a bookstore, a document delivery service, or other provider. Sometimes, the date of a document's public accessibility will

involve both indexing and library date information. However, date information for indexing entries is often unavailable. This is especially true for online indices.

30. Indexing services use a wide variety of controlled vocabularies to provide subject access and other means of discovering the content of documents. The formats in which these access terms are presented vary from service to service.

31. Before the widespread development of online databases to index articles in journals, magazines, conference papers, and technical declarations, libraries purchased printed volumes of indices. Graduate library school education mandated that students learn about the bibliographic control of disciplines, the prominent indexing volumes, and searching strategies required to use them effectively and efficiently. Half of the courses that I studied in library school were focused on bibliography and resources in academic disciplines.

32. Librarians consulted with information seekers to verify citations, check availability in union catalogs, printed books catalogs, and the OCLC database, and make formal requests for materials, *e.g.*, books, conference proceedings, journal articles. Requests were transmitted using Telex machines, rudimentary email systems, and the United States Postal Service. During my career, I have performed and supervised staff who handled these resource sharing tasks.

33. A major firm known for the breadth of subjects and comprehensive treatment in the preparation of index volumes, the H. W. Wilson Company offered these reference resources since the firm was founded in 1898. The *Reader's Guide to Periodical Literature* is one of the best-known titles available from H. W. Wilson. Each volume includes a comprehensive index for 300 of the most popular and important periodicals published in the United States and Canada. Information seekers have subject access expressed in plain language terminology, author access, and cross references to find the desired results from their searches. The family of index titles included *Science & Technology Index*, *Business Periodicals*, *Applied Science & Technology Index, Humanities Index, Biological & Agricultural Index*, and *Industrial Arts Index*. These printed indices have been superseded by digital database offerings available to information seekers through Ebsco.

34. Online indexing services commonly provide bibliographic information, abstracts, and full-text copies of the indexed publications, along with a list of the documents cited in the indexed publication. These services also often provide lists of publications that cite a given document. A citation of a document is evidence that the document was publicly available and in use no later than the publication date of the citing document.

IV. LIBRARY CATALOGING PRACTICES

A. MARC RECORDS AND THE ONLINE LIBRARY CATALOG

35. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and organizing library catalog information.[10] MARC was first developed in the 1960s by the Library of Congress. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. Today, MARC is the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.[11]

36. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access

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[10] The full text of the standard is available from the Library of Congress at http://www.loc.gov/marc/bibliographic/.

[11] Almost every major library in the world is MARC-compatible. *See, e.g.*, *MARC Frequently Asked Questions (FAQ)*, Library of Congress, https://www.loc.gov/marc/faq.html (last visited December 22, 2024) ("MARC is the acronym for MAchine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began nearly forty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today."). MARC is the ANSI/NISO Z39.2-1994 (reaffirmed 2016) standard for Information Interchange Format.

to books, journals, and other resources in the collection. The bibliographic data provide points of access and can be searched by a person of ordinary skill in the art ("POSITA") to identify and obtain resources in the library collection. An information seeker (or POSITA) can search a local online library catalog or the holdings of a group of libraries in a state or region or in the global catalog WorldCat.

37. MARC records are not designed for public viewing. Although a significant number of libraries provide access to the MARC version of a bibliographic record, the public display is designed to show information in a succinct manner that is quickly understood and useful to the information seeker. Libraries determine the default search for the online catalog to make the entry of search terms efficient and result in a successful search. Information seekers can enter a keyword, title, author, or standard number for the item. Libraries may also provide a search capability called "Summon" that allows the information seeker to enter known information about the item to conduct a search.

38. Since at least the early 1970s and continuing to the present day, MARC has been the primary communications protocol for the transfer and storage of bibliographic metadata in libraries.[12] As explained by the Library of Congress:

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[12] A complete history of the development of MARC can be found in *MARC: Its History and Implications* by Henrietta D. Avram (Washington, DC: Library of

> You could devise your own method of organizing the bibliographic information, but you would be isolating your library, limiting its options, and creating much more work for yourself. Using the MARC standard prevents duplication of work and allows libraries to better share bibliographic resources. Choosing to use MARC enables libraries to acquire cataloging data that is predictable and reliable. If a library were to develop a "home-grown" system that did not use MARC records, it would not be taking advantage of an industry-wide standard whose primary purpose is to foster communication of information.
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> Using the MARC standard also enables libraries to make use of commercially available library automation systems to manage library operations. Many systems are available for libraries of all sizes and are designed to work with the MARC format. Systems are maintained and improved by the vendor so that libraries can benefit from the latest advances in computer technology. The MARC standard also allows libraries to replace one system with another with the assurance that their data will still be compatible.

Why Is a MARC Record Necessary? LIBRARY OF CONGRESS, http://www.loc.gov/marc/umb/um01to06.html#part2 (last visited December 22, 2024).

Congress, 1975) and available online from the Hathi Trust (https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1; last visited December 22, 2024).

39. Examining the MARC records for a specific item reveals the comprehensive data transcribed about a particular item at the time that cataloging and classification occurred. In addition to the creator, title, subjects, and standard numbers, additional information may provide additional and relevant data depending on the type of resource. Understanding the full extent of bibliographic data for an item and the points of access associated with it provides essential information that can be used to determine the indexing and public availability for documents described in this Declaration.

B. MARC RECORDS

40. A MARC record comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follow. For example, a work's title is recorded in field 245, the primary author or creator of the work is recorded in field 100, an item's International Standard Book Number ("ISBN") is recorded in field 020, an item's International Standard Serial Number ("ISSN") is recorded in field 022, an item's Library of Congress call number is recorded in field 050, and the publication date is recorded in field 260 under the subfield "c." *Id.*[13] If a work is a periodical, then its publication frequency is recorded in field

[13] In some MARC records, field 264 is used rather than field 260 to record publication information. *See* http://www.loc.gov/marc/bibliographic/bd264.html

310, alternate publication frequency is recorded in field 321, and the publication dates (*e.g.*, the first and last publication) are recorded in field 362, which is also referred to as the enumeration/chronology field. *See* http://www.loc.gov/marc/bibliographic/bd3xx.html (last visited December 22, 2024).

41. The library that created the record is recorded in Field 040 in subfield "a" with a unique library code. When viewing the MARC record online via Online Computer Library Center's ("OCLC") bibliographic database, hovering over this code with the mouse reveals the full name of the library. I used this method of "mousing over" the library codes in the OCLC database to identify the originating library for the MARC records discussed in this Declaration. Where this "mouse over" option was not available, I consulted the Directory of OCLC Libraries to identify the institution that created the MARC record.[14]

42. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress at http://www.loc.gov/marc/bibliographic/. For

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(last visited December 22, 2024) ("Information in field 264 is similar to information in field 260 (Publication, Distribution, etc. (Imprint)). Field 264 is useful for cases where the content standard or institutional policies make a distinction between functions").

[14] https://www.oclc.org/en/contacts/libraries.html

example, 6XX fields are termed "Subject Access Fields." *See* http://www.loc.gov/marc/bibliographic/bd6xx.html. Among these, for example, is the 650 field; this is the "Subject Added Entry – Topical Term" field. *See* http://www.loc.gov/marc/bibliographic/bd650.html. The 650 field is a "[s]ubject added entry in which the entry element is a topical term." *Id.* These authenticated subject entries "are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (*e.g.*, *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH))." *Id.*

43. Further, MARC records include call numbers, which themselves indicate a subject and physical location within the library collections. For example, the 050 field is the "Library of Congress Call Number." *See* http://www.loc.gov/marc/bibliographic/bd050.html (last visited December 22, 2024). A defined portion of the Library of Congress Call Number is the classification number, and "source of the classification number is *Library of Congress Classification* and the *LC Classification-Additions and Changes*." *Id.* Thus, included in the 050 field is a subject matter classification. Each item in a library has a single classification number. A library selects a classification scheme (*e.g.*, the Library of Congress Classification scheme just described or a similar scheme such as the Dewey Decimal Classification scheme or the National Library of Medicine Classification scheme) and uses it consistently. When the Library of

Congress assigns the classification number, it appears as part of the 050 field. If a local library assigns the classification number, it appears in a 090 field. In either scenario, the MARC record includes a classification number that represents a subject matter classification.

44. Each item in a library has a single classification number. A library selects a classification scheme (*e.g.*, the Library of Congress Classification scheme just described or a similar scheme such as the Dewey Decimal Classification scheme) and uses it consistently. When the Library of Congress assigns the classification number, it appears as part of the 050 field, as discussed above. For MARC records created by libraries other than the Library of Congress (*e.g.*, a university library or a local public library), the classification number may appear in a 09X (*e.g.*, 090) field. *See* http://www.loc.gov/marc/bibliographic/bd09x.html (last visited December 22, 2024).

C. OCLC

45. The OCLC was created "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering

ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."[15] Among other services, OCLC and its members are responsible for maintaining the WorldCat database (http://www.worldcat.org/), used by independent and institutional libraries throughout the world.

46. OCLC also provides its members online access to MARC records through its OCLC bibliographic database. When an OCLC member institution acquires a work, it creates a MARC record for this work in its computer catalog system in the ordinary course of its business. MARC records created at the Library of Congress were initially tape-loaded into the OCLC database through a subscription to MARC Distribution Services daily or weekly. Once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress, the MARC record is then made available to any other OCLC members online, and therefore made available to the public. Accordingly, once the MARC record is created by a cataloger at an OCLC member institution or is tape-loaded from the Library of Congress or another library anywhere in the world, any publication corresponding to the MARC record has

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[15] Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Incorporated (available at https://www.oclc.org/content/dam/oclc/membership/articles-of-incorporation.pdf).

been cataloged and indexed according to its subject matter such that a person interested in that subject matter could, with reasonable diligence, locate and access the publication through any library with access to the OCLC bibliographic database or through the Library of Congress.

47. When an OCLC member institution creates a new MARC record, OCLC automatically supplies the date of creation for that record. The date of creation for the MARC record appears in the fixed field (008), characters 00 through 05. The MARC record creation date reflects the date on which the item was first acquired or cataloged. Initially, field 005 of the MARC record is automatically populated with the date the MARC record was created in year, month, day format (YYYYMMDD) (some of the newer library catalog systems also include hour, minute, second (HHMMSS)). Thereafter, the library's computer system may automatically update the date in field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library). Field 005 is visible when viewing a MARC record via an appropriate computerized interface. The initial field 005 date (*i.e.*, the date the MARC record was created) does appear. The date upon which the most recent update to field 005 occurred also appears in field 005. Thus, when an item's MARC record has been printed to hardcopy—as is the case with the

exhibits to this declaration—the date reflected next to field 008 is necessarily on or after the date the library first cataloged and indexed the underlying item.

48. Once one library has cataloged and indexed a publication by creating a MARC record for that publication, other libraries that receive the publication do not create additional MARC records—the other libraries instead rely on the original MARC record. They may update or revise the MARC record to ensure accuracy, but they do not replace or duplicate it. This practice does more than save libraries from duplicating labor, it also enhances the accuracy of MARC records. It also allows librarians around the world to know that a particular MARC record is authoritative. In contrast, a hypothetical system wherein duplicative records were created would result in confusion as to which record is authoritative.

49. The date of creation of the MARC record by a cataloger at an OCLC member institution reflects when the underlying item is accessible to the public. Upwards of two-thirds to three-quarters of book sales to libraries come from a jobber or wholesaler for online and print resources. These resellers make it their business to provide books to their customers as fast as possible, often providing turnaround times of only a single day after publication. Libraries purchase a significant portion of the balance of their books directly from publishers themselves, which provide delivery on a similarly expedited schedule. In general, libraries make these purchases throughout the year as the books are published and

shelve the books as soon thereafter as possible in order to make the books available to their patrons. Thus, books are generally available at libraries across the country within just a few days of publication.

V. PUBLICATIONS IN THIS PROCEEDING

A. "Concurrent Multiband Low-Noise Amplifiers—Theory, Design, and Applications" by Hossein Hashemi and Ali Hajimiri. [EX1011]

50. Attached hereto as EX1011 is a copy of the journal article titled "Concurrent Multiband Low-Noise Amplifiers—Theory, Design, and Applications" by Hossein Hashemi and Ali Hajimiri (hereafter "Hashemi"). The Hashemi article was published in Volume 50, Number 1 of the journal *IEEE Transactions on Microwave Theory and Techniques* and was found in the Linda Hall Library of Science, Engineering & Technology (Kansas City, Missouri). The Hashemi article appears beginning on page 288 of this issue dated January 2002. EX1011 is a true and correct copy of the Hashemi article (pages 288-301) that I understand is being submitted as an exhibit in this proceeding. Specifically, the text of the article is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. EX1011 was found within the custody of a library – a place where an authentic copy of this journal would likely be. EX1011 is a true and correct copy in a condition that creates no suspicion about its authenticity.

51. The Hashemi article is also available from the publisher's *IEEE Xplore* database[16] and the digital repository *ResearchGate*.[17] The *IEEE Xplore* database indicates that the Hashemi article was added on August 7, 2002.

52. Attached hereto as Attachment 1A is a true and correct copy of the MARC record for the journal *IEEE Transactions on Microwave Theory and Techniques* from the Linda Hall Library of Science, Engineering & Technology online catalog. The library continues to update and enhance the MARC record to meet current cataloging rules. The most recent enhancement to Attachment 1A occurred on September 6, 2023, as shown in field 005 ("20230906"). I personally identified and retrieved the MARC record that is Attachment 1A.

53. Based on finding a copy of EX1011 in the Linda Hall Library of Science, Engineering & Technology and MARC record in its online library catalog attached as Attachment 1A, it is my opinion that the Hashemi article published in the journal *IEEE Transactions on Microwave Theory and Techniques* was publicly available on August 7, 2002, as shown on the *IEEE Xplore* website. Attachment 1A also shows that EX1011 was catalogued with a descriptor term reading "Microwaves $v Periodicals" (see Attachment 1B, Library of Congress subject

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[16] https://ieeexplore.ieee.org/document/981282

[17] https://www.researchgate.net/publication/3121878_Concurrent_multiband_low-noise_amplifiers-theory_design_and_applications

heading sh2010101691) in the 650 field.

54. As noted in the holdings information (362 field), the Linda Hall Library of Science, Engineering & Technology has received the journal *IEEE Transactions on Microwave Theory and Techniques* since January 1963 and continues to receive the publication. In view of the MARC record for ExhibitEX1011, the Hashemi article was publicly available on August 7, 2002, because the serial title had been received, cataloged, and indexed at the Linda Hall Library of Science, Engineering & Technology and made part of its online catalog.

55. Attached hereto as Attachment 1C is a true and correct copy of the MARC record for the journal *IEEE Transactions on Microwave Theory and Techniques* obtained from the OCLC bibliographic database. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 1C, that library code is "DLC," which means that the MARC record for this serial was cataloged in the Library of Congress. As can be seen in field 008 ("Date entered on file") in the MARC record for this exhibit, a cataloger in the Library of Congress created OCLC record number 1752555 on November 1, 1975, as shown in field 008 ("751101"). The library continues to update and enhance the MARC record to meet current cataloging rules. The most recent enhancement to Attachment1C occurred on April 21, 2021, as shown in field 005 ("20210421"). I personally identified and retrieved the MARC record

that is Attachment 1C. The "BLvl" entry in Attachment 1C is "s," which indicates that the journal *IEEE Transactions on Microwave Theory and Techniques* is a serial publication. Field 310 of Attachment 1C reads "Monthly, $b 1966-." Accordingly, the MARC record for EX1011 corresponds to the journal *IEEE Transactions on Microwave Theory and Techniques* from the time the serial title began and includes the date of the Hashemi article.

56. Attachment 1C includes an entry in field 050 ("TK7800 $b .I23")—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system) and an entry in field 082 ("621.381/3/05")—as described above, a subject matter classification number consistent with the Dewey Decimal classification system. Attachment 1C further includes a descriptor terms reading "Microwaves $v Periodicals" (see Attachment 1B, Library of Congress subject heading sh2010101691) in the 650 field. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 1C was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field082 entry, and the field 650 entry. As of November 1, 1975, the MARC record attached hereto as Attachment 1C was accessible through any library with access to the OCLC bibliographic database or the online catalog at a library that subscribed to the serial, which means that the

corresponding publication was publicly available on or before that same date through any library with access to the OCLC bibliographic database or through an individual library.

57. WorldCat indicates that the journal *IEEE Transactions on Microwave Theory and Techniques* as cataloged in the Library of Congress is currently available from 749 libraries.[18] In view of the above, this issue of the journal *IEEE Transactions on Microwave Theory and Techniques* was publicly available on August 7, 2002, because by that date it had been cataloged and indexed in the Library of Congress, made part of the OCLC bibliographic database, and received in the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that EX1011 was published and accessible to the public on August 7, 2002.

B. *Design and Implementation of High-Q Passive Devices for Wireless Applications Using System-on-Package (SOP) Based Organic Technologies* by Sidharth Dalmia. [Exhibit EX1010]

58. Attached hereto as EX1010 is a doctoral dissertation titled *Design and Implementation of High-Q Passive Devices for Wireless Applications Using System-on-Package (SOP) Based Organic Technologies* by Sidharth Dalmia (hereafter "Dalmia") presented to the Department of Electrical and Computer Engineering at Georgia Institute of Technology (Atlanta, Georgia) in 2002.

[18] https://search.worldcat.org/title/1752555

EX1010 is a true and correct copy of the title page, table of contents, and text from University Microfilms (UMI). The dissertation title page shows a date of September 2002. I obtained this dissertation from UMI and made the copies which comprise EX1010. Specifically, the text is complete; no pages are missing, and the text on each page appears to flow seamlessly from one page to the next; further, there are no visible alterations to the document. EX1010was found within the custody of the custodian to whom the author granted permission to make copies and reproductions. EX1010 is a true and correct copy in a condition that creates no suspicion about its authenticity.

59. A dissertation exhibits the following characteristics: the dissertation is attributed to a single creator or author (in this case Sidharth Dalmia) who affixes a date of creation (in this case September 2002), recognizes a committee of three or more faculty members with their affiliations, (in this case Madhavan Swaminatha, Farrokh Ayazi, C. P. Wong, Rao Tummala, Andrew Peterson, and Sung-Kyu Lim), a list of scholarly references (in this case 35 references), and publishes the document through the higher education institute conferring the doctoral degree (in this case the Department of Electrical and Computer Engineering at Georgia Institute of Technology).

60. Attached hereto as Attachment 2A is a true and correct copy of the online catalog metadata record for this dissertation from the Geogia Institute of

Technology online catalog. The catalog record indicates that copies of the dissertation are located in the Thesis and Dissertations Collection of the GT Digital Repository [19] at Georgia Institute of Technology. I personally identified and retrieved the library catalog record which is Attachment 2A.

61. The Dalmia dissertation is also available through the digital repository *Semantic Scholar*[20] and the *ProQuest Dissertations and Theses* database.[21]

62. Attached hereto as Attachment 2B is a true and correct copy of the MARC record for the Dalmia doctoral dissertation titled *Design and Implementation of High-Q Passive Devices for Wireless Applications Using System-on-Package (SOP) Based Organic Technologies* obtained from the OCLC bibliographic database. I personally identified and retrieved the MARC record that is Attachment 2B. As previously noted, the library that created the record is recorded in field 040 with a unique library code. For Attachment 2B, that library code is "GAT," which means that the MARC record for this dissertation was

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[19] https://repository.gatech.edu/entities/publication/f5e4da03-2047-42d6-8b22-8fdeeada3824

[20] https://www.semanticscholar.org/paper/Design-and-implementation-of-high-Q-passive-devices-Dalmia/05f5f297f964d9c4ba3262e7626a0c926a20bc2b

[21] https://www.proquest.com/dissertations/results/3D098CE889604E65PQ/1?accountid=10361

created at the Georgia Institute of Technology Libraries. As can be seen in the field 008 ("Date entered on file") in the MARC record for this exhibit, a cataloger at the Georgia Institute of Technology Library created OCLC record number 51804831 on March 6, 2003 ("030306").

63. Attachment 2B further includes an entry in field 050 ("TK174.G45x $b D2367")—as described above, a subject matter classification number consistent with the Library of Congress classification system (analogous to the Dewey Decimal classification system). Attachment 2B includes two descriptor terms reading "Microelectronic packaging $x Materials" (see Attachment 2C, Library of Congress subject heading sh85084821 and Attachment 2D, Library of Congress subject heading sh85082065) and "Wireless communication systems" (see Attachment 2E, Library of Congress subject heading sh92006740) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 2B was indexed according to its subject matter by two independent classifications: the field 050 entry and the field 650 entries. Further, as of March 6, 2003, the MARC record attached hereto as Attachment 2B was accessible through any library with access to the OCLC bibliographic database or through an individual library.

64. WorldCat indicates that the Dalmia doctoral dissertation as cataloged at the Georgia Institute of Technology Library is currently available from that

institution and the *ProQuest Dissertations and Theses* database. In view of above, this doctoral dissertation was publicly available no later than March 6, 2003, because by that date it had been received, cataloged, and indexed at the Georgia Institute of Technology Library, placed in the custody of UMI, and made part of the OCLC bibliographic database. For these reasons, it is my opinion that EX1010 was published and accessible to the public no later than March 6, 2003.

VI. SUMMARY OF OPINIONS

65. In view of the foregoing, it is my opinion that the publication described above was publicly available no later than the corresponding date listed in the table below:

Exhibit	Publication	Publicly Available By
EX1011	Hashemi, Hossein, and Ali Hajimiri. "Concurrent Multiband Low-Noise Amplifiers—Theory, Design, and Applications." *IEEE Transactions on Microwave Theory and Techniques*, vol. 50, no. 1 (January 2002): 288-301.	August 7, 2002
EX1010	Dalmia, Sidharth. *Design and Implementation of High-Q Passive Devices for Wireless Applications Using System-on-Package (SOP) Based Organic Technologies*. Dissertation. Department of Electrical and Computer Engineering, Georgia Institute of Technology. Atlanta, GA: Georgia Institute of Technology, 2002.	March 6, 2003

66. In signing this Declaration, I recognize that the Declaration will be filed as evidence in a case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

67. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

February 6, 2025

Sylvia D. Hall-Ellis, Ph.D.

ATTACHMENT 1A

leader 03838cas a2200769 a 4500
001 992684143405961
005 20230906181335.0
008 751101c19639999nyumr1p 0 a0eng
010 ##$a 57039729 //r853 $zsn 78000470
012 ##$a3 $b3 $en $i8411 $j1 $k1 $l1 $m1
022 0#$a0018-9480
030 ##$aIETMAB
032 ##$a256940 $bUSPS
035 ##$a(OCoLC)1752555
035 ##$a(Horizon)370816
035 ##$a(MoKL)268414-lhalldb
035 ##$a(lhalldb)268414-lhalldb
040 ##$aDLC $cMUL $dNSD $dYUS $dMUL $dSER $dRCS $dNSD $dAIP $dDLC $dAIP $dDLC $dNST $dOCL $dNSD $dNST $dNSD $beng
042 ##$ansdp $alc
049 ##$aLHLA
050 00$aTK7800 $b.I23
069 1#$aI03790000
082 0#$a621.381/3/05 $219
210 0#$aIEEE trans. microwave theor. tech.
222 #0$aIEEE transactions on microwave theory and techniques
245 00$aIEEE transactions on microwave theory and techniques.
246 10$aI.E.E.E. transactions on microwave theory and techniques
246 10$aTransactions on microwave theory and techniques
246 10$aMicrowave theory and techniques
246 23$aInstitute of Electrical and Electronics Engineers transactions on microwave theory and techniques
260 ##$aNew York, N.Y. : $bProfessional Technical Group on Microwave Theory and Techniques, Institute of Electrical and Electronics Engineers, $cc1963-
300 ##$av. : $bill. ; $c28 cm.
310 ##$aMonthly, $b1966-
321 ##$aBimonthly, $b1963-1965
362 0#$aVol. MTT-11, no. 1 (Jan. 1963)-
500 ##$aTitle from cover.
510 1#$aApplied science & technology index, $x0003-6986 $b1991-
510 1#$aComputer & control abstracts, $x0036-8113 $b1968-
510 1#$aElectrical & electronics abstracts, $x0036-8105 $b1968-
510 1#$aIndex to IEEE publications, $x0099-1368
510 1#$aPhysics abstracts. Science abstracts. Series A, $x0036-8091 $b1968-
510 2#$aCoal abstracts, $x0309-4979
510 2#$aChemical abstracts, $x0009-2258
510 2#$aEnergy research abstracts, $x0160-3604
510 2#$aEngineering index annual (1968), $x0360-8557
510 2#$aEngineering index bioengineering abstracts, $x0736-6213
510 2#$aEngineering index energy abstracts, $x0093-8408
510 2#$aEngineering index monthly (1984), $x0742-1974
510 2#$aExcerpta medica,

510 2#$aInternational aerospace abstracts, $x0020-5842
510 2#$aMathematical reviews, $x0025-5629
510 0#$aEngineering index monthly, $x0013-7960
510 0#$aNuclear science abstracts, $x0029-5612
550 ##$aVols. for 1963-May 1964 published by the Professional Technical Group on Microwave Theory and Techniques; July 1964-Nov. 1964 by the Microwave Theory and Techniques Group; Jan. 1965- by the IEEE Microwave Theory and Techniques Group; 19<79>- by the IEEE Microwave Theory and Techniques Society.
555 ##$a11-14(1963-67) (incl. earlier title); 11-28(1963-80) bd w/29 (incl. earlier title); 1952-83(` `MTT Symposia'' only); 29-36 publ. as v.37 no.6 pt.2.
562 ##$aTitle received on deposit; do not claim as of 9.10.2010.
650 #0$aMicrowaves $vPeriodicals
710 2#$aInstitute of Electrical and Electronics Engineers. $bProfessional Technical Group on Microwave Theory and Techniques
710 2#$aInstitute of Electrical and Electronics Engineers. $bMicrowave Theory and Techniques Group
710 2#$aIEEE Microwave Theory and Techniques Group
710 2#$aIEEE Microwave Theory and Techniques Society
780 00$tIRE transactions on microwave theory and techniques $x0097-2002 $w(DLC)sf 84001171 $w(OCoLC)2014300
850 ##$aCaOWtU $aCoU $aDLC $aDeU $aFU $aNN $aNcD $aNcRS $aTU $aViBlbV
945 ##$aIEEE transactions on microwave theory and techniques.
945 ##$bIEEE transactions on microwave theory and techniques.
948 ##$aLTI 09/01/2008
948 ##$aLTI 10/19/2010

ATTACHMENT 1B

LIBRARY OF CONGRESS AUTHORITIES

LC control no.: sh2010101691
LCCN Permalink: https://lccn.loc.gov/sh2010101691
HEADING: Microwaves Periodicals

000 00453cz a2200169n 450
001 8157181
005 20110729163603.0
008 100126|| anannbabn |n ana
010 __ |**a** sh2010101691
035 __ |**a** (DLC)452674
035 __ |**a** (DLC)sh2010101691
040 __ |**a** DLC |**b** eng |**c** DLC
150 __ |**a** Microwaves |**v** Periodicals
667 __ |**a** Record generated for validation purposes.
670 __ |**a** Work cat.: IEE proceedings, 1994-c2006
906 __ |**t** 8888 |**u** tc00 |**v** 0
953 __ |**a** tc00

◀ Previous Next ▶

Save, Print or Email Records (View Help)

Select Download Format: Text (Labelled Display) Press to SAVE or PRINT

Email Text (Labelled Display) to: Press to SEND EMAIL

Library of Congress
URL: https://www.loc.gov/

Mailing Address:
101 Independence Ave, S.E.
Washington, DC 20540

Library of Congress Authorities
URL: http://authorities.loc.gov/
Library of Congress Online Catalog
URL: https://catalog.loc.gov/

Questions, comments, error reports: Contact Us

ATTACHMENT 1C

Bibliographic Record - OCLC Number: 1752555

LDR	Record Status	'c' - Corrected or revised
	Type of Record	'a' - Language material
	Bibliographic Level	's' - Serial
	Type of Control	' ' - No specified type of control
	Encoding Level	' ' - Full level
	Descriptive Cataloging Form	'a' - AACR2
001	1752555	
005	20210421191446.4	
008	Date Entered on File	'751101'
	Type of Date/Publication Status	'c' - Continuing resource currently published
	Date1/Beginning Date of Publication	'1963'
	Date2/Ending Date of Publication	'9999'
	Place of Publication, Production, or Execution Code	'nyu' - New York
	Frequency	'm' - Monthly
	Regularity	'r' - Regular
	Type of Continuing Resource	'p' - Periodical
	Form of Original Item	' ' - None of the following
	Form of Item	' ' - None of the following
	Nature of Entire Work	' ' - No specified nature of entire work
	Nature of Contents	' '
	Government Publication	' ' - Not a government publication
	Conference Publication	'0' - Not a conference publication
	Original Alphabet or Script of Title	'a' - Basic Roman
	Entry Convention	'0' - Successive entry
	Language Code	'eng' - English
	Modified Record	' ' - Record is not modified
	Cataloging Source Code	' ' - National bibliographic agency

010 57039729 **$z** sn 78000470

040 DLC **$b** eng **$c** MUL **$d** NSD **$d** YUS **$d** MUL **$d** SER **$d** RCS **$d** NSD **$d** AIP **$d** DLC **$d** AIP **$d** DLC **$d** NST **$d** OCL **$d** NSD **$d** NST **$d** NSD **$d** MYG **$d** CUS **$d** MYG **$d** OCL **$d** IEEEX **$d** OCLCQ **$d** LYU **$d** OCLCQ **$d** NSD **$d** NLGGC **$d** LVB **$d** OCLCQ **$d** BUF **$d** UKMGB **$d** OCLCF **$d** OCLCO **$d** IUL **$d** OCLCO **$d** RCE **$d** GILDS **$d** OCLCQ **$d** L2U **$d** OCLCO **$d** BRF

012 3 **$b** 3 **$e** n **$i** 8411 **$j** 1 **$k** 1 **$l** 1 **$m** 1

016 7 I03790000 **$2** DNLM

016 7 009845018 **$2** Uk

016 0 0 JW **$z** 06/11/95

019 185063398 **$a** 255560072 **$a** 963606794 **$a** 976903050 **$a** 978907560 **$a** 1013247139 **$a** 1016230476 **$a** 1031643126 **$a** 1031730325 **$a** 1043233256 **$a** 1059807051 **$a** 1064518031 **$a** 1078112520 **$a** 1145406121 **$a** 1179598473 **$a** 1236054831 **$a** 1242781460 **$a** 1246534508

022 0 0018-9480 **$l** 0018-9480 **$2** 1

030 IETMAB

032 256940 **$b** USPS

042 nsdp **$a** pcc
050 0 0 TK7800 **$b** .I23
082 0 4 621.381/3/05 **$2** 19
210 0 IEEE trans. microwave theor. tech.
222 0 IEEE transactions on microwave theory and techniques
245 0 0 IEEE transactions on microwave theory and techniques.
246 3 Institute of Electrical and Electronics Engineers transactions on microwave theory and techniques
246 3 0 I.E.E.E. transactions on microwave theory and techniques
246 3 0 Transactions on microwave theory and techniques
246 3 0 Microwave theory and techniques
260 New York, N.Y. : **$b** Professional Technical Group on Microwave Theory and Techniques, Institute of Electrical and Electronics Engineers, **$c** ©1963-
300 volumes : **$b** illustrations ; **$c** 28 cm
310 Monthly, **$b** 1966-
321 Bimonthly, **$b** 1963-1965
336 text **$b** txt **$2** rdacontent
337 unmediated **$b** n **$2** rdamedia
338 volume **$b** nc **$2** rdacarrier
362 0 Vol. MTT-11, no. 1 (Jan. 1963)-
500 Title from cover.
510 2 Chemical abstracts **$x** 0009-2258
550 Volumes for 1963-May 1964 published by the Professional Technical Group on Microwave Theory an d Techniques; July 1964-Nov. 1964 by the Microwave Theory and Techniques Group; Jan. 1965- by th e IEEE Microwave Theory and Techniques Group; 19<79>- by the IEEE Microwave Theory and Tech niques Society.
650 0 Microwaves **$v** Periodicals.
650 6 Micro-ondes **$v** Périodiques.
650 7 53.82 microwave technology. **$0** (NL-LeOCL)077605071 **$2** bcl
650 7 Microwaves. **$2** fast **$0** (OCoLC)fst01020261
650 1 7 Microgolven. **$2** gtt
655 7 Periodicals. **$2** fast **$0** (OCoLC)fst01411641
655 7 Periodicals. **$2** lcgft
710 2 Institute of Electrical and Electronics Engineers. **$b** Professional Technical Group on Microwave The ory and Techniques.
710 2 Institute of Electrical and Electronics Engineers. **$b** Microwave Theory and Techniques Group.
710 2 IEEE Microwave Theory and Techniques Group.
710 2 IEEE Microwave Theory and Techniques Society.
776 0 8 **$i** Online version: **$t** IEEE transactions on microwave theory and techniques (Online) **$x** 1557-9670 **$w** (DLC) 2005214275 **$w** (OCoLC)44580655
780 0 0 **$t** IRE transactions on microwave theory and techniques **$x** 0097-2002 **$w** (DLC)sf 84001171 **$w** (OCoLC)2014300
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ATTACHMENT 2A

Title:
Design and implementation of high-Q passive devices for wireless applications using System-On-Package (SOP) based organic technologies

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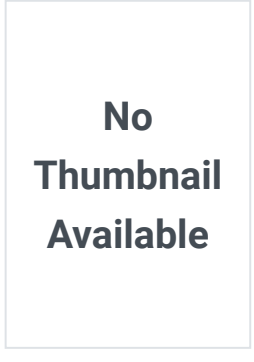
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dc.contributor.author	Dalmia, Sidharth	en_US
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dc.type	Text	
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local.contributor.advisor	Swaminathan, Madhavan	
local.contributor.corporatename	School of Electrical and Computer Engineering	
local.contributor.corporatename	College of Engineering	
local.relation.ispartofseries	Doctor of Philosophy with a Major in Electrical and Computer Engineering	
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050 4 TK174.G45x **$b** D2367

100 1 Dalmia, Sidharth, **$d** 1978-

245 1 0 Design and implementation of high-Q passive devices for wireless applications using System-On-Pack age (SOP) based organic technologies / **$c** by Sidharth Dalmia.

264 0 **$c** 2002.

300 xviii, 162 leaves : **$b** illustrations ; **$c** 29 cm

336 text **$b** txt **$2** rdacontent

337 unmediated **$b** n **$2** rdamedia

338 volume **$b** nc **$2** rdacarrier

502 **$b** Ph. D. **$c** School of Electrical and Computer Engineering, Georgia Institute of Technology **$d** 20 03. Directed by Madhavan Swaminathan

504 Includes bibliographical references (leaves 159-162).

650 0 Microelectronic packaging **$x** Materials.

650 0 Wireless communication systems.

650 6 Mise sous boîtier (Microélectronique) **$x** Matériaux.

650 6 Transmission sans fil.
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856 4 2 **$3** ProQuest, Abstract **$u** http://gateway.proquest.com/openurl?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&res_dat=xri:pqm&rft_dat=xri:pqdiss:3072302

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053 _0 |**a** TA401 |**b** TA492

150 __ |**a** Materials

360 __ |**i** subdivision |**a** Materials |**i** under scientific and technical disciplines and under types of equipment and construction, e.g. |**a** Electronics--Materials; |**i** and phrase headings for special types of materials, e.g. |**a** Building materials; Raw materials

450 __ |**a** Engineering |**x** Materials

450 __ |**a** Engineering materials

450 __ |**a** Industrial materials

550 __ |**w** g |**a** Engineering design

550 __ |**a** Manufacturing processes

680 __ |**i** Here are entered comprehensive works on the basic engineering and industrial materials used in the construction of devices, apparatus, structures, equipment, etc.

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450 __ |**a** Wireless data communication systems

450 __ |**a** Wireless information networks

450 __ |**a** Wireless telecommunication systems

550 __ |**w** g |**a** Telecommunication systems

670 __ |**a** Work cat.: 92-43366: Wireless communications, c1993: |**b** CIP pref. (wireless information networks)

670 __ |**a** LC data base, 12/10/92 |**b** (wireless information networks, wireless communications, wireless data communications)

670 __ |**a** ASTI |**b** (Wireless telecommunications networks)

670 __ |**a** Engr. index: |**b** v. 89, pt. IX, p. 10249 (Wireless communication)

670 __ |**a** Web. 3 |**b** (Wireless; Wireless telephony: relating to radiotelegraphy, radiotelephony, or radio)

680 __ |**i** Here are entered works on networks for transmission of voice or data using either radio or optical (e.g. infrared) technologies.

906 __ |**t** 9304 |**u** te07 |**v** 1

952 __ |**a** 4 bib. record(s) to be changed

952 __ |**a** LC pattern: Broadband communication systems

953 __ |**a** jg12

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