

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SNAP INC.,
Petitioner

v.

NOKIA TECHNOLOGIES OY,
Patent Owner.

IPR2025-01345
U.S. Patent No. 9,036,701

DECLARATION OF SYLVIA HALL-ELLIS, PH.D.

I, Sylvia D. Hall-Ellis, Ph.D., declare as follows:

I. INTRODUCTION

1. My name is Sylvia D. Hall-Ellis. I have been retained as an expert by Snap Inc. (“Snap” or “Petitioner”), who I am informed is a petitioner to this IPR proceeding.

2. I have written this declaration at the request of the Petitioner to provide my expert opinion regarding the authenticity and public availability of two publications, identified in Section IV below. My Declaration sets forth my opinions in detail and provides the basis for my opinions regarding the authenticity and public availability of these publications. If called to testify in the above-captioned matter, I will testify with regard to the opinions and bases set forth below.

3. I reserve the right to supplement or amend my opinions, and bases 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.

4. I am being compensated for my time spent working on this matter at my normal consulting rate, 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 and relied upon 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 in San José, California. 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 have served as the Chair for the ALA Office of Diversity's Committee on Diversity, as a member of the REFORMA National Board of Directors, as a member of the Editorial Board for the ALCTS premier cataloging journal, *Library Resources and Technical*

Services, as a Co-Chair for the Library Research Round Table (LRRT) of ALA, and 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. My full curriculum vitae is attached hereto as **Exhibit A**.

III. PRELIMINARIES

A. Scope of Declaration and Legal Standards

10. 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 before the dates discussed below with respect to the specific documents.

11. 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.

12. 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.

13. 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. Persons of Ordinary Skill in the Art

14. I am told by counsel that the subject matter of this proceeding generally relates to video coding, including digital video coding and decoding.

15. I have been 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 the inventions. This hypothetical person is also a person of ordinary creativity, capable of understanding the scientific principles applicable to the pertinent field.

16. I am told by counsel that a person of ordinary skill in this subject matter or art would have had a (1) a Bachelor’s degree in Electrical Engineering, Computer Engineering, Computer Science, or a comparable field of study such as Physics, and (2) approximately two to three years of practical experience with digital video and/or image processing or coding. More education could substitute for less experience, and vice versa. I have been further informed by counsel that a person of ordinary skill in the art would have been familiar with and able to understand the information known in the art relating to these fields, including the publications discussed in this declaration.

IV. LIBRARY CATALOGING PRACTICES

17. In preparing this Declaration, I used authoritative databases, such as the Online Computer Library Center (OCLC) bibliographic database, the Library of Congress Online Catalog, and the Library of Congress Subject Authorities, to confirm citation details of the publications discussed below. It is my opinion that this standard cataloging and classification protocol was followed for the publications discussed below.

18. Based on my experience working in research libraries, it is my opinion that members of the public would have been able to locate the material discussed herein on their own or with the assistance of a research librarian with relative ease using the tools and resources described herein.

A. INDEXING

19. 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 the 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.

20. 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.

21. 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 the bibliography and resources in academic disciplines.

22. 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.

23. 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.

24. 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.

25. *IEEE Xplore Database*. Librarians in academic, special, and large public libraries are familiar with the *IEEE Xplore* database.¹ In working with undergraduate and graduate students, researchers, scientists, and the public,

¹ <https://ieeexplore.ieee.org/Xplore/home.jsp>.

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 declarations, 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 6.3 million documents which is known for its reputable curation and maintenance of documents and publication information. The *IEEE Xplore* database accurately reports the dates of publications and events and accurately identifies locations of events in accordance with standard practices for major industry journals. 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.

26. The *IEEE Xplore* database 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* database 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.

27. *ACM Digital Library*. This index is produced by the Association for Computing Machinery, the world's largest scientific and educational computing society.² The *ACM Digital Library* contains the full text of all AMC publications, hosted full-text publications from selected publishers, and the ACM Guide to Computing Literature—a comprehensive bibliography of computing literature beginning in the 1950s with more than a million entries. All metadata in the database are freely available on the Web, including abstracts, linked references, citing work, and usage statistics. Full-text articles are available with subscription.

B. MARC RECORDS AND THE ONLINE LIBRARY CATALOG

28. 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.³ 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

² <https://dl.acm.org/>.

³ The full text of the standard is available from the Library of Congress at <http://www.loc.gov/marc/bibliographic/>.

primary communications protocol for the transfer and storage of bibliographic metadata in libraries.⁴

29. MARC is a framework into which descriptive bibliographic data are transcribed to interact with the software in online library catalogs to provide access to books, journals, and other resources in the collection. The bibliographic data provide points of access and can be searched by a 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.

30. MARC records are not designed for public viewing. Although a

⁴ 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 June 19, 2025) (“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.

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.

31. 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.⁵ As explained by the Library of Congress:

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

⁵ 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 Congress, 1975) and available online from the Hathi Trust at <https://babel.hathitrust.org/cgi/pt?id=mdp.39015034388556;view=1up;seq=1> (last visited June 19, 2025).

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.

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 June 19, 2025).

32. 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.

1. MARC RECORDS

33. 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."⁶ *Id.* If a work is a periodical, then its publication frequency is recorded in field 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 June 19, 2025).

34. The library that created the record is recorded in Field 040 in subfield

⁶ 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> (last visited June 19, 2025) ("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.").

“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.⁷

35. 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 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.*

⁷ <https://www.oclc.org/en/contacts/libraries.html>.

36. 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 April 28, 2025). 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.

37. 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 June 19, 2025).

2. OCLC

38. 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.”⁸ 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.

⁸ 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>).

39. 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 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.

40. 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.

41. 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.

42. 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.

C. JOURNALS

43. Catalogers can create MARC records for all types of print, online, and digital resources. For example, MARC records cover serial publications, including both serially-published monographs and journals. OCLC hosts MARC records for more than 320 million serial publications. Serial publications are those publications that have the same collective title but are intended to be continued indefinitely with

enumeration such as a volume or issue number (*e.g.*, magazines, journals, etc.). In the OCLC bibliographic database, the first issue of the serial publication is typically cataloged (*i.e.*, a corresponding MARC record is created), but the date is left open-ended with the use of a punctuation mark such as a dash. OCLC serial publication MARC records represent the entire run of the serial title. With knowledge of the first issue published, future issues can be predicted based on the information provided in the MARC record, for example in field 362. In my extensive professional experience, is it highly unusual for a library to stop collecting and shelving a serial publication prior to the end of its publication run. If a subscription to a serial publication ends its run or is cancelled before the end of its run, the library will denote that it has stopped receiving new volumes by filling in the end date in the MARC record.

44. The handling of printed journal subscriptions is shown on the cover or the first few pages of individual issues. As was the best practice among libraries, issues arrived at a central facility and were immediately received, verified as part of a subscription, checked in, and stamped or labeled with the institution's name and date. Determining that the issue was part of the library subscription ensured that the entire set of publications for the year had been received so that they could be professionally bound and retained. This process also verified that all of the published issues arrived so that the library staff did not have to request or claim an

issue that did not arrive as expected. In large public libraries with branches and multi-campus libraries within academic institutions, the journals were sorted and delivered to the subscribing unit. The new issue was placed in the public area; the older issue was stored so that it remained available.

45. The foregoing process has been standard library practice longer than I have been working in the profession. I first learned the steps in the process in the late 1970s and later supervised it. Although the checking in process has become automated and now links electronically to holdings records for the MARC record for each serial title, the manual placement of a stamp or label and placing the issue in a public area has not changed for 50 years. Unless I note otherwise below in reference to a specific serial publication, it is my expert opinion that this standard protocol was followed for the serial publication discussed below.

V. PUBLICATIONS

A. “A High Performance CABAC Decoding Architecture” by Wei Yu and Yun He [Exhibit 1018]

46. Exhibit 1018 is a copy of the journal article titled “A High Performance CABAC Decoding Architecture” by Wei Yu and Yun He (hereafter “the Yu article”).

47. The Yu article was published in Volume 51, Number 4 of the journal *IEEE Transactions on Consumer Electronics* and was found in the Linda Hall Library of Science, Engineering & Technology (Kansas City, Missouri). The Yu

article appears beginning on page 1352 of this issue dated November 2005. Exhibit 1018 is a true and correct copy of the Yu article (pages 1352-1359) 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. The Yu article is also available through the *IEEE Xplore* database⁹ and the Association for Computing Machinery's *ACM Digital Library*.¹⁰ Exhibit 1018 was found within the custody of a library – a place where an authentic copy of this journal would likely be. Exhibit 1018 is a true and correct copy in a condition that creates no suspicion about its authenticity.

48. Attachment 1A is a true and correct copy of the MARC record for the journal *IEEE Transactions on Consumer Electronics* at the Linda Hall Library of Science, Engineering & Technology. The library ownership is indicated by the presence of the library's code ("LHL") in field 049. The library continues to update and enhance this 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

⁹ <https://ieeexplore.ieee.org/document/1561867>.

¹⁰ <https://dl.acm.org/doi/10.1109/TCE.2005.1561867>.

Attachment 1A.

49. Based on my finding a print copy of the Yu article (Exhibit 1018) 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 Yu article published in the journal *IEEE Transactions on Consumer Electronics* was publicly available on or shortly December 28, 2005, as shown by the library's stamp on the cover. In common practice these stamps are applied at or around the time the volume is entered into the library's collection and the volume is made available to library patrons within a short time thereafter. Attachment 1A also shows that Exhibit 1018 was catalogued with four descriptor terms reading "Household electronics \$v Periodicals" (see Attachment 1B, Library of Congress subject heading sh85062582 and Attachment 1C, Library of Congress subject heading sh85099890), "Radio \$x Receivers and reception \$v Periodicals" (see Attachment 1D, Library of Congress subject heading sh85110410 and Attachment 1C, Library of Congress subject heading sh85099890), "Television \$x Receivers and reception \$v Periodicals" (see Attachment 1E, Library of Congress subject heading sh85133470 and Attachment 1C, Library of Congress subject heading sh85099890), and "Electronic apparatus and appliances \$v Periodicals" (see Attachment 1F, Library of Congress subject heading sh2008102923) in the 650 fields.

50. As noted in the holdings information (362 field), the Linda Hall Library

of Science, Engineering & Technology has received the journal *IEEE Transactions on Consumer Electronics* since February 1975 and continues to receive the publication. In view of the MARC record for Exhibit 1018, the Yu article was publicly on or shortly after December 28, 2005, 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 database.

51. Attachment 1G is a true and correct copy of the MARC record for the journal *IEEE Transactions on Consumer Electronics* 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 1G, that library code is “DLC,” which means that the MARC record for this serial was cataloged at the Library of Congress. As can be seen in field 008 (“Date entered on file”) in the MARC record for this exhibit, a cataloger at the Library of Congress created OCLC record number 241216 on October 21, 1975 (“751021”). The library continues to update and enhance this MARC record to meet current cataloging rules. The most recent enhancement to Attachment 1G occurred on May 22, 2025, as shown in field 005 (“20250522”). I personally identified and retrieved the MARC record that is Attachment 1G. The “BLvl” entry in Attachment 1G is “s,” which indicates that the journal *IEEE Transactions on Consumer Electronics* is a serial publication. Field 310 of Attachment 1G reads “Quarterly, \$b Feb. 1980.” Accordingly, the MARC

record for Exhibit 1018 corresponds to the journal *IEEE Transactions on Consumer Electronics* from the time the serial title began and includes the date of the Yu article.

52. Attachment 1G includes an entry in field 050 (“TK6563 \$b .I2”)—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 (“621.38”), a subject matter consistent with the Dewey Decimal classification system. Attachment 1G further includes four descriptor terms reading “Household electronics \$v Periodicals” (see Attachment 1B, Library of Congress subject heading sh85062582 and Attachment 1C, Library of Congress subject heading sh85099890), “Radio \$x Receivers and reception \$v Periodicals” (see Attachment 1D, Library of Congress subject heading sh85110410 and Attachment 1C, Library of Congress subject heading sh85099890), “Television \$x Receivers and reception \$v Periodicals” (see Attachment 1E, Library of Congress subject heading sh85133470 and Attachment 1C, Library of Congress subject heading sh85099890), and “Electronic apparatus and appliances \$v Periodicals” (see Attachment 1F, Library of Congress subject heading sh2008102923) in the 650 fields. Thus, as of its cataloging, the publication corresponding to the MARC record attached hereto as Attachment 1G was indexed according to its subject matter by virtue of at least three independently sufficient classifications: the field 050 entry, the field 082 entry, and the field 650 entries. As of October 21, 1975, the MARC

record attached hereto as Attachment 1G 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.

53. WorldCat indicates that the journal *IEEE Transactions on Consumer Electronics* as cataloged at the Library of Congress is currently available from 692 libraries.¹¹ In view of the above, this issue of the journal *IEEE Transactions on Consumer Electronics* was publicly available on or shortly after December 28, 2005, because by that date it had been cataloged and indexed at the Library of Congress, made part of the OCLC bibliographic database, and received at the Linda Hall Library of Science, Engineering & Technology. For these reasons, it is my opinion that Exhibit 1018 was published and accessible to the public on or shortly after December 28, 2005.

VI. CONCLUSION

54. 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-

¹¹ <https://search.worldcat.org/title/2241216>.

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.

55. 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.

Dated: July 28, 2025

Respectfully submitted,

A handwritten signature in blue ink, reading "Sylvia D. Hall-Ellis". The signature is written in a cursive, flowing style.

Sylvia D. Hall-Ellis, Ph.D.

Attachment 1A

leader 03388cas a2200709 a 4500
 001 992718833405961
 005 20230906181834.0
 008 751021c19759999nyuqn1p 0 a0eng
 010 ##\$a 75643472 //r85
 012 ##\$a3 \$b3 \$d7 \$en \$f- \$gp \$h- \$i8411 \$k1 \$l1 \$m1
 019 ##\$a6057324 \$a6163410 \$a1244811 \$a2250388
 022 0#\$a0098-3063
 030 ##\$aITCEDA
 032 ##\$a256480 \$bUSPS
 035 ##\$a(OCOLC)2241216
 035 ##\$a(Horizon)375748
 035 ##\$a(MoKL)271883-lhalldb
 035 ##\$a(lhalldb)271883-lhalldb
 035 ##\$z(OCOLC)6057324 \$z(OCOLC)6163410 \$z(OCOLC)1244811 \$z(OCOLC)2250388
 040 ##\$aDLC \$cDLC \$dNSD \$dOCL \$dNSD \$dDLC \$dNST \$dOCL \$dNSD \$dAIP \$dOCL \$dNST
 \$dDLC \$dNST \$dDLC \$dOCL \$dDLC \$dOCL \$dNST \$dNSD \$dNST \$dHUL \$dNSD \$beng
 042 ##\$alc \$ansdp
 049 ##\$aLHLA
 050 00\$aTK6563 \$b.l2
 082 0#\$a621.38 \$219
 210 0#\$aIEEE trans. consum. electron.
 222 #0\$aIEEE transactions on consumer electronics
 245 00\$aIEEE transactions on consumer electronics.
 246 23\$aInstitute of Electrical and Electronics Engineers transactions on consumer electronics
 260 ##\$aNew York : \$bInstitute of Electrical and Electronics Engineers,
 300 ##\$av. : \$bill. ; \$c28 cm.
 310 ##\$a5 times a year \$b<, July 1979->
 321 ##\$aQuarterly \$b<, Feb. 1976->
 362 1#\$aBegan with Feb. 1975 issue.
 500 ##\$aDescription based on: Vol. CE-22, no. 1 (Feb. 1976); title from cover.
 510 1#\$aApplied science & technology index, \$x0003-6986 \$b1991-
 510 1#\$aComputer & control abstracts, \$x0036-8113 \$bFeb. 1975-
 510 1#\$aElectrical & electronics abstracts, \$x0036-8105 \$bFeb. 1975-
 510 1#\$aIndex to IEEE publications, \$x0099-1368
 510 1#\$aPhysics abstracts. Science abstracts. Series A, \$x0036-8091 \$bFeb. 1975-
 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
 525 ##\$aSome volumes have separate supplement.
 550 ##\$aIssue for <Nov. 1982, Aug. 1985> include some papers from International Conference
 on Consumer Electronics.
 550 ##\$aA publication of: the IEEE Consumer Electronics Group, <Feb. 1976>-May 1976; IEEE
 Broadcast, Cable, and Consumer Electronics Society, Aug. 1976-<Nov. 1982>; IEEE Consumer
 Electronics Society, <May 1984->
 555 ##\$a21-28(1975-82) bd w/29 (incl. earlier title)
 562 ##\$aTitle received on deposit; do not claim as of 9.10.2010.

650 #0\$aHousehold electronics \$vPeriodicals.
 650 #0\$aRadio \$xReceivers and reception \$vPeriodicals.
 650 #0\$aTelevision \$xReceivers and reception \$vPeriodicals.
 650 #0\$aElectronic apparatus and appliances \$vPeriodicals
 710 2#\$aIEEE Consumer Electronics Society
 710 2#\$aIEEE Broadcast, Cable, and Consumer Electronics Society
 710 2#\$aIEEE Consumer Electronics Group
 711 2#\$aIEEE International Conference on Consumer Electronics
 780 00\$tIEEE transactions on broadcast and television receivers \$x0018-9308 \$w(DLC)
 57039724 \$w(OCOLC)1604343
 850 ##\$aArU \$aCaBVaS \$aDLC \$aFU \$aICU \$aIaAS \$aMH-GM \$aMoU \$aNN \$aNcD \$aNcRS
 \$aPPi \$aPU \$aTxArU \$aViBlbV
 890 ##\$aIEEE transactions on consumer electronics.
 901 ##\$cSer
 948 ##\$aLTI 09/01/2008
 948 ##\$aLTI 10/19/2010

Attachment 1B

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MARC Display

Labelled Display

LC control no.: sh 85062582

LCCN Permalink: <https://lcn.loc.gov/sh85062582>

HEADING: Household electronics

000 00785cz a2200217n 450

001 4713810

005 20120326095843.0

008 860211|| anannbabn |b ana

010 __ |a sh 85062582

035 __ |a (DLC)sh 85062582

035 __ |a (DLC)60495

040 __ |a DLC |c DLC |d DLC

150 __ |a Household electronics

450 __ |a Consumer electronics

450 __ |a Home electronics

550 __ |w g |a Electronic apparatus and appliances

550 __ |w g |a Electronics

680 __ |i Here are entered works on electronic equipment in the home, i.e. audio equipment, television, home video systems, etc. Works on electronics for amateurs and hobbyists are entered under |a Electronics--Amateurs' manuals.

681 __ |i Note under |a Electronics--Amateurs' manuals

906 __ |t 7930 |u fk07 |v 0

953 __ |a xx00

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Next >

MARC Display**Labelled Display****LC control no.:** sh 85099890**LCCN Permalink:** <https://lcn.loc.gov/sh85099890>**HEADING:** Periodicals

000 01324cz a2200337n 450

001 4749694

005 20120717060125.0

008 860211 | anannbabn |b ana

010 __ |a sh 85099890

035 __ |a (DLC)sh 85099890

035 __ |a (DLC)6226910

035 __ |a (DLC)sp 85099890

035 __ |a (DLC)314952

040 __ |a DLC |c DLC |d DLC

053 _0 |a AP |c General periodicals

053 _0 |a PN4700 |b PN5650 |c History

150 __ |a Periodicals

360 __ |i subdivision |a Periodicals |i under specific subjects, e.g. |a Engineering--Periodicals; United States--History--Periodicals

450 __ |a Journals (Periodicals)

450 __ |a Magazines

550 __ |w g |a Library materials

550 __ |w g |a Mass media

550 __ |w g |a Serial publications

550 __ |a Newspapers

550 __ |a Press

670 __ |a UMI business vocab. |b (Journals)

680 __ |i Here are entered works on the periodicals of the world and, with appropriate subdivisions, works on special aspects or sections of periodicals. Works on periodicals in a specific language, or in a specific country or larger area, are entered under the adjectival form of the language or area, e.g. |a Arabic periodicals; Canadian periodicals.

906 __ |t 0420 |u te03 |v 0

910 __ |a Proposal saved by tc03 on 05/14/2012 at 17:15:30

953 __ |a xx00 |b td14

906 __ |t 1206 |v 0

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URL: <https://catalog.loc.gov/>

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Next >

MARC Display

Labelled Display

LC control no.: sh 85110410

LCCN Permalink: <https://lcn.loc.gov/sh85110410>

HEADING: Radio Receivers and reception

000 00656cz a2200253n 450

001 4759930

005 20120328074254.0

008 860211|| anannbabn |a ana

010 __ |a sh 85110410

035 __ |a (DLC)sh 85110410

035 __ |a (DLC)5243299

035 __ |a (DLC)sp 85110410

035 __ |a (DLC)264976

040 __ |a DLC |c DLC |d DLC

053 _0 |a TK6563

150 __ |a Radio |x Receivers and reception

450 __ |a Radio receivers

450 __ |a Radio-receiving apparatus

450 __ |a Radio reception

450 __ |a Radios

550 __ |w g |a Household electronics

550 __ |w g |a Radio |x Equipment and supplies

906 __ |t 0050 |u te04 |v 0

953 __ |a xx00 |b ta21

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MARC Display

Labelled Display

LC control no.: sh 85133470

LCCN Permalink: <https://lcn.loc.gov/sh85133470>

HEADING: Television Receivers and reception

000 00781cz a2200301n 450

001 4782204

005 20120328081544.0

008 860211|| anannbabn |a ana

010 __ |a sh 85133470

035 __ |a (DLC)sh 85133470

035 __ |a (DLC)5243295

035 __ |a (DLC)sp 85133470

035 __ |a (DLC)264975

035 __ |a (DLC)6031705

035 __ |a (DLC)304948

040 __ |a DLC |c DLC |d DLC

053 _0 |a TK6653

150 __ |a Television |x Receivers and reception

450 __ |a Television receivers

450 __ |a Television sets

450 __ |a Televisions

450 __ |a TV sets

450 __ |a TVs

550 __ |w g |a Household electronics

550 __ |w g |a Television |x Equipment and supplies

550 __ |a Television/video combinations

906 __ |t 0334 |u te04 |v 0

953 __ |a xx00 |b ta21

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LC control no.: sh2008102923

LCCN Permalink: <https://lcn.loc.gov/sh2008102923>

HEADING: Electronic apparatus and appliances Periodicals

000 00471cz a2200169n 450

001 7440869

005 20110729160214.0

008 080208|| anannbabn |n ana

010 __ |a sh2008102923

035 __ |a (DLC)378489

035 __ |a (DLC)sh2008102923

040 __ |a DLC |b eng |c DLC

150 __ |a Electronic apparatus and appliances |v Periodicals

667 __ |a Record generated for validation purposes.

670 __ |a Work cat.: Dian zi zhi liang =,

906 __ |t 8888 |u te00 |v 0

953 __ |a te00

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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 1G

Bibliographic Record - OCLC Number: 2241216

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 2241216
 005 20250522073241.1
 008 Date Entered on File '751021'
 Type of Date/Publication Status 'c' - Continuing resource currently published
 Date1/Beginning Date of Publication '1975'
 Date2/Ending Date of Publication '9999'
 Place of Publication, Production, or Execution Code 'nyu' - New York
 Frequency 'q' - Quarterly
 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 75643472
 040 DLC \$b eng \$c DLC \$d NSD \$d OCL \$d NSD \$d DLC \$d NST \$d OCL \$d NSD \$d AIP \$d
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 HUL \$d NSD \$d MYG \$d CUS \$d MYG \$d OCL \$d LYU \$d IEEEX \$d OCLCQ \$d ORE \$d
 NSD \$d LVB \$d OCLCQ \$d OCLCO \$d OCLCF \$d OCLCO \$d IUL \$d OCLCQ \$d BRF \$d
 OCLCO \$d PUL \$d OCLCL

012 3 \$b 3 \$d 7 \$e n \$f - \$g p \$h - \$i 8411 \$k 1 \$l 1 \$m 1
 016 0 0 PH \$z 24/03/94
 019 1244811 \$a 2250388 \$a 6057324 \$a 6163410 \$a 185062840 \$a 255583605 \$a 606084996 \$a 96
 3283670 \$a 963759580 \$a 964171827 \$a 976879331 \$a 1011798273 \$a 1179651663 \$a 1224694
 338
 022 0 0098-3063 \$l 0098-3063 \$2 1
 030 ITCEDA
 032 256480 \$b USPS
 042 pcc \$a nsdp
 050 0 0 TK6563 \$b .I2

082 0 4 621.38 \$2 19 \$1 <https://id.oclc.org/worldcat/ddc/E36Km4XVgHKfCGJjRqRvrbpyW8>

222 0 IEEE transactions on consumer electronics

245 0 0 IEEE transactions on consumer electronics.

246 3 Institute of Electrical and Electronics Engineers transactions on consumer electronics

260 New York : \$b Institute of Electrical and Electronics Engineers, \$c ©1975-

300 volumes : \$b illustrations ; \$c 28 cm

310 Quarterly, \$b Feb. 1980-

321 Quarterly, \$b Feb. 1975-May 1979

321 Five times a year, \$b July 1979-Nov. 1979

336 text \$b txt \$2 rdacontent

337 unmediated \$b n \$2 rdamedia

338 volume \$b nc \$2 rdacarrier

362 0 Vol. CE-21, no. 1 (Feb. 1975)-

500 Title from cover.

525 Some volumes have supplements.

550 Issues for <Nov. 1982, Aug. 1985> include some papers from International Conference on Consumer Electronics.

550 A publication of: the IEEE Consumer Electronics Group, <Feb. 1976>-May 1976; IEEE Broadcast, Cable, and Consumer Electronics Society, Aug. 1976-<Nov. 1982>; IEEE Consumer Electronics Society, <May 1984->

650 0 Household electronics \$v Periodicals.

650 0 Radio \$x Receivers and reception \$v Periodicals.

650 0 Television \$x Receivers and reception \$v Periodicals.

650 0 Electronic apparatus and appliances \$v Periodicals.

650 6 Appareils électroniques domestiques \$v Périodiques.

650 6 Radio \$x Récepteurs et réception \$v Périodiques.

650 6 Télévision \$x Récepteurs et réception \$v Périodiques.

650 6 Appareils électroniques \$v Périodiques.

650 7 Electronic apparatus and appliances. \$2 fast \$0 (OCOLC)fst00906772

650 7 Household electronics. \$2 fast \$0 (OCOLC)fst00962119

650 7 Radio \$x Receivers and reception. \$2 fast \$0 (OCOLC)fst01087124

650 7 Television \$x Receivers and reception. \$2 fast \$0 (OCOLC)fst01146597

655 7 Periodicals. \$2 fast \$0 (OCOLC)fst01411641

655 7 Periodicals. \$2 lcgft \$0 <http://id.loc.gov/authorities/genreForms/gf2014026139> \$0 (uri) <http://id.loc.gov/authorities/genreForms/gf2014026139>

710 2 IEEE Consumer Electronics Society.

710 2 IEEE Broadcast, Cable, and Consumer Electronics Society.

710 2 IEEE Consumer Electronics Group.

711 2 IEEE International Conference on Consumer Electronics.

776 0 8 \$i Online version: \$t IEEE transactions on consumer electronics (Online) \$x 1558-4127 \$w (DLC) 2005212495 \$w (OCOLC)60639335

776 0 8 \$i Online version: \$t IEEE transactions on consumer electronics \$w (OCOLC)752430525

780 0 0 \$t IEEE transactions on broadcast and television receivers \$x 0018-9308 \$w (DLC) 57039724 \$w (OCOLC)1604343

850 ArU \$a CaBVaS \$a DLC \$a FU \$a ICU \$a IaAS \$a MH-GM \$a MoU \$a NN \$a NcD \$a NcRS
\$a PPi \$a PU \$a TxArU \$a ViBlbV

856 4 1 \$u <http://ieeexplore.ieee.org/servlet/opac?punumber=30>

891 2 0 \$9 853 \$8 1 \$a v. \$b no. \$u 4 \$v r \$i (year) \$j (month) \$w q \$x 02

891 4 1 \$9 863 \$8 1.1 \$a <34> \$b <1> \$i <1988> \$j <02>

029 1 AU@ \$b 000000985686

029 1 AU@ \$b 000023969901

029 1 AU@ \$b 000023983591

029 1 AU@ \$b 000024367224

029 1 AU@ \$b 000050757251

029 1 NLGFC \$b 036620718

029 1 NZ1 \$b 3757643

029 1 NZ1 \$b 9735838

029 1 ZWZ \$b 038963787