

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMAZON.COM, INC. and AMAZON.COM SERVICES LLC,

Petitioner

v.

NOKIA TECHNOLOGIES OY,

Patent Owner.

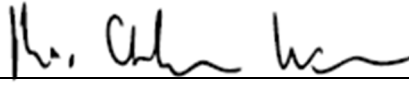
IPR2024-01175

U.S. Patent No. 6,856,701

DECLARATION OF DR. STEPHAN WENGER

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.

Date: September 16, 2024

By: 
Dr. Stephan Wenger

AMAZON-1021
6,856,701

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I. INTRODUCTION

1. My name is Dr. Stephan Wenger. I have been retained by Amazon.com, Inc. and Amazon.com Services LLC (“Petitioner”) in connection with its petition for *inter partes* review (“IPR”) of United States Patent No. 6,856,701 (“the ’701 patent”). I am being compensated at my usual and customary rate of \$400 per hour for the time I spend in connection with preparing this declaration. My compensation is not affected by the outcome of this or any other IPR.

2. I have been asked to provide information regarding the public availability of certain input contributions submitted to the Video Coding Expert’s Group (VCEG), formally known as ITU-T Q.6/16, and its predecessor, ITU-T Q.15/16. Specifically, I was asked to provide information regarding the Q.15/16 contribution Q15K30 submitted to the Q15/16 in meeting August 2000, and VCEG-L13 and VCEG-L28 submitted to the VCEG meeting in Eibsee January 2001. To summarize my findings, all three documents were available to the public months before the earliest claimed priority date of the ’701 patent, which I have been asked to assume is September 14, 2001.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

3. I have been involved with the standardization of audiovisual and multimedia systems for over twenty-five years. I have frequently served as a

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chairperson of subgroups in VCEG and other video coding standards bodies, including during the 2000 to 2001 timeframe.

4. In 1989 I received the German equivalent of a Master's degree from the Technische Universität Berlin. I then received the German equivalent of a Ph.D. in Computer Science from the Technische Universität Berlin in 1995. Both my Master's and Ph.D. theses relate to multimedia coding and communication.

5. Since 1994, I have served as a consultant for a variety of companies, including Creatix Polymedia GmbH, Siemens AG, Array Microsystems, Philips Multimedia Research Center, Intel Corp., Microsoft Corp., LG Electronics, Polycom Network Systems, Polycom Inc., and TeleSuite Inc., providing technical expertise related to video coding. For example, at Siemens AG, where I consulted between 1996 and 1997, I led the creation of an 80-page study on the H.263 and then forthcoming H.263+ standards for video conferencing applications.

6. During my time consulting for Microsoft Corp., between 1997 and 1999, I provided advice on standardization issues in the ITU-T, particularly on questions of video compression. As a consultant for Polycom Network Systems (Israel), between 1999 and 2004, I trained signal processing staff at the company on forthcoming video compression technologies, namely H.263+, H.263++, MPEG-4 advanced simple profile, and JVT/H.264. I also worked as a consultant for Polycom Inc, Video Group (USA), where I was involved in standardizing a certain video

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coding tool as part of ITU-T Recommendation H.264. Between 2002-2004, I advised TeleSuite Inc. on the design of a new, high-end H.264 video conferencing endpoint.

7. In addition to the above consulting roles, between 1988 and 2024, I was employed by several companies and organizations such as Technische Universität Berlin, Teles AG, Teles Communications Corp., Vidyo, and Tencent America LLC. During my employment with these companies, I was actively involved with ITU-T standardization. My involvement with ITU-T included, among other things, work with the VCEG and the Joint Video Team (“JVT”) that developed the Advanced Video Coding Standard (“AVC”), which is also known as H.264. From 1995 to 2001, I attended a minimum of 8 standardization meetings every year, and was an active contributor in these meetings on behalf of Teles AG and the German National Body (i.e., the German delegation to the ITU-I, which is a sub-organization of the United Nations).

8. In short, I have extensive knowledge of the workings of the ITU-T’s video coding standardization groups, including (but not limited to) VCEG and its meetings, which I discuss below.

9. I provide additional detail regarding my experience and education in my CV, attached hereto as Appendix A.

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10. I was also employed by Nokia between 2004 and 2009. My work at Nokia is irrelevant to the issues discussed in this declaration, which relate to events in 2001 that predate my Nokia employment by several years. In preparing this declaration, I did not consider or rely on any information obtained during my time at Nokia.

III. PUBLIC AVAILABILITY OF Q15-K-30, VCEG-L13, AND VCEG-L28

11. In this section, I focus on the public availability of various documents submitted in connection with the VCEG, including Q15-K-30, VCEG-L13, and VCEG-L28 (collectively, the “VCEG Documents”).

12. I attended at least the following VCEG meetings in the 2000-2001 timeframe: Osaka (May 16-19, 2000), Portland (August 22-25, 2000), Eibsee (January 9-12, 2001), Austin (April 2-4, 2001), and Santa Barbara (September 24-27, 2000).

13. Documents submitted in connection with VCEG meetings (outside of the ITU-T Study Group 16-hosted meetings) in the 2000-2001 timeframe were named according to a certain convention. For VCEG meetings through the August 2000 Portland meeting, a document name began “Q15” (i.e., Question 15 of Study Group 16), was followed by a letter that would indicate which meeting the document was submitted in connection with (i.e., the meeting denoted with the letter “J” came right before the meeting denoted with the letter “K”), and then included a unique

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number to identify the particular document. After the August 2000 Portland meeting, VCEG meeting documents began with “VCEG” (rather than “Q15”) followed by the letter indicating the meeting and the unique number to identify the document. The document number for each document was assigned by the VCEG Rapporteur Dr. Gary Sullivan, or his designee, using a manual process. A document author would contact Dr. Sullivan with planned document titles and purpose (e.g., input contribution) to request a document number, which would then be transmitted to the author by email. Certain document numbers would, by convention, be assigned for certain purposes, but those conventions changed over time. For example, during the Santa Barbara (“N”) meeting of VCEG, the 00 document was the document list; the 01 document was the previous meeting’s report; the 02 and 03 documents were the list of participants of the “N” meeting and the list of experts maintained by the VCEG Rapporteur (to include mailing list subscribers, past participants, and so forth); documents 04 through 09 were ad hoc committee reports; documents 10 through 67 were regular contributions; documents 68 through 87 were late input contributions (often drafted during the meeting by breakout groups), output documents of the meeting, and such; and the final document 88 was the meeting report. Once an author had received a document number, he/she would then write the document with header information and filename according to the conventions described above, and upload it as described below.

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14. Documents submitted in connection with VCEG meetings typically included a “generated” date on the first page. The meaning of that date depended on the word processing tool the author used. Most authors used Microsoft Word as their authoring tool and a template distributed by Dr. Sullivan by email well before the meetings, in which case the “generated” date was the last date the document was saved by the author.

15. Q15-K-30 is a contribution entitled “Use of adaptive switching between two VLCs for intra luma coefficients,” which was submitted by Gisle Bjontegaard of Telenor Satellite Services in connection with the August 22-25, 2000 Portland meeting of the VCEG.

16. VCEG-L13 is a contribution entitled “Adaptive Codes for H.26L,” which was submitted by Detlev Marpe, Gabi Blättermann, and Thomas Wiegand of the Heinrich-Hertz-Institute in connection with the January 9-12, 2001 Eibsee meeting of the VCEG.

17. VCEG-L28 is a contribution entitled “VLC concatenation for Intra coding,” which was submitted by Rickard Sjöberg and Per Fröjdh of Ericsson Radio Systems AB in connection with the January 9-12, 2001 Eibsee meeting of the VCEG.

18. Based on my decades of participation in video coding standardization committees, including my role as representative of Teles AG and the German

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National Body as explained in Section II above, I have extensive personal knowledge regarding the procedures for publishing of video coding standardization-related documents and making them publicly available.

19. Accordingly, during the 2000-2001 timeframe, I can confirm that documents uploaded to the VCEG FTP server—including test model documents, contributions, and other documents—were very soon thereafter available for download at the same server to the public, including at least hundreds of individuals interested in the development of a video coding standard as of the upload date of the documents on the VCEG FTP server.

20. Prior to each meeting, the approximately 50 participants of the VCEG (at that time) had the option to submit “test model” documents, contributions, and other documents to be discussed at each upcoming meeting, and many exercised that option.

21. According to the procedures set forth around 1996 by the Low Bitrate Coding group’s Rapporteur, Richard Schaphorst, and reaffirmed throughout the existence of VCEG by VCEG’s Rapporteur, Dr. Gary Sullivan, documents to be discussed at a forthcoming meeting were to be uploaded or emailed for submission at least 10 working days before a given meeting. Members of the VCEG would upload documents to an FTP server’s dropbox or upload folder. The read-access to the upload folder of the FTP server was password-protected. On a regular basis, Dr.

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Sullivan, or his delegate, would review the documents uploaded to the FTP server's upload folder, check them for malware, ensure they were properly formatted and addressed subject matter in VCEG's realm, and make documents that passed all those tests publicly available within a folder of the FTP server for the meeting at which the document would be discussed. This folder did not (and does not, even today) require a username or password to access the documents contained therein; as noted below, the VCEG used anonymous FTP for downloading of documents, such that the folder was freely accessible by the public.

22. The documents made available in that timeframe include the specific VCEG Documents that I discuss below. I am personally familiar with the VCEG Documents, including because I reviewed them during the course of my participation in VCEG. I was also provided the VCEG Documents by counsel and also obtained these same documents from the current archive of the VCEG. Based on my review, the documents I obtained are identical to those provided by counsel. Further, the documents I obtained, and the documents provided by counsel, appear as they would have when they were initially made publicly available for download as of the dates listed below.

23. During the 2000-2001 timeframe in which the VCEG Documents were submitted in connection with various meetings of the VCEG, these documents were available for download from at least two different servers. First, the PictureTel

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company donated web server space and resources to the VCEG and other organizations. Thus, documents uploaded via the FTP server for VCEG meetings were accessible from the PictureTel servers at <http://standard.pictel.com/ftp/video-site>. Second, I maintained an archive of VCEG documents on a server hosted by the Technische Universität Berlin, where I was employed as an Assistant Professor. Thus, documents uploaded via the FTP server for VCEG meetings were also accessible during this time period from the university's servers at <http://kbs.cs.tu-berlin.de/~stewe/vceg>. My affiliation with TU Berlin ended in 2004; this server ceased to exist at some point after that.

24. Prior to 2003, the document distribution and archival system of the ITU-T itself was rarely used in the VCEG context. This was because the ITU infrastructure servers, while certainly accessible to large parts of the interested public—at least to employees of ITU Sector members, affiliates, and certain invited experts, for example, from academia—were not generally accessible to persons not in the above categories. Thus, VCEG and its predecessor organizations, with the consent of the Study Group hierarchy, decided early on that they wanted to receive the widest possible input from the public, including academia, open source developers, even hobbyists, and so forth, and hence decided to use the most open communication and distribution procedures technically feasible at the time, i.e., anonymous FTP.

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25. In 2003, the data hosted on the PictureTel servers was migrated to the ITU itself. Thus, the ITU itself now hosts the archives of the VCEG's activity, which can be accessed at <https://www.itu.int/wftp3/av-arch/video-site/>. In a document describing the migration process found in the VCEG archive at <https://www.itu.int/wftp3/avarch/Transfer%20of%20standards.pictel.com%20to%20ITU.htm>, Dr. David Lindbergh, the Rapporteur of a related Question in SG16 and the relevant manager at PictureTel at the time, noted that the site had been “operated as an anonymous FTP” (i.e., the site had been accessible to the public, without a password) “because each Question had (and has) at least some invited experts and other interested parties who were unable to access the official ITU-T Question sites.” EX1018. The ITU agreed to take over the site from PictureTel “on the same basis as before – via anonymous FTP.”

26. Since 2003, the ITU has occasionally adjusted the folder structure of the VCEG's activity, which can be accessed at <https://www.itu.int/wftp3/av-arch/video-site/>. In some cases, the adjustment followed the restructuring of the Study Group structure. For instance, the “video-site” sub-folder was created on April 15, 2020 (*see* <https://www.itu.int/wftp3/av-arch/>). Within that folder, the “h26l” sub-folder was created on March 9, 2010 (*see* <https://www.itu.int/wftp3/av-arch/video-site/>). And, within that folder, the “older_tml” subfolder was also created on March 9, 2010 (*see* <https://www.itu.int/wftp3/av-arch/video-site/h26L/>). Within

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each of these sub-folders, however, the ITU maintained the documents' original upload date to the PictureTel server (except for certain documents as noted below), and the documents as they appeared on that upload date.

27. During the 2000-2001 time period, after a document was uploaded, the submitter would generally also send an email message to the VCEG's email reflector to notify email recipients of the availability of the proposal. Email recipients were not limited to VCEG members. For instance, I understand that it was not unusual for individuals outside the ITU-T's membership to subscribe. Likewise, when I was employed at TU Berlin, students of mine were routinely subscribed to those reflectors, without being employed by an ITU member or having a different association beyond their subscription to the VCEG mailing list. That includes the 2000 to 2002 timeframe. Members of the general public were thus able to subscribe to the VCEG reflector, and routinely received emails from that reflector.

28. Sending such emails was common during the 2000-2001 timeframe, and I can personally recall sending such emails to notify VCEG participants of my own submissions. Electronic distribution of the document was the only widely used method of distribution; paper copies were discouraged in the 2000-2001 timeframe. I have personal knowledge of the processes of uploading documents for discussion at an upcoming VCEG meeting and the public availability of documents before and after a meeting. This is because I routinely submitted proposals and other documents

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in connection with VCEG meetings. For example, I personally authored or co-authored and uploaded the following documents in connection with the Portland meeting: Q15-K-04, Q15-K-52, Q-15-K-55, and Q15-K-58. I personally co-authored and uploaded the following documents in connection with the Eibsee meeting: VCEG-L33 and VCEG-L39. I also attended each of these meetings and obtained meeting-related documents for my personal review.

29. Prior to the VCEG meetings, participants of the VCEG could download the submissions for their own review in preparation for the meeting. Before VCEG meetings, I regularly downloaded meeting documents well before the meeting, printed them, and studied them before the meeting. This includes my own documents, which I downloaded and checked to verify correct upload.

30. VCEG used informally, in the 2000-2002 timeframe, many types of documents addressing many different needs of VCEG. Examples include meeting reports, ad-hoc committee reports, input proposals towards the test model, informational documents, and various output documents. While the document headers and boilerplate were generally similar, the deliberations that took place in VCEG were different from document type to document type. Reports were generally noted and occasionally corrected, in which case a new version with the same document number but a different revision number was created. The technical merits of input proposals towards the test model were discussed, sometimes revised

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(which often led to resubmission with a different revision number), and finally accepted, recommended for further study, or rejected. Informational documents were generally presented and noted during the meetings. Output documents were approved or generated as a result of discussions had during the meeting.

31. In the relevant timeframe and for the H.26L project, VCEG did not distinguish between a draft standard and a test model document. Instead, the group maintained a Test Model Long-Term “TML” document, which was an output document of each meeting and usually received the second-highest meeting document number of each meeting, the highest being reserved for the meeting report.

32. VCEG further maintained a software package that was also known as Test Model Long-term or TML. It was generally attempted to keep the TML software aligned with the TML document.

33. Because the VCEG’s activities were intended to be public, the Rapporteur and other members would periodically publish in technical journals summaries of the VCEG activities. For example, Dr. Gary Sullivan published in well-known technical journals articles summarizing some of the work of the VCEG, which helped inform the larger public about the efforts of the VCEG. As one example, Dr. Gary Sullivan, Thomas Wiegand, and Thomas Stockhammer published an article entitled “Using the Draft H.26L Video Coding Standard for Mobile Applications” in the 2001 Proceedings of the IEEE International Conference on

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Image Processing. EX1014. This conference was held in October 2001. In that article, the authors specifically point interested readers to the PictureTel server and the Technische Universität Berlin server where “information, documents and software for the” H.26L project can be found. Persons interested in the development of multimedia and video coding standards would have reviewed articles associated with the IEEE International Conference on Images Processing to keep abreast of developments in such topics, and thus would have had reason to review Dr. Sullivan’s article about H.26L.

34. In addition, I am aware of several articles published in well-known technical journals, and a leading textbook on video codec design, that acknowledge that TML-6 was available to those interested in the development of multimedia and video coding standards in “March 2001.”¹ For example, Markus Flierl, Thomas Wiegand, and Bernd Girod published an article entitled *Multihypothesis Pictures for H.26L* in the 2001 Proceedings of the IEEE International Conference on Image Processing. EX1017. This conference was held in October 2001. In that article, the

¹ See Ushashree (EX1015), *Video Compression Based on RMB*, International Journal of Electronics Communication and Computer Engineering (2013) at 57, 60; Richardson (EX1016), *Video Codec Design: Developing Image and Video Compression Systems* (2002) at 92.

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authors specifically cite VCEG-L45d0 with a “Mar. 2001” publication date, and point interested readers to the PictureTel server. EX1017 at 1, 3.

35. Additionally, from its inception, the VCEG had a general policy of making VCEG documents publicly available. Thus, at least during the 2000-2001 timeframe, VCEG documents uploaded onto the VCEG’s servers would have been mirrored to and available for download from other websites by the public, including at least hundreds of individuals interested in the development of multimedia and video coding standards. By way of example, while an individual company would have one or two participants at a given VCEG meeting, those participants frequently worked with numerous colleagues at their company. For instance, I shared not only my own but also other meeting documents related to the VCEG’s work with my students at TU Berlin. Those colleagues were frequently interested in the development and progress of the VCEG’s work and would regularly obtain and review documents and test models submitted for discussion at VCEG meetings.

36. Consistent with the general policy of VCEG, there were no restrictions for downloading documents available from the VCEG sites during the 2000-2001 timeframe, including the VCEG Documents. Indeed, as I note above, one of the locations at which the VCEG documents were available to download was a server hosted by the Technische Universität Berlin under my academic account, and I imposed no restrictions on downloading documents from that location. Moreover,

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based on my knowledge and recollection, given the relevance of the VCEG in the video coding industry, persons interested in tracking the developments of the latest video coding standard would regularly visit the VCEG sites to ensure that products and services they were developing were consistent with the standards under development. In fact, I and many of my colleagues would regularly review submissions from each meeting from the VCEG websites.

37. Thus, in my opinion, individuals interested in the art of video coding would have known and appreciated in the 2000-2001 timeframe that the documents on the VCEG site represented the latest developments in the standards being developed by the VCEG, including the “H series” of ITU-T Recommendations noted above. For example, any individuals interested in the art of video coding would have known that the test models, contributions, and other documents discussed at VCEG meetings would have represented and included details of the technologies relating to the standard under development, including technologies that had the potential to make their way into the standard under development. A person interested in video coding technologies would have known to review these documents for proposals of interest that were discussed at a given meeting and navigate to the folder for the meeting on the VCEG site to view and download documents of interest, including documents with revision codes. This would have led such a person to the VCEG Documents discussed in this declaration.

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38. Accordingly, the current archive of the VCEG website, now hosted by the ITU itself, indicates that each VCEG Document was uploaded as of a given date, and thus available for download as of that same date. In my opinion, each VCEG Document listed in the chart below would have been publicly available no later than the Upload Date for that document, as confirmed by the Upload Date for that document listed at the accompanying Upload Address in the chart for the relevant video-site subfolder:

Document	Upload Address	Upload Date
Q15-K-30	https://www.itu.int/wftp3/av-arch/video-site/0008_Por/q15k30.doc	August 16, 2000
VCEG-L13	https://www.itu.int/wftp3/av-arch/video-site/0101_Eib/VCEG-L13.doc	January 8, 2001
VCEG-L28	https://www.itu.int/wftp3/av-arch/video-site/0101_Eib/VCEG-L28.doc	January 3, 2001

IV. SUPPLEMENTATION OF CONCLUSIONS

39. I reserve the right to supplement my conclusions in the future to respond to any arguments that the Patent Owner raises and to take into account new information as it becomes available to me. I may supplement or amend my conclusions, and bases for them, in response to any opinions offered by the Patent Owner's experts. I may also supplement or amend my conclusions, and bases for them, in light of additional evidence, testimony, discovery, arguments on the part of the Patent Owner, or additional information I may become aware of after the date of

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this declaration. I may also prepare appendices, demonstrative appendices, summaries, tutorials, demonstrations, charts, drawings, tables, or animations to supplement or demonstrate my conclusions as appropriate.

V. AVAILABILITY FOR CROSS-EXAMINATION

40. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested 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.

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APPENDIX A

Dr. Stephan Wenger – Curriculum Vitae

Born: 23 March 1965

- 30+ years of experience in research and standardization, intellectual property generation and use, and hardware and software development.
- Bi-lingual in English and German, with considerable experience in running projects involving multi-lingual staff from different cultural backgrounds and across time zones.
- Excellent communication and presentation skills, strong team leader and motivator.
- Expert on patent policy and patent licensing issues. Represented employers and clients in several IPR working groups of standard setting organizations including ITU-T, IETF, and W3C, and in several patent pools. Active in bi-lateral IP transactions. Also experienced in open-source policy issues.
- Internationally recognized expert in multimedia standardization. Active in ITU-T, IETF, ISO/IEC/MPEG, and AOM. In-depth knowledge of IETF and ITU-T standards on multimedia conferencing.

EMPLOYMENT

2018 – present Sr. Director IP and Standards, Tencent America L.L.C. (www.tencent.com)

Co-heading Tencent MediaLab's Standard Center, comprising four teams with 30 employees, with line management and budget responsibility. Responsible for Tencent's activities related to MPEG's systems and requirements groups, JVET's High-Level Syntax, media-related activities of 3GPP and the IETF, and related patent work. (Co-)inventor of more than 100 standards essential patents. Active in the ITU's IPR working group. Active in patent monetarization efforts including patent pool setup discussions as well as in patent submissions to pools. Claim chart drafting. Supervising academic consultants and sponsorship of academic projects. Moderator of the IETF IPR mailing list. IETF Trustee. Board member, Corporate Secretary, and chairman of the IP Ecosystem Working Group of the Multimedia Coding Industry Forum (MC-IF). Alternate Board Member of the Alliance for Open Media.

2011 – 2018 VP IP and standards, Vidyo, Inc. (www.vidyo.com)

Responsible for patent portfolio development and management for media coding and standards essential patents. Selection of inventions to be patented, setting prosecution strategy, steering prosecution, mapping standards essential patent claims to standard, submitting patents to pools, declaring to SDOs where needed. Responsible for all patent in- and out-licensing, including handling of patent assertions, review and participating in business agreement discussions with an emphasis on IPR matters, pool in- and out-licensing. Attending technical standards meetings (IETF, JCT-VC, JVET, approximately 7 meetings per year, world-wide) to influence forthcoming standards to reflect Vidyo's business needs. Active in IPR policy development, for example advised on resolving IPR policy incompatibilities in the merger of the Unified Communication Interoperability Forum (UCIF) with the International Multimedia Teleconferencing Consortium (IMTC), and following (and sporadically commenting and attending) ITU's IPR policy working group. Moderator of the IETF's IPR mailing list and one of the most active participants. Internal training of potential inventors on patent matters and IPR related conduct in standardization. Contribute to open-source clearing requests by engineering. Budget responsibility (including external counsel budget) for all above matters. Reporting to the CEO.

2009 – 2013

CTO, VidyoCast

Responsible for the strategic aspects of a new product, developed by a small, but rapidly growing and well-funded startup in the field of telecommunication. Tasks include general research in the field, oversight of hardware and software development, standardization, the development of a patent portfolio, documentation, and customer contact. Also active in sister company Vidyo (desktop video conferencing supplier), responsible for patent prosecution, portfolio management, and licensing. From 2011 onwards, increasingly active in sister company Vidyo. VidyoCast was integrated into Vidyo in 2013,

2007 – 2009

Senior IPR Manager, Nokia, Mountain View, CA, USA (<http://www.nokia.com>)

Responsible for managing Nokia's patent Portfolio of standard-essential cases produced by international standardization organizations such as the ITU-T, OMA, IETF, W3C, and OASIS, among others. Developed strategies related to licensing and portfolio development specifically related to codec standardization. Reviewed hundreds of patent cases in a litigation context so to identify standard-essentials for both offensive and defensive use. Created a centralized repository, in the form of a Wiki, of the standards-essential cases in Nokia's patent portfolio. Responsible for patent policy work in many SDOs, including ASNI, ATIS, ATSC, IETF, ITU, W3C and many others. Provided opinions on the risks and benefits of joining an SDO both from a legal and a business background and cleared join/leave requests as well as key contributions to SDOs with a mandatory royalty-free licensing obligation in their policy. Provided training and on-site support (including real-time patent application drafting) to SDO delegates in half a dozen SDOs. Represented Nokia in the Open Web Foundation.

2005 – 2007

Adjunct Professor – Tampere University of Technology, Finland

Part-time Adjunct Professor (Docent) at TUT. Supervised two MSc theses since July 2005. Taught SGN3156 "Video Compression" in Fall/Winter 2005. Research activities are performed primarily in Nokia.

2004 – 2007

Principal Scientist – Nokia Research Center, Tampere, Finland

Project and later personnel responsibility. Applied for ~15 patents in 20 months. Authored or co-authored six journal or conference papers. Standardization delegate to IETF (RAI and Transport Areas, AVT, MMUSIC, FECFRAME, and other WGs). Liaison officer from IETF to MPEG. Active in 3GPP SA4. Delegate to ITU-T SG16 (Q.1, 2, 3, 6). From mid 2005 increasingly involved in the interface between research and legal/IPR. Key contributor to projects covering defensive and offensive patent issues related to strategic litigation. Also involved in licensing negotiations with three companies. Reviewed dozens of patents and patent applications, both in the context of Prior Art searches for own patent applications and related to legal/licensing activities in Nokia. On own initiative, created half-day course on patent matters for engineers, focused on the understanding of the patent creating process, Prior Art search, claim language, essentiality, and equivalence. Enabled the donation of Nokia's H.264 source code by selecting an appropriate open-source license and clearing the donation with management.

1995 – 2006

Incorporator/President – Teles Communications Corp, San Francisco, CA, USA

Incorporated Teles Corp., and, together with the first President, hired staff, rented office space, and set up the operations. Started work on product adaptation of Teles/Germany ISDN and video conferencing products for the US market. Left the US in late 1996 after a fully functional business including sales, marketing, engineering, and administration was established, and the company was acquired by Teles/Germany. Sent back to the USA by the German headquarters in early 1998 as a last-minute effort to generate sales. For a short time managed a team of 20, including sales, marketing, engineering, and administration. Closed the company because of the discontinuation of the ISDN-PC-board products, supervised the sale of inventory and assets, laying off the remaining staff, and taking care of the necessary legal steps.

1989 – 2001 Project Manager and Strategic Advisor, Teles AG, Berlin, Germany (<http://www.teles.de>)

Managed projects of various sizes in the field of video conferencing and video telephony applications – mostly PC-based. As part of PhD thesis led a team of 10 engineers to implement a Transputer-based video-mixing H.231-compliant MCU. Led a team of 8 engineers in designing the first software-only PC-based H.320-compliant video telephony terminal. This system was later enhanced to support the then emerging H.323 recommendation. Acquired, negotiated for, and led two projects to sell the resulting H.320/H.323 protocol stacks to other companies in Germany and in the USA that used it as a rapid prototyping tool for demonstration purposes of their video hardware. The larger one of these projects involved a staff of 15 engineers from three companies in Los Gatos, CA USA, Burlingame, CA USA, and Berlin, Germany. From 1995 on attended 8+ standardization meetings every year, world-wide, and contributed to these meetings on behalf of Teles AG and the German National Body. Advised the CTO and the Teles AG board on standardization and patent matters.

1990 – 2002 Assistant Professor – Technische Universität Berlin, Germany

As a “wissenschaftlicher Mitarbeiter” and later “wissenschaftlicher Assistent” taught undergraduate and graduate students, supervised more than 20 Diploma Theses (roughly corresponding to Master’s Thesis), and managed a team of up to 20 research and teaching assistants. In 1998, took a one-year sabbatical and taught at University of British Columbia in Vancouver, British Columbia, Canada.

1987-1998 Software/Firmware Engineer, Fraunhofer-Institut für Werkzeugmaschinen und Fertigungstechnik, Berlin, Germany

Started as a student employee, was quickly elevated to junior engineering pay scale while continuing undergraduate studies. Worked on user interfaces for tool machines. Introduced C-language to the development group (until then all development work was performed using 68K assembler).

- 1987 Programmer, self-employed

As a high school and undergraduate student started a business that implemented specialized CP/M, Apple-II and PC-based commercial/accounting software. Successfully implemented a software package for hotel management (320000 lines of code) that was sold to three hotels in Spain. Also worked on a software package for a shoe import company in Germany (220000 lines of code). Business was taken over by a partner in 1987.

CONSULTING ACTIVITIES (part time)

1997 – present Expert witness on video coding patent matters

Provided written testimony and depositions related to document availability of standardization documents, and certain technical matters in proceedings related to video coding and system layer patents pending before a German Bundespatentgericht (Federal Patent Court), the U.S. Patent Trial and Appeals Board of the USPTO, and the US International Trade Commission.

2009 – 2017 Board advisor –eBriskVideo, Vancouver, BC, Canada

Helped founding the company. Was involved in strategy setting for the business and its IPR and standardization activities. Especially early on, evaluated and commented on hardware and software architectures. Prosecuted standard-essential patents. With a colleague, sold the standard-essential patent

portfolio at the right time and for the right price. eBrisk Video was successfully acquired by Intel in summer 2017.

2000 – 2005 Director – UB Video, Inc, Vancouver, BC, Canada

Helped founding the company. Provided input on business, procedural, legal, marketing, and technology issues. Worked with the engineers, marketing, and management to create the world leader in H.264 based video compression technology. Personally acquired one strategic customer and helped in negotiations with several others. Represented UB Video in many standardization meetings, and in meetings of two patent pools in formation. Stayed on the BoD until the successful acquisition by Scientific Atlanta/Cisco in November 2005. Had a key role in the acquisition process, especially with respect to the due diligence of UB Video's extensive IPR portfolio.

2002 – 2004 TeleSuite Inc, Englewood, OH, USA (<http://www.telesuite.com>)

Was contracted to advise the company on the design of a new, high-end H.264 video conferencing endpoint (8 DSPs, screen resolution of 2560 x 480, custom designed camera, codec, and data projectors). Was then hired to manage the project. Wrote an initial spec sheet for the video compression engine, the audio environment, the network infrastructure, and the overall system design. Hired and supervised an engineering team. Identified, negotiated with, and contracted two external companies for hardware development and video compression engine. Wrote low-level spec sheets for most of the essential interfaces within the design and supervised the contracted companies and the engineers to adhere to those specifications. Also wrote initial draft marketing material for the new technology and presented the technical aspects of the new design to investors and board members of TeleSuite. Identified the patentable parts of the technology and filed two patent applications.

2001 – 2003 Companies interested in a Royalty Free Baseline of the forthcoming JVT/H.264 standard

Together with two other world-renowned experts in the field, conducted an extensive study on the applicable IPR that may be infringed by unlicensed use of H.264 baseline. Convinced some ten companies to join the political efforts by offering royalty-free license or a non-assert covenant. Made technical and procedural contributions to the standardization committee for the removing of the draft standard features that would require licenses by those companies that were not willing to license their IPR royalty free. Fought the political battles to make those contributions pass, despite substantial resistance from some of the largest companies in the field. Reviewed, with the help of other technical and legal experts, more than 200 patents, and hundreds of academic publications and standardization contributions.

2001 – 2003 Polycom Inc, Video Group, Austin, TX, USA (<http://www.polycom.com>)

Worked with the technical staff to push a very controversial video coding tool (on which Polycom owns IPR) into the ITU-T Recommendation H.264. Implemented the required reference software, by changing the old reference design, which amounts to several 100,000 lines of code. Conducted an intensive study of the features according to the test plan agreed to by the committee. Wrote 200+ pages of justification documents and two academic publications on the issue. Traveled to four key opponents of the new technology and lobbied for it. Successfully completed the project by helping to arrange a political compromise in the standardization committees in question.

1999 – 2004 Polycom Network Systems, Tel Aviv, Israel

Trained the signal processing staff of Polycom Israel (formerly Accord networks) on forthcoming video compression technologies, namely some modes of H.263+, H.263++, MPEG-4 advanced simple profile, and JVT/H.264. Conducted an extensive study on error concealment schemes for coded video, and wrote a report, that led to the implementation of the recommended scheme into a product design. Implemented a software simulation environment for audio error concealment, and conducted a study on audio concealment schemes for erasure environments with varying packet loss rates, and assuming six different audio

compression schemes. Advised the company about new technologies in the field of IP based video conferencing, namely of the SIP protocol developed in the IETF, and introduced company personnel to the key members of this committee.

1999 – 2001 Cisco Systems, Inc., San Jose CA, USA (<http://www.cisco.com>)

Worked with senior management on a strategic technical decision in the Softswitch technology field that ultimately resulted in the acquisition of a company worth several hundred millions of dollars.

1999 – 2004 LG Electronics, Seoul, Korea (<http://www.lg.co.kr>)

Helped training new team members on advances in video compression, audio compression, and transmission of multimedia content over IP and over 3GPP networks. Created and maintained a 400+ slides presentation and a 200+ page textbook document on these topics. Evaluated CVs and performed interviews for new team members in Korea and in the USA.

1998 Philips Multimedia Research Center, Palo Alto, CA, USA (<http://www.philips.com>)

Helped the company to select an appropriate product reference design for their new TriMedia chip for a video-telephony and video conferencing application.

1996 – 1998 Array Microsystems, Inc, Los Gatos, CA, USA (<http://www.array.com>)

Helped the fab-less semiconductor company to embed their low cost video compression hardware into a commercial H.320 protocol stack. Was involved in the hiring of experts in the technology, including performing interviews and reviewing CVs. Coordinated the work of two development teams located in Germany and in California.

1996 – 1997 Siemens AG, München, Germany (till 1996) (<http://www.siemens.com>)

Created an 80 page study on the effectiveness and error resilience impacts of the H.263 and (then forthcoming) H.263+ optional modes for video conferencing applications. Helped select the appropriate set of compression tools for the (later abandoned) video compression chip project. Worked together with Siemens personnel on a detailed spec sheet for the design.

1994 – 1996 Creatix Polymedia GmbH, Saarbrücken, Germany

Designed a prototype of an H.320 desktop video conferencing solution, consisting of a special VGA board with on-board frame grabber, device drivers, an H.261 video codec, G.711 and G.722 audio codecs. Led a team of four engineers and several external consultants. Negotiated the purchase of a software library for H.320 protocol suite and for video compression technology.

EDUCATION :

1995

Dr.-Ing. (PhD) in Computer Science, Technische Universität Berlin, Grade: sehr gut (corresponding to A)

1989

Diplom-Informatiker (equivalent to MS), Technische Universität Berlin, Grade: sehr gut (corresponding to A)

1985

High School Diploma from Friedrich-Bährens-Gymnasium, Schwerte, Germany

INTERESTS : Multimedia and Compression
Skiing, Mountaineering, Hiking
Travel, good food and wine
Private pilot with instrument rating

AFFILIATIONS: Member IEEE, ACM, VDI
Member of K.A.V. Suevia im CV (Fraternity in Berlin, <http://www.suevia-berlin.de>)