

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner

v.

WILDSEED MOBILE, LLC,
Patent Owner

Case IPR2023-00248
U.S. Patent No. 7,376,414

DECLARATION OF DR. SAM MALEK

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I, Dr. Sam Malek, declare under penalty of perjury as follows:

I. INTRODUCTION AND BACKGROUND

1. I have been retained as an expert witness by Wildseed Mobile, LLC (“Wildseed”) and have been asked to provide my expert opinions regarding U.S. Patent No. 7,376,414 (EX1001) (the “’414 Patent” or the “Patent in Review”) currently under review by the Patent Trial and Appeal Board (PTAB). Specifically, I have been asked to consider the patentability of the Patent in Review as of its priority date.

2. I have been asked to provide an opinion as to whether claims 1-7 and 9-14 of the ’414 patent are rendered obvious by the combination of U.S. Patent No. 6,684,249 (“Frerichs” or “the ’249 patent”), U.S. Patent Application No. 2007/0083886 (“Kauffman” or “the ’886 app”), and U.S. Patent No. 6,539,375 (“Kawasaki” or “the ’375 patent”).

3. I understand that the PTAB has instituted *inter partes* review (“the IPR”) regarding the patentability of the Patent in Review, with Google LLC as Petitioner, and Wildseed Mobile LLC, as Patent Owner.

4. I understand that a related pending litigation entitled, “Wildseed Mobile LLC v. Google LLC and YouTube LLC,” Case No. 3:22-cv-04928, in the United States District Court Northern District of California, San Francisco Division, has been stayed pending this IPR.

5. In this declaration I provide my independent analysis of the '414 patent in light of the materials cited below and my knowledge and experience in this field during the relevant time frame. I have been asked to consider what one of ordinary skill in the art at the time of the invention of the '414 patent (a "POSITA"; refer to IV below) would have understood from the specification, including scientific and technical knowledge related to the patent. I have also been asked to consider whether certain references disclose or render obvious the invention described by claims 1-7 and 9-14 of the '414 patent.

6. My findings, as explained below, are based on my study, experience, and background in the fields discussed below, informed by my education in computer science and web-based design, and my extensive experience in the fields of browser-based user interfaces and network services. I have also relied on my review and analysis of the prior art, information provided to me, and information that I have independently reviewed.

7. I am being compensated for my independent analysis as an expert with respect to this *inter partes* review proceeding at my standard hourly rate of \$700, but my compensation is not contingent in any way on the content of my analysis or the outcome of this proceeding. I have no financial interest in Petitioner (Google LLC) or Patent Owner (Wildseed) and I have no financial interest in the challenged patent.

II. QUALIFICATIONS

8. Details of my professional qualifications and background are set out in my Curriculum Vitae (EX2010).

9. I have over two decades of experience in the general area of computer and software technology in a variety of roles, including as a software engineer, software architect, and programmer at a variety of companies, as well as a researcher and professor at several universities.

10. I am currently a Full Professor of Software Engineering with tenure in the School of Information and Computer Sciences at the University of California, Irvine (“UCI”). At UCI, I am also the Director of the Institute for Software Research (“ISR”) and the Software Engineering and Analysis Laboratory (“SEAL”). I have served as the principal investigator of several federally funded research projects totaling more than ten million dollars. Before UCI, I was an Associate Professor at George Mason University (“GMU”). I formerly worked as a researcher at the University of Southern California (“USC”).

11. I have extensive formal training in the general fields of computing and technology. In 2000, I earned a B.S. degree in Information and Computer Science from UCI. In 2004, I received a M.S. degree in Computer Science from USC. In 2007, I received a Ph.D. in Computer Science, also from USC. My PhD dissertation was in the general area of distributed software systems, and

specifically resulted in new algorithms and an architectural middleware for effective deployment of a component-based software system among a distributed set of computing nodes. I have received numerous awards for my scientific contributions to the field of Computer Science, including Test of Time Award in 2020 from the Association for Computing Machinery, CAREER award from the National Science Foundation in 2013, Emerging Researcher/Scholar/Creator award from GMU in 2013, and Computer Science Department Outstanding Faculty Research award from GMU in 2011. Software systems and results produced in my research lab have been adopted for use by various organizations in both private (*e.g.*, Boeing, Bosch) and public (*e.g.*, NASA, DHS, FBI) organizations. I am a member of the Association for Computing Machinery ("ACM"), ACM Special Interest Group on Software Engineering ("SIGSOFT"), and the Institute of Electrical and Electronics Engineers ("IEEE").

12. My research is in the field of software engineering, and to date my focus has spanned the areas of software design and architecture, distributed and embedded systems, smartphone and mobile computing, internet and web technologies, middleware, service-oriented computing, autonomic computing, software testing and analysis, and software dependability and security. My research has produced more than 120 manuscripts that have been published in

peer-reviewed scientific conferences and journals. These publications have been highly cited (more than 10,000 times according to scholar.google.com).

13. I also have several years of experience as a software engineer, software architect, and programmer at a variety of companies, including the Boeing Company, PricewaterhouseCoopers Consulting (later acquired by International Business Machines ("IBM") Corporation), FieldCentrix, and Neural Computing Systems Lab. During my tenure in the industry, I gained professional experience in the design, development, and management of large-scale software engineering efforts.

14. I have extensive prior knowledge and experience in the subject matter of the technology at issue in this case. Among others, at PricewaterhouseCoopers Consulting, I worked as a software engineer on several software development projects involving the development of web-based applications using HTML, JavaScript, Java Applet, Java Servlet, and several other related technologies. I also developed enterprise Java-based applications on top of web application servers and containers. At Boeing Corporation, I worked on the development of autonomous aerial vehicles (nowadays commonly referred to as drones) as part of a military modernization program. These drones were designed to produce high-resolution multimedia feed. In addition to my professional experience in the industry, I have conducted research and published heavily in the subject matter of the patented

technology. For example, I was one of the principal investigators in a research project sponsored by the National Science Foundation, entitled “SASSY:Self-Architecting Software Systems,” which aimed to develop a solution for dynamically composing a software system through automated discovery and coordination of web services. This work involved development of new modeling languages and runtime environments for enabling web services to interoperate, communicate, and coordinate their activities.

15. I also regularly teach courses related to the subject matter of the patented technology at my university. At the graduate level, I regularly teach a course on Distributed Software Architectures, and at the undergraduate-level, I regularly teach a course on Internet Applications Engineering. In these courses, I cover topics related to the patented technology including HTML, CSS, JavaScript, Java, React, NodeJS, database programming, web services, web servers, application servers, and web containers.

16. Because of my background, training, and experience, I am qualified as an expert in the technical areas relevant to the '414 patent.

III. LEGAL PRINCIPLES

17. I am not an attorney and have not been asked to offer my opinion on the law. However, I understand that I am obliged to follow existing law. I have therefore been asked to apply the following legal principles in my analysis.

18. I understand that in an *inter partes* review proceeding the party challenging the patent's validity must prove by a preponderance of the evidence that the patent claims are invalid.

19. I understand that validity based on novelty, *i.e.*, anticipation and obviousness is governed by 35 U.S.C. §§ 102–103 (Pre-AIA) which read as follows:

35 U.S.C. 102 (PRE-AIA) CONDITIONS FOR PATENTABILITY;
NOVELTY AND LOSS OF RIGHT TO PATENT

A person shall be entitled to a patent unless —

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or
- (c) he has abandoned the invention, or
- (d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or
- (e) the invention was described in — (1) an application for patent, published under section 122(b), by another filed in the United States

before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language; or

(f) he did not himself invent the subject matter sought to be patented, or

(g) (1) during the course of an interference conducted under section 135 or section 291, another inventor involved therein establishes, to the extent permitted in section 104, that before such person's invention thereof the invention was made by such other inventor and not abandoned, suppressed, or concealed, or (2) before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it. In determining priority of invention under this subsection, there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

[35 U.S.C. § 102.]

35 U.S.C. 103 Conditions for patentability; non-obvious subject matter.

(a) A patent may not be obtained though the invention is not

identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

(b)

(1) Notwithstanding subsection (a), and upon timely election by the applicant for patent to proceed under this subsection, a biotechnological process using or resulting in a composition of matter that is novel under section 102 and nonobvious under subsection (a) of this section shall be considered nonobvious if-

(A) claims to the process and the composition of matter are contained in either the same application for patent or in separate applications having the same effective filing date; and

(B) the composition of matter, and the process at the time it was invented, were owned by the same person or subject to an obligation of assignment to the same person.

(2) A patent issued on a process under paragraph (1)-

(A) shall also contain the claims to the composition of matter used in or made by that process, or

(B) shall, if such composition of matter is claimed in another patent, be set to expire on the same date as such other patent, notwithstanding section 154.

(3) For purposes of paragraph (1), the term "biotechnological process" means-

(A) a process of genetically altering or otherwise inducing a single- or multi-celled organism to- (i) express an exogenous nucleotide sequence, (ii) inhibit, eliminate, augment, or alter expression of an endogenous nucleotide sequence, or (iii) express a specific physiological characteristic not naturally associated with said organism; (B) cell fusion procedures yielding a cell line that expresses a specific protein, such as a monoclonal antibody; and (C) a method of using a product produced by a process defined by subparagraph (A) or (B), or a combination of subparagraphs (A) and (B).

(c)

(1) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.

(2) For purposes of this subsection, subject matter developed by another person and a claimed invention shall be deemed to have been owned by the same person or subject to an obligation of assignment to the same person if —

(A) the claimed invention was made by or on behalf of parties to a joint research agreement that was in effect on

or before the date the claimed invention was made;

(B) the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement; and

(C) the application for patent for the claimed invention discloses or is amended to disclose the names of the parties to the joint research agreement.

(3) For purposes of paragraph (2), the term "joint research agreement" means a written contract, grant, or cooperative agreement entered into by two or more persons or entities for the performance of experimental, developmental, or research work in the field of the claimed invention.

35 U.S.C. § 103.

20. I understand that to be patentable, an invention must not have been obvious to a person of ordinary skill in the pertinent art at the time the invention was made. A claim is invalid for obviousness if the differences between the subject matter sought to be patented and the prior art are such that that the claimed subject matter as a whole would have been obvious, at the time the invention was made, to a person having ordinary skill in the art to which that subject matter pertains.

21. In determining whether a claimed invention is invalid for obviousness, one should consider the scope and content of the prior art, the level of ordinary skill in the relevant art, the differences between the claimed invention and the prior art, and whether the claimed invention would have been obvious to one of ordinary

skill in the art in light of those differences. I understand that hindsight must not be used when comparing the prior art to the invention for obviousness. I understand that it is improper to stitch together an obviousness finding from discrete portions of prior art references without considering the references as a whole.

22. Obviousness may be shown by demonstrating that it would have been obvious to modify what is taught in a single piece of prior art to create the patented invention. In addition, obviousness may be shown by showing that it would have been obvious to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of one of ordinary skill in the art, multiple approaches and rationales may be considered, including:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique to improve similar devices, methods, or products in the same way;
- Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;

- Applying a technique or approach that would have been “obvious to try” (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; or
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

23. I understand that in order for a prior art combination to render a claim obvious, the cited references must disclose each element of the challenged claim, alone or in combination. Additionally, there must have been some motivation to combine the asserted prior art, and the proposed combination would have rendered the patented claims obvious. I also understand that hindsight is inappropriate, as obviousness must be evaluated at the time of the invention. As part of my obviousness analysis, I have considered the scope and content of the prior art. I also considered whether any differences between the alleged invention and the

prior art are such that the subject matter, as a whole, would have been obvious to a POSITA.

24. It is my understanding that to demonstrate unpatentability, the burden is on the Petitioner to demonstrate that their prior art references must disclose, teach, or suggest all limitations of a given claim. To the extent that the cited references do not disclose, teach, or suggest the limitations of an independent claim, then those references also do not disclose, teach, or suggest all the limitations of any dependent claims depending therefrom.

IV. PERSON OF ORDINARY SKILL IN THE ART (“POSITA”)

25. I understand that the teaching of the prior art is viewed through the eyes of a POSITA. Counsel for Wildseed has informed me that a person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. In my opinion, the relevant field of art for the patents-in-suit is that of inserting advertisements into broadcast content played on a mobile device. EX1001, 1:15-17. I have also been informed by counsel for Wildseed that the person of ordinary skill is generally familiar with the type of problems encountered in the field and the prior art solutions to those problems and possesses an ordinary level of creativity.

26. For purposes of this declaration, Counsel for Wildseed has asked me to use the date of U.S. Provisional Application No. 60/290,592, filed May 11,

2001, as the priority date. Counsel for Wildseed has informed me that Petitioner has asserted that the '414 patent may not be entitled to claim priority to the provisional application, such that the priority date of the '414 patent may be May 10, 2002.

27. For purposes of this declaration, I have applied Petitioner's definition of a POSITA and level of ordinary skill. *See* Pet., 15-16.

28. Petitioner's definition of a POSITA and level of ordinary skill can also be found in Dr. Houh's Declaration at paragraph 21.

V. METHODOLOGY

29. In arriving at my opinions, I relied upon material that I reviewed as part of my investigations and my analyses.

30. In preparing this Declaration, I have considered the claims, specification, and prosecution history of the '414 patent. As part of my analysis for this Declaration, I have considered my own knowledge and experience, including my work and experience with computer science, computer networking, distributed systems, multimedia streaming, distributed multimedia systems, email, messages, advertising, artificial intelligence neural networks, and programming. Additional materials that I have reviewed in preparing this declaration include the following documents:

Paper/Exhibit No.	Description
2	Petition for <i>Inter Partes</i> Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 and Exhibits (“Petition”)
10	Decision - Granting Institution of <i>Inter Partes</i> Review (“Decision”)
1001	U.S. Patent No. 7,376,414
1002	Prosecution History of U.S. Patent No. 7,376,414
1003	Declaration of Dr. Henry Houh, under 37 C.F.R. § 1.68 in Support of Petition for <i>Inter Partes</i> Review and Exhibits (“Houh” or “Houh Declaration”).
1004	U.S. Patent No. 6,684,249 to Frerichs et al. (“Frerichs”)
1005	U.S. Patent No. 6,539,375 to Charles Kawasaki (“Kawasaki”)
1006	U.S. Patent Pub. No. 2007/0083886 by Kauffman et al. (“Kauffman”)
2010	Curriculum Vitae of Dr. Sam Malek
2011	Deposition Transcript of Dr. Henry Houh (“Houh Dep. Tr.”)
2012	Abstract from Zell et al., “SNNS (Stuttgart Neural Network Simulator),” <i>Neural Network Simulation Environments, The Kluwer International Series in Engineering and Computer Science</i> , Vol. 254; pp. 165-186 (1994), accessible at https://link.springer.com/chapter/10.1007/978-1-4615-2736-7_9 (last accessed September 14, 2023)
2013	Matney, L., “Google introduces Neural Networks API in developer preview of Android 8.1,” TechCrunch, October 25, 2017, accessible at https://techcrunch.com/2017/10/25/google-introduces-neural-networks-api-in-developer-preview-of-android-8-1/#:~:text=Google%20introduces%20Neural%20Networks%20API%20in%20developer%20preview%20of%20Android%208.1,-Lucas%20Matney%40lucasmtny (last accessed September 13, 2023)

Paper/Exhibit No.	Description
2014	“PDA Review: Ericsson R380 Smartphone,” Geek.com, November 24, 2000, archived by the Internet Archive on February 16, 2001, accessible at https://web.archive.org/web/20010216041714/http://www.geek.com/hwswrev/pda/ericr380/ (last accessed September 13, 2023)
2015	“About Us,” vlingo, archived by the Internet Archive on October 17, 2007, accessible at https://web.archive.org/web/20071017040005/http://www.vlingo.com/management.html (last accessed September 13, 2023)
2016	“Technology,” vlingo, archived by the Internet Archive on October 18, 2007, accessible at https://web.archive.org/web/20071018021518/http://www.vlingo.com/technology.html (last accessed September 13, 2023)
2017	Graham, F., “Vlingo on the iPhone: Speak and spell,” CNET, March 10, 2010, accessible at https://www.cnet.com/tech/mobile/vlingo-on-the-iphone-speak-and-spell/ (last accessed September 13, 2023)
2018	Nokia 9210 Communicator pictures, GSMArena.com, accessible at https://www.gsmarena.com/nokia_9210_communicator-pictures-210.php (last accessed September 13, 2023)
2019	Excerpts from “Binary Classification using Neural Networks,” Kaggle.com, accessible at https://www.kaggle.com/code/karthik7395/binary-classification-using-neural-networks/notebook (last accessed September 14, 2023)
2020	Battersby, J., “Vlingo for iPhone,” Macworld.com, May 24, 2010, accessible at https://www.macworld.com/article/205600/vlingo-2.html (last accessed September 13, 2023)
2021	Austen, I., “NEWS WATCH; A New Blackberry Pager Allows Longer E-Mail,” <i>The New York Times</i> , April 13, 2000, accessible at https://www.nytimes.com/2000/04/13/technology/news-watch-a-new-blackberry-pager-allows-longer-e-mail.html (last accessed September 13, 2023)

Paper/Exhibit No.	Description
2022	“Blackberry RIM 957,” PCMag.com, May 21, 2002, accessible at https://www.pcmag.com/archive/blackberry-rim-957-25956 (last accessed September 13, 2023)
2023	Segan, S., "The Evolution of the BlackBerry, From 957 to Z10," January 28, 2013, accessible at https://www.pcmag.com/news/the-evolution-of-the-blackberry-from-957-to-z10 (last accessed September 14, 2023)
2024	Orlowski, A., "Nokia 9210 Communicator - any good?", <i>The Register</i> , August 14, 2001, accessible at https://www.theregister.com/2001/08/14/nokia_9210_communicator_any_good/ (last accessed September 13, 2023)
2025	Simonite, T., “Apple's 'Neural Network' Infuses the iPhone with AI Smarts,” <i>Wired</i> , September 13, 2017, accessible at https://www.wired.com/story/apples-neural-engine-infuses-the-iphone-with-ai-smarts/ (last accessed September 13, 2023)
2026	“RIM 957,” IT History Society, accessible at https://www.ithistory.org/db/hardware/research-motion-limited/rim-957 (last accessed September 13, 2023)
2027	U.S. Patent No. 6,266,664 to Russell-Falla et al., issued July 24, 2001
2028	“What is SNNS?”, archived by the Internet Archive on November 22, 2001, accessible at https://web.archive.org/web/20011122181832/http://www-ra.informatik.uni-tuebingen.de/SNNS/announce.html (last accessed September 13, 2023)
2029	“workstation,” Britannica, accessible at https://www.britannica.com/technology/workstation (last accessed September 13, 2023)
2030	“Desktop and Workstation PCs: What's the Difference?”, DBK, June 29, 2022, accessible at https://www.dbk.com/resources/desktop-vs-workstation/ (last accessed September 14, 2023)

Paper/Exhibit No.	Description
2031	Gerencer, T., “Why Buy a Workstation vs. Desktop for Your Business,” HP Tech@Work, March 8, 2021, accessible at https://www.hp.com/us-en/shop/tech-takes/workstation-vs-desktop-business (last accessed Septmeber 14, 2023)

31. I refer to citations in the publications by paragraph number. I refer to citations in the Houh Declaration by paragraph number. I have used the claim numbering convention used by Dr. Houh in his declaration.

32. When I provide an example, or say, “for example,” I am not limiting my analysis to only that example.

33. References to documents and testimony herein are meant to provide examples of supporting information but are not intended to be comprehensive or an exhaustive list of all known support.

VI. TECHNOLOGY BACKGROUND

A. Brief Summary of the '414 Patent

34. The '414 Patent, entitled “Method and System for Inserting Advertisements Into Broadcast Content,” issued on May 20, 2008 and claims priority to U.S. Provisional Application No. 60/290,592, filed May 11, 2001. EX1001, [45], [54], [60].

35. The '414 patent relates to targeting ads delivered to users who are streaming content on cellular telephones, and recording the streaming content for

later playback while the ad plays. The '414 patent notes that in the past, ads were selected based on generic viewer demographics. EX1001, 1:33-47. The '414 patent, on the other hand, takes a new and different approach: sending targeted ads to the individual user streaming the content on the cellular telephone by using information associated with the user of the mobile device to determine an advertisement to play. *See, e.g.*, EX1001, 1:51-2:27, 9:42-51.

36. The '414 patent discloses using various sources to generate information about a user for targeted ads. *See, e.g.*, EX1001, 9:48-10:24. For example, in one embodiment, the patent discloses selecting an ad based on information taken from a message sent to a first user by another user on a different mobile device, where the message identifies characteristics of the user of the first mobile device. *See* EX1001, 9:48-10:22. The server employs the user information, generated from the various sources, to determine which advertisements might be suitable for the mobile device user. EX1001, 3:58-60, 9:24-27, 9:48-51, 11:34-37. The challenged independent claims specifically require that a source of this “information associated with a user of the cellular device” must be “taken ... from a message sent to the cellular device from another user of another cellular device.” *See*, EX1001, Claims 1, 9, 12, 14. Petitioner’s cited references, on the other hand, do not take information from other users’ messages, and do not record content on an end user device for later playback.

B. Cell Phones in 2001

37. Mobile devices had extremely primitive hardware and were highly resource constrained by today's standards, and also in comparison to servers and desktops around the time of invention. In fact, the mere ability to display email on mobile devices was a feat at around that time and was heralded as a key feature to consumers.

38. Consider some of the devices that Dr. Houh has offered as examples that in his opinion could have been used in his combination of references. First, is RIM 957. *See* EX1003, ¶121. I have provided a screenshot of RIM 957 to illustrate its primitive nature:



See EX2023.

39. RIM 957 had a monochrome display and was marketed as a “pager,” not even a phone, let alone a smartphone. *See* EX2021; EX2023. It provided the

ability to send and receive emails, but did not support attachments. *See* EX2021; EX2023. It did not have an integrated microphone. *See* EX2021; EX2023. It could not be used for making phone calls. *See* EX2026. It had 512 Kbytes of memory. It was a locked down device that did not allow for installation of new software.

40. Nokia 9210 Communicator is another mobile device that Dr. Houh offers as an example of the kind of device that could have been used in his combination of references. *See* EX1003, ¶121. I have provided several screenshots of this device to illustrate its primitive nature:

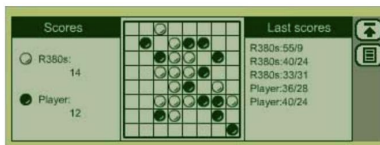
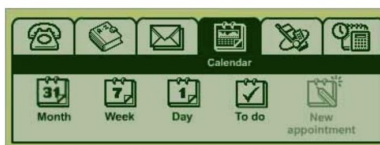
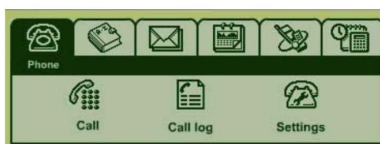


See EX2024.

41. Reviews of the Nokia 9210 Communicator around the time of invention are helpful in understanding its capabilities. For example, the reviews indicate the difficulty of running two applications or even viewing an email in the

browser: “the Nokia 9210 is simply underendowed in the RAM department. 4MB is insufficient to maintain more than two applications at once. Sometimes, it isn't even enough to maintain more than one as even in the most frugal conditions mail messages can fail to open during a web browsing session. Since the Symbian OS doesn't allow you to create a swap file - memory can't be paged to the memory card, which would be horribly slow in any case - there's no workaround.” EX2024, 1. The review goes on to explain the difficulties of performing something as simple as showing an image on the phone: “Now the 9210 actually ships with 8MB of RAM. The problem is that you're actually left with a fraction of that for running applications. To show a simple 45k image captured by the accompanying digital camera, alongside an email requires shutting down some of the built-in applications.” EX2024, 1-2. The review also explains that “it doesn't play MP3s.” EX2024, 2.

42. Ericsson R380 is another mobile device that Dr. Houh offers as an example of the kind of device that could be used in his combination of references. EX1003, ¶121. I have provided several screenshots of this device to illustrate its primitive nature:



See EX2014.

43. Like RIM 957, it had a monochrome display. According to the archived page that Dr. Houh has relied on in paragraph 121 of his Declaration, R380's battery was extremely bad. ("the battery SUCKS." *See* EX2014, 4.) In fact, the archived page provides an example of how long the battery lasted: "The phone, being used for what I consider normal usage (4 or 5 times of checking e-mail, about one hour of calls, and a few other tidbits, such as the odd SMS or looking up a phone number), croaked at 7 P.M., after being charged all the previous night." EX2014, 4. The key highlight of the phone was simply its ability to allow a user to read "e-mail from the road." EX2014, 1. Furthermore, the phone had 2 MB of memory and did not allow any additional software to be uploaded. EX2014, 1.

44. A POSITA would have been familiar with the capabilities of the mobile devices at the time of invention, and would have readily concluded that neither the scanning and generation of unknown data disclosed in Kawasaki, nor the execution of its neural network models could be performed on those devices. A POSITA would have recognized extraction of content from user emails to be computationally too expensive for mobile devices, and would effectively render those devices inoperable. Furthermore, a POSITA would have not been motivated to run this kind of analysis on a mobile device, since servers already had the email contents, were significantly more advanced than mobile devices, and could have performed this analysis much more effectively.

VII. SUMMARY OF PRIOR ART

A. U.S. Patent No. 6,684,249 (“Frerichs” or “the ’249 patent”)

45. Frerichs relates to “inserting a targeted advertisement based upon a user profile through streaming audio.” EX1004, 1:10-12. In one embodiment of Frerichs, for example:

The user profile can include information derived from a user registration process. The user registration process can derive information such as, for example, sex, age, hobbies, geographic region, race, religion, health, and sexual orientation. Other information can also be derived from the stations being selected as well as use of such stations during the time of day, for example. The user profile information can also include any other information which can be used to provide a more desirable advertisement or information to the user.

EX1004, 14:42-51.

46. Frerichs does not disclose anything about messages, let alone selecting an ad based on information taken from a message as every independent claim requires, and Petitioner does not assert otherwise. *See* Pet., 38-41.

B. U.S. Patent Application No. 2007/0083886 (“Kauffman” or “the ’886 app”)

47. Kauffman relates to inserting advertising into streaming multimedia. EX1006, ¶1. In Kauffman,

a ‘caching inserter’ system is disposed at a local point of presence

(POP) which intercepts a video stream destined for an end user. When insertion of advertising (or other information—such as a “news” bulletin weather information, for example) is desired, the video stream is stored/buffered at the local POP and the advertisement is played. When the ad is completed, the first stream is then played out of the buffer.

EX1006, ¶7.

48. Although Kauffman caches content while inserting an ad, the device that caches the content is not the device that plays the content. Rather, in Kauffman’s embodiments, the caching is done upstream of the end-user device that plays content, and the content is played for example on a television or computer terminal. *See, e.g.*, EX1006, ¶¶17-18.

C. U.S. Patent No. 6,539,375 (“Kawasaki” or “the ’375 patent”)

49. Kawasaki relates to targeted advertising by creating “a profile of the user that may ultimately be used to target offers to users based upon the profile.” EX1005, Abstract. Kawasaki describes that “the objects of this invention are accomplished through a method [and] system that scans information content and automatically and transparently assesses its subject matter. Over time, this invention accumulates a ‘profile’ of interests of the User, which can be used to subsequently direct Offers.” EX1005, 3:19-23. For example, Kawasaki describes “[a]nalyzing and building Profiles from e-mail information . . . by analyzing sent

and received e-mail information and building profiles based upon its content.”

EX1005, 5:61-65. Kawasaki does not disclose, however, selecting an ad based on information taken from a message.

1. Kawasaki requires artificial intelligence neural networks.

50. Petitioner and Dr. Houh’s declaration do not acknowledge that Kawasaki requires using artificial intelligence neural networks. They also do not address any of the consequences of that fact. They do not allege that a cell phone could run a neural network, for example, or that a POSITA would be motivated to combine the cell phone of Frerichs with a neural network. Pet., 24-25, 35-43; EX1003, ¶¶ 51-58, 100-128.

51. The “recognizers” in Kawasaki are neural networks. EX2011, 40:10-14 (“... the *recognizer* discussed and presented in Kawasaki ... [is] the kind of *neural network* analyzer that Kawasaki is talking about.”).¹ Kawasaki states that recognizers 23 are developed using neural networks:

The development of these algorithms and weighted rules is accomplished through the use of a three-tier feed-forward *artificial neural network*, a *Neural Net 22* The *output from Neural Net 22* is algorithms and rules, the *Recognizers 23* ...

¹ Emphasis added unless otherwise noted.

EX1005, 4:17-25.

52. The recognizers 23 are trained neural networks. Additional disclosures in Kawasaki reinforce this fact. Kawasaki states that it uses analytic models disclosed in the related '664 patent to determine the relevance of unknown data to data sets and predefined categories:

The two modules, scanning and analyzing, named in the *above-referenced [6,266,664] patent* application are capable of *determining the relevance of unknown data* to a *known data set* through efficient *analytic models*. These modules are used in real time to assess the incoming *data* from Services to the Users of the Services for their *relevance* to the common (or specific) *predefined categories* of interest to Advertisers.

EX1005, 4:6-12.

53. Kawasaki also states that it uses methods described in the related '664 patent to assess the match between data sets and new information, and that recognizers 23 are what perform the analysis of the unknown data versus known data to assess the match and generate a matching rating (*i.e.*, rating for a match between the unknown data and a predefined category).

The method and system of this invention employs methods for *scanning, analyzing and handling digital information content*, described in the above-referenced patent application Ser. No. 09/164,940 now U.S. Pat. No. 6,266,664 to *assess the match between known Data Sets 21* of subject matter and *newly encountered*

information.

Referring to FIG. 3, each discrete unit of information newly encountered by Users is *analyzed by Recognizers 23* against a set of *known Data Sets 21* such as sports, news, health information, etc. The return value of the analysis is a *matching rating* indicating the “strength” or “closeness” of the *newly encountered data* to known *Data Sets 21*.

EX1005, 4:62-5:6.

54. Artificial intelligence neural networks are the only method that the related '664 patent discloses for generating a rating that indicates a match compared to predetermined characteristics.

... in a *neural network* system, *rating* the examined web page using the weightings in the *weight database*;

...

... regular expressions that are useful in a *neural network* system in discriminating web page *content* relative to the *predetermined* content *characteristic*.

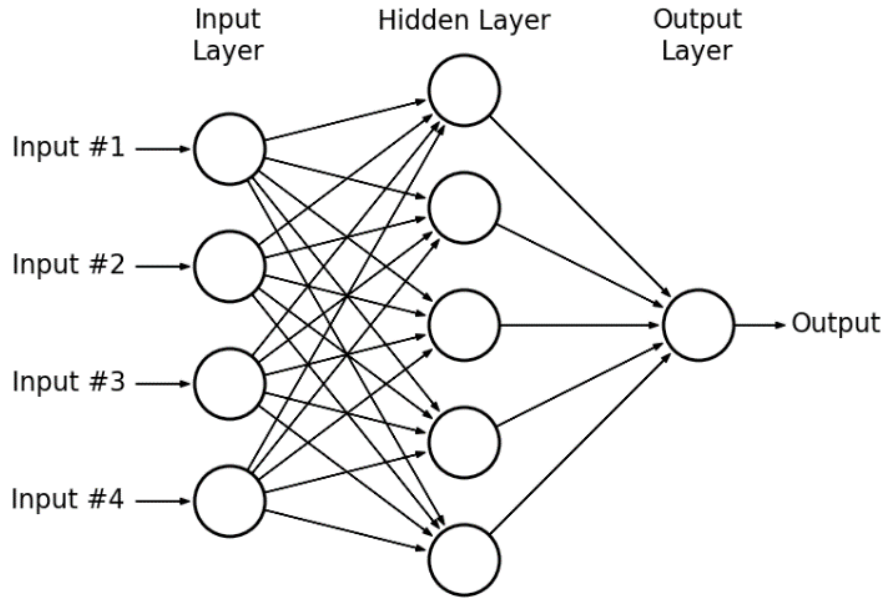
...

... analyzing the web page natural language *content* relative to a *predetermined database* of regular expressions, and using a *neural network* system to form a *rating* ...

EX1024, 11:30-33, 11:53-55, 12:6-9.

55. Kawasaki discloses the development of algorithms and weighted rules to analyze the unknown content is achieved through a three-tier feed-forward artificial neural network. See EX1005, 4:6-32. A three-tier feed-forward artificial

neural network typically consists of an input layer, one or more hidden layers, and an output layer. Each layer contains multiple neuron (also called units) that perform calculations and transformation on the input data. The number of neurons in the input layer depend on the number of features in each data point. For example, if each data point has 4 features, the input layer would have 4 neurons. The hidden layers is where the network can learn more complex patterns from the input data. It can have different number of neurons depending on what the developers decide is best suited for the problem. The output layer would typically have a single neuron if the network is solving a binary classification problem. An activation function, such as a step function or a sigmoid function, is used to produce an output between 0 and 1. A neural network is a feed-forward if the values flow in only one direction (forward). Here is an example of a three-tier feed-forward neural network:



See EX2019, 1.

56. In a feed-forward neural network model, input into the model is a set of numbers corresponding to the features comprising each data point. For example, with 4 neurons in the input layer, we could model the existence of four different words in a document. If a word is present in a document, we can set the corresponding neuron to be 1, and otherwise 0. Given a labelled dataset (*i.e.*, a dataset where the desired classification for each input is known), we can then train a neural network model. The training algorithm sets the weights in the hidden layer neurons to reduce the classification error. These weights determine how the values propagate throughout the network to produce the final output. The final output from the neural network is one or more numbers indicating whether the input belongs to a particular class. The actual number depends on the activation function.

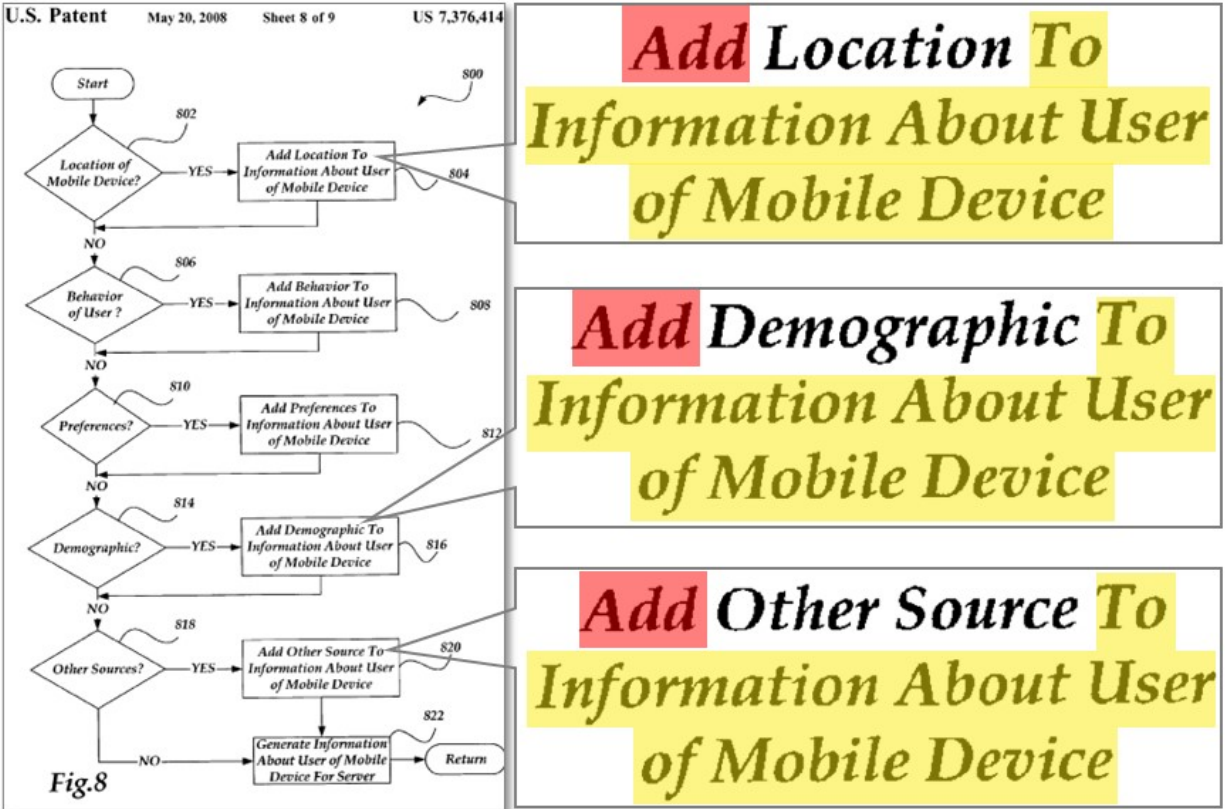
In the simplest case, the output could be a 1 if the neural network determines the input belongs to a particular class (*e.g.*, the document deals with a particular subject), and 0 otherwise.

VIII. CLAIM CONSTRUCTION

A. “[I]nformation taken ... from a message” requires information that was actually in a message (limitations 1.1.2, 9.4, 12.3.2, 14.3.2).

57. The plain meaning of the claim term “taken,” when interpreted in light of the specification and file history, requires using information that was in a message, not merely data “derived” from a message, as Petitioner alleges. Pet., 38.

58. The specification teaches directly using information that is in a message, as opposed to indirectly deriving information from a message where the derived information may or may not exist in the message. Figure 8 of the ’414 patent and accompanying discussion refer to testing for the presence of multiple types of data, and if a given type of data exists, then adding that actual data to information about a user.



EX1001, FIG. 8, annotated.

59. Location data is the first type of data described; if location data exists, then it is added to information about the user.

... a determination is made if the *location* of the mobile device is available. If true, the process advances to block 804 where the *location* is *added to information about the user* of the mobile device. The *location* may be *manually entered by the user* and/or *provided* from a *GPS*, assisted GPS, wireless signal triangulation, and the like, to determine the location of the user of the mobile device.

EX1001, 10:48-55.

60. Thus, if location data exists, that exact data—*e.g.*, the location data entered by the user or provided from GPS—is added to information about the user. Similarly, if demographic data exists, that exact data is added:

... a determination is made as to whether at least one *demographic* piece of *information* regarding the user is provided. If true, the process steps to block 816 where the *demographic information* is *added* to other *information regarding the mobile device user*.”

EX1001, 11:5-9.

61. Data in (not merely “derived from”) messages from other users is also added to the information about the user. Messages from other users are expressly referred to belonging to “other sources” category depicted toward the bottom of Figure 8. EX1001, 10:18-23 (“Additionally, *other source* module 606 enables other sources to be used to provide information regarding the user, *e.g.*, *a message from another user of another mobile device that identifies characteristics* of the current user of the mobile device.”). The actual data in a message from another user is added to information about the user:

... a determination is made as to whether *other sources* have provided *information* regarding the mobile device user.

At decision block 818, ... the *other source information* is *added* to other *information regarding the mobile device user*.”

EX1001, 11:10-18.

62. When using information to select an ad (as claim 1(b) requires), the specification teaches using the actual data that was in a message:

... *information* about the user of the mobile device is provided. This process is expressed in the *discussion accompanying FIG. 8* The process flows to block 904 where the provided mobile device user's *information* is asynchronously employed to *determine* at least one *advertisement* that could be of interest to the user of the mobile device.

EX1001, 11:31-37.

63. Dr. Houh's opinion regarding the meaning of information "taken" from a message is based on his misreading of the '414 specification. Specifically, he mistakenly thought that the '414 patent specification did not refer to taking actual data from a message, and therefore concluded that a POSITA would not understand the claim term "taken" to be limited to information that is actually in a message:

Q. ... let me ask you, your understanding of the '414 patent *taking information from a message does not require* that you *actually extract something, content, data, from a message* and send it to the server; correct?

A. Again, *I don't believe the spec said that specifically or would require that. And thus, in the context of the spec, I'm not seeing how a POSITA would understand the claim phrase to be limited to information must be in the message* because the claim says what it

says and provides *an example of user preferences* information.

EX2011, 46:19-47:8; *see also* 44:3-16 (“*I recall nothing from the spec that discussed that the user preference or other information autonomously provided to the server has to be literally data that’s literally in the message itself.*”); 46:1-5 (“*Even if it’s required that it has to be a word literally in the message, which I don’t see in the [’414] spec anywhere that that’s the requirement of the information taken from a message ...*”); 175:22-176:8 (“*... I saw no such description like that about how to take information from a message in -- from the ’414 specification.*”); 36:8-18; 38:17-39:10; 47:19-48:9 (similar).

64. Dr. Houh therefore reached the incorrect conclusion that merely deriving data from messages is in the scope of the claims, pointing to the ’414 specification’s discussion of user preferences. EX2011, 173:9-19 (alleging that “*deriving a profile from a message*” is “*an example of how to take information from something else.*”).

65. The ’414 patent specification does not state that everything in user preferences is data taken from a message. Instead, the specification teaches that user preferences can include data that was in a message, and can also include other data that was not in a message, including information derived from other data, such as determinations made using behaviors or answers to surveys.

Demographic module 612 enables the demographics of a user to be

determined. For example, a user's age, income and spending habits may be manually entered by the user or *determined by the user's answers* to various questionnaires or surveys presented by demographic module 612.

Behavior module 608 enables the user's behavior in using the mobile device to be *determined* such as, but not limited to, playing video games, listening to radio station, viewing television channels, participating in chat rooms, and communicating SMS messages. The *type and frequency of behaviors* can be *determined* by behavior module 608.

EX1001, 10:7-18; *see also* EX1001, 11:31-37.

66. Thus, the specification expressly teaches taking the data from a message by using the actual data that was in a message. It does not refer to data as “taken” from a message if that data is merely derived from a message. EX1001, 10:7-18; *see also* EX1001, 11:31-37. In sum, the specification provides examples that distinguish data taken from a message and other information that is derived; the claims recite the former.

67. The file history reinforces that information “taken” from a message means information that was actually in the message. The Examiner understood the claim limitation to require data that was in a message—not merely data “derived” from a message. The Examiner rejected pending claims based on art that disclosed selecting ads using a profile that was derived from messages. After the requirement

to “take” information from messages was added to the claims—and no other limitations were added—the Examiner allowed the claims.

68. In particular, the Examiner rejected the claims over art that discloses selecting ads based on a profile that was built using messages, and art that discloses messages received from other users. EX1002, 67-83. However, after argument and amendment by the Applicant, distinguishing the cited art, the Examiner allowed the claims. EX1002, 30-37, 50-58. Significantly, the Examiner allowed the claims after analyzing and citing specific passages from Owensby (EX2007). *See* EX1002, 30-37, 67-83. Owensby relates to advertising in streaming media and discloses selecting ads using data derived from messages, including by using a profile that includes data derived from messages.

69. Notably, the Examiner explained in the reasons for allowance that Owensby does not disclose selecting an ad based on *information taken from a message*:

Owensby discloses the server determines a specific *advertisement* to play *based on* the user information from the cellular device in order to address the *user’s interest*.

However, Sass in view of Owensby *do not disclose*: providing to a server, by a cellular device, *information taken* by the cellular device *from a message* sent to the cellular device from another user of another cellular device

...

However, the prior art in combination *do not meet the requirements of the claimed invention*, which requires: ‘providing information associated with a user of the cellular device to a server, the *information* taken by the cellular device *from a message* sent to the cellular device from another user of another cellular device, the message identifying characteristics of the user of the cellular device; and receiving from the server an *advertisement* to the cellular device *based on the provided informaiton* [sic]’.

EX1002, 36-37 (underlining in original).

70. The prosecution history leading to these statements from the Examiner provides context and further confirms that the term “taken” does not include data that is merely derived from other information. Applicant introduced details about the claimed “information associated with a user of the cellular device” by amendment. EX1002, 91.

- (a) autonomously providing to a server, ~~employing by a~~ the cellular device, to autonomously provide information associated with a user of the cellular device, the information including at least one of the group consisting of a preference of a user of the cellular device, a demographic data of a user of the cellular device, a user behavior of the cellular device, and content played on the cellular device;

EX1002, 91.

71. In the next Office Action, and just prior to allowance, the Examiner rejected the claims in view of Owensby, citing specific passages for concepts such

as “Owensby discloses . . . receiving information . . . including . . . a preference of a user of the cellular device . . . col. 15, lines 32-47” EX1002, 81. That cited passage refers to selecting an ad *based on profile*, not information taken from a message:

The Subscriber Identification Code . . . is provided to the *Ad Chooser* Server 22 of the Call Management System 20 where it is used to identify the predetermined *Subscriber Profile* Data 26 pertaining to the subscriber.

EX2007, 15:43-47.

72. In addition to selecting ads based on subscriber profile data, Owensby discloses selecting ads based on “Historical Response Data,” which are a user’s responses to past message, *i.e.*, data derived from messages:

By assimilating the Wireless Mobile Location Data with the *Subscriber Profile* Data and/or the *Historical Response* Data, the invention permits messages, and in particular commercial information and *advertisements*, to be *targeted* to as broad or narrow a range of subscribers as desired by the sponsor of the message.

EX2007, 5:62-67.

The database management program inputs, outputs, stores and retrieves the Ad Content Data 24 (*i.e.*, the plurality of pre-selected messages to be targeted to the subscriber), the *Subscriber Profile* Data 26 (*i.e.*, the demographic and personal preference data pertaining to the subscriber) and the *Historical Response* Data 28 (*i.e.*, the record of

the targeted *messages previously provided* to the subscriber *and* the *responses* made to the targeted *messages*

EX2007, 17:54-65.

73. Owensby also discloses building a subscriber personality profile by using previous responses to messages, *i.e.*, data derived from messages.

Thus, the Ad Selection Code is not merely a database of unrelated location, identity, demographic, *preference*, date and time date, but instead is a database of inter-related subscriber information which may be “managed” by a computational algorithm to *develop subscriber personality profiles including the previous responses* [to messages] and movement patterns of the subscriber based on wireless mobile location, date and time.

EX2007, 19:45-52. All of this profile information is used in Owensby to determine the ad. *See* EX2007, 18:2-10 (“The database management program combines the Switch Data with the Subscriber Profile Data 26 and the Historical Response Data 28 to generate an Ad Selection Code. The Ad Selection Code is then manipulated to select an appropriate advertisement for the subscriber . . .”).

74. In response, Applicant amended the claims to specifically recite that the “information associated with a user of the cellular device” (and that is used to determine the advertisement) is “*taken by the cellular device from a message sent to the cellular device from another user of another cellular device.*” EX1002, 50.

- (a) autonomously providing to a server, by the cellular device, information associated with a user of the cellular device, the information taken by the cellular device from a message sent to the cellular device from another user of another cellular device, the message identifying characteristics of the user of the cellular device including at least one of the group consisting of a preference of a user of the cellular device, a demographic data of a user of the cellular device, a user behavior of the cellular device, and content played on the cellular device;

EX1002, 50.

75. After this amendment and having previously considered Owensby's disclosures discussed above — selecting ads based on data derived from messages — the Examiner allowed the claims. EX1002, 33-39.

76. Indeed, as noted above, the Examiner expressly found that the cited art did not teach an advertisement determined based on provided information that is “taken by the cellular device from a message sent to the cellular device from another user of another cellular device.” *See* EX1002, 37.

77. Thus, the Examiner distinguished art that selected ads based on data “derived” from messages. Although Owensby focuses on messages that are advertisements rather than other types of messages, the Examiner did not make a distinction based on the type of message. Instead the Examiner allowed the claims because Owensby does not select ads based on information taken from *a* message. The type of message was not central to the Examiner's reasoning, and the

Examiner was, of course, aware that cell phones can receive messages from other cell phones, including from users who are not advertisers.

78. Therefore, the Examiner determined that selecting ads using data “derived” from messages (specifically, using a profile derived from messages and other data) is not within the scope of the claims.

79. Accordingly, the specification and the prosecution history of the ’414 patent demonstrate that the claims require using information that was “taken” from one or more messages, *i.e.*, directly using information that is contained within a message—not merely data derived from information that was in a message.

IX. THE PETITION AND HOUH DECLARATION FAIL TO SHOW THAT THE ’414 PATENT CLAIMS ARE OBVIOUS

80. For the reasons explained in detail below, and based on my review of the ’414 patent, file history, and the prior art references, and my knowledge and experience in the field, it is my opinion that the proposed combination of Frerichs, Kauffman, and Kawasaki do not render claims 1-7 and 9-14 of the ’414 patent obvious. As explained below, the proposed combinations do not disclose each element of claims 1-7 and 9-14, and any differences between claims 1-7 and 9-14 and the combinations proposed by Petitioner would not have been obvious to a POSITA. It is also my opinion that a POSITA would not have been motivated to combine Frerichs with Kauffman or Kawasaki.

A. Independent Claims 1, 9, 12, and 14 are not rendered obvious by Petitioner's asserted combination.

1. The cited art does not disclose taking information from a message that satisfies the claims (limitations 1.1.2-1.1.3, 9.4, 12.3.2-12.3.3, 14.3.2-14.3.3).

81. Claim limitation 1.1.2 requires a cellular device that sends a server “information taken by the cellular device from a message sent to the cellular device from another user of another cellular device, the message identifying characteristics of the user of the cellular device.” The other independent claims (limitations 9.4, 12.3.2, and 14.3.2) each have substantially the same limitation, and Petitioner simply refers back to its discussion of claim 1.1.2. Pet., 63, 67 (also referring to a typo in claim 12), and 73.

82. Petitioner relies on Kawasaki for this limitation. Petitioner does not allege that Frerichs or Kauffman discloses clients that send data taken from messages, let alone messages that include information associated with a user and that are from another user of another cellular device. Indeed, Petitioner does not mention Kauffman in its discussion of this limitation. Pet., 35-43. Petitioner refers to Frerichs, but only for the concept of a cell phone, and does not allege that Frerichs discloses clients that provide data taken from a message. Pet., 38-43; EX2011, 91:9-15 (“Q. But Frerichs itself, setting aside Kawasaki and Kauffman, does not disclose taking this user profile information from a message; correct? A. Yeah. In my analysis, I’m not relying on Frerichs for any teaching of taking user

preference -- or taking user information from an a message.”). Houh’s Declaration refers to Frerichs’ client providing information (listening patterns, derived information, and the number of times a user listened to an ad) to a server, but none of that data is from a message from another user, which Dr. Houh admitted at his deposition. EX1003, ¶¶ 96-98; EX2011, 88:15-20 (“... 96 through 98, you *don’t* contend that’s information taken from a message. Instead, you rely on Kawasaki for that aspect; correct? A. I think that’s fair.”), 87:16-22 (similar). Consistent with that, Petitioner and the Houh Declaration do not cite anything in Frerichs for the claim limitation “[1.1.2] the information taken by the cellular device from a message” Pet., 38-45, EX1003, ¶¶111-124 (each referring to Frerichs as providing a cell phone for the combination, without citing any portion of Frerichs).

a. Kawasaki clients do not send information taken from messages.

1. Kawasaki uses data derived, not taken, from messages.

83. As Petitioner and Dr. Houh concede, Kawasaki’s unknown data and profile are “derived” from messages—not information that was part of any message. Pet., 38; EX1003, ¶112. The unknown data and the profile are not data taken from messages. Instead, they are the input and processed output of Kawasaki’s “recognizers.” Kawasaki discloses using recognizers to classify messages into pre-defined categories, then using the output of recognizers to create

profiles. EX1005, 4:6-9 (“... assess the incoming data ... for their relevance to ... *predefined categories* of interest to Advertisers.”) Specifically, the recognizers each generate a “statistical output” regarding whether a message matches a certain pre-defined category. EX1005, 4:34-35 (“... the statistical output from Recognizers 23 ...”). For example, a “golf” recognizer (that is, a recognizer that is dedicated to determining whether unknown data relates to golf) could output “90” to denote that the “golf” recognizer is 90% confident that a message belongs to the “golf” category (*i.e.*, the message probably does belong in the “golf” category), and a different “finance” recognizer could output “5” to denote that the “finance” recognizer is only 5% confident that a message belongs to the “finance” category (*i.e.*, the message probably does not belong to that category). EX2011, 181:8-18 (“Q ... outputting ... a confidence level represented by some number? A. Right. ... confidence level 90 versus confidence level 5, ...”); 185:4-14

84. The recognizers in Kawasaki use the unknown data as input. EX1005, 4:33-34 (“*Recognizers* are executed against incoming *unknown data* ...”); 7:45-46 (“processing the *unknown data* using a plurality of category based *recognizers* ...”). The recognizers operate on numbers; they take numbers as input and generates numbers as output. EX2011, 153:7-10 (“Kawasaki provides a method that some *recognizers* could be run, since they’re just sets of *arithmetic*, you know, *additions and multiplications*, typically.”). Therefore, the input (unknown data) is

numbers that were generated by analyzing the messages, and the output is numbers that were generated by analyzing the input numbers. Because the input and output numbers are generated, they were never in a message. They are not words that were in a message, for example. The numeric output from recognizers is not the word “golf” or any other word that a human would use to label the category. Instead, the numeric statistical output from the recognizer is used to determine whether or not the message belongs to a pre-defined category.

85. The categories are “pre-defined,” so by definition existed before the message was analyzed, and therefore are not *taken from a message*. The predefined labels used to classify a message exist before a message is analyzed and fed to the neural network. A neural network model needs to be first trained. To train the neural network model, a labeled dataset is used. The labels are the classes/categories that are determined prior to training a neural network. To the extent Dr. Houh is pointing to Kawasaki’s Recognizers indicating the category (label) of messages to satisfy the limitation of taking information from messages, those categories (labels) exist before the messages are analyzed, and therefore cannot be information that is taken from messages.

86. Profiles are built using quantitative analysis of the match / no match numeric rating output from recognizers, and therefore, the profile that is built using those outputs is even further removed from information in a message. EX1005,

4:42-48 (“... *Profiler 26* that *receives* the *output* from the real-time analysis of *Recognizers 23*. *Profiler 26* tracks and builds an *aggregate statistical model*, ‘*Profile*,’ of the User including *quantitative analysis* of the *match*, frequency, duration, age and other factors between unknown content reviewed by the User and the set of installed *Recognizers 23*.”) Kawasaki discloses *Profilers* that receive the output of *Recognizers*, track and build an aggregate statistical model, “*Profile*,” of the User. *See* EX1005, 4:42-47. Therefore, the *Profile* of Kawasaki is just a statistical model, which is again expressed in the form numbers and the relationships among them. The *Profile* of Kawasaki does not contain information that is taken from the messages.

87. Kawasaki does not disclose that the profiles were actually in a message from another user.

88. Since *Recognizers* of Kawasaki are built using feed-forward neural network model, they do not take any information from messages. The input to Kawasaki’s neural network model is a set of encoded features, which are just numbers (*e.g.*, zeros and ones). The output of Kawasaki’s neural network model is one or more numbers indicating the classification result. Neural network models do not accept the actual content of messages as input. They also do not produce outputs that resemble the content of messages, unless by coincidence the messages contain numbers.

89. The output of a neural network model may have a reverse relationship with the existence of information in a message. That is, a neural network model may classify a message as belonging to a category because it does NOT contain certain information, not because it contains certain information. For example, a neural network model may determine an email is malicious (potentially containing malware) not because the email uses terms that are associated with harm/malice, but because it uses terms that are overly (abnormally) benign/polite — as is often the case with social engineering types of emails. Since the neural network model is basing its decision on the absence of information, there is no information to be taken from the message.

2. Kawasaki does not disclose clients transmitting the required information to servers (e.g., limitation 1.1.2).

90. Petitioner presents two theories regarding the data that Kawasaki's clients send, that allegedly satisfy limitation 1.1.2: (1) clients send "unknown data"; and (2) clients send "profiles" to ad servers. Pet., 38-41. Neither meets limitation 1.1.2.

91. Petitioner's first theory is that clients send "unknown data." Pet., 40-41. Unknown data is the output from the initial processing of email messages, which will be input to the recognizers. EX1005, 4:33 ("*Recognizers* are executed against incoming *unknown data* ...")

92. Although Kawasaki states that the step of processing incoming data to generate unknown data can occur at the client or a server, and that processing the unknown data to eventually generate a profile can occur at the client or a server, Kawasaki does not disclose performing some of the processing at the client, then the client sending partially-processed data to a server, and the server performing the rest of the processing. EX1005, 5:66-67 (“*Analysis and Profile building can be accomplished at either the Client or Server location within an e-mail system.*”) Instead, Kawasaki teaches that the processing occurs entirely at the client, or entirely at the server.

93. According to Dr. Houh, “Kawasaki teaches that the “unknown data” scanned from the user’s content information, such as e-mail (“information associated with a user”), is provided “to a server” (the server performing the profiling).” See EX1003, ¶¶105, 122. There is, however, no such disclosure in Kawasaki. See, e.g., EX1005, 5:66-67.

94. Even if there was such a disclosure in Kawasaki, a POSITA would have recognized that extracting the user’s content information from emails on a mobile device to send back to a server to be a non-sensical solution. Mobile devices receive emails from servers. There would be no reason for a mobile device to retrieve emails from a server, scan and extract certain content from them, and then send those contents back to the server for profiling. First, the server already

has the emails and their contents, thus there is no reason to send back to the server the contents that it already has. Second, the mobile devices around the time of invention were extremely resource constrained and primitive, particularly in comparison to server devices. Putting the scanning and extraction functions of Kawasaki on mobile devices not only made no sense given that servers were already significantly more capable than mobile devices, it would have also not resulted in a workable solution. The mobile devices simply did not have the available memory, processor speed, network bandwidth, and battery capacity to be able to do this for enough emails to allow the server to construct a profile. When asked about this at his deposition, Dr. Houh offered a different theory in which the email server sends emails to the mobile client device, the mobile client device extracts information from the emails, and then sends that information to a different server, which he called “profiling server.” (“... you might have received it from -- you know, through this particular email server, but the profiling server may be a different server. So, in that case, the client can do the analysis of the message, and that information can be sent to the profiling server. ... some of the process can be done on the client, and some of the process can be done on the server, which is not necessarily the same server as the email server through which the email comes when it's received.” *See* EX2011, 191:20-192:12. However, this alternative theory devised on the fly by Dr. Houh also makes no sense. Servers are several orders of

magnitude more capable and resourceful than mobile devices. Servers are connected to a power outlet, while mobile devices are running on a battery. The gap between capabilities of servers and mobile devices was even more profound in the 2001-era. The email server and profiling server proposed by Dr. Houh could just communicate directly. There is no reason for the email server to go through an intermediary, especially if that intermediary is a 2001-era mobile device. A POSITA would have simply put the functionality of extracting information from emails in the email server and had that email server send the extracted information to the profiling server. Such a solution would have been easier to build, would have resulted in a much faster system, and would not burden the resource constrained mobile device.

95. Petitioner asserts that clients send profiles to ad servers. Pet., 38-40. But the profile does not have information “taken” from a message (*e.g.*, an email) in Kawasaki. Instead, the profile is built using quantitative analysis of the recognizers’ numeric output. EX1005, 4:42-48 (“... Profiler 26 [] receives the output from the real-time analysis of Recognizers 23. Profiler 26 tracks and builds an aggregate statistical model, ‘Profile,’ of the User including quantitative analysis”).

b. Kawasaki does not disclose or analyze the type of messages that the claims require (limitations 1.1.2, 1.1.3).

96. Claim 1 requires data that is taken from a message that meets two requirements: the message [1] is “from another user of another cellular device” (limitation 1.1.2) and [2] “identif[ies] characteristics of the user of the cellular device” (limitation 1.1.3).

97. Petitioner has not identified anything in Kawasaki that suggests taking information from at least one message that [1] is “from another user of another cellular device” (limitation 1.1.2) and [2] “identif[ies] characteristics of the user of the cellular device” (limitation 1.1.3).

98. The other references in Petitioner’s combination also do not provide any such teaching or suggestion, and Petitioner does not allege otherwise. Pet., 38-43.

2. The cited art does not disclose selecting an ad based at least in part on the information that a client takes from a message and sends to a server (limitations 1.2, 9.5, 12.4, 14.4).

99. Claim limitation 1.2 requires the cellular device to receive an ad that “is determined by the server based at least in part on the provided information.”

Dr. Houh admitted that “the provided information” is the information that was taken from a message (in the preceding claim limitations). EX2011, 49:11-50:5.

The other independent claims (limitations 9.5, 12.4, and 14.4) each have

substantially the same limitation, and Petitioner simply refers back to its discussion of claim 1. Pet., 63, 69, and 73 (also repeating some of the points made regarding claim 1).

100. Petitioner relies on Kawasaki for this limitation. Kauffman and Frerichs are not relevant. Although Petitioner refers to a server in Frerichs that provides ads, Petitioner does not allege that Frerichs or Kauffman selects ads based on information taken from messages. Pet., 43-45. Dr. Houh is “not relying on Kauffman for [his] analysis for Claim Element 1.2.” EX2011, 93:11-94:4.

101. Petitioner presents two arguments regarding a server in Kawasaki that selects ads: (1) a client sends unknown data to a server and (2) a client sends a profile to an ad server. But Kawasaki does not disclose a client sending unknown data to a server, and it would not make sense to do so. EX2011, 93:11-94:4. Thus, Kawasaki does not disclose or suggest selecting an ad based on unknown data received from a client.

102. As for Petitioner’s second scenario where a client sends a profile to a server, Kawasaki does not disclose a server sending a profile to a client and then having a client send the profile to an ad server, and Petitioner does not assert otherwise. Pet., 38-45. Therefore, the only possibility for a client to send a profile to a server is if the client built the profile itself. The profile does not contain

information taken from a message. Instead, the profile is built quantitative analysis of numeric output from recognizers. EX1005, 4:42-48.

3. The cited art does not disclose playing content on any device—let alone a cell phone—while caching other content (limitations 1.3.1, 1.3.2).

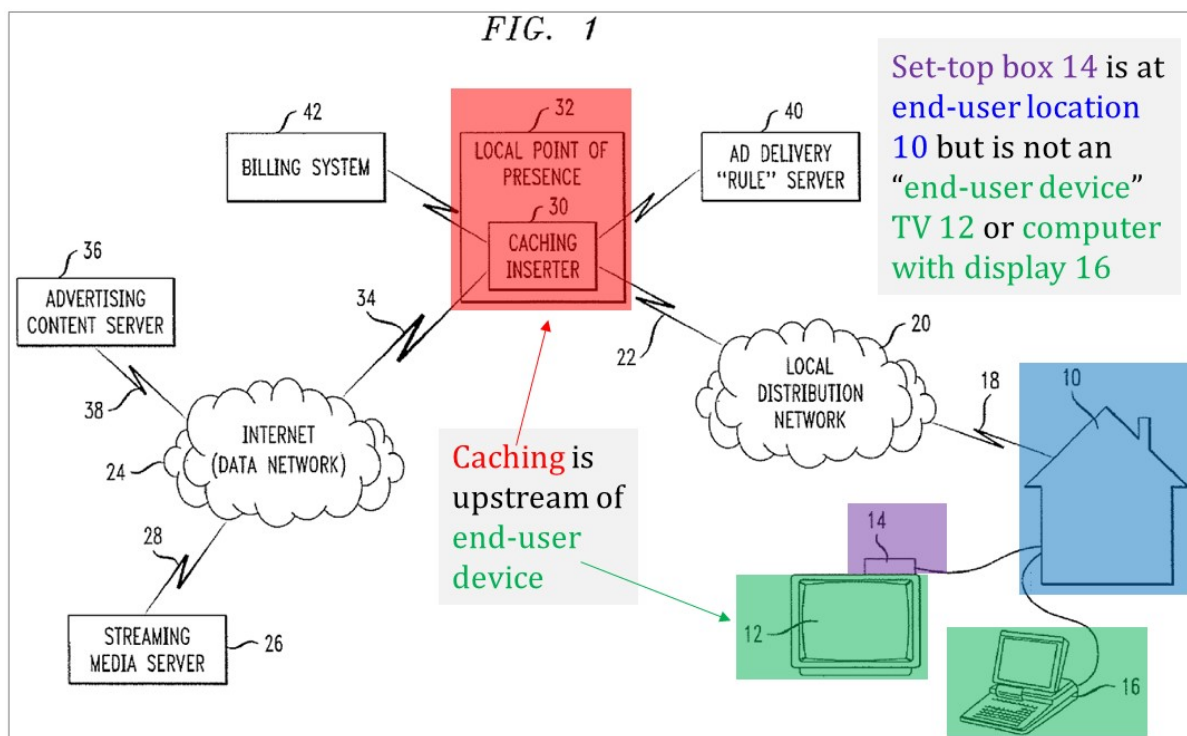
103. Claim limitations 1.3.1 and 1.3.2 require recording and playing content on a cellular device. Specifically, the cellular device [1] records (*e.g.*, caches) content (“*recording, by the cellular device, the content which playing was stopped*”), while [2] playing an ad on the cellular device (“while the at least one determined *advertisement* is *playing*,” where “the at least one” ad is “at least one *advertisement* to be *played on the cellular device*” from claim element 1(b)), then [3] that same cellular device plays the content that it recorded (“*resuming the playing of the stopped content, by the cellular device*”). The other independent claims (9, 12, and 14) each have substantially the same limitation, and Petitioner simply refers back to its discussion of claim 1. Pet., 64, 69, and 75.

104. Kawasaki and Frerichs are irrelevant to limitations 1.3.1 and 1.3.2. Petitioner does not assert that Kawasaki streams or caches multimedia content, and does not cite Kawasaki in its discussion of claim element 1(c). Pet., 45-53. Petitioner admits that Frerichs does not cache as required by the claims. Pet., 32 (“... *caching* streaming media content during the playback of an advertisement, *so that the streaming media content* can then be *resumed* after completion of the

advertisement content, which is *not explicitly taught by Frerichs.*"); EX2011, 67:12-18 ("*Frerichs isn't teaching caching the content during the playback of an advertisement so that the streaming media content can then be resumed after completion of the advertisement content. That whole thing is not taught by Frerichs.*"); 73:4-7 ("Q ... you're *not relying on Frerichs for 1.3.2*; correct? A. *Yeah.* I'm relying really on analysis with respect to Kauffman").

a. In Kauffman, the device that plays content does not cache.

105. Although Kauffman caches content while inserting an ad, the device that caches the content is not the device that plays the content. Instead, Kauffman caches content at "caching inserter 30" within the "local point of presence 32," which is upstream of devices that play content: TV 12 and computer terminal 16, each of which show content on a display.



EX1006, FIG. 1 (annotated).

106. Consistent with Figure 1, every time that Kauffman refers to location of the point-of-presence or the caching inserter within it, Kauffman teaches that the caching inserter is upstream from the end-user device that plays content. Kauffman teaches that the caching inserter "intercepts" content destined for an end-user and outputs files to the end-user, *i.e.*, the caching inserter is upstream of the end-user device:

An arrangement for inserting advertisement media into a streaming multimedia file *destined* for an *end-user* uses a *caching inserter* including ... a second cache for holding the streaming multimedia file that needs to be buffered as the advertisement *file* is *sent to the end-user*.

...

[0007] In accordance with the present invention, a 'caching inserter' system is disposed at a *local point of presence (POP)* which *intercepts*

a video *stream destined* for an *end user*.

EX1006, Abstract, ¶ 7.

107. Kauffman states that the caching inserter is between—not at—the end-user devices and servers, for example between data network 24 and a local distribution path 20, as illustrated in Figure 1 (shown above):

[0018] ... Referring to FIG. 1, a ‘*caching inserter*’ 30, located in a *local point-of-presence (POP)* 32 along the *path between data network 24* and *local distribution network 20*

EX1006, ¶ 18; see also EX1006, ¶¶ 24, 25 (caching inserter is “between” network / servers and end-user).

108. Kauffman teaches that the “extreme” downstream position for the caching inserter is at the end user’s location in a set-top box, and teaches that locating the caching inserter “further upstream” provides benefits:

[0009] The *POP* where the *advertisement cache* is located could be at any convenient place *along the signal path between* the information *source(s)* and the *end-user*. For example, the advertisement cache could be at the *headend*, or at a FTTH node in a neighborhood. *At the extreme*, the advertisement cache could be part of a *set-top box at the end-user location*. Obviously, the location of the advertisement cache then affects the number of separate end users that can receive the same advertisement. Particularly, the *further upstream* the *advertisement cache* is located, the greater the broadcast potential of a particular ad.

EX1006, ¶ 9; see also EX1006, claims 12, 17-19 (cache at set-top box or residential gateway device). Thus, even at the “extreme,” Kauffman’s caching inserter is upstream of the device that plays content.

109. Petitioner refers to the set-top box as a “client device” that caches.

The set-top box is irrelevant to the ’414 claims, however, because content is not played on the set-top box. Kauffman refers to devices that display content as “end-user devices” TV 12 and computer 16, each of which have a display. Kauffman distinguishes the set-top box and residential gateway as being upstream from the end-user devices. Content received “through” a set-top box or residential gateway is played “on” an end-user device (TV or computer display device).

[0003] ‘Streaming media’ is now considered to be a term of art and defines the capability to download multimedia files in real time (or ‘near real’ time) and *play the file on an end-user device, such as through a set-top box on a television or on a computer display device.*

...

[0017] Referring to FIG. 1, an end-user 10 is depicted as a residential end-user that is capable of receiving multimedia information through either a *television 12* (using a *set-top box 14* or other appropriate *residential gateway device*) or a *computer terminal 16*

EX1006, ¶¶ 3, 17.

110. Thus, in Kauffman, content is played on an “end-user device” (TV 12 and computer terminal 16) that plays whatever stream of content it receives, without caching to play substitute content. All caching of content while substituting an ad is done at the caching inserter, upstream of any device that plays content. Kauffman does not disclose playing substitute content on a device that caches other content, as claim 1 requires.

b. Petitioner’s hypothetical combination of Kauffman with a cell phone would cache content upstream of the cell phone (limitation 1.3.2).

111. Kauffman does not disclose a cellular device. Petitioner does not allege otherwise. Pet., 45-53. Dr. Houh relied on Frerichs, not Kauffman, for the concept of a cell phone. EX2011, 94:5-11. Even if Petitioner’s hypothetical combination of Kauffman and a cell phone were to play an ad on the cell phone, the cell phone would not cache other content while playing an ad. Instead, Kauffman teaches that caching is done upstream of any device that plays content. Substituting a cellular device for TV 12 or computer terminal 16 would not move the location of Kauffman’s upstream caching inserter any closer to the device that plays content.

B. Dependent Claims

1. Radio station data is not taken from a message (Claims 2, 3, 10, and 13).

112. Petitioner fails to demonstrate that claims 2, 3, 10, or 13 are invalid. Dependent claim 2 requires “the provided information” (that is, the information in claim 1 that the cell phone takes from a message) “additionally includes ... preferences,” “content played,” or other data. Petitioner refers to Frerichs users listening to radio stations, and asserts that the radio station data may be included in a user profile and therefore qualifies as the “preference” or “content played” of claim 2. Pet., 53-54. Dependent claims 10 and 13 are similar to claim 2, and

Petitioner simply refers to its discussion of claim 2. Pet., 64, 69. Claim 3 depends from claim 2, and requires that “the information” also includes “a radio station broadcast” or other data. Petitioner does not provide any additional substance except an assertion that the radio stations play radio station broadcasts. Pet., 54-55.

113. The radio stations that a user listens to are not taken from a message as claim 1 requires. Petitioner does not allege otherwise, and does not even cite anything in Frerichs for the claim limitation “[1.1.2] the information taken by the cellular device from a message” Pet., 38-45.

2. The recorded ad is not determined using information taken from a message (Claims 4 and 11).

114. Petitioner fails to demonstrate that claims 4 or 11 are invalid. Claim 4 requires the cell phone of claim 1 to receive and record “the” determined ad (*i.e.*, the ad that the server in claim 1 determines using information taken from a message) before playing the ad. Dependent claim 11 is similar, and Petitioner simply refers back to its discussion of claim 4. Pet., 64.

115. Petitioner cites passages from Frerichs regarding a client with a locally-stored ad, and passages from Kauffman regarding caching an ad. Pet., 56-57. Those ads are not determined using information taken from a message as claim 1 requires, and Petitioner does not allege otherwise. Pet., 55-57. Indeed, Petitioner tacitly concedes that Frerichs and Kauffman do not disclose that claimed concept: Petitioner does not cite anything in Frerichs or Kauffman for the claim limitation

“[1.1.2] the information taken by the cellular device from a message ...,” and does not even mention Kauffman in its discussion of claim [1.2] “... advertisement is determined by the server based at least in part on the provided information.” Pet., 38-45.

3. The prior art does not disclose a cell phone that receives a streaming ad while recording another stream of content (claim 7).

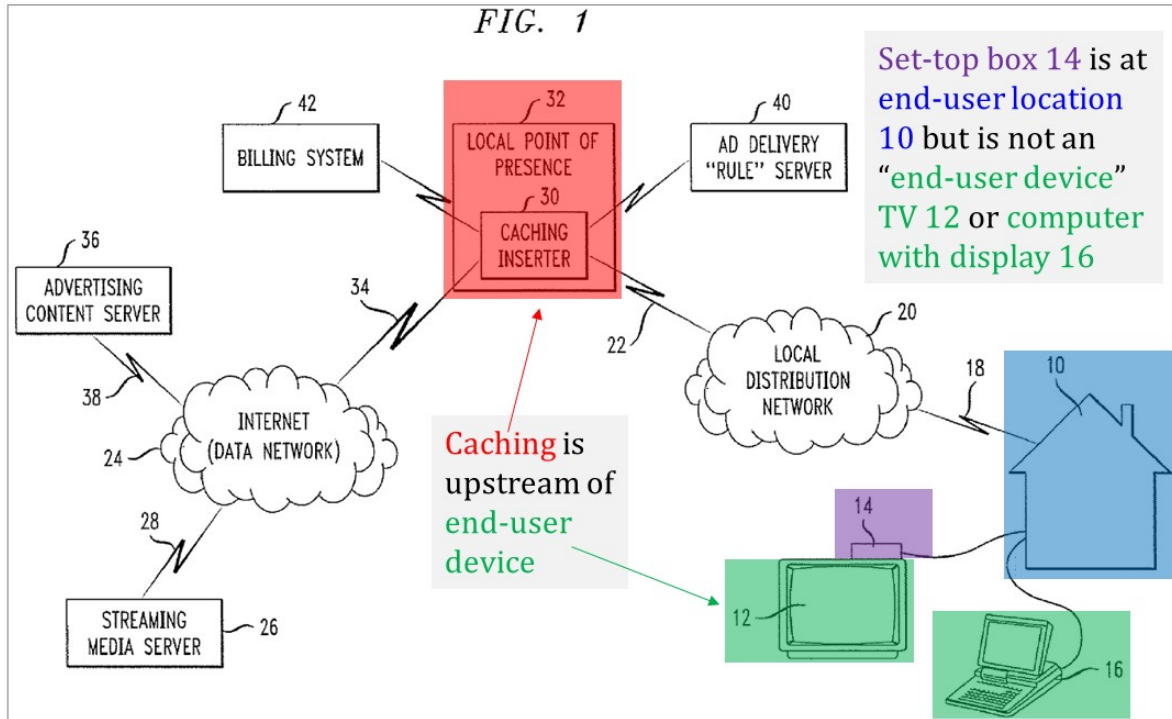
116. Dependent claim 7 requires that the cellular device of independent claim 1 receives a stream for “the at least one determined advertisement,” that is, the ad that is played on the cellular device of claim 1 while the cellular device pauses and records other streaming content.

117. Petitioner admits that Frerichs does not cache as required by the claims. Pet., 32 (“... *caching* streaming media content during the playback of an advertisement, *so that the streaming media content* can then be *resumed* after completion of the advertisement content, which is *not explicitly taught by Frerichs*”). Put another way, Petitioner admits that no client in Frerichs plays any ad—streamed or not—while pausing and recording the non-ad streaming content. Further, claim 7 requires that the substituted ad is streamed, but Petitioner does not allege that Frerichs streams the substitute ad. Pet., 59-60.

118. Despite its admission that Frerichs does not teach the claimed caching, Petitioner cites Frerichs passages that are irrelevant because they refer to a

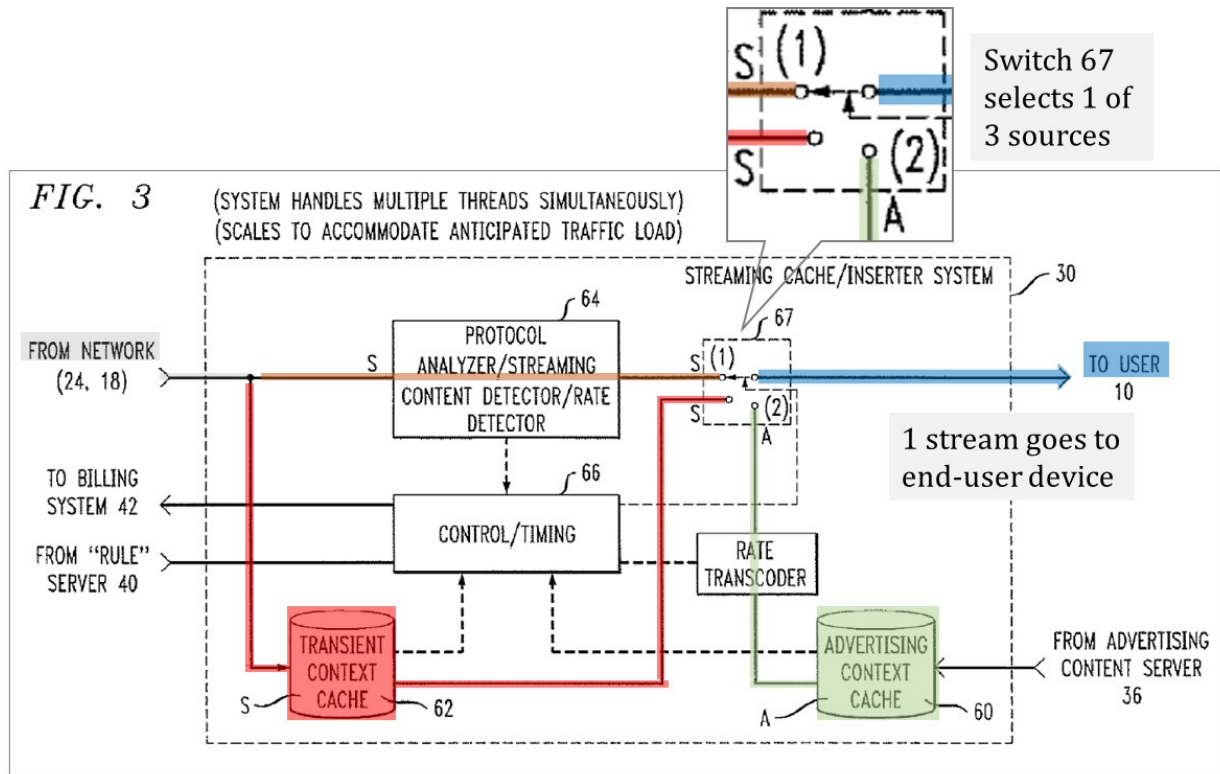
single stream that already includes an ad (EX1004, 4:54-56) or that has an ad inserted into it without the use of caching (EX1004, 4:44-46). Pet 59, citing EX1004, 4:44-46 and 4:54-56, and citing EX1003 ¶177, which merely echoes the Petition language. A single stream does not demonstrate recording one stream of content while playing a streamed ad, as claim 7 requires. Rather, a single stream that already includes ads is similar to normal radio broadcast: the client simply plays whatever it receives, ad or otherwise, without caching another stream of content. Inserting an ad into a stream does not show caching the stream for later playback while the inserted ad is played: Frerichs inserts an ad without caching the streamed content for later playback. The original content is played at a lower volume, or ignored—but not cached. EX1004, 12:14-16 (“the method *reduces* a *volume* intensity of the *streaming audio* and places the *advertisement on top of* the *streaming audio*”).

119. Petitioner also cites Kauffman for the notion of caching a streamed ad. Pet., 59-60 (citing EX1003, ¶178, which merely repeats the Petition language). Kauffman does not disclose sending two streams to the device that plays content, as claim 7 requires. Instead, content is played on a device that receives only a single stream from the upstream caching inserter.



EX1006, FIG. 1 (annotated).

120. The upstream caching inserter receives streaming multimedia content, or an ad, caches them as needed, and outputs only one stream to the device that presents the content (*e.g.*, the TV).



EX1006, FIG. 3 (annotated).

121. Specifically, Kauffman sets switch 67 to one of three positions to select only one of three sources to output to the end-user device: the (1) un-cached requested stream, (2) inserted ad, or (3) cached requested stream:

FIG. 3 illustrates an exemplary caching inserter 30 multimedia *stream MM* can be *played* coupled in real time to end-user 10, indicated as *position (1) of switch 67* of inserter 30. When ... advertisement stream *A* is ready to be played ... the *switch ... move[s] to position (2)*, allowing the cached advertisement stream *A* to be sent to end-user 10. ... When ... the end of the advertisement has been reached, a signal to move switch 67 to position (3) will be sent, allowing the *cached multimedia stream* to be sent to end-user 10.

EX1006, ¶ 24 (note that position (3) is not written in Figure 3 but relates to the third (cached) input that the switch can select, highlighted in red in the annotated

figure).

122. Kauffman outputs either the requested stream, or the ad, but not both. When an ad is to be played, the requested multimedia is cached and not output, and the ad is output in “place” (*i.e.*, instead) of the requested stream, so that a single stream is sent to the end-user device “in a seamless manner.”

In accordance with the present invention, once caching inserter 30 has an advertisement file available (either stored, or available as a stream from the advertisement server), the incoming (*requested*) *multimedia* file *destined for end-user 10* can be *cached*, and the *advertisement* multimedia file *streamed in its place* to end-user 10 *in a seamless manner*.

EX1006, ¶ 20.

123. Thus, in Kauffman, all caching is handled upstream of the device that plays content. Content is played on a device that simply displays whatever is in the single stream it receives, including any ad that happens to be in that single stream, without caching a second streaming ad as claim 7 requires.

4. Petitioner fails to establish a motivation to combine the applied references.

- a. A POSITA would not have been motivated to combine Kawasaki's artificial intelligence neural networks with a cell phone, which was not technologically feasible at the time of the '414 patent.**

1. Petitioner fails to address the fact that its proposed combination requires a cell phone to run a neural network.

124. Kawasaki requires a neural network. Although Dr. Houh admitted at his deposition that Kawasaki relates to neural networks, Petitioner and Dr. Houh's declaration do not acknowledge or address the fact that Kawasaki requires running artificial intelligence neural networks. Pet., 24-25, 35-43; EX1003, ¶¶ 51-58, 100-128; EX2011, 40:8-14 ("... the *recognizer* discussed and presented in Kawasaki ... [is] the kind of *neural network* analyzer that Kawasaki is talking about.").

Petitioner and Dr. Houh do not allege that a 2001-era cell phone could run a neural network, or that a POSITA would be motivated to combine the cell phone of Frerichs with a neural network. Pet., 24-25, 35-43. Petitioner and Dr. Houh offer no evidence, or even argument, that in 2001 a cell phone had ever run a neural network, or that such a feat was possible. Pet., 24-25, 35-43. Dr. Houh did not consider the technical challenges of running a neural network on a cell phone. Even at his deposition months after the Petition was filed, Dr. Houh could not name a single example of any cell phone in 2001 that ran a neural network. EX2011, 147:10-150:6. Dr. Houh admitted that he had not even considered

whether the phones he relies on could run a neural network. EX2011, 151:18-152:1 (“that’s not a specific question I considered in the preparation of my declaration”); 152:2-19; 154:19-155:7. He did not know whether cell phones had any of the functionality that is typically involve for running neural networks, such as GPUs or parallel processing. EX2011, 151:8-12; 157:8-12. Dr. Houh also did not know when Apple or Google introduced support for running a neural network on phones. EX2011, 144:17-9. By remaining silent on this significant issue rather than addressing it, Petitioner overlooked the fact that the proposed combination requires a cell phone to run an artificial intelligence neural network—a major technical flaw that completely undermines the proposed combination.

2. Significant technical challenges prohibited cell phones from running neural networks in 2001.

125. I am not aware of any deployments of neural networks on a mobile device in or around the year 2001. I was heavily involved in mobile computing development and research around the time of invention. In fact, in 1999-2000 time frame I was working as a software engineer at FieldCentrix, which was one of the first companies to produce mobile applications for field technicians. After that I was heavily involved in mobile computing research, *e.g.*, in 2003 I published a paper in IEEE Computer entitled “Software Architectural Support for Handheld Computing,” which presented a new paradigm for mobile application software development. Because of this experience, I am very familiar with the capabilities

of mobile devices around that time. They were highly resource constrained devices. I do not recall any deployments of neural networks on mobile devices, nor do I believe it was possible to deploy neural networks on mobile devices around that time. In fact, as I mentioned earlier, top mobile manufacturers (*e.g.*, Apple and Google) did not begin to provide support for neural networks on their devices until many years later (around 2017). There is no evidence that cell phone manufacturers had ever deployed neural networks on their phones in 2001. Cell phones in 2001 were not equipped to run neural networks. Therefore, anyone hoping to run a neural network on a cell phone would have needed to invent an unheard of, third-party solution.

126. There is no evidence in this proceeding that anyone had ever run a neural network on a 2001-era cell phone. Running Kawasaki's neural networks on a 2001-era cell phone as Petitioner proposes would not have been feasible. Neural networks were known, but they used hardware and software that was far more powerful than anything a cell phone offered in 2001.

127. Cell phones did not have sufficient storage space, RAM, or processing power to run Kawasaki's neural networks. Further, given their limited battery life, a cell phone would have had to be plugged in continuously to perform any processing that came even close to running a neural network.

128. Dr. Houh trivialized the technical difficulties of running a neural network on a cell phone. When asked whether it was known that “cellular devices could run neural network models,” Dr. Houh suggested that a phone with a built-in calculator app could run a neural network, because neural networks are “simply running these arithmetic operations.” EX2011, 153:7-156:7; 179:11-15 (“It’s just simple math ...”). Dr. Houh pointed out that running a trained model is “less computationally intensive” than training a model. EX2011, 153:7-156:7; 179:11-15. Although running a trained neural network is less computationally intense than running a trained one, it is nevertheless far too computationally intense for any 2001 era cell phone to handle.

129. Dr. Houh’s explanation of how neural networks work is incomplete. Neural networks require more than simple arithmetic operations. Dr. Houh did not consider the computational cost of extracting features from email messages. Features need to be extracted both during the training phase of a neural network and the operation (execution) of a previously trained neural network. Kawasaki cites to the ’664 patent for the disclosure of how its neural network solution worked. The ’664 patent mentions a database containing a word list and weights. The words in this database are used to compare the words extracted from web pages to find a match. A matching word indicates a feature that is used by the neural network model for prediction. During the training, the weights associated

with the words are refined to reduce the neural network's classification error. At the operation stage (*i.e.*, during usage of a previously trained neural network model), a page should be first scanned/parsed to collect the words that appear on it. Those words should then be matched against words that are in the above-mentioned database. The weights corresponding to the matching words are then retrieved to calculate a score. *See* EX2027, 4:66-5:35. Dr. Houh has not considered the overhead of extracting this information from email messages on a 2001-era mobile device. In my opinion, the computing and battery resources available on a 2001-era mobile device would have not allowed for a system that scanned and parsed all the words of each received email, and repeatedly queried a database for each of those words.

130. Furthermore, Dr. Houh did not consider the feasibility of storing the database of words and their weights on a 2001-era mobile device. The '664 patent recommends collecting 10 times the size of the word list expected to be used for prediction by the neural network. *See* EX2027, 6:65-7:15. According to the '664 patent, since a typical web page contains on the order of 1,000 natural language words, a useful quantity of training pages is on the order of 10,000 web pages. *See* EX2027, 6:65-7:15. While the '664 patent is discussing the number of words and pages that should be used for training a neural network model, a POSITA would have known that after the training, the result of training in the form of word list and

word weights should be available on a database on the device for making predictions, as shown in Figure 1 of '664 patent. A POSITA would have also recognized that there would be a separate word list and weights for each recognizer of Kawasaki. Each word list would contain many, possibly thousands of words. A word listing may include all natural language words that appear in the textual portion of a web page. EX2027, claim 10 (“forming a word listing including all natural language words that appear in the textual portion of the web page”). There are many words in a natural language, such as English. Thus, several lists of natural language words and their weights for the various recognizers of Kawasaki would have to be stored on the device running Kawasaki’s neural network model. Dr. Houh is silent as to feasibility of storing this much information on a 2001-era mobile device. In my opinion, it would have not been possible to deploy a database containing thousands of words and their weights on a 2001-era mobile device.

131. A 2001-era mobile device would have to first scan/parse an email containing all of its words, then query the above-mentioned large database separately for each word to obtain the corresponding weights, before it could perform the classification. That would not have been feasible on a 2001-era mobile device.

132. A POSITA would know about the capabilities of mobile devices and cell phones around the time of invention. At the time of invention, mobile devices

were extremely primitive. The '414 patent predates smartphones, such as iPhone and Android phones by several years. The '414 patent's filing date is approximately 5 years before the first iPhone, which was released in June 2007, and 6 years before the first Android phone, which was released in September 2008.

133. Mobile devices in the early 2000s provided barebones support for computing. In fact, Dr. Houh has cited to several articles in his declaration that are lauding these devices for their ability to send and receive emails. That is, in that time frame the ability to send and receive email on the mobile devices was a technological breakthrough that deserved attention, and framed how these devices were marketed.

134. In that time frame, a POSITA would have known it is not possible to run Kawasaki's recognizers on a mobile device. Kawasaki discloses its recognizers are built using advanced forms of machine learning algorithms known as Neural Networks. EX1005, 4:16-24 ("The development of these algorithms and weighted rules is accomplished through the use of a three-tier feed-forward artificial neural network, a Neural Net 22, with a learning algorithm as described in the above-referenced patent application. Various artificial neural networks are commercially available that could be used for this purpose. The output from Neural Net 22 is algorithms and rules, the Recognizers 23, which in essence "recognize" a match of incoming, unknown data with Data Sets 21.").

135. It was not until 2017, approximately 15 years after the filing date of '414 patent that Apple and Google provided support for execution of Neural Network models on iOS and Android devices, respectively. (*See* EX2025; EX2013).

136. When Dr. Houh was asked about the feasibility of running Neural Networks of Kawasaki on mobile devices in his deposition, Dr. Houh suggested that a phone with a built-in calculator app could run a neural network, because neural networks are “simply running these arithmetic operations.” EX2011, 153:7-156:7; 179:11-15 (“It’s just simple math ...”). That is absurd. Ultimately the execution of all software is achieved through arithmetic operations performed by hardware. But because all forms of computing involve some form of arithmetic operation does not mean that all forms of computing can be performed everywhere. Take for example World Wide Web (WWW) search engines, such as Google Search and Microsoft Bing. The software realizing such search engines also performs arithmetic operations. However, running such search engines on a cell phone is impossible.

137. Dr. Houh had difficulty recalling even one example of running Neural Networks on mobile devices around the time of invention during his deposition. *See* EX2011, 147:10-148:18. After he was pressed, he recalled a company called Vlingo that he apparently contends had a product that ran Neural Networks on

mobile devices, although he was not able to provide any specifics. *See* EX2011, 148:19-151:2. However, this company was not formed until 2006, 4 years after filing date of the '414 patent. *See* EX2015, 1 (“In 2005, Mike left ScanSoft to spend a year as a visiting scientist at MIT before starting vlingo in the summer of 2006.”). Furthermore, Vlingo’s voice recognition app sent a user’s voice recording on the mobile device to its servers for translating the user’s voice recording to text. *See* EX2020, 1 (“Vlingo listens when you hold your finger on the app’s Press & Speak button. It then copies your recording to Vlingo’s servers, where your speech is translated to text and sent back to the Vlingo app.”); *see* EX2017, 2 (“Vlingo handles all the voice-recognition heavy lifting on its servers, so you must have a data connection for it to work.”); *see* EX2016. It is not clear what algorithm Vlingo’s system used in providing its voice-to-text translation service. But even if it performed the translation using Neural Networks, it did so on the server side, not on the mobile device. Thus, this confirms my opinion that it was not possible to run Neural Networks on mobile devices around the time of invention, or even several years after the invention.

138. According to Dr. Houh, “Kawasaki also notes that “commercially available” software is available to implement its techniques, and the Recognizers used are “very small and compact.” EX1003, ¶74 (citing EX1005, 4:21-32). Kawasaki further describes that its invention “employs methods for scanning,

analyzing and handling digital information content” as described in a related patent (U.S. Patent No. 6,266,664, EX2027) which refers to “source code files” for implementing its techniques. EX1005, 4:62-67. “Thus, a POSITA would have recognized a reasonable expectation of success in applying Kawasaki’s teachings to the devices described in Frerichs.” *See* EX1003, ¶74. There are several flaws in Dr. Houh’s analysis.

139. While it is true that at the time of invention there were commercially available solutions for training and running Neural Network models on server and desktop computers, there was no commercially available solution for doing the same on mobile and cell phone devices. In fact, U.S. Patent No. 6,266,664 (EX2027) provides additional details about the kinds of available software that Kawasaki anticipated could be used for building the Neural Network component of its Recognizers. Specifically, it discloses a Neural Network software package called “SNNS.” *See* EX2027, 8:4-20. (“For example, a neural-network software packaged called “SNNS” is available on the internet for downloading from the University of Stuttgart.”). “SNNS” stands for Stuttgart Neural Network Simulator. SNNS works only on Unix or Windows workstations. *See, e.g.*, EX2012; EX2028, 1 (“*SNNS* (Stuttgart Neural Network Simulator) is a software simulator for *neural networks* on *Unix workstations* developed at the Institute for Parallel and Distributed High Performance Systems (IPVR) at the University of Stuttgart.”).

140. A workstation is a high-performance computer that is more powerful than a personal computer. *See, e.g.*, EX2029; EX2030; EX2031.

141. No version of SNNS ever existed for mobile devices.

142. Dr. Houh had not heard of “SNNS” when he was asked about it at his deposition. EX2011, 156:13-15 (“Q. Have you heard of the Stuttgart Neural Network Simulator or SNNS? A. I don’t think I have, no.”).

143. Petitioner refers to the “recognizers” being “very small and compact,” but offers no evidence they are small enough for a 2001-era cell phone to store or run them. Pet., 30 (citing EX1005, 4:21-32).

144. Dr. Houh is mistaken when he relies on the phrase “very small and compact” in Kawasaki to support his opinion that a POSITA would have had reasonable expectation of success in applying Kawasaki’s teaching on mobile and cell devices around the time of invention. *See* EX1003, ¶74. The actual sentence in which that phrase appears in Kawasaki makes it clear that the phrase “very small and compact” is a reference to the size of the actual Neural Network model for the purposes of electronic distribution and updates. *See* EX1005, 4:28-32 (“In addition, because Recognizers 23 are very small and compact, dynamically generated Recognizers 23 are used for electronic distribution and updates.”). The ability to distribute (transmit) Neural Networks or updating them is different from the ability to run them on a device. Kawasaki’s statement is about the feasibility of

distributing (transmitting) the Neural Network models, not about the feasibility of executing (running) them on mobile devices.

3. Cell phones did not run neural networks and therefore were not suitable clients for Kawasaki.

145. Kawasaki does not disclose a cellular device. Petitioner does not allege otherwise, but presents incorrect logic to argue that Kawasaki could use the cell phone of Frerichs as a client. Petitioner and Dr. Houh's flawed reasoning is as follows:

1. Kawasaki states that a client can be a device that displays email.
2. A cell phone could display email.
3. Therefore, a cell phone could be a client in Kawasaki.

Pet. 30, 40; EX1003, ¶¶ 74, 120-121. Under Petitioner's faulty logic, Frerichs's personal digital assistant and pager could also be clients in Kawasaki, because those devices also can display email. EX1004, 3:52-54 ("The remote computing device can include, for example, a cellular phone, a *personal digital assistant*, a *pager*, or the like."). No one would ever consider putting a neural network on a pager, just as no one would consider putting a neural network on a cellular phone from 2001.

146. Petitioner's reasoning for using use a cell phone disclosed in Frerichs as a client in Kawasaki is incorrect because displaying email is not the only criteria

for a device to be a client in Kawasaki. Kawasaki does not state that every device that can display email can be a client. EX1005, 6:4-5.

147. Of the universe of devices that could qualify as clients, Kawasaki discloses only two particular examples: set-top boxes and desktop computers. EX1005, 6:4-5 (“Clients refers to any software loaded on *desktop PCS, set top boxes* and end-user display devices that display e-mail.”); *see also* the six other nearly identical language referring solely to desktop PCs and set top boxes at EX1005, 6:17-19, 6:31-33, 6:45-48, 6:59-61, 7:8-10, and 7:22-26.

148. Petitioner focuses on the language “devices that display email” to suggest moving from the computational power of desktop computers all the way down to cell phones. Kawasaki offers no basis to do so. A POSITA reading Kawasaki’s reference to other clients that display email would understand that to mean other types of powerful computers that were known to run neural networks, such as workstations that ran the SNNS neural networks that Kawasaki’s related patent refers to. EX2027, 8:6-20.

149. Kawasaki refers to “desktop” computers, as opposed to laptops or hand-held computers. EX1005, 6:4-5. Kawasaki does not suggest using less powerful computers such as a laptop computer as a client, let alone a cell phone.

150. There is no mention of a cell phone in Kawasaki, and Dr. Houh could not point to anything in Kawasaki that discloses one. EX2011, 151:3-7; 158:9-14.

Unlike a 2001-era cell phone, the clients in Kawasaki do not have low processing power, minimal RAM, or minimal storage space, and none of them run on a battery.

151. Although some 2001-era cell phones could display email, such devices would not qualify as a client in Kawasaki. Displaying email was one of the most sophisticated tasks that a cell phone could accomplish in 2001, and was heralded at the time as a significant technological advance. But in Kawasaki, clients perform tasks that are computationally far more intense than anything a 2001-era cell phone ever did or could ever do, including running artificial intelligence neural networks. Kawasaki runs multiple artificial intelligence neural network “recognizers” to determine whether messages belong to any of multiple predefined categories by analyzing the unknown data against data sets in real time:

The two modules, *scanning* and *analyzing*, ... are used in *real time* to assess the incoming data ... for their relevance to ... *predefined categories* of interest to Advertisers.

...

Various *artificial neural networks* are commercially available that could be used for this purpose. The output from *Neural Net 22* is algorithms and rules, the *Recognizers* [plural] 23, which in essence “recognize” a *match* of incoming, *unknown data* with *Data Sets* [plural] 21.

...

... if a golfing Recognizer 23 is loaded and the User views golf-

related ... E-mail ... or other digital content, the *golfing Recognizer*
23 returns a *positive match* for that *Data Set* 21.

EX1005, 4:6-11, 4:16-24; 4:37-41. The Kawasaki “Profiler” then performs quantitative analysis of the output of the neural network recognizers to create an aggregate statistical model (profile):

... *Profiler* 26 that *receives* the output from the *real-time analysis* of *Recognizers* [plural] 23. *Profiler* 26 tracks and builds an *aggregate statistical model*, ‘*Profile*,’ of the User including *quantitative analysis* of the match, frequency, duration, age and other factors between unknown content reviewed by the User and the set of installed *Recognizers* [plural] 23.

EX1005, 4:42-48. Petitioner refers to Kawasaki’s profiling analysis. Pet., 25; EX1003, ¶ 102. Petitioner does not acknowledge or address the question of whether a cell phone could run a neural network, and does not assert that a cell phone could perform Kawasaki’s profiling analysis. Pet., 24-25, 35-43; EX1003, ¶¶ 51-58, 100-128.

152. Running neural networks was far beyond the capacity of Frerichs’ cell phone. Thus, Petitioner’s hypothetical combination of Frerichs’ cell phone performing the work that Kawasaki requires would not have been feasible. Petitioner’s hypothetical combination requires that a client—more specifically, Frerichs’ cell phone—must do the work; otherwise, Petitioner could not point to

any information that a Kawasaki client takes from a message and sends to a server as the claims require, for example. Pet., 38-43. Petitioner does not point to any disclosure in Kawasaki suggesting that any device less powerful than a desktop computer could handle the tasks that Kawasaki requires. Pet., 29-30. Instead, Petitioner merely offers the incorrect and conclusory assertion that “Kawasaki contemplates applicability to a wide variety of client devices.” Pet., 29. That is wrong. To perform the work that Petitioner’s hypothetical combination requires of a client, the client must be capable of running artificial intelligence neural networks and other processing that servers would otherwise do.

4. Any benefits of combining Kawasaki and Frerichs could be achieved without the unnecessary and unprecedented feat of running a neural network on a cell phone.

153. Petitioner does not offer any reason to combine Kawasaki’s neural networks with a cell phone. Pet., 27-30; EX1003, ¶¶ 69-75. Petitioner merely offers advertisement-related reasons to combine Kawasaki with Frerichs generally—not the cell phone embodiment of Frerichs specifically, which is essential to Petitioner’s proposed combination. Pet., 30; *see also* Pet., 27-30 (referring to improved targeted advertising, playing advertisements on a user device, and advertising based on user profiles)

154. The alleged benefits could be achieved without burdening any client—let alone a cell phone—by running the neural network on a server—which

would not satisfy the claims. Frerichs discloses servers, and Kawasaki discloses that the neural network can run on a server, and need not run on a client. EX1005, 5:66-67 (“*Analysis and Profile building* can be accomplished at either the Client or Server ...”); EX1004, 4:44-46 (“In each of the *servers* 105, information such as advertisements can be inserted into the streaming audio for output at any one of the client devices.”). Petitioner points to no reason for, or benefit from, combining clients instead of servers.

155. Petitioner does not point to any reason or benefit for taking on the unnecessary and unprecedented challenge of running neural networks on a cell phone, and does not recite any advantages that a cell phone would provide that other embodiments would not. Pet., 27-30; EX1003, ¶¶ 69-75.

156. It was far beyond the skill of a POSITA to run a neural network on a 2001-era cell phone. To the extent a POSITA would have any need to run a neural network, a POSITA would have used devices that were known to run the “commercially available” neural networks that Kawasaki refers to, such as the desktop computer clients that are common to both references and that Kawasaki discloses as being capable of running neural networks. EX1005, 4:6-24 (“commercially available” neural networks), 6:4-5 (“Clients refers to any software loaded on *desktop PCS, set top boxes*”); EX1004, 11:10-13 (“The client can be a *personal computer, ... television set top box*”).

5. Any expectations of success apply to powerful computers, not cell phones.

157. Petitioner alleges that a POSITA would have had reasonable expectations of success combining Kawasaki and Frerichs because Kawasaki refers to (1) “‘commercially available’ software” and (2) “‘methods for scanning, analyzing and handling digital information content’ as described in a related patent (U.S. Patent No. 6,266,664).” Pet., 30 (citing EX1005, 4:21-32; 4:62-67). What Petitioner fails to mention is that both of those quotes refer to neural networks that did not run on cell phones. Doing so would have required skill far beyond ordinary skill in the art. That is especially true because Petitioner’s definition of a POSITA is silent with respect to knowledge of neural networks. Therefore, there is no evidence that a POSITA would have had any expectation of success in running a neural network on a cell phone in 2001. Pet., 15-16. Unsurprisingly, there is no evidence that the feat had ever been accomplished, or even attempted at that time.

158. The “commercially available” software that Petitioner cites is neural network software, as Dr. Houh admitted. EX1005, 4:21-23 (cited in Pet., 30) (“Various *artificial neural networks* are *commercially available* that could be used for this purpose.”); EX2011, 165:17-7. Kawasaki does not mention any particular commercially available product, but there was no commercially available neural network for cell phones, and Dr. Houh could not name any. EX1005, 4:21-23; EX2011, 166:16-21 (“I’m not aware of the exact timeline” for such products).

Therefore, a POSITA would not have had any expectation—or even a possibility—of success running a commercially available neural network on a cell phone.

159. Similarly, the methods that Petitioner refers to in the related patent use neural networks. The related patent, like Kawasaki, refers to commercially available software, without mentioning any product by name. EX2027, 3:33-36 (“... it reflects a *commercially available embodiment* of the invention.”). The patent mentions PCs, but does not mention cell phones. EX2027, 8:34-40 (“For example, the present technology can be implemented as a software product for *personal computers* ...”). The patent also refers to training a neural network by analyzing 10,000 web pages using a database and the “SNNS” software package:

The neural-network then executes a series of equations for analyzing the entire set of training pages (for example, *10,000 web pages*) using the set of weightings (*database 110*) which initially are set to random values. ... This type of *neural-network training* arrangement is known in prior art for other applications. For example, a neural-network software packaged called “*SNNS*” is available on the internet ...

EX2027, 8:6-20. No 2001-era cell phone could possibly do that.

160. Thus, Kawasaki and its related patent each undermine Petitioner’s position and do not support using a cell phone to run a neural network. A POSITA reading Kawasaki and its related patent would be motivated to use the disclosed server or desktop computer, not a cell phone, to run neural networks.

161. Petitioner refers to the “recognizers” being “very small and compact.” Pet., 30 (citing EX1005, 4:21-32). Petitioner does not suggest they are small enough for a 2001-era cell phone to store the recognizers, let alone run them. Pet., 30 (citing EX1005, 4:21-32). Indeed, such phones did not have enough processing power or RAM to run the neural networks. The cited Kawasaki sentence refers to distributing “small and compact” recognizer neural networks as updates. EX1005, 4:29-31 (“... because Recognizers 23 are very *small and compact*, dynamically generated *Recognizers 23* are used for electronic *distribution and updates*.”). Specifically, distributing (1) smaller, trained recognizer neural networks, instead of (2) a larger, untrained Neural Net 22, which Kawasaki refers to in the preceding paragraph. EX1005, 4:17-24 (“The development of these algorithms and weighted rules is accomplished through the use of a three-tier *feed-forward artificial neural network*, a *Neural Net 22* The *output* from *Neural Net 22* is algorithms and rules, the *Recognizers 23* ...”).

162. Dr. Houh did not evaluate the technical challenges of running neural networks, and could not describe techniques that Kawasaki expressly discloses, such as the “feed-forward” concept in the previous quote. EX2011, 145:10-20. Training a neural network requires more RAM, storage, and processing power than running a neural network that has already been trained, and therefore a trained neural network is small and compact compared to an untrained neural network. Dr.

Houh admitted that the “the training of a neural network would typically be done on higher-end devices with more computation” power and running a trained neural network is “much less computationally intensive.” EX2011, 146:15-147:9. Thus, Kawasaki refers to distributing updated neural networks to computers that already ran neural networks. EX1005, 4:17-23. Kawasaki does not suggest expanding the universe of devices that actually run neural networks.

b. A POSITA would not have been motivated to combine Frerichs’ audio cell phone client with Kauffman’s caching inserter for streaming video.

163. Petitioner does not provide any reason to combine Kauffman with Frerichs—let alone the cell phone of Frerichs.

1. The sole benefit that Petitioner refers to—playing from a cache without further network delay—is a problem that Kauffman creates but does not acknowledge or solve.

164. The vast majority of Petitioner’s discussion regarding combining Frerichs and Kauffman has nothing to do with any motivation to combine. Instead, it is directed to similarities between Kauffman and Frerichs. For example, the concepts of showing ads seamlessly and inserting ads at arbitrary locations are benefits that Frerichs achieved alone, without caching and without Kauffman, as Petitioner itself points out. Pet., 30-34.

165. Petitioner cites only one alleged benefit of combining Kauffman and Frerichs: caching “would allow the paused content to be immediately resumed ...

without further delay caused by network retrieval of the streaming media content.”

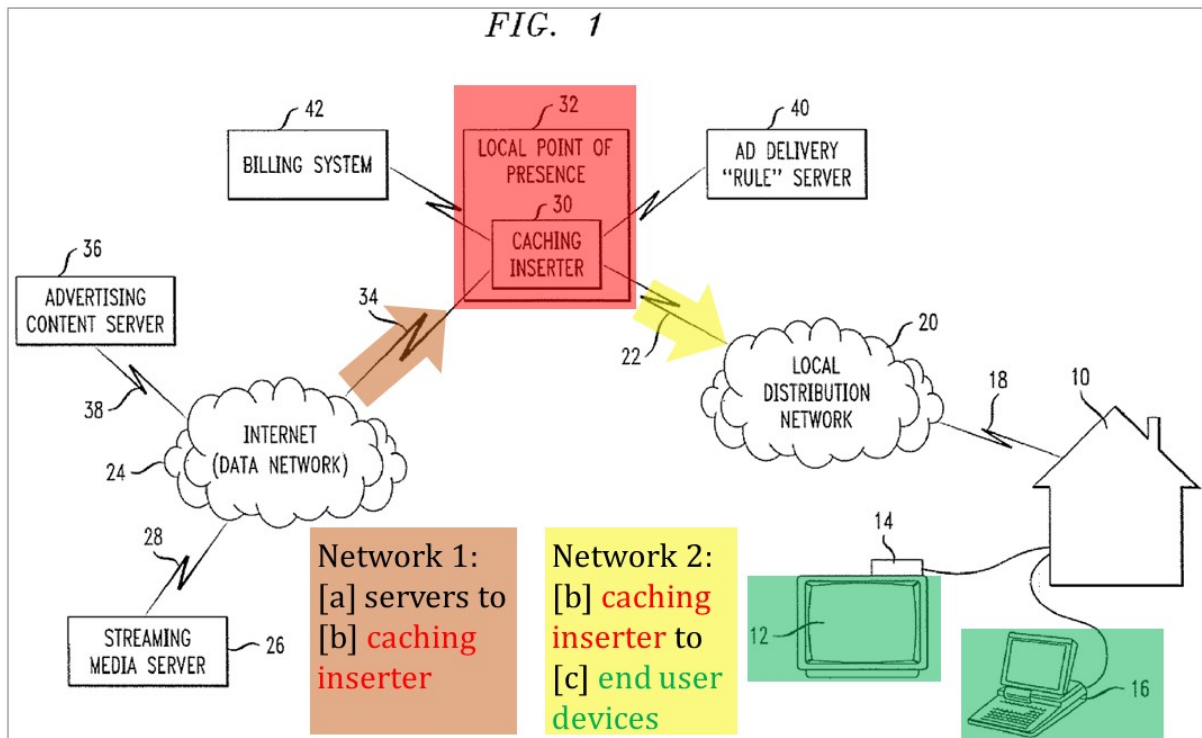
Pet., 33. Glaringly absent from the Petition is any cite to a statement by Kauffman regarding this alleged benefit. There is no motivation to combine with Frerichs with Kauffman to avoid network delays. Kauffman is silent regarding, and teaches away from, that concept. Indeed, Kauffman’s only mention of the term “delay” relates to the delay that Kauffman itself causes by “intercepting” a stream destined for an end-user to insert an ad, which creates the need to delay and cache the remainder of the stream. EX1006, ¶¶ 7, 20 (“... a time *delay* between the incoming stream to caching inserter 30 and the outgoing stream to end-user 10 (the ‘*delay*’ being the length of the inserted advertisement).”).

166. Petitioner is unclear regarding what is supposedly solved by combining Frerichs with Kauffman. If Petitioner is asserting that Kauffman solves a delay caused by intercepting and caching a stream, it is Kauffman that creates that problem. Thus, there is no motivation to combine with Kauffman to create, then solve, an additional problem that is not present in Frerichs.

167. If instead Petitioner is asserting that Kauffman’s caching can alleviate network delay, it is Petitioner alone, not Kauffman, who says so. Kauffman mentions that collecting statistics about ads is a benefit of using caching inserter, but never mentions reduced network delay. EX1006, ¶ 10 (“It is an *advantage* ... that ... passing an advertisement stream through a *cache allows for various*

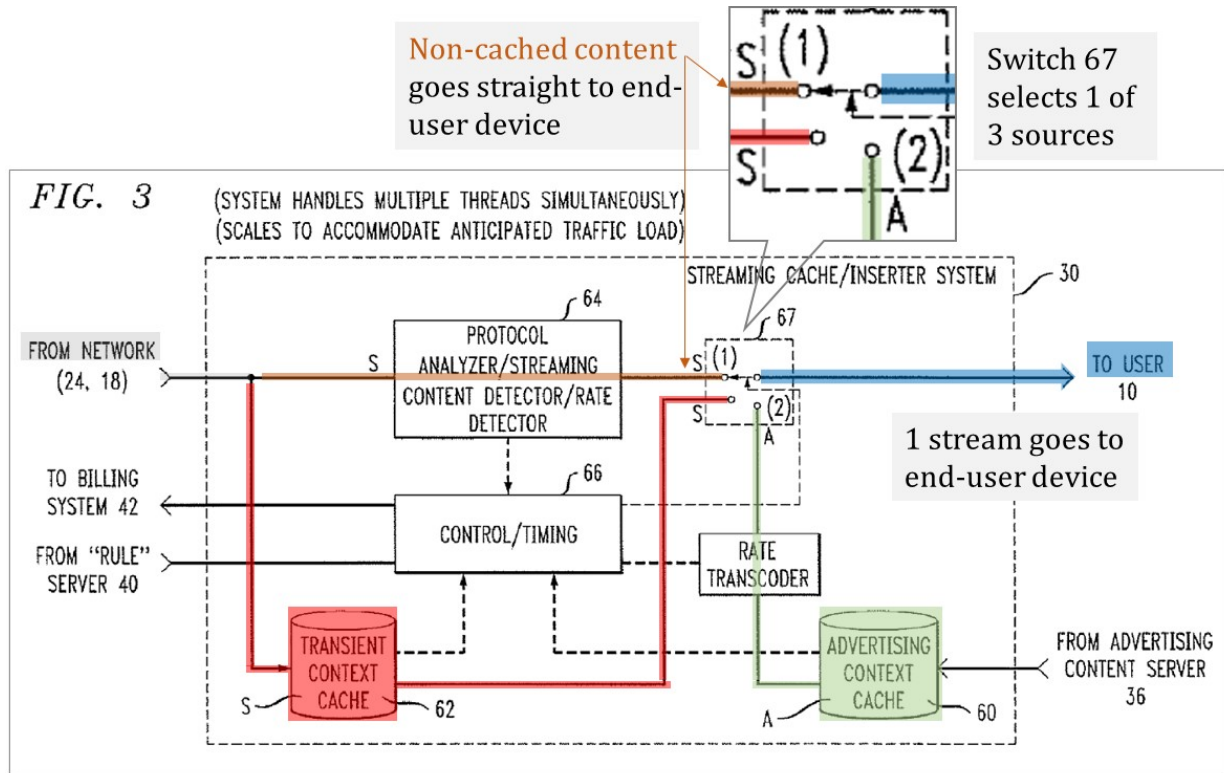
statistics to be collected at the POP, such as the number of times a particular ad is played”).

168. Kauffman compounds the risk of network delay rather than solving it, because the caching inserter creates the need for a second connection from the caching inserter to the end-user device.



EX1006, FIG. 1 (annotated). Kauffman’s first connection is from servers to the caching inserter. Kauffman is silent regarding any possible network delay on that first path, and does not teach caching all incoming content to avoid network delays. To the contrary, Kauffman teaches away from caching to reduce network delay on that path: Kauffman streams content directly from the first network, through the inserter without caching, and through the second network to the end-user.

Specifically, before there is any ad to insert, Kauffman teaches putting switch 67 of Figure 3 into the position 1 to allow the stream to pass straight through, without caching.



EX1006, FIG. 3 (annotated). Kauffman states that switch position 1 outputs non-cached content in real time until an ad is ready to be played, at which time the switch moves to position 2 to play the ad. After the ad ends, the switch moves to position 3 to output cached content:

... unless and until a full advertisement file is loaded in first cache 60, *multimedia stream* MM can be played coupled in *real time* to *end-user* 10, indicated as *position (1)* of switch 67 of inserter 30. ... [when an ad is ready] switch ... move[s] to position (2), allowing the cached advertisement stream A to be sent to end-user 10. ... When ... the end

of the advertisement has been reached, a signal to move switch 67 to position (3) will be sent, allowing the cached multimedia stream to be sent to end-user 10.

EX1006, ¶ 24.

169. Kauffman's second connection is from the caching inserter to the end-user device. That second connection is one that Kauffman creates by "intercept[ing]" the stream. EX1006, ¶ 7. Thus, rather than solving network delay, Kauffman creates a risk of additional delay in the embodiments where caching inserter outputs content to a second network to reach the end user. "At the extreme," the caching inserter can be located in a set-top box, in which case the second connection does not require a network path to the end-user's location, but Kauffman does not mention reducing network delay, or anything else, as a benefit of putting the caching inserter into the set-top box. EX1006, ¶ 9.

2. Any benefits of combining Kauffman and Frerichs are achievable without caching at a client device, let alone a client that plays content.

170. Petitioner proposes a hypothetical combination: Kauffman's caching inserter inside Frerichs' clients that play content. That combination simply does not exist in Kauffman, Frerichs, or both of them combined. Kauffman caches upstream of the end-user device that plays content, so combining Kauffman with Frerichs' cell phone would not create a combination that cached content on the cell phone.

171. Any benefits of using Kauffman's disclosure are achievable without caching at any client device: in all but one embodiment, Kauffman cached outside of the end-user's home, at an upstream location that the end user cannot control, such as a cable headend.

172. Petitioner does not provide any reason or benefit for caching at a client. Petitioner refers to Kauffman "client-side" caching without any supporting citation. Pet., 33 ("Kauffman's acknowledgement that its techniques may be implemented at a [sic] *client-side* (e.g., in Frerichs' cellular phone)," with no relevant citation). Dr. Houh admitted that he did not provide any relevant citation, and stated that he is not relying on anything in Kauffman as instructing anyone to use a cell phone. EX2011, 98:14-99:8; 105:4-5 ("... I'm not explicitly saying that Kauffman says do this on a cell phone."), 102:9-22. Kauffman does not mention a cell phone, so Petitioner's statement about "client-side" is presumably referring to Kauffman caching at a set-top box or residential gateway. EX1006, ¶ 9, claims 17-19.

173. Although the set-top box and residential gateway are characterized as client devices, they are not end user devices on which content is played as the '414 claims require. Kauffman does not disclose implementing the caching inserter on an end user device that plays content. Instead, content is played on a device that is downstream from the caching, even in the set-top box and gateway embodiments.

EX1006, ¶ 3 (“play the file ... *through a set-top box*” and “on a television or on a computer display device”), ¶ 17 (“receiving multimedia information through either a *television 12* (using a *set-top box 14* or other appropriate *residential gateway device*) or a computer terminal 16”). Thus, even in a hypothetical combination of Kauffman with a cell phone, the caching would take place upstream of the cell phone.

3. Any benefits or expectations of success from combining Kauffman and Frerichs apply, if at all, to client devices that are more powerful than cell phones.

174. Petitioner does not cite any reason why a POSITA combining Frerichs and Kauffman would choose a cell phone as a client, instead of the computer, TV, or set-top box disclosed in both references. Pet, 30-34; EX1006, ¶9, 3 (“play the file on an end-user device, such as through a *set-top box* on a *television* or on a *computer display device*.”); EX1004, 1:13-19 (“... the present invention is implemented using a *personal computer* The invention can be applied to ... *set top boxes, television, and the like*.”). Any combination of Frerichs and Kauffman would naturally use the same devices. Frerichs also discloses a wide range of additional clients that are far more lightweight than Kauffman’s clients, including pens. EX1004, 3:46-49 (“*Client* can be ... [a] palmtop, *pen* ...”). Lightweight Frerichs clients such as pens, PDAs, and cell phones are not suitable for Kauffman, because, for example, they did not play streaming video. This is particularly true of

the three mobile devices that Dr. Houh has cited in his report, some of which as I mentioned earlier had monochrome display — thereby could not play video — or did not have speakers — thereby could not play audio.

175. Kauffman discloses putting the caching inserter into a set-top box “[a]t the extreme.” EX1006, ¶9. Petitioner does not assert that Kauffman’s set-top box could be replaced with a cell phone, nor that a cell phone could have handled streaming video. Pet., 45-53.

176. A POSITA would not substitute a 2001-era cellular phone for a set-top box and attempt to insert the caching inserter into a cellular phone. Kauffman’s set-top box is a specialized computer that is dedicated to functions including processing incoming streaming video and converting it for display on a TV. There is no evidence in this proceeding that any cell phone in 2001 had ever output video for display on a TV, or handled streaming video—let alone cached incoming streaming video for later playback, which is an even more difficult task than receiving video and processing it for immediately display. A system that caches one stream and simultaneously plays another stream is more complex to construct than a system that simply plays a stream. A POSITA would have found it difficult to resolve this complexity on the resource constrained mobile devices of 2001-era.

177. Kauffman disclosed caching upstream from—not at—TV 12 and computer terminal 16, for example to play content “on” TV 12 that it received

“through” the upstream set-top box. EX1006, ¶9, 3 (“*play the file on an end-user device, such as through a set-top box on a television or on a computer display device.*”). Thus, even computer terminal 16 is not a suitable device for Kauffman’s caching inserter. The cell phone of Frerichs had far less processing power, RAM, and storage than Kauffman’s computer terminal, and therefore is an even less suitable candidate for Kauffman’s caching inserter. Thus, any combination with a cell phone would continue to place the caching inserter upstream of, not inside, the cell phone.

178. Kauffman is directed to streaming video. EX1006, ¶7 (“In accordance with the present invention, a ‘caching inserter’ system is disposed at a local point of presence (POP) which intercepts a *video stream* destined for an end user.”). Petitioner does not address why a POSITA would combine Frerichs’ audio clients with Kauffman’s video caching. Pet., 30-34 (referring to Frerichs’ “audio” and “media,” and Kauffman’s “multimedia,” without ever mentioning “video” or acknowledging that audio media is different than video multimedia). Dr. Houh admitted at deposition that Frerichs does not use the term “multimedia” and “is primarily talking about the streaming of audio content.” EX2011, 92:10-18.

179. Petitioner only mentions streaming audio, not video. Specifically, Petitioner asserts that a cell phone had “sufficient processing power and memory” for caching streaming audio. Petitioner offers no evidence that a cell phone had

sufficient processing power; Houh’s declaration merely repeats the unsupported conclusory statement. Pet., 34; EX1003, ¶85. Houh discusses a phone’s storage space, but does not address whether a cell phone had sufficient RAM or anything else required for receiving and presenting streaming audio. EX1003, ¶86. Further, even if a cell phone theoretically could have cached streaming audio for later playback, there is no evidence in this proceeding that cell phones in 2001 actually performed such caching.

180. Dr. Houh did not consider whether cell phones could stream media when forming his opinions. He did not know whether any of the phones he relies on could stream media. EX2011, 156:13-157:2 (“Q. With respect to the Nokia, RIM, and Ericsson devices that you cited in your declaration, do you know if any of those accepted and displayed streaming multimedia content? A. I mean, off the top of my head, I don’t know.”). He could not name any cell phone or application for a cell phone in 2001 that received streaming audio or video—let alone cached streams. EX2011, 79:21-81:22. He could not even name any type of encoding used for streaming media content in 2001—by any device, let alone cell phone. EX2011, 86:15-87:9.

181. Adding Kauffman’s caching inserter to a cell phone would pose additional technical challenges that Petitioner, Frerichs, and Kauffman do not address. Furthermore, these challenges would have been completely unnecessary

because a POSITA would simply put Kauffman's caching inserter upstream of the end-user device—exactly as Kauffman teaches. EX1006, ¶9.

- c. A POSITA would not have been motivated to combine all three references because such a combination would pose even more challenges than either combination alone.**

182. Petitioner suggests reasons for combining Frerichs and Kawasaki, and for combining Frerichs and Kauffman. Unsurprisingly, Petitioner does not cite any reasons to combine all three references together in order to create its proposed Frankenstein device out of a 2001-era cell phone (Frerichs), a computationally advanced computer system for running neural networks (Kawasaki), and a caching inserter designed to be arranged upstream and outside of an end user's device (Kauffman). Pet., 27-34.

183. Petitioner's suggested combination would require a 2001-era cell phone to perform feats that no cell phone from that era ever did or was capable of doing. Petitioner's hypothetical cell phone would need to run artificial intelligence neural networks, while also processing and caching streaming content for later playback on the device. Combining all of those technologies into a cell phone would have been beyond the skill of a POSITA at the time.

184. Petitioner considered only the storage of a cell phone for the purpose of caching audio, leaving aside the processor, RAM, and other technical challenges. Even if one considers only the storage of a cell phone, the triple

combination was simply not achievable. Any neural networks, and any profile created using the neural networks, would require storage space on the phone. Therefore, the altered hypothetical Frerichs-Kawasaki combination cell phone would have even less memory remaining for installing software capable of receiving streaming content, and even less memory for caching streamed content for later playback. Kawasaki's neural network models require a 2001-era mobile device to (1) store a large database containing word lists and weights representing the results of training for each recognizer, (2) scan, parse, and extract all natural language words from an email message, (3) query the database separately for each extracted word from an email message, and (4) compute a score. Despite these massive storage and computing requirements that would overload a 2001-era cell phone, Dr. Houh considers storage only for the relatively simple suggestion that a 2001-era cell phone that had about 4 MB available for all programs could store 300 KB of audio (for a 30-second audio ad and another 30 seconds of streaming audio). EX1003, ¶86. Petitioner and Dr. Houh do not suggest that the cell phone had sufficient memory for Kawasaki's neural network, let alone sufficient storage for both combinations at once. EX1003, ¶86; Pet., 27-34.

X. ADDITIONAL REMARKS

185. This Declaration reflects my opinions as currently held. However, my analysis may continue such that I may consider additional information that may result in additional observations. 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.

186. 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 are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on September 14, 2023, in Irvine, California.

A handwritten signature in dark ink, appearing to read "Sam Malek", written over a horizontal line.

Dr. Sam Malek