

Declaration of Andrew Wolfe, Ph.D.
U.S. Patent No. 10,219,020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCL Electronics Holdings Ltd.
(f/k/a TCL Multimedia Technology Holdings, Ltd.)

Petitioner,

v.
Maxell, Ltd.

Patent Owner.

Case IPR2025-00135
U.S. Patent No. 10,219,020

**DECLARATION OF ANDREW WOLFE, PH.D.
ON BEHALF OF PETITIONER**

CLAIMS 1-6, 17-30

I, Andrew Wolfe, Ph.D., declare as follows:

1. I have been retained on behalf of TCL Electronic Holdings Ltd. (f/k/a TCL Multimedia Technology Holdings, Ltd.) (“TCL” or “Petitioner”) to render my opinion on the patentability of claims 1-35 of U.S. Patent 10,219,020 (the “’020 Patent”). I have been asked to consider the state of the art and the prior art available before the time of the ‘020 Patent. My opinions are provided in this declaration.

2. To the best of my knowledge, I have no financial interest in Petitioner. Petitioner’s counsel has also informed me that a company known as Maxell, Inc. (“Maxell” or “Patent Owner”) is named as the current assignee of the ‘020 Patent and presumably is the Patent Owner. To the best of my knowledge, I have no financial interest in Maxell and, to the best of my recollection, I have had no contact with Maxell outside of their actions as opposing parties in similar litigation matters. To the best of my knowledge, I similarly have no financial interest in the ‘020 Patent. To the extent any mutual funds or other investments that I own have a financial interest in the Petitioner, the Patent Owner, or the ‘020 Patent, I am not aware of, nor do I have control over, any financial interest that would affect or bias my judgment.

3. I am being compensated at my standard consulting rate of \$750 for my time. My compensation is in no way contingent on the results of this or any other proceedings relating to the '020 Patent.

4. For ease of understanding, I have annotated figures and added emphasis in my discussions unless otherwise noted.

1. Background and Qualifications

5. My qualifications and professional experience are described in my curriculum vitae, a copy of which is provided as Exhibit 1006. The following briefly summarizes my relevant qualifications and professional experience.

6. I have more than 40 years of experience in consumer electronics and interactive graphics and interactive video computer systems, including as a computer architect, computer system designer, PC graphics designer, educator, and as an executive in the consumer electronics business.

7. In 1985, I earned the B.S.E.E. degree in Electrical Engineering and Computer Science from the Johns Hopkins University. In 1987, I received the M.S. degree in Electrical and Computer Engineering from Carnegie Mellon University and then in 1992, I received a Ph.D. in Computer Engineering from Carnegie

Mellon University. My doctoral dissertation proposed a new approach for the architecture of a computer processor.

8. In 1983, I began designing microprocessor-based computer systems and I/O cards for personal computers as a senior design engineer for Touch Technology, Inc. In some of these design projects, I designed interrupt-based I/O cards for PC-compatible computer systems including the IBM PC-AT to interface interactive touch-based computer terminals that I designed for use in public information systems. I later worked for the Carroll Touch division of AMP where I designed additional touchscreen technologies, developed system firmware, and designed the company's first custom integrated circuit. I designed the touch/pen input system for the Linus WriteTop, which many believe to be the first commercial tablet computer.

9. From 1986 through 1987, I designed and built a high-performance computer system at Carnegie Mellon University. From 1986 through 1988, I also developed the curriculum and supervised the teaching lab for the processor design courses.

10. In 1987-88, I worked as a senior design engineer for ESL-TRW Advanced Technology Division. I designed and built a bus interface and memory

controller for a workstation-based computer system and worked on the design of a multiprocessor system.

11. At the end of 1989, along with some partners, I reacquired the technology I had developed at Touch Technology and at AMP and founded The Graphics Technology Company. As an officer and a consultant, I managed engineering development activities at that company and personally developed dozens of interactive graphics and interactive video computer systems over the next seven years. Each of these included image rendering hardware and software and image-based user interfaces.

12. I have consulted, formally and informally, for a number of consumer electronics design companies. In particular, I have served on the technical advisory boards for two media processor design companies, BOPS, Inc., where I chaired the board, and Siroyan Ltd. I served in a similar role for three networking chip companies, Intellon, Inc., Comsilica, Inc., and Entridia, Inc. and one 3D game accelerator company, Ageia, Inc. I have also served as a technology advisor to Motorola and to several venture capital funds in the U.S. and Europe. Currently, I am a director of Turtle Beach Corporation, providing guidance in its development of premium audio peripheral devices for a variety of commercial electronic products.

13. From 1991 through 1997, I served on the Faculty of Princeton University as an Assistant Professor of Electrical Engineering. At Princeton, I taught undergraduate and graduate-level courses in Computer Architecture, Advanced Computer Architecture, Display Technology, and Microprocessor Systems courses as well as conducting sponsored research in the area of computer systems and related topics. I conducted DOD-sponsored research into client-server video streaming and supervised Ph.D. students working in this area. From 1999 through 2002, I also taught the Computer Architecture course to both undergraduates and graduate students at Stanford University several times as a Consulting Professor. At Princeton, I received several teaching awards, both from students and from the School of Engineering. I have also taught advanced microprocessor architecture to industry professionals in IEEE and ACM sponsored seminars. I am currently a lecturer at Santa Clara University teaching courses on Embedded Systems, Real-Time Computing, Mechatronics, and Engineering Practice.

14. From 1997 through 2002, I held a variety of executive positions at a publicly-held PC graphics company originally called S3, Inc. and later called Sonicblue Inc. These included Chief Technology Officer, Vice President of Systems Integration Products, Senior Vice President of Business Development, and

Director of Technology. At the time I joined S3, it supplied graphics accelerators for more than 50% of the PCs sold in the United States.

15. In these roles, I managed teams of engineers developing complex graphics chips for use in personal computers. I also managed the video research lab. I supervised several engineering design teams that developed 2D/3D graphics chips for notebook PCs including digital video playback hardware. I was involved in every aspect of the relationship with PC manufacturers ranging from discussions of product requirements, testing and qualification procedures, and competitive analysis, to market segmentation and pricing discussions. I met with senior executives in major PC manufacturers on numerous occasions to discuss business opportunities and general market trends. I also developed numerous consumer audio and video products including the Rio MP3 players, the ReplayTV digital video recorders, certain Löewe televisions, and the GoVideo DVD and VCR products. I also developed user interfaces and remote control protocols. I further assisted in the launch of streaming services. During my time at SonicBlue we launched more than 30 new consumer electronics products.

16. I have published more than 50 peer-reviewed papers in computer architecture and computer systems design including papers related to video streaming. I have also chaired IEEE and ACM conferences in microarchitecture

and integrated circuit design. I am a named inventor on at least fifty-seven U.S. patents and thirty-seven foreign patents, including on video recording and playback technology. I am an IEEE Fellow and an IEEE Computer Society Distinguished Contributor.

17. I have been the invited keynote speaker at the ACM/IEEE International Symposium on Microarchitecture and at the International Conference on Multimedia. I have also been an invited speaker on various aspects of technology or the PC industry at numerous industry events including the Intel Developer's Forum, Microsoft Windows Hardware Engineering Conference, Microprocessor Forum, Embedded Systems Conference, Comdex, and Consumer Electronics Show as well as at Harvard Business School and the University of Illinois Law School. I have been interviewed on subjects related to computer graphics and video technology and the electronics industry by publications such as the Wall Street Journal, New York Times, LA Times, Time, Newsweek, Forbes, and Fortune as well as CNN, NPR, and the BBC. I have also spoken at dozens of universities including MIT, Stanford, University of Texas, Carnegie Mellon, UCLA, University of Michigan, Rice, and Duke.

18. In summary, I have extensive familiarity with fields involving electronic device user interfaces, communication protocols, and displays. I am

familiar with the state of this field at the time of the '020 Patent, which I have been informed by Petitioner's counsel to assume as being September 26, 2007, for the purposes of this proceeding.

2. Materials Reviewed

19. In preparing this declaration, I have reviewed and considered the references listed below and all other documents referenced in this declaration. I have provided my opinions based on my personal knowledge of these documents as viewed from the view of a person of ordinary skill in the art (a "POSITA"), which I am familiar with based on my education, training, and experience in the field.

Exhibit No.	Document Description
EX1001	United States Patent 10,219,020
EX1002	Prosecution History of United States Patent 10,219,020
EX1004	U.S. Patent Application Publication No. 20070124792 A1 ("Bennett"), filed November 30, 2005 and published May 31, 2007, is prior art at least under pre-AIA Section 102(a) and 102(e).

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EX1005	U.S. Patent Application Publication No. 20030020693 A1 ("Nashida"), filed July 10, 2002 and published January 30, 2003, is prior art at least under pre-AIA Section 102(a), 102(b), and 102(e).
EX1006	Curriculum Vitae of Andrew Wolfe
EX1007	US20060212902A1 ("Seo")
EX1008	United States Patent 7,555,006
EX1009	United States Patent 6,967,971
EX1010	Apple Reinvents the Phone with iPhone
EX1011	HP MediaSmart HDTV User's Guide
EX1012	DLNA Wikipedia Page
EX1013	P.R. 4-5(d) Joint Claim Construction Chart
EX1014	HDMI Specification 1.1
EX1015	A/53: ATSC Digital Television Standard
EX1016	WKYC's Director's Cut with Frank Macek News HDTV Penetration at 28%
EX1017	Dictionary of Computing (5th ed.; 2004), p.239 ("operating instructions")

3. Relevant Legal Standards

20. In preparing this declaration, counsel for Petitioner has informed me of the following aspects of the law, which I have applied in providing my opinions.

3.1. Burden of Proof

21. I have been informed and understand that the Petitioner must demonstrate unpatentability of a claim by a preponderance of the evidence. I understand that preponderance of the evidence means more likely than not in this context.

3.2. Person of Ordinary Skill in the Art

22. I have been informed and understand that a patent should be analyzed from the perspective of a POSITA. I have also been informed that factors considered in determining a level of POSITA include: (1) the type of problems encountered in the art or field; (2) prior art solutions to these problems; (3) sophistication of the technology; (4) the rapidity with which innovations are made; (5) education level of workers active working in the field; (6) the named inventor's educational level and training; (7) the general state of the technology; and (8) types of testing and skills required to carry out such tests that are described in the patent.

23. I have been informed and understand that a POSITA is a hypothetical person of ordinary creativity. This person has knowledge of all prior art in the relevant field and takes from each reference what it would teach to a person having the skills of a POSITA. A POSITA is not an automaton and would be able to consider teachings from multiple references.

3.3. Claim Construction

24. I have been informed that to determine the meaning of the terms in the claims of the '020 Patent for purposes of this declaration, one should generally use the ordinary and customary meaning as understood by a POSITA at the time of the '020 Patent, taking into consideration the claim language and specification of the '020 Patent.

25. I have been informed and understand that an application of the patent can explicitly define a specific claim term in the specification. I have been informed and understand that in cases where a special definition is provided in the specification that is different from the normal plain and ordinary meaning of that term, the applicant has acted as his own lexicographer and that definition governs.

26. I have been informed and I understand that the specification of the patent and documents included in the file history of the '020 Patent (EX1002) should be considered in evaluating the proper construction of a claim term.

3.4. Obviousness

27. I have been informed that if one or more prior art references teach the claimed limitations, the claim can be found unpatentable based on obviousness.

28. I have been informed and understand that a patent claim would have been obvious to a POSITA over single or multiple references if the differences between the subject matter in the prior art and the subject matter in the claim would have been obvious to a POSITA before the priority date of the patent. I understand that a claim would have been obvious if a POSITA would have been motivated to combine the teachings of two or more prior art references to achieve the claimed subject matter and a POSITA would have had a reasonable expectation of success of doing so.

29. I have been informed and understand that obviousness may be found based on the following exemplary rationales:

- 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 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;
- “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 that prompts 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 are predictable to one of ordinary skill in the art;
- some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art reference teachings to arrive at the claims.

30. I have been informed and understand that an obviousness analysis cannot be based on the benefit of hindsight obtained from the patent under consideration. In other words, the patent’s specification or claim cannot be used as a map in the consideration of combining prior art references.

4. Summary of Opinions

31. In my opinion, claims 1-35. (the “Challenged Claims”) of the ‘020 Patent would have been obvious to a POSITA as more fully explained below in my declaration based on the following prior art and grounds.

32. Prior Art References	
Ref. 1:	U.S. Patent Application Publication No. 20070124792 A1 (“Bennett”), filed November 30, 2005, and published May 31, 2007, (EX1004).
Ref. 2:	U.S. Patent Application Publication No. 20030020693 A1 (“Nashida”), filed July 10, 2002, and published January 30, 2003 (EX1005).

GROUNDS			
Ground	Challenged Claims	Asserted Prior Art	Statutory Grounds
1	1-6, 17-30	Bennett and the Knowledge of a POSITA	AIA 35 U.S.C. §103
2	1-5, 23, 30	Bennett, Nashida, and the Knowledge of a POSITA	AIA 35 U.S.C. §103

5. Technology Background

33. Each of the Challenged Claims is generally directed to an image display apparatus (e.g., a television, a monitor, etc.) that can display, in the alternative, standard digital television broadcasts or internet video content. The claimed apparatus can also receive and process commands from either a wireless mobile terminal or a traditional infrared remote control. The intent of this structure is to be able to transfer the viewing of video content from a mobile terminal to a television device smoothly.

34. The Challenged Claims include one independent apparatus claim. It is directed to a “*display apparatus*” that is controlled by an “*external mobile terminal*.” EX1001. The “*display apparatus*” displays “*a first video content*” from “*a digital broadcast signal*” and receives “*an identifier*” from the “*external mobile terminal*,” and in response, “*terminate[s] display of the first video content*” and displays “*a second video content*” from “*the internet*” and “*execute operation instructions*” received from the “*external mobile terminal*,” which is different from typical “*remote controller*.” EX1001.

35. The assumed priority date of the ‘020 Patent is September 26, 2007. As of that date, wireless communications to a video display were well established in the art. Video displays were available in the form of smart television,

smartphones (such as the iPhone), and computer monitors. All were capable of supporting wireless communications at the time. Additionally, each of these video devices could support internet connectivity at the time including receiving video content from the internet. Many TV's and monitors supported the HDMI video transmission standard along with the HDCP encryption protocol. These were required in order to perform digital playback of certain content.

36. Televisions and displays that could stream video and still pictures over Wi-Fi /and or Ethernet (via the internet) were released commercially around 2004.¹

37. The HDMI 1.1 (attached as Exhibit 1014) standard for video transmission was released in 2004. It included a recommendation to use HDCP copy protection with the HDCP 1.1 specification.

¹ <https://www.engadget.com/2004-04-14-new-lcd-tv-with-wifi-coming-from-philips.html>
<https://www.cnet.com/reviews/philips-23pf9976i-preview/>
<https://www.nytimes.com/2004/03/18/technology/state-of-the-art-a-tv-that-cuts-all-cords.html>
<https://www.engadget.com/2004-04-12-down-on-sharps-new-wireless-lcd-tv.html>

9 Content Protection

9.1 Recommendation

Content protection capability is recommended for all HDMI compliant devices. An HDMI compliant Source should protect all of the protected audiovisual data. Amongst adequate copy protection technologies that are compatible with HDMI, HDCP is available.

9.2 HDCP Implementations

HDCP implementations for HDMI shall adhere to HDCP specification version 1.10.

HDMI 1.1 specification at 96

38. Infrared remote controls and control of smart televisions via a mobile terminal were also well known.

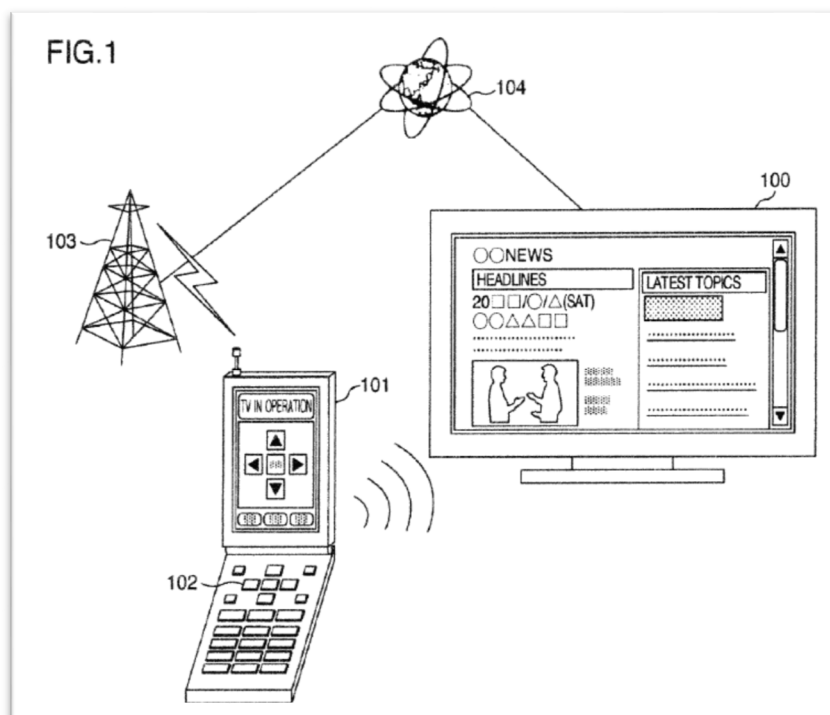
39. Furthermore, systems with similar structure and capabilities were known in the patent art. U.S. Patent Publication No. 2007/0124792 (“Bennett”) (EX1004) discloses essentially the same system and methods as claimed in claims 1-6, 17- 30 of the ‘020 Patent.

6. The ‘020 Patent

40. The ‘020 Patent alleges that prior art video display systems had the drawback of requiring a “number of operation steps” to pass the display of content from a “mobile terminal” (e.g., a cell phone) to an “information processing

apparatus” (e.g., a television). EX1001, 2:58-3:7. The ‘020 Patent purports to address this alleged problem by providing a system “wherein viewing of a content on a portable terminal is smoothly passed to an information processing apparatus.” EX1001, 3:8-12.

41. The system in the disclosed embodiment includes a “mobile terminal 101” and an “internet connection terminal 100” as depicted on Figure 1:

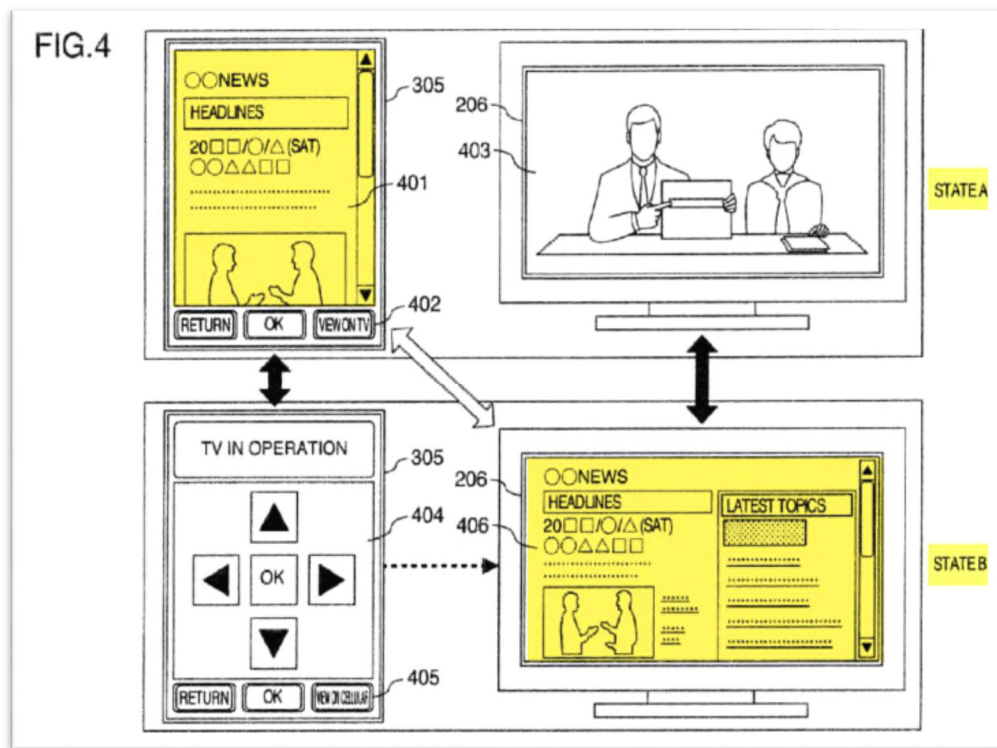


EX1001, FIG. 1 and FIG. 4, 4:42-50, 4:63-67.

42. In operation, a user can change what is displayed on “internet connection terminal 100” from a “a digital broadcast” to an “internet site” that was

previously displayed on “mobile terminal 101.” EX1001, 7:1-55; 9:56-12:36. The ‘020 Patent refers to this as “change-over processing.” EX1001, 7:19-30; 7:45-50.

43. As depicted in Figure 4, in a first state (State A), “mobile terminal 101,” on the top left, is displaying an “internet site” on its “screen display 401” (highlighted yellow), and “internet connection terminal 100,” on the top right, is

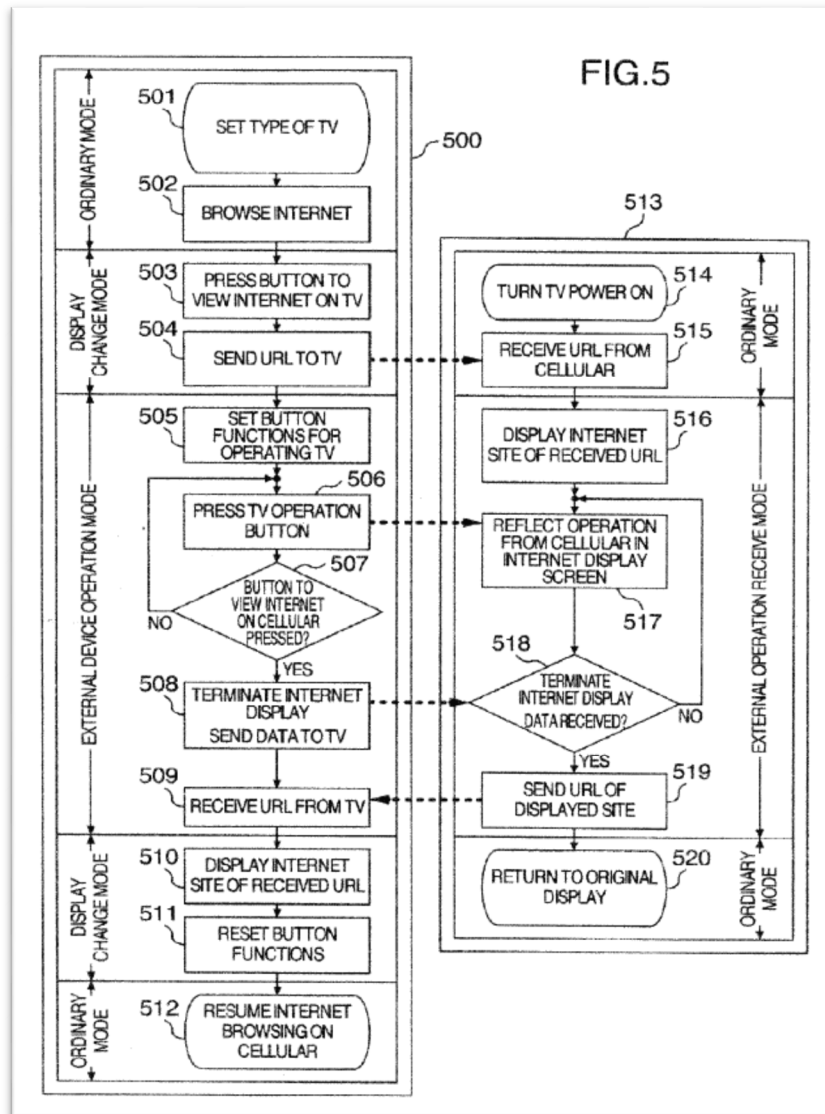


displaying a “TV program” on its “screen display 403”:

EX1001, FIG. 4, 7:11-30. The system transitions to a second state (State B) when the user presses a “view on TV” button 402 on the “mobile terminal 101.” EX1001, 4:38-49, 7:11-50, 9:11-17, 9:56-63, 10:37-11:29, 12:14-28,

FIGS. 4, 5. In the second state (State B), “internet connection terminal 100” displays the “internet site” on its “screen display” 403/406 (highlighted yellow), and “mobile terminal 101” displays an “operation guide” on its “screen display” 401/404. *Id.* In this state (State B), the user can use “mobile terminal 101” to browse the “internet site” on “internet connection terminal 100.” *Id.*

44. Figure 5 illustrates the foregoing sequence:



EX1001, FIG. 5. The steps performed by “mobile terminal 101” are shown on the left, in box 500, and the steps performed by “internet connection terminal 100” are shown on the right, in box 513. EX1001, 9:56-12:36, FIG. 5.

45. The '020 Patent discloses that “mobile terminal 101” sends “data,” for example, a “URL of the internet site,” to the “internet connection terminal 100” to effectuate the “change over processing” and browsing of the “internet site” on “internet connection terminal 100.” See, e.g., EX1001, 8:49-61, 10:37-11:55.

46. For browsing the “internet site” on “internet connection terminal 100,” “mobile terminal 101” sends, “data which indicates an operation for the TV set” to “internet connection terminal 100.” EX1001, 11:6-29.

6.1. Prosecution History of the '020 Patent

47. I have reviewed the prosecution history of the '020 Patent, which I summarize below:

48. The '020 Patent is the eighth in a series of continuation patents allowed by the same Examiner. The Examiner issued a Notice of Allowance in October 2018, in which the Examiner discussed three prior art references (referred to as “Slotznick,” “Walker et al.,” and “Goto” in the Notice of Allowance). The Examiner also opined that certain claim limitations in original claim 5 (now claim 1) are means-plus-function claims. EX1002, p. 44. However, after a subsequent Examiner interview in November 2018, the Examiner issued another Notice of Allowance and deleted the section that had applied the means-plus-function

analysis. EX1002, pp. 26-30. For the purposes of this declaration, I have been asked to assume that the priority date of the '020 Patent is September. 26, 2007.

7. Level of Ordinary Skill in the Art

49. As I noted above, I have been informed that a patent and the prior art should be analyzed from the perspective of a POSITA. In my opinion, a POSITA as of the assumed priority date of the '020 Patent claims priority to (i.e., September 26, 2007) would have had a Bachelor's degree in computer science, computer communications, electrical engineering or a similar field and would have been familiar with display systems (such as television systems), remote controllers, control information, and user interaction together with two years of practical experience in the research, design, or development of consumer electronics products or the equivalent, with additional education possibly substituting for practical experience and vice versa. A POSITA would have had a working knowledge of computing, networking, and data representation.

50. As of September 26, 2007, I met and/or exceeded these requirements for a POSITA for at least the reasons described in the qualifications section above. Additionally, I worked with and managed many POSITAs and can evaluate documents from their perspective.

8. Claim Construction

51. I have reviewed the claims, specification, and file history of the ‘020 Patent.

52. I have been asked to opine if any claim terms must be construed for the Board to understand how the challenged claims read on the prior art. I do not believe the Board needs to necessarily construe any particular claim terms for the purposes of this proceeding. It is my understanding that the Petitioner reserves the right to request constructions in other jurisdictions and construction may be necessary outside the context of this review.

53. As explained in this declaration, the Challenged Claims would have been obvious under their ordinary and customary meanings as understood by a POSITA.

54. It is my understanding that in the related litigation, Patent Owner presented a proposed claim construction for “operation instructions” as “information for changing the display of the second video content such as move or select operations.” *See* EX1013. The Patent Owner’s proposed construction is unwarranted because it improperly imports limitations from specific embodiments or examples in the specification into the claims. The proposed construction adds

specific types of operations (move or select) that are not necessarily required by the claim language itself, and would not be consistent with the principle of claim differentiation with respect to claim 5. Moreover, the exemplary language in the proposed construction does not have clear bounds. A POSITA can readily understand the plain meaning of operation instructions in the context of the remaining claim language.

55. It is my understanding that for purposes of this *inter partes* review, Petitioner has suggested that the ordinary meaning of “*operation instructions*” in the context of the claims is “*commands and instructions used to operate a computer.*” Intrinsic Evidence: EX1001, at 7:1-58; FIG. 4; 15:7-32; 11:6-29; Fig. 5; 17:65-18:11; FIG. 9; 18:12-21; FIG. 10; 18:57-62; 19:10-18. Extrinsic Evidence: Dictionary of Computing (5th ed.; 2004), p.239 (“operating instructions”) (“commands and instructions used to operate a computer”). EX1017. This is consistent with the understanding of a POSITA at the time.

9. Description of the Asserted Prior Art

56. Before the priority date, the prior art had already disclosed solutions to the problem identified—and purportedly solved—in the ‘020 Patent, namely

providing for “smooth” transition of the display of video from a portable terminal to a television. EX1001, 3:4-13.

9.1. Bennett (EX1004)

57. As discussed in more detail below, Bennett discloses a system where a mobile phone interacts with a television system to control the selection and display of multimedia content from various sources, including television broadcasts and the internet. EX1004. The phone receives user inputs, displays media guides, and transmits control signals to the television to display selected video content. *Id.*

9.2. Nashida (EX1005)

58. As discussed in more detail below, Nashida discloses a remote control system comprising a remote controller and an image display apparatus (television). EX1005. The remote controller includes a display unit, an operation unit, and a communicator for communication with the television. *Id.* The system allows the remote controller to display information, receive user inputs, and transmit operational information to the television to control the display of content. *Id.* The remote controller can also receive display information from the television and display it on its own screen. *Id.*

10. Ground 1: Bennett in combination with the knowledge or a POSITA

59. Bennett discloses all elements of the challenged claims under Ground 1. To the extent that that Bennett does not sufficiently teach a particular element, a POSITA would have already known about the relevant element through one's education and knowledge of the state of the art. It would have been obvious to a POSITA to combine Bennett and the POSITA's knowledge to arrive at the apparatuses recited in the claims challenged under Ground 1, with a reasonable expectation of success.

60. In my opinion, Bennett and the '020 Patent are analogous art. Bennett is in the same field of endeavor as the '020 Patent. Both are related to the interoperation between a mobile device and a television or similar apparatus.

61. Bennett is directed to the same problem as the '020 Patent, namely problems related to enhancing user experience by enabling seamless control and interaction between external devices and television systems. EX1001. A POSITA would consider Bennett to be directed to the same problem as the '020 Patent. Both Bennett and the claimed '020 inventions pertain to systems that allow for the display of video content from various sources (broadcast and internet) and enable control via external devices, including mobile phones. A POSITA would have been motivated to combine Bennett and POSITA's knowledge. Like the '020 Patent,

Bennett is directed towards a POSITA with substantial skill in the art and relies on such a POSITA to fill in the details when to do so merely requires ordinary and widespread knowledge of the field of art. Such motivation is evident from both Bennett and as well as many other exemplary prior art references.

10.1. Claim 1

10.1.1. Preamble: “a display apparatus for the display of video content acquired from a television broadcast and for the display of video content acquired via the internet”

62. Bennett discloses the preamble of claim 1. I do not see any reason why this preamble should be a limitation given the structure of this claim, but to the extent that it is deemed to be a limitation, it is disclosed. Bennett discloses a comprehensive display apparatus system that includes a phone coupled with a set top box and a remote media broadcaster. EX1004, FIG 6, ¶0056.

63. As shown in Figure 6, below, Bennett’s Set Top Box 607 receives broadcasts from Remote Media Broadcaster 609. *Id.* This set top box (607) has three communication interfaces: one to communicate to the television 605, another to communicate with the remote media broadcaster 609 and one to communicate over the Internet 613. This setup allows for the display of video content from both television broadcasts and the internet.

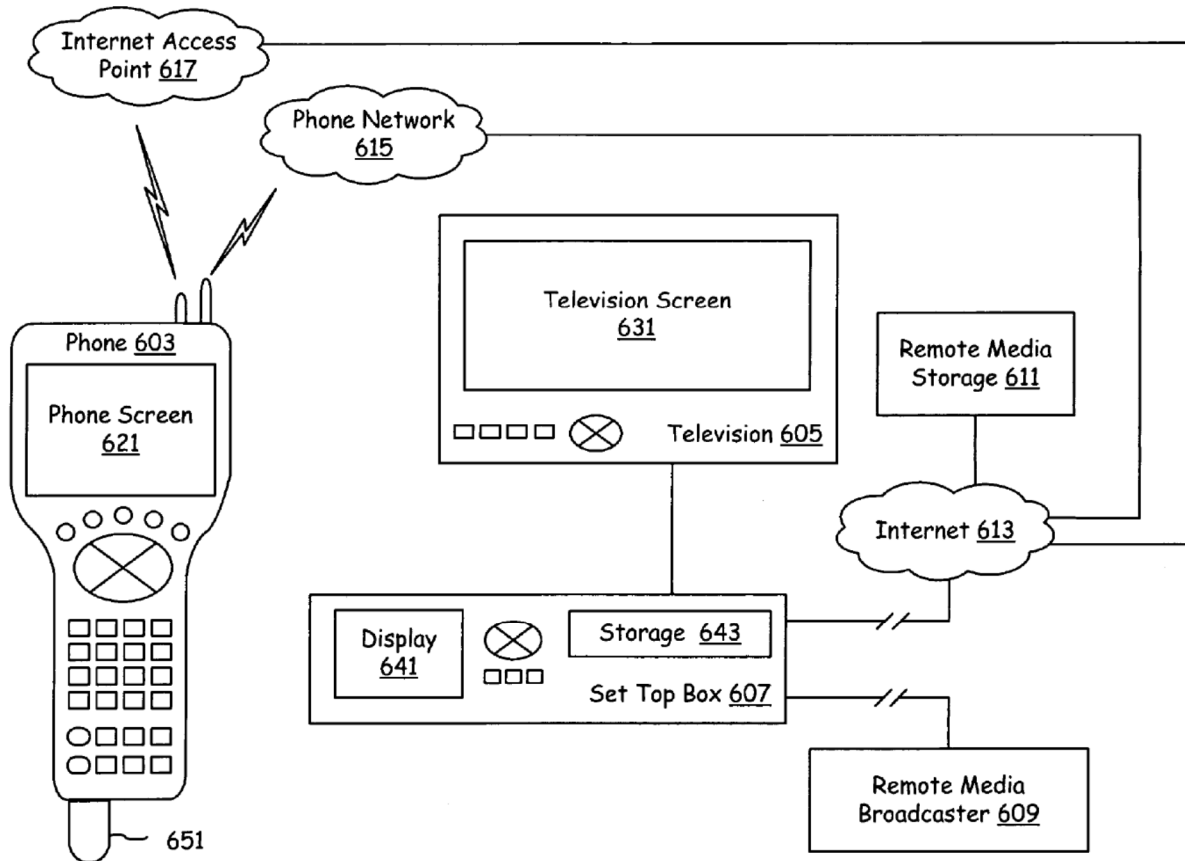


FIG. 6

10.1.2. Element [A]: “a digital broadcast receiver configured to receive a digital broadcast signal”

64. Bennett discloses media systems, including set top boxes and DVD players, with communication interfaces for handling digital broadcast signals transmitted from a remote media broadcaster. EX1004, FIG 6, ¶¶0010, 0056. Bennett further mentions that media sources were HDTV (High Definition Television) format. EX1004, ¶0031. A POSITA would have understood these media systems possessed capabilities for receiving digital broadcast signals. By the time of Bennett’s disclosure, digital broadcasting was a standard in the media

industry. For example, the ATSC digital broadcasting system had been adopted in the United States. EX1015. Further, high definition television was being adopted by a significant number of consumers. EX1016, p. 3 of 6. A POSITA would have been aware that set top boxes were compatible with these standards. A POSITA would have been familiar with the typical features and capabilities of set top boxes and DVD players, which routinely included digital signal processing capabilities including the ability to receive and process digital broadcast signals.

65. In the alternative, this limitation would have been obvious over Bennett in view of a POSITA's knowledge. The Digital Television Transition and Public Safety Act of 2005 mandated the cessation of analog broadcasting and the shift to digital broadcasting by April 2009, making digital receivers a regulatory requirement rather than innovation. As noted above, the digital broadcast standard, ATSC, had been published and implemented for many years prior to this April 2009 date (which had already been delayed multiple times for commercial and political reasons). The claimed feature of a digital broadcast receiver, therefore, represents a predictable response to changing regulatory requirements and technological standards. The integration of a digital broadcast receiver, as required by legislation and readily facilitated by then-existing technology, represents a predictable use of known technology for its established purpose. Such

integration would have been obvious, and in fact known to be commercially necessary to a POSITA.

66. By the priority date, digital broadcast technology had been widely implemented, as evidenced by the adoption of digital cable broadcasts and digital satellite services such as DirectTV in the mid-1990s. POSITAs would have recognized the benefits including improved picture quality, reduced spectrum requirements, and advanced features such as multilingual soundtracks, making the adoption of digital receivers an obvious choice. Additionally, references like US20060212902A1 (“Seo”) (EX1007) explicitly disclose digital broadcast receivers, confirming the well-understood nature of such technology in the relevant field. EX1007, at Abstract.

10.1.3. Element [B]: “a signal separator for de-multiplexing the digital broadcast signal into video data and audio data”

67. Bennett describes a system where “[e]ach television channel has an audio portion and a video portion.” EX1004, ¶0038. Bennett teaches with respect to the separate processing of audio and video portions: “[t]ranscoding may... be performed to save bandwidth occupied by the audio portion, the video portion or both.” EX1004, ¶0041. Further, “[t]he audio portion of the first multimedia element is forwarded to the speaker 415 for listening, and the video portion is

forwarded to the phone screen 414 for display.” EX1004, ¶0047, FIG. 4. To my recollection, all of the digital video standards in use at the time included separate encoding of audio and video data and thus would normally require separate processing of audio and video data including the separation of audio data from video data.

68. While Bennett does not explicitly mention a signal separator, a POSITA would recognize such a requirement based on the POSITA’s understanding of digital television technology, industry standards, and the functional requirements described in Bennett’s disclosure. The broadcast digital standard (ATSC) (EX1015) in use at the time would have been well-known to a POSITA. This standard defines how audio and video data are multiplexed in the broadcast signal through the interleaving of data packets. E.g., EX1015, pp. 32, 38-42 of 136, Tables 6.1 (page 33 of 136), 6.7 (page 39 of 136), 6.9 (page 41 of 136), 6.12 (page 48 of 136). To achieve the separate processing and routing of audio and video described by Bennett, the system would first isolate these components from the received signal by extracting and identifying each packet type and reassembling the packets into an audio stream and a video stream. In the field of digital television systems, the use of demultiplexers or similar components to separate audio and video streams is well-established and suggested by each of the

relevant standards. E.g., EX1015, p.13 of 136 (“definition of program specific information (PSI),” Fig. 5.1 (referencing “Transport depacketization and multiplexing”). Bennett’s description of “Processing Circuitry” performing “de-multiplexing the digital broadcast signal into video data and audio data” strongly implies the presence of a signal separator. EX1004, FIG. 4.

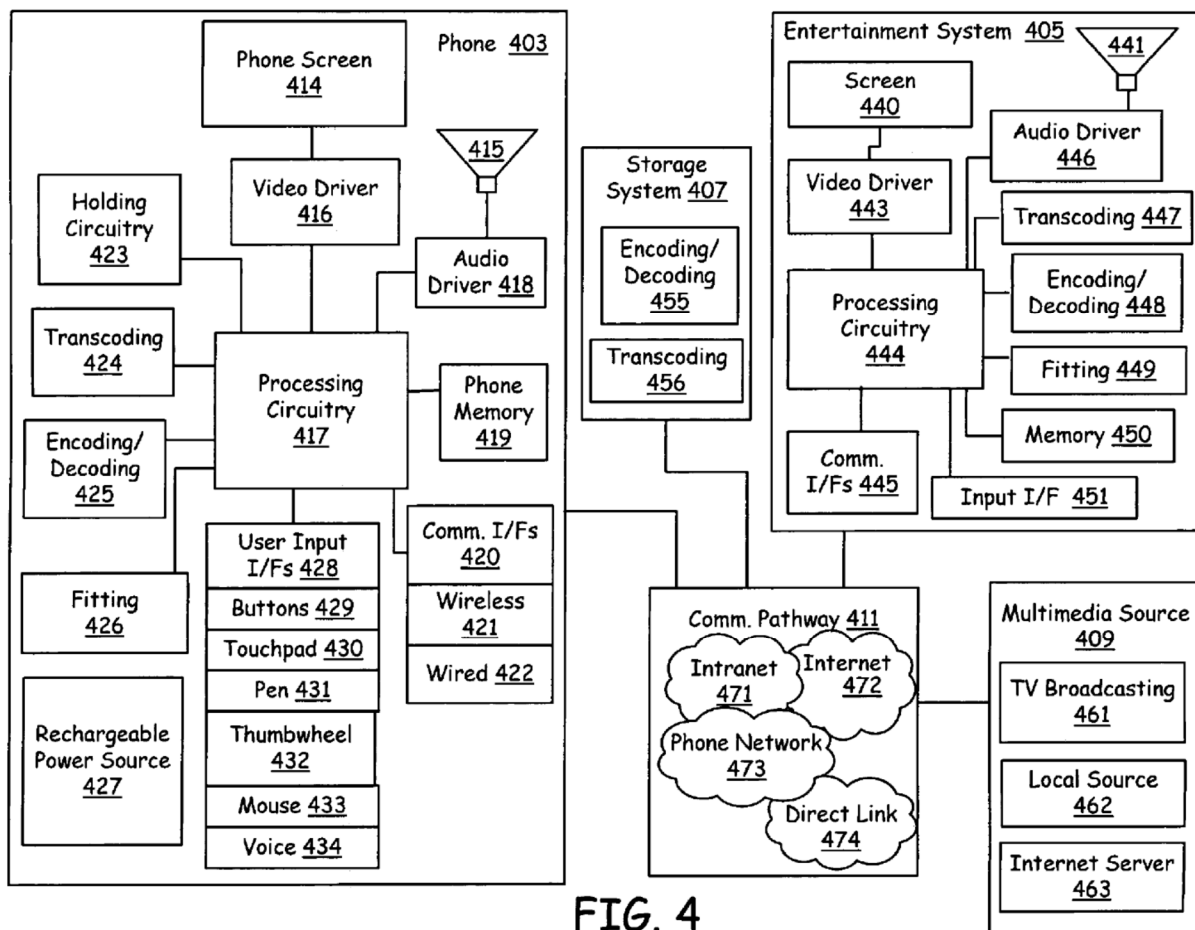


FIG. 4

69. By the ‘020 Patent’s priority date, signal separators were commonplace in digital broadcast systems driven by industry practices and

legislative requirements, making the claimed signal separator an obvious implementation to a POSITA.

70. A POSITA would have been motivated to use a signal separator in Bennett's system for several reasons: Bennett explicitly discloses separate processing of audio and video portions. EX1004, ¶0041. A signal separator would enable this efficient, separate processing. In fact, a POSITA would assume that some structure for separating the signals is required in order to process them separately. Bennett discusses "sav[ing] bandwidth occupied by the audio portion, the video portion or both." *Id.* A signal separator would facilitate this bandwidth optimization by allowing distinct compression mechanisms and optimized bandwidth allocation as well as independent processing of each portion. Bennett mentions making "the audio and the video portion of the television channel compatible with an encoding standard" *Id.* A signal separator would advantageously allow for independent format conversion of audio and video portions. Bennett discloses streaming of multimedia information. EX1004, ¶0006, FIG. 4, ¶0046. A POSITA would recognize that efficient streaming often requires separation of audio and video data, especially when using well-known streaming standards at the time such as MPEG-2, MPEG-4, or H.264.

71. Other prior art, provided as background information, confirms the concept of a signal separator was well-known at the time of the '020 Patent. Seo (EX1007) discloses in FIG. 2 “the demultiplexer 210 receives the demodulated MPEG-2 TS² data outputted from the demodulator 120, and separates each of the received data into audio, video, and other data.” EX1007, ¶¶0067-0068, FIGS. 1-3.

² Transport Stream

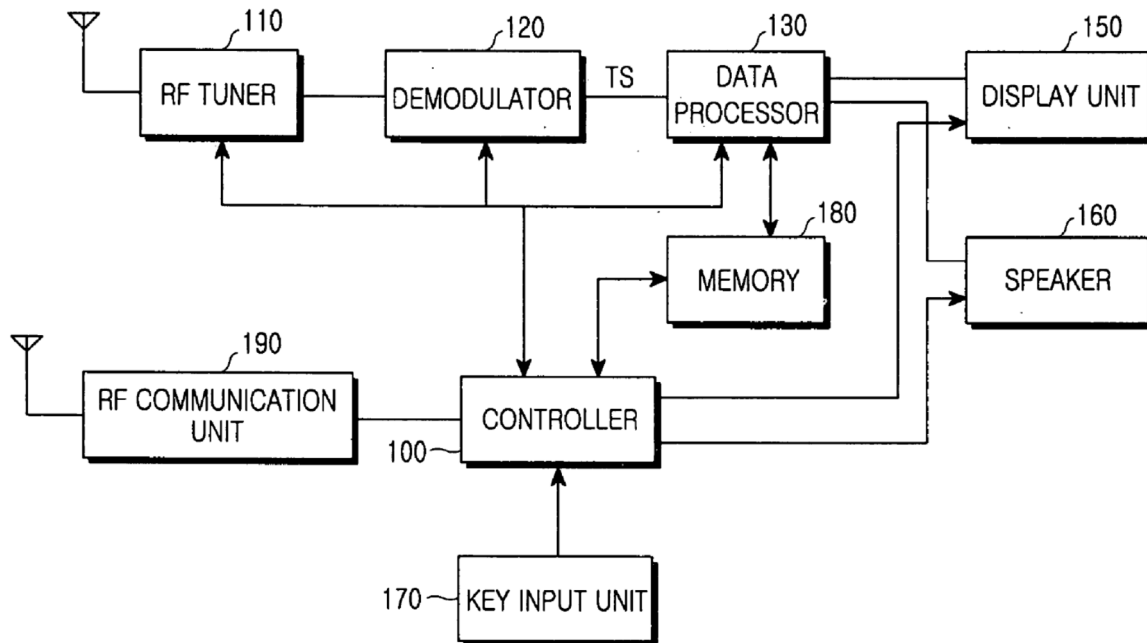


FIG. 1

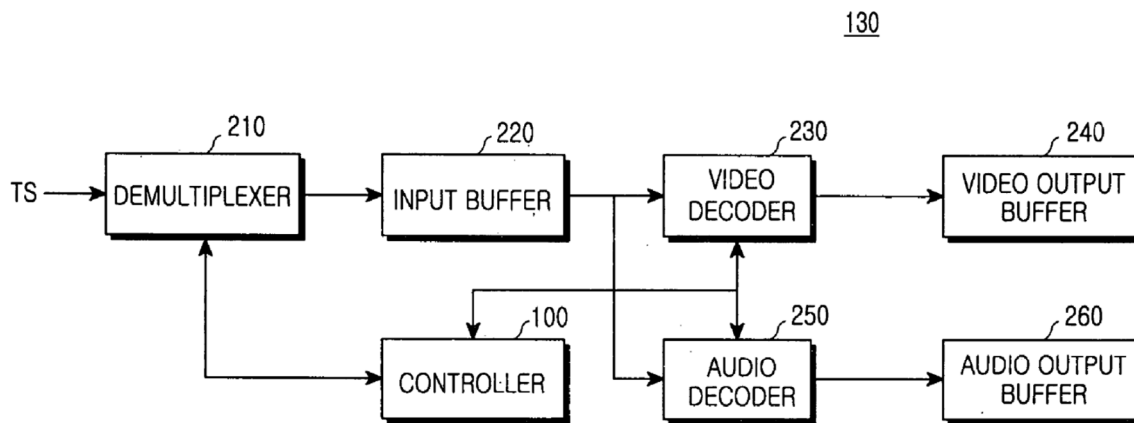


FIG. 2

EX 1007 – Figs. 1-2

72. Given the explicit teachings of Bennett regarding separate processing of audio and video portions, combined with the well-known nature of signal separators as evidenced by references like Seo, it would have been obvious to a POSITA to incorporate a signal separator in Bennett's system. This modification would yield the predictable result of efficiently separating the broadcast signal into its constituent audio and video portions for subsequent processing, as required by Bennett's disclosure.

10.1.4. Element [C]: “a video processor configured to convert the format of the video data”;

73. Bennett discloses processing “media elements,” which include video data, for specific display devices. EX1004, ¶¶0028. The processing can be performed by the phone, the television, and the media source. Id. The processing may convert the format of the video data via “transcoding, encoding and decoding.” EX1004, ¶¶0028, 0041. Transcoding refers to converting audio and/or video data from one format to another (in terms of resolution, sampling rate, data representation, or other characteristics.)³ Bennett discloses the processors

³ See e.g. EX1008, U.S. Pat. 7,555,006: Method and system for adaptive transcoding and transrating in a video network, at 2:29-44.

configured to convert the format of video data in blocks 119, 127, 143, and 145 of FIG.1. EX1004, FIG. 1.

10.1.5. Element [D]: “an audio processor configured to convert the format of the audio data”

74. Bennett discloses processing “media elements,” which include audio data, for specific display devices. EX1004, ¶¶0028. The processing can be performed by the phone, the television, and the media source. Id. The processing may convert the format of the audio data via “transcoding, encoding and decoding.” EX1004, ¶¶0028, 0041. Bennett discloses the processors configured to convert the format of audio data in blocks 119, 127, 143, and 145 of FIG.1. EX1004, FIG. 1. To the extent that an audio processor is not explicitly disclosed, a POSITA would know that an audio processor is the most appropriate way to perform the explicitly-disclosed audio processing.

10.1.6. Element [E]: “a network communication module configured to communicate over the internet”

75. Bennett discloses a system that retrieves video content from media sources, including an “Internet server.” EX1004, ¶¶0045. Bennett also describes the “communication interfaces,” of the phone and set-top box, configured to “communicate over the internet.” EX1004, ¶¶0056. The “network communication module” is disclosed by e.g. communication interface 445 in FIG 4. EX1004, FIG.

4. To the extent that such a communication module is not explicitly disclosed, a POSITA would know that an ordinary structure for performing the explicitly-disclosed network communication functions would be a network communication module.

10.1.7. Element [F]: “a radio receiver for receiving data from an external mobile terminal”

76. Bennett describes the set-top box receiving control signals from a phone. EX1004, ¶¶0058. Bennett teaches that “[t]he phone 103 is communicatively coupled to the television 105 ... over ... wireless links,” where “[t]he wireless links may comprise characteristics of any of a variety of communication link types (e.g., Bluetooth, IEEE 802.11, IEEE 802.15, cellular telephony (e.g., GSM/GPRS/EDGE, CDMA, CDMA2000, UMTS, WCDMA, etc., Ultra WideBand, standard/proprietary, etc.” EX1004, ¶0030. This indicates that the set-top box has a receiver capable of receiving data from an “external mobile terminal” (the phone). Bennett discloses a system using “a cellular transmission, 802.11, Bluetooth, and an infrared transmission” for wireless communication. EX1004, ¶¶0052. A POSITA would understand these wireless technologies (i.e. radio communications) require a radio receiver or equivalent for operation. A radio receiver is fundamental to the functioning of these wireless communication

methods. In light of the explicit disclosure of receiving radio-based communications, a POSITA would expect to use a radio receiver.

77. To the extent that Bennett does not expressly disclose the radio receiver, this limitation would have been obvious to a POSITA. Bennett discloses various wireless communication technologies (RF, Bluetooth, Wi-Fi, cellular) that are well-known to use radio receivers. EX1004, ¶0052. It was common knowledge in the field at the time of the invention that these wireless technologies required radio receivers to function. The use of a radio receiver to receive data from an external mobile terminal (such as a phone or remote control) would have been an obvious implementation choice for a POSITA, given the disclosed wireless communication capabilities in Bennett. A POSITA would have been motivated to use a radio receiver to enable the wireless communication features described in Bennett, as it would allow for convenient, remote control and data exchange between devices.

10.1.8. Element [G] “an infra-red (IR) receiver for receiving commands from a remote controller”

78. Bennett discloses as background that “[a] remote generally sends a control signal to a TV using infrared or RF transmission” to change TV channels and settings. EX1004, ¶0008. Bennett teaches four different mobile phones, each

of which can be a remote controller that remotely controls the entertainment system using an “infrared link.” EX1004, ¶¶0072, 0075. This explicit disclosure of infrared communication teaches that the system includes an infra-red receiver for receiving commands from a remote controller. A POSITA would expect to use an infra-red receiver to perform the function of receiving an infra-red communication.

79. In the alternative, this limitation is obvious over Bennett in view of the knowledge of a POSITA. Bennett discusses infrared remotes as being well known in the art. EX1004, ¶0008. Bennett further teaches that his invention contemplates receiving communications from cellular devices acting as remotes through infrared link. EX1004, ¶¶0033, 0052. In view of these explicit disclosures, a POSITA would have expected Bennett to have an infrared receiver, or at least would have found it obvious to include one. Using an infrared remote control and receiver would have been obvious in view of the teachings, suggestions, and motivations in Bennett that would have led a POSITA to modify or combine his knowledge with this prior art reference.

10.1.9. Element [H] “a display panel”

80. Bennett discloses a “display panel,” which is a “television screen 125” or “screen 440.” EX1004, FIGS.1, 4, ¶¶0024, 0044.

10.1.10. Element [I] “a system controller configured to control the display apparatus to”

81. Bennett discloses “processing circuitry” in the “set-top box” (“system controller”) controlling the distribution of multiple television channels to different display screens. EX1004, ¶0039. Moreover, Bennett discloses an entertainment system with integrated “processing circuitry,” (“display apparatus”) which controls the entertainment system (“display apparatus”). EX1004, ¶0044.

10.1.11. Element [I.1] “receive a first video content via the received broadcast signal”

82. Bennett discloses a “set-top box” (“system controller”) that “receives the first television channel from the media source 309 and forwards the video portion (“a first video content”) of the first television channel (“broadcast signal”) to the television screen 325 (“display panel”).” EX1004, ¶0038. In FIG.6 below, Bennett also discloses the “set-top box 607” controls the “Television 605,” (“display panel”) which receives and displays the broadcast signal the “set-top box 607” received from the “Remote Media Broadcaster 609.” EX1004, ¶0056, FIG.6.

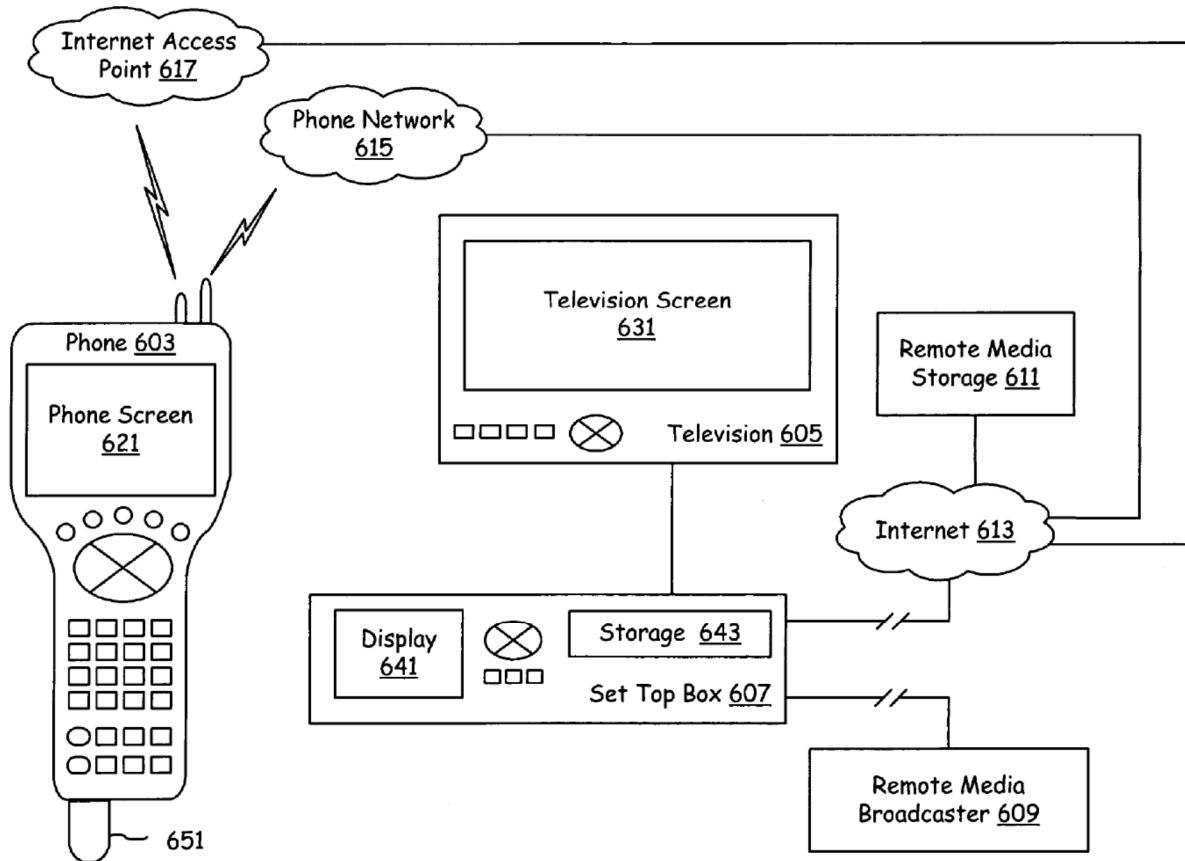


FIG. 6

10.1.12. Element [I.2] “to display the first video content on the display panel”

83. Bennett discloses that a “set-top box” (“system controller”) “forwards the video portion (“a first video content”) of the first television channel to the television screen 325 (“display panel”)” for display. EX1004, ¶0038. In FIG.6, shown above, Bennett also discloses that the “set-top box 607” controls the “Television 605,” (“display panel”) which displays the video content. EX1004, ¶0056, FIG.6.

10.1.13. Element [I.3] “receive an identifier for identifying a second video content from the external mobile terminal”

84. Bennett describes a cellphone communicating to display multimedia elements on the display device. Bennett also discloses a phone (“external mobile terminal”) delivering a “control signal,” (“identifier”) to the set top box 507 which “directs (“identifying”) display of the second video stream on the television screen 231.” EX1004, ¶0032. Subsequently, “[t]he set top box 207... receives the second video stream (“second video content”).” Id. Bennett further discloses the videos may be selected from a “media guide” (“identifier”) which may “comprise a list that **identifies** a plurality of media elements,” which includes “a second video.” EX1004, ¶0034. Bennett also discloses “[t]he control signal from the phone 503 to the set top box 507 **identifies** a media element.” EX1004, ¶0055. Based on these disclosures, a POSITA would recognize that Bennett’s system receives an “identifier” from the phone for identifying the second video content. The combination of the control signal directing the display of a specific video stream, the media guide identifying various media elements including a second video, and the explicit statement that the control signal from the phone identifies a media element, would lead a POSITA to understand that an identifier for the second video content is received from the phone. This understanding aligns with standard practices in video content delivery systems known to a POSITA.

85. Alternatively, this feature is at least obvious over Bennett, in view of the knowledge of a POSITA. Bennett discloses the use of a “media guide,” (“identifier”), for the user to select video content to be displayed on the entertainment system. EX1004, ¶¶0034. Bennett also discloses a control signal from the phone “identifies” a media element for the television, which in turn receives the media element from the remote media source. EX1004, ¶¶0055. Therefore, Bennett teaches, suggests, and motivates a POSITA to use an “identifier,” such as a “media guide,” in the control signal sent to the television such that the television can retrieve the selected multimedia element (e.g., video) from the media source.

10.1.14. Element [I.4] “acquire the second video content via the internet using said identifier”

86. As noted above, Bennett discloses a system using an identifier from the phone for identifying the second video content from the media source. Bennett further discloses that the “media source” comprises an “Internet server.” EX1004, ¶¶0055. Therefore, A POSITA would understand these disclosures in Bennett to mean that the video content can be acquired “via the internet” using “said identifier.” Additionally, Bennett discloses a system in FIG. 6 below where the set-top box retrieves the video content from “Internet 613” using the “control signal.” EX1004, FIG.6.

87. Alternatively, it would have been obvious to a POSITA to use an identifier such as a common URL in Bennett's system to retrieve video content from the Internet. A POSITA would understand that Bennett's system retrieves video content "via the internet" using "said identifier." In fact, it is hard to conceive how anything can be retrieved from the internet without using an identifier somewhere in the process. This understanding stems from the POSITA's knowledge of how internet servers typically operate and how content is generally accessed over the internet. Furthermore, Bennett discloses a system where the set-top box retrieves video content from "Internet" using the "control signal." EX1004, FIG.6. A POSITA, with their understanding of internet protocols and content retrieval methods, would recognize that accessing content from an internet server generally involves the use of an identifier such as a URL. A POSITA would readily appreciate that an identifier is a standard and necessary component for retrieving specific content from an internet server. It is a logical extension of Bennett's disclosed "control signal" to include necessary identifying information for content retrieval.

10.1.15. Element [I.5] "display the second video content on the display panel"

88. Bennett discloses "[i]f the media element is meant for the television 505, then the set top box 507 receives the media element from the remote media

source 509 and forwards the received media element to the television 505. The media element is subsequently displayed on the television screen 531.” EX1004, ¶¶0055. Bennett also discloses a system in FIG. 6, where “set-top box 607” retrieves and forwards the media element including “the second video content” to the “television 605” (“display panel”) for display, after identifying and retrieving “the second video content.” EX1004, FIG.6.

10.1.16. Element [I.6] “terminate display of the first video content prior to display of the second video content”

89. Bennett discloses a “media swapping,” in which the phone sends a control signal that directs the multimedia source to deliver “a second multimedia element” to the entertainment system, while it is presenting “a first multimedia element.” EX1004, ¶¶0051, 0067. The entertainment system then terminates the display of the first multimedia element and commences the display of the second multimedia element. Id.

10.1.17. Element [I.7] “execute operation instructions received from the external mobile terminal via the radio receiver while the second video content is being displayed”

90. Bennett discloses “a radio receiver for receiving data from an external mobile terminal.” (See Element [F]) Bennett further discloses “the processing circuitry 417 of the phone 403 then delivers a control signal (“operation

instructions”) via the communication interface 420 that directs application of the different setting (“execute operation instructions”) to the entertainment system 405.” EX1004, ¶¶0050. Bennett further discloses a “media swapping,” in which the phone sends a control signal that directs (“operation instructions”) the display of other multimedia elements while one media element (“the second video content”) is being displayed. EX1004, ¶¶0051, 0067.

10.1.18. Element [I.8] “execute commands received from the remote controller, wherein said remote controller is a different device than the external mobile terminal.”

91. Bennett discloses a system that includes an “infra-red receiver” for receiving commands from a “remote controller.” (See Element [G]) A POSITA would understand that such a system includes a system controller to process and execute the received commands. This understanding stems from the POSITA’s knowledge of standard practices in electronic control systems, where received signals would be interpreted and acted upon by a control unit.

92. Bennett further discloses the typical “remote control,” which is used to change TV channels, audio and video settings of the TV and control power supply to the TV. EX1004, ¶0008. Based on this description, a POSITA would conclude that the “remote controller” disclosed by Bennett is not necessarily designed for transmitting identifiers of specific video content to the system

controller. Rather, its disclosed function aligns with traditional TV remote control capabilities. In contrast, Bennett teaches the “phone” (“external mobile terminal”) is used to send identifiers and control signals to “direct the display of video information.” EX1004, ¶¶0025, 0032. Additionally, the “phone” disclosed in Bennett can make “phone calls.” EX1004, ¶0037. Given these distinct capabilities, a POSITA would recognize the “phone” as a separate device from the “remote controller,” each serving different purposes within the system. Also, a POSITA would have understood that televisions came standard with the “typical remote” described in Bennett and would have determined it obvious not to dispense with it.

93. Further, FIG. 10 of Bennett illustrates five different phones as remote controls, each of which can include one or more communication interfaces, including a radio frequency interface and/or an “infrared link.” EX1004, FIG. 10, ¶0075. A POSITA would have understood that a phone that communicates over infrared (e.g. Phone 1035) meets the limitation of the “remote controller”.

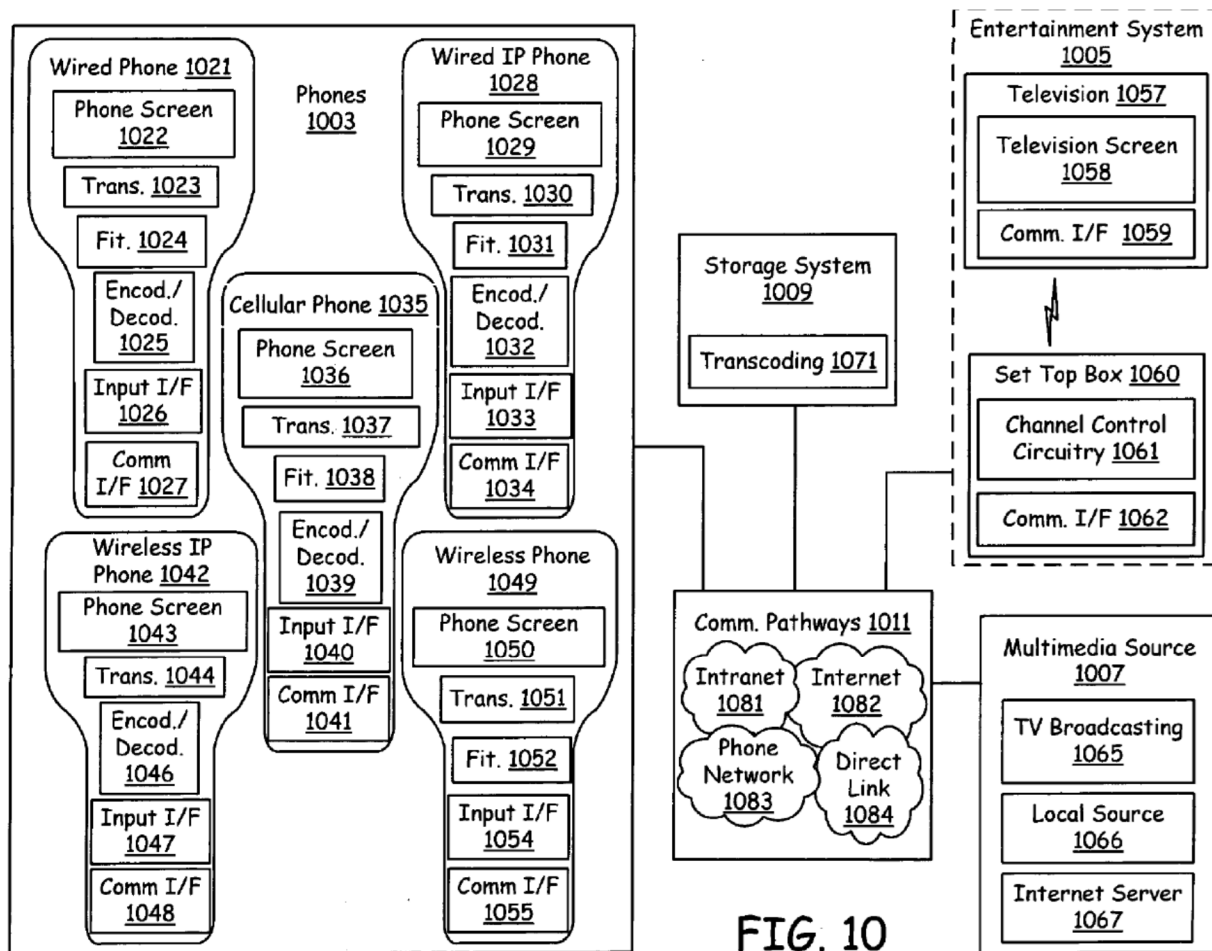


FIG. 10

94. Alternatively, this limitation is obvious over Bennett in view of the knowledge of a POSITA. For example, using a separate, infrared remote control would have been obvious in view of the teachings, suggestions, and motivations in Bennett that would have led one of ordinary skill to modify or combine the prior art references. More specifically, FIG. 10 of Bennett expressly illustrates five different phones as remote controls, each of which can include one or more communication interfaces, including among them a radio frequency interface and/or an “infrared link.”. EX1004, FIG. 10, ¶0075.

95. Also, the mobile phones disclosed in Bennett are used to control an entertainment system, which by its nature, is commonly shared by more than one user. Additionally, Bennett explicitly discloses multiple control interfaces. Fig. 10. Therefore, it would have been obvious to a POSITA to configure the entertainment system of Bennett to be controlled by two mobile devices at the same time, one via radio frequency and the other via infrared. This modification would employ known techniques and yield predictable results—namely, the effective control of an entertainment system through diverse remote controller devices.

96. Thus, in my opinion, the apparatus claimed in claim 1 of the ‘020 Patent would have been obvious to the POSITA.

10.2. Dependent Claim 2: “The display apparatus according to claim 1, wherein the second video content comprises video content displayed on the external mobile terminal.”

97. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

98. Bennett discloses the action of displaying video content from a phone (“external mobile terminal”) onto an entertainment system (“display apparatus”). EX1004, ¶0051, FIG.8. Bennett further discloses a “media swapping” mechanism where a control signal from the phone directs the multimedia source to

deliver a second “multimedia element” (“second video content”), which is originally displayed on the “phone” (“external mobile terminal”), to the entertainment system. EX1004, ¶0067.

99. Thus, in my opinion, the apparatus claimed in claim 2 of the ‘020 Patent would have been obvious to the POSITA.

10.3. Dependent Claim 3: “The display apparatus of claim 2, wherein the display apparatus is further configured to receive display state information for the second video content.”

100. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 2 as explained above.

101. Bennett discloses the TV (“display apparatus”) is configured to receive settings and state information related to the display of video content. For example, the TV receives the control signal applying the “user-selected setting to the media displayed on the television screen 125” after a user selection. EX1004, ¶0029. Further, Bennett teaches “[t]he set top box” “receives the second video stream” and delivers it to TV for display. EX1004, ¶¶0032, 0064. The POSITA would have understood the television receives the second video stream from the set-top box for display.

102. A POSITA would have understood that for a television to correctly render video content received from a set-top box, certain display state information would be communicated along with the video stream. This information typically at least includes: resolution, bit-depth, color space, format, aspect ratio, interlace method, and frame encoding type. A POSITA would recognize that without this information, the television would not be able to properly display the received video content. A POSITA would be aware that in the display technology industry, it is standard practice for digital video streams to include metadata that carries essential display state information. This practice ensures compatibility and proper rendering across different display devices and allows for devices that support multiple video formats. It is also required by ordinary digital video standards such as MPEG-2. A POSITA would have understood that the reception of display state information is a functional requirement for the system described by Bennett to operate as intended.

103. Bennett also teaches the user using a phone to select and control multimedia elements displayed on the entertainment system, which includes display “settings” (“display state information”). EX1004, ¶¶0046, 0050. A POSITA would understand Bennett’s disclosure of receiving multimedia elements to include the reception of display state information required for proper playback on the display apparatus. This understanding is based on the POSITA’s

understanding of how display systems function and the requirements for successful video playback.

104. Thus, in my opinion, the apparatus claimed in claim 3 of the '020 Patent would have been obvious to the POSITA.

10.4. Dependent Claim 4: “The display apparatus of claim 3, wherein the display state information comprises position information.”

105. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 3 as explained above.

106. Bennett discloses how media elements displayed on different devices can be interchanged upon user commands. EX1004, ¶0051. A POSITA would understand that such functionality incorporates the handling of display state information, including “position information,” which is crucial for the swapping process and “fitting functionalities” described.

107. A POSITA would recognize that fitting functionalities involve adjusting the multimedia content to fit the display. Based on their knowledge and experience in the field, a POSITA would understand that this process encompasses managing position information such as alignment, scaling, and placement on the screen.

108. Bennett further discloses “[a] user uses the phone 403 to control selection and display of a multimedia element on the screen 440 of the entertainment system 405.” EX1004, ¶0046. A POSITA, drawing from their expertise in display systems and user interfaces, would recognize that this control process involves the transmission of position information to the display apparatus, as this information is essential for managing how and where content is displayed on the screen.

109. In systems allowing content interchange between devices, a POSITA would know that maintaining display state is crucial for the user. This state includes position information to ensure proper content placement after swapping. A POSITA would understand that “fitting” content to a display requires knowledge of the content’s current position and the target display’s dimensions. This requires the use of position information in the fitting process. For example, when a user controls content display from a separate device (like the phone in Bennett’s disclosure), a POSITA would recognize that position data is communicated to achieve accurate content placement on the target display. Given the described functionalities, a POSITA would conclude that position information is handled by the system, even if not explicitly stated, as it’s a critical component for the described operations to function as intended. Based on common practices in

the field of multimedia display systems, a POSITA would expect position information to be a fundamental component of any system managing content across multiple displays.

110. By considering these points, a POSITA would conclude that Bennett's system, while not explicitly mentioning "position information," would handle such data to perform the described functions effectively.

111. Thus, in my opinion, the apparatus claimed in claim 4 of the '020 Patent would have been obvious to the POSITA.

10.5. Dependent Claim 5: "The display apparatus according to claim 2, wherein said operation instructions include move and select operations."

112. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 2 as explained above.

113. As discussed below, Bennett discloses the phone-based remote control interacting with the television system to perform various control functions, including navigating media guides, selecting media content, and adjusting settings. A POSITA would recognize that these functionalities involve move and select operations.

114. Bennett discloses that “the phone 103 receives a selection from a user” “identifying a video selection” using “user input interface 117.” EX1004, ¶0025. “The selection may be performed using a media guide,” which may “comprise a list that identifies a plurality of media elements available with the media sources 107.” Id. A POSITA would understand that navigating through a list of media elements and making a selection implicitly requires move operations to scroll through the list and select operations to choose the desired content. This understanding stems from common implementations of media guides and user interfaces in television systems at the time.

115. Bennett also details the user input interface of the phone, including components such as “buttons,” a “touchpad,” a “pen,” a “thumbwheel,” a “mouse.” EX1004, ¶0043. A POSITA would recognize that these interface components are specifically designed to facilitate move and select operations. For instance: buttons are commonly used for directional navigation (move) and confirmation (select); touchpads and mice are used for cursor movement (move) and clicking (select); thumbwheels are typically employed for scrolling (move) and pressing (select). The inclusion of these specific input methods would signal to a POSITA that the system is designed to support move and select operations.

116. In addition, Bennett discloses that the phone can also “control various television system settings,” including “settings related to media displayed on the television screen,” by receiving user input and sending control signals to the television system. EX1004, ¶0029. A POSITA would understand that the process of controlling settings typically involves navigating through menus or lists of settings (move operations); selecting specific settings to modify (select operations); adjusting values or options within those settings (additional move and select operations). This understanding is based on standard practices in user interface design for television systems and remote controls at the time.

117. Given these disclosures and a POSITA’s understanding of typical implementations in television control systems, it would be clear to a POSITA that Bennett’s system incorporates move and select operations as fundamental aspects of its functionality, even without explicit use of these terms. The described user interactions and control capabilities include these basic operations that are necessary for effective navigation and selection within the system’s interfaces.

118. Thus, in my opinion, the apparatus claimed in claim 5 of the ‘020 Patent would have been obvious to the POSITA.

10.6. Dependent Claim 6: “The display apparatus according to claim 5, wherein the display apparatus is not configured to transmit an identifier that identifies said first video content displayed on the display panel to the external mobile terminal.”

119. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 5 as explained above.

120. Bennett discloses a one-way communication where the phone delivers control signals to the television. EX1004, ¶0025. A POSITA would recognize that Bennett’s disclosure does not include any indication that the television sends back any identifier of the content it is displaying to the phone. Given the explicit description of the one-way communication from the phone to the television, a POSITA would have understood that Bennett’s system operates without any transmission of content identifiers from the television to the phone. Bennett clearly describes the communication as one-way, from phone to television. Together with the clear lack of any need to communicate back to the phone in this system, a POSITA would have interpreted this as precluding any return communication. Bennett’s disclosure lacks any mention of return communication or content identifiers being sent from the television. A POSITA would recognize this absence as significant in the context of this document. A POSITA would have understood that Bennett’s system achieves its stated purpose without requiring the television to send content identifiers to the phone. Given the state of the art at the

time, a POSITA would have expected that if such a return communication were part of the system, it would have been explicitly mentioned due to its technical significance. In addition, a POSITA would have appreciated that the one-way communication design described by Bennett offered advantages in terms of simplicity and efficiency, which would be compromised by adding unnecessary return communication. Additionally, the most common infrared communications to televisions at the time were one way.

121. Therefore, based on the information in Bennett and the knowledge a POSITA would bring to the interpretation of this disclosure, the POSITA would have understood that Bennett's system operates without the television sending any identifier of the content it is displaying back to the phone.

122. Thus, in my opinion, the apparatus claimed in claim 6 of the '020 Patent would have been obvious to the POSITA.

10.7. Dependent Claim 17: "The display apparatus according to claim 1, wherein the system controller is not configured to receive the identifier from the remote controller."

123. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

124. Bennett discloses “[a] typical remote control” used to “change TV channels,” “audio and video settings” and “control power supply.” EX1004, ¶¶0008. This tells the POSITA that the remote controller is used for basic functions other than transmitting identifiers of specific video content to the system controller. Meanwhile, Bennett teaches the “phone,” not the remote controller, is used to send identifiers and control signals “adapted to direct the display of video information corresponding to the video selection.” EX1004, ¶¶0025, 0036, 0055. The POSITA would have thus understood that in Bennett the system controller was not configured to receive the identifier from the remote control.

125. Thus, in my opinion, the apparatus claimed in claim 17 of the ‘020 Patent would have been obvious to the POSITA.

10.8. Dependent Claim 18: “The display apparatus according to claim 1, wherein the display apparatus is not configured to transmit an identifier that identifies video content displayed on the display panel to the external mobile terminal.”

126. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

127. Bennett discloses a one-way communication where the phone delivers control signals to the television. EX1004, ¶¶0025, There is no indication that the television sends back any identifier of the content it is displaying to the

phone. A POSITA would have understood that Bennett's system operated without such transmission from the television to the phone. See also, claim 6.

128. Thus, in my opinion, the apparatus claimed in claim 18 of the '020 Patent would have been obvious to the POSITA.

10.9. Dependent Claim 19: “The display apparatus according to claim 1, wherein said operation instructions include move and select operations.”

129. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above. Further, Claim limitation 19 is identical to Claim limitation 5. Accordingly, Bennett teaches limitation 19 for the same reasons as it teaches the limitation of claim 5. See paragraphs 113-117 above. Thus, in my opinion, the apparatus claimed in claim 19 of the '020 Patent would have been obvious to the POSITA.

10.10. Dependent Claim 20: “The display apparatus according to claim 1, wherein the external mobile terminal is capable of receiving the second video content via a cellular base station.”

130. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

131. Bennett teaches that the “phone” (“external mobile terminal”) is capable of receiving video content via cellular networks. A POSITA would have

understood that cellular networks, as described by Bennett, operated through cellular base stations. This understanding stems from the fundamental architecture of cellular networks that a POSITA would have been familiar with at the time of the invention.

132. Bennett discloses that the phone “retrieves via the communication interface 121 a first video stream... from the media sources 107.” EX1004, ¶0025. Bennett further discloses the phone is “communicatively coupled to the media sources 107 over respective wireless links” which involve “cellular telephony (e.g., GSM/GPRS/EDGE, CDMA, CDMA2000, UMTS, WCDMA, etc.),” which operate via cellular base stations. EX1004, ¶0030. A POSITA, with their knowledge of cellular network technologies, would have recognized that the cellular telephony standards mentioned by Bennett (GSM/GPRS/EDGE, CDMA, CDMA2000, UMTS, WCDMA) all relied on a network architecture that includes cellular base stations. See, for example, U.S. Patent No. 6,967,971 (EX1009) at Fig. 1, Fig. 2, 4:7-48. These cellular standards are and were designed to facilitate communication between mobile devices (like the phone in Bennett’s disclosure) and the broader network infrastructure through cellular base stations. The “wireless links” described by Bennett, in the context of cellular telephony, would have been understood by a POSITA to involve transmission between the phone and cellular

base stations. The retrieval of video streams “from the media sources 107” over cellular networks, as described by Bennett, necessarily would have involved the phone communicating with cellular base stations to access the broader network and reach these media sources.

133. Given this context, a POSITA would have concluded that Bennett’s disclosure of a phone receiving video content via cellular networks implicitly describes communication through cellular base stations, as this is a fundamental aspect of how cellular networks operate.

134. Thus, in my opinion, the apparatus claimed in claim 20 of the ‘020 Patent would have been obvious to the POSITA.

10.11. Dependent Claim 21: “The display apparatus according to claim 1, wherein the external mobile terminal comprises a smart phone.”

135. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

136. A POSITA at the time of the invention would recognize that the functionality described in Bennett for a “phone” is consistent with the capabilities of smartphones.

137. Bennett describes a “phone” that interacts with a television system to control media display, retrieve video content, and issue control commands to the television. EX1004, ¶0012. A POSITA would have recognized these as advanced features are associated with smartphones, which are (and were at the time of Bennett) essentially mobile computers with telecommunication capabilities. I note that the iPhone was commercially available prior to the ’020 priority date. See EX1010.

138. Bennett also discloses that the “phone” implements transcoding, encoding, decoding, and formatting functionalities, which are advanced computing capabilities typical of smartphones. EX1004, ¶¶0028, 0048, 0063, 0072. A POSITA would have understood these sophisticated computing operations to be a characteristic of smartphones rather than basic mobile phones.

139. Bennett also discloses the “phone” has functionality of retrieving media from a media source and displaying it on either the phone or the television. EX1004, ¶0025. A POSITA would have associated this capability with smartphones, which are and were known for their ability to handle and display various types of media.

140. Bennett discloses the “phone” includes wireless and wired communication interfaces, which enable it to control multimedia systems, showing the phone’s interaction with multiple media sources. EX1004, ¶¶0042, 0043. A POSITA would have recognized this level of connectivity and versatility to be typical of smartphones.

141. Bennett further discloses a “phone” having functionality to control the selection and delivery of media to an entertainment system (EX1004, ¶0072. A POSITA would have understood that this level of control and interaction aligns with the capabilities of smartphones, given their computing power and connectivity features.

142. Given these advanced features described in Bennett, a POSITA at the time of the invention would understand the disclosed “phone” was a smartphone. This interpretation is based on the POSITA’s understanding of mobile phone technology evolution and the characteristic features that distinguish smartphones from basic mobile phones. The combination of advanced computing capabilities, multimedia handling, diverse connectivity options, and the ability to control other electronic devices are all hallmarks of smartphone functionality that a POSITA would recognize in Bennett’s description.

143. Even though Bennett does not use the term “smartphone,” a POSITA would have understood that the described device fell under this category based on its capabilities and the context of mobile technology at the time of the invention. The POSITA’s knowledge of the rapid advancements in mobile phone technology at the time and the trend towards integrating advanced computing features into handheld devices would have further informed this interpretation of Bennett’s disclosure.

144. Thus, in my opinion, the apparatus claimed in claim 21 of the ‘020 Patent would have been obvious to the POSITA.

10.12. Dependent Claim 22: “The display apparatus according to claim 1, wherein the display apparatus is not configured to transmit an identifier that identifies said first video content displayed on the display panel to the external mobile terminal.”

145. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above. Claim limitation 22 is identical to Claim 6. Accordingly, Bennett teaches limitation 22 for the same reasons expressed above at paragraphs 120-121 with respect to claim 6.

146. Thus, in my opinion, the apparatus claimed in claim 22 of the ‘020 Patent would have been obvious to the POSITA.

10.13. Dependent Claim 23: “The display apparatus according to claim 1, wherein the identifier comprises a URL.”

147. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

148. Bennett discloses a system that retrieves video content from media sources, including a “Internet server.” EX1004, ¶0045. Bennett discloses the users may select media element using a “media guide” comprising “a list that identifies a plurality of media elements available with the media sources.” EX1004, ¶0026.

149. Since the media sources include Internet servers, and standard practice for retrieving content from Internet servers involved using URLs (“uniform resource locator”), it would have been well-known to a POSITA that the identifier used for retrieving resources from such servers would likely be a URL. At the time of Bennett, it was well-known in the art that URLs are used to identify and retrieve resources from Internet servers. The use of URLs to access multimedia content over the Internet was a common and standard practice. Therefore, it would have been obvious to the POSITA to use a URL as the identifier when retrieving video content from an Internet server. See also the discussion of Element [I.4] above.

150. Thus, in my opinion, the apparatus claimed in claim 23 of the '020 Patent would have been obvious to the POSITA.

10.14. Dependent Claim 24: “The display apparatus according to claim 1, wherein the system controller is further configured to control the network communication module to acquire the second video content without a user having to perform a log-in operation through the display apparatus.”

151. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

152. Bennett teaches that the phone interacts with a television via a set-top box to manage video streams. EX1004, ¶0032. The process involves the user selecting video content on the phone, which then communicates with the set-top box to display the selected content on the television. *Id.* This configuration allows the television to acquire and display video content based on the phone's commands without necessitating a direct user log-in via the television. Bennett further teaches a video content is selected through the phone and transmitted for display on the television via a set-top box. EX1004, ¶0055. The content delivery to the television does not require any log-in authentication performed on the television itself and Bennett contains no teaching that requires a log-in operation via the television.

153. BThis is confirmed by Bennett’s teaching that the purchasing or credential verification processes are executed **via the phone** and not through the display apparatus (television). EX1004, ¶0062. If a log-in is needed, “the phone may perform credential verification functionalities.” Id. Bennett further discloses **the phone** “purchases the selected media element” using “key based” methods and “user interactive steps,” which clearly includes “a log-in operation” claimed here. Id.

154. Thus, in my opinion, the apparatus claimed in claim 24 of the ‘020 Patent would have been obvious to the POSITA.

10.15. Dependent Claim 25: “The display apparatus according to claim 1, wherein the display apparatus further includes a memory for storing a user operation history.”

155. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

156. Bennett discloses “[t]he entertainment system 405 has a screen 440, a speaker 441, a memory 450.” EX1004, ¶0044. Bennett does not explicitly state that the memory stores a user operation history. However, a POSITA would have recognized that such functionality was a common and expected use of memory in interactive systems through the use of configuration databases, log files, or other

data structures. This understanding stems from the POSITA's knowledge of standard practices in the field of interactive entertainment systems at the time of Bennett's disclosure.

157. Bennett further teaches "[t]he phone 103 may... control various television system settings... The processing circuitry 113 of the phone 103 then delivers a control signal... that directs application of the user-selected setting to the media displayed on the television screen 125." EX1004, ¶0029. Because the television system would process these inputs, the POSITA would have reasonably concluded that it would store user operation history to facilitate user preferences and settings.

158. At the time of Bennett, it was well-known in the art that interactive display systems often included a memory for storing user operation history to enhance user experience, to enable quick access to frequently used functions, and to personalize settings. For example, the 2006 manual for HP's Mediasmart SLC3760N smart television contains instructions for resetting the device to factory settings, which removed "all user preferences (media server, network type, and so on), all user personal information (cookies, services passwords, and so on), if any, and all network settings." EX1011, p. 88 of 310. Given that Bennett discloses a

display apparatus with a memory and interactive capabilities, it would have been obvious to a POSITA to utilize the memory for storing user operation history.

159. The motivation to store user operation history stems from the need to improve system responsiveness and user convenience, which are common objectives in the field of multimedia systems. Operation history is also stored to facilitate diagnostics and debugging.

160. By applying their knowledge of industry standards and best practices, a POSITA would have concluded that Bennett's system, with its disclosed memory and interactive features, would benefit from and likely incorporate user operation history storage functionality.

161. Thus, in my opinion, the apparatus claimed in claim 25 of the '020 Patent would have been obvious to the POSITA.

10.16. Dependent Claim 26: "The display apparatus according to claim 25, wherein the user operation history comprises a set of user selections."

162. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 25 as explained above.

163. While Bennett does not explicitly state that the memory stores a user operation history comprising a set of user selections, a POSITA would have

readily understood that interactive multimedia systems typically stored user selections to enhance user experience. See above discussion regarding claim 25.

164. Bennett discloses that “[t]he selection by the user may...identify two... media elements...using a media guide...” EX1004, ¶0026. This indicates that the system processes multiple user selections. A POSITA would have recognized that processing multiple user selections in such a system requires utilizing memory to store and manage these selections. This understanding stems from common practices in the field of interactive multimedia systems at the time.

165. Bennett further discloses that processing of user selections for settings handled by the system controller. EX1004, ¶0029. A POSITA would have inferred from this that the system likely stores these selections in memory for future reference, as this is a standard approach in the field to maintain system state and user preferences across sessions.

166. Further, at the time of Bennett, it was well-known in the art that interactive systems often store user operation histories, including sets of user selections, to improve functionality and user experience. Features like “recently watched” lists, personalized recommendations, and quick access to frequently used settings rely on storing user selections in memory. Since Bennett teaches a display

apparatus with a memory and interactive capabilities processing user selections, it would have been obvious to a POSITA to store these selections as part of a user operation history. The motivation to store user selections would have stemmed from the need to enhance usability and provide personalized experiences, common objectives in multimedia systems.

167. Thus, in my opinion, the apparatus claimed in claim 26 of the '020 Patent would have been obvious to the POSITA.

10.17. Dependent Claim 27: “The display apparatus according to claim 1, wherein the video processor is capable of having the second video content displayed in full screen display mode and, alternatively, in a partial area of the screen.”

168. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

169. Bennett teaches the “fitting functionalities” of the first and second multimedia elements can be processed by the system. EX1004, ¶0048. This indicates that the system can adjust video content to fit the display area. Also, the first and second media element “may be processed for (e.g., specifically adapted for)” the television screen or the phone screen. EX1004, ¶0028. The processing can be employed in the phone, in the television, etc. and includes “various fitting functionalities.” Id. “If the selected media element is received in a format that is

not supported by the screen of the phone, then transcoding is applied to the received media element.” EX1004, ¶0063. A POSITA would have understood that these features included the capability to display content in full-screen mode or within a partial area of the screen. Additionally, the system allows for user control over “the setting for either the screen or the speaker or both of the entertainment system,” suggesting the capability to adjust how the content is presented on the screen. EX1004, ¶0050.

170. Alternatively, at the time of Bennett, it was common for video processors in entertainment systems to include functionalities that allow for displaying video content in full-screen or partial-screen modes (e.g., Picture-in-Picture, split-screen). Given that Bennett discloses a video processor with “fitting *functionalities*,” EX1004, ¶0048. it would have been understood by a POSITA that such functionalities include adjusting the size and position of video content on the display, enabling both full-screen and partial-screen display modes. Additionally, television systems that used set-top boxes as in Bennett, often displayed video content on a portion of the screen along with menus, advertising, program guides, or other information.

171. Thus, in my opinion, the apparatus claimed in claim 27 of the ‘020 Patent would have been obvious to the POSITA.

10.18. Dependent Claim 28: “The display apparatus according to claim 1, wherein the display apparatus is further configured to communicate with the external mobile terminal over a wireless LAN.”

172. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

173. Bennett discloses that the phone is communicatively coupled to the television and media sources over “wireless links,” which include a variety of communication types such as “IEEE 802.11,” which is and was commonly known as Wi-Fi or **wireless LAN**. EX1004, ¶¶0030. This disclosure shows that wireless LAN technologies were already utilized for communication between devices in media display environments at the time of Bennett. Bennett further teaches that the communication links between the set-top box, television, and phone are wireless, use technologies like “IEEE 802.11,” which is the standard protocol family for wireless LAN communications. EX1004, ¶¶0033, 0052

174. Thus, in my opinion, the apparatus claimed in claim 28 of the ‘020 Patent would have been obvious to the POSITA.

10.19. Dependent Claim 29: “The display apparatus according to claim 1, wherein the display apparatus further comprises a DLNA communications device.”

175. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

176. The Digital Living Network Alliance (DLNA) is a standard that enables devices to share media over a local network. See EX1012. This claim incorporates DLNA functionality for transmitting and receiving media content between devices within a home network. I personally participated in the creation of DLNA and spoke at the meeting where the decision to launch the development of DLNA was made. DLNA was an open standard.

177. Bennett teaches a system capable of sharing media content across devices, including communication over a network, which is functionally equivalent to DLNA communications. Bennett describes the interaction of the phone with a television system and media sources over wireless communication protocols, such as Wi-Fi or Bluetooth, to control the delivery and display of media content across multiple devices in a multimedia network. EX1004, ¶¶0030-0032, 0050. The disclosed communication methods in Bennett perform the same essential function as DLNA: enabling devices to communicate and share multimedia content across a

local network. The apparatus described in Bennett thus effectively embodies the same type of networked communication capabilities as DLNA.

178. Thus, in my opinion, the apparatus claimed in claim 29 of the '020 Patent would have been obvious to the POSITA.

10.20. Dependent Claim 30: “The display apparatus according to claim 1, wherein the display apparatus further includes a memory storing an internet browser.”

179. Bennett discloses and/or renders obvious in light of the knowledge of a POSITA, each and every element of claim 1 as explained above.

180. Bennett discloses a display apparatus (entertainment system) which includes a memory component as part of its system architecture. EX1004, ¶¶0044. Bennett further discloses that the entertainment system is capable of accessing and processing multimedia content from various sources, including “Internet servers.” EX1004, ¶¶0045, 0046. This capability to access content from “Internet servers,” would have been understood by a POSITA to incorporate software capable of handling Internet protocols and content formats.

181. The entertainment system in Bennett has functionalities of “transcoding,” “encoding,” “decoding,” and “fitting.” EX1004, ¶¶0048. A POSITA would have recognized that the ability to process and display multimedia elements

from Internet servers suggests that the entertainment system included software applications—such as an internet browser—stored in its memory to retrieve, interpret, and display web-based content.

182. Further, at the time of Bennett, it was well-known that devices accessing Internet content generally included an internet browser or equivalent software stored in memory. Given that Bennett discloses a display apparatus with memory and the capability to access Internet servers, it would have been obvious to a POSITA to include an internet browser stored in the memory of the display apparatus. The motivation to include an internet browser arises from the desire to retrieve, interpret, and display web-based multimedia content on the display apparatus, a common feature in multimedia systems of that time. Although Bennett does not explicitly mention that the display apparatus includes a memory storing an internet browser, the system's ability to access online media sources through internet servers implies that such functionality is present or required. Given the widespread use of internet browsers in multimedia systems accessing online content at the time, it would have been obvious to include an internet browser stored in the display apparatus's memory.

183. Thus, in my opinion, the apparatus claimed in claim 30 of the '020 Patent would have been obvious to the POSITA.

11.GROUND 2: BENNETT IN VIEW OF NASHIDA AND A POSITA'S KNOWLEDGE

184. Bennett combined with Nashida and the knowledge of a POSITA renders obvious every limitation of all Challenged Claims, including the limitations in independent Claim 1 and additional limitations in dependent claims 2-5, 23, and 30.

185. In my opinion, Bennett, Nashida and the '020 Patent are analogous art. Bennett is in the same field of endeavor as the '020 Patent. All are related to the interoperation between a mobile device and a television or similar apparatus.

186. Bennett is directed to the same problem as the '020 Patent, namely problems related to enhancing user experience by enabling seamless control and interaction between external devices and television systems. EX1001. A POSITA would consider Bennett to be directed to the same problem as the '020 Patent. Both Bennett and the claimed '020 inventions pertain to systems that allow for the display of video content from various sources (broadcast and internet) and enable control via external devices, including mobile phones. A POSITA would have been motivated to combine Bennett and POSITA's knowledge. Like the '020 Patent, Bennett is directed towards a POSITA with substantial skill in the art and relies on such a POSITA to fill in the details when to do so merely requires ordinary and

widespread knowledge of the field of art. Such motivation is evident from both Bennett and as well as many other exemplary prior art references.

187. Nashida is directed to a remote-control system comprising a remote controller and an image display apparatus. EX1005. The remote controller includes a display unit, an operation unit, and a communicator for communication with the television. *Id.* The system allows the remote controller to display information, receive user inputs, and transmit operational information to the television to control the display of content. *Id.* The remote controller can also receive display information from the television and display it on its own screen. *Id.* Therefore, Nashida is directed to the same field of endeavor as Bennett and the '020 Patent.

188. A POSITA would have been motivated to combine Bennett and Nashida. Such motivation is evident from both Bennett and Nashida, as well as many other exemplary prior art references.

189. First, it would have been obvious to a POSITA to make the proposed combination for the same reasons discussed for Ground 1. For example, a POSITA's knowledge would have provided motivation to combine Nashida with Bennett. It was well-known for televisions to have a digital broadcast receiver (Element [A]) to receive the digital broadcast signal from the internet and an infra-

red (IR) receiver (Element [G]) for receiving commands from a remote controller.

Also, it was well-known for external remote controllers to send identifiers (Element [I.3]), such as URLs, to the radio receiver (Element [F]) of televisions for the acquisition of video contents from the internet (Element [I.4]).

190. Second, a POSITA would have recognized this combination as a use of a known technique (*i.e.*, Nashida's digital broadcast receiver, IR receiver, radio receiver, identifiers, display state information, position information) to improve a similar device (*i.e.*, providing Bennett's display system with capabilities for its media display and media swap function) in the same way (*i.e.*, complementing Bennett's system, and related functionality, to include Nashida's features such as position information).

191. A POSITA also would have had a reasonable expectation of success. Both Nashida and Bennett use well-known, conventional architectural elements, such as CPUs/processing circuitry, memories, wireless communication devices, and displays—all performing their intended functions. In addition, both Nashida and Bennett use well-known forms of wireless communication (*e.g.*, infrared) to communicate between devices.

192. The disclosures of Bennett and the knowledge of a POSITA have been discussed above. In this section I only discuss the additional disclosures of Nashida that would be used in a combination.

11.1. Independent Claim 1

11.1.1. Element [1A]: “a digital broadcast receiver configured to receive a digital broadcast signal”

193. Nashida discloses “the external input/ output controller 2012” configured to “receive an image signal and an audio signal of a television broadcast.” EX1005, ¶0071. Nashida further discloses the image and audio signals include “digital” broadcast signals. EX1005, FIG.12, FIG.14C.

11.1.2. Element [1F]: “a radio receiver for receiving data from an external mobile terminal”

194. Nashida discloses a “second communicator” in the image display apparatus for wireless communication with the “first communicator” of the external mobile terminal. EX1005, ¶0065, FIG.1. Therefore, combining Bennett and Nashida, it would have been obvious to include a radio receiver in the television to receive data from an external mobile terminal.

11.1.3. Element [1G] “an infra-red (IR) receiver for receiving commands from a remote controller”

195. Nashida explicitly discloses that the image display apparatus includes an “infrared-ray receiving/emitting device” for “communication between the image display apparatus and the remote controller.” EX1005, ¶¶0051, 0063, 0065. Using an infrared remote control and receiver would have been obvious in view of the teachings, suggestions, and motivations in Bennett that would have led a POSITA to modify or combine Nashida. Therefore, combining Bennett and Nashida, it would have been obvious to include a IR receiver in the television to receive commands from a remote controller.

11.1.4. Element [I.3] “receive an identifier for identifying a second video content from the external mobile terminal”

196. Nashida discloses the use of identifiers, like URLs, for retrieving internet content. In Nashida, the “controller 1010 transmits a command of requesting a transmission of a URL” for retrieving and displaying web content on a display apparatus. EX1005, ¶¶0120, 0124, 0126, 0200-0203. URL use is also disclosed in FIGS. 17A-17C below. Incorporating a URL or similar identifier into Bennett’s “control signal” would have been an obvious combination of prior art elements (*e.g.*, using URL) according to known methods (*e.g.*, via a web browser),

yielding the predictable result of efficiently retrieving specific content from an
“Internet source.”

11.1.5. Element [11.4] “acquire the second video content via the internet using said identifier”

197. Nashida discloses the use of identifiers, such as URLs, for retrieving internet content. In Nashida, the “controller 1010 transmits a command of requesting a transmission of a URL (Uniform Resource Locator) information” for retrieving and displaying internet content on a display apparatus. EX1005, ¶¶0120, 0124, 0126, 0200-0203, FIGS. 17A-17C. Combining these teachings, it would have been obvious that the display apparatus acquires second video content from the internet after receiving the identifier, e.g. URL. Thus, in my opinion the apparatus claimed in claim 1 would have been obvious to the POSITA.

11.2. Dependent Claim 2: “The display apparatus according to claim 1, wherein the second video content comprises video content displayed on the external mobile terminal.”

198. Nashida discloses that the “display information” (e.g. “displayed channel,” “second video content”) on the “remote controller” (“external mobile terminal”) is “moved” to the image display apparatus upon receiving user’s operations. EX1005, ¶¶0088-0091, 0096, 0114, FIGS. 4(A1)-4(A5), 4(B1)-4(B5), 6, 8. In FIG 6 and 8 below, Nashida discloses that the video content D1/D3

displayed on the external remote controller is “moved” to the display apparatus as D2/D4. Thus, in my opinion, the apparatus of claim 2 of the ‘020 Patent would have been obvious to a POSITA.

11.3. Dependent Claim 3: “The display apparatus according to claim 2, wherein the display apparatus is further configured to receive display state information for the second video content.”

199. Nashida discloses that upon the “movement operation” of “display information D1,” the remoter controller transmits the “display information D1” and the “associated” “operational information” to the display apparatus. EX1005, ¶¶0089. The “operational information” requests “the display of the last displayed channel” (on the remote controller) on the display apparatus. *Id.* Nashida further discloses that upon receiving the “operational information,” “display surface” (“display apparatus”) displays “an image of the last displayed channel” or “the image information corresponding to the remote controller side display information.” EX1005, ¶¶0091, 0107, FIG.5 (“[A]n image of the last displayed channel” and “the image information corresponding to the remote controller side display information” contains the state of the video image displayed on the “remote controller,” i.e., what channel is last displayed and the corresponding image, and therefore include “display state information” for the video content.

Thus, it is my opinion that the apparatus of claim 3 of the '020 Patent would have been obvious to the POSITA.

11.4. Dependent Claim 4: “The display apparatus according to claim 3, wherein the display state information comprises position information.”

200. Further complementing Bennett, Nashida explicitly discusses the control of the position of video content on a large display, managed by a remote controller EX1005, ¶¶0095-0096. Nashida teaches that “the display position” of the “remote controller side display information D1” (“second video content”) associated with the “operational information” is “moved towards the image display apparatus.” EX1005, ¶0095. Nashida teaches that this result in “the visual effect as if the remote controller side display information D1 is physically moved towards the image display apparatus 20 from the display surface 1016 of the remote controller 10” EX1005, ¶0096.

201. Nashida’s teachings about the position control, creating a visual effect suggesting movement of video content towards the display, directly correlate to “position information” being part of display state information. This reference supports the concept of position control, emphasizes its practical implementation and benefits, and drives home the obvious nature of this limitation to a POSITA.

202. The interrelation of Bennett and Nashida's teachings makes it apparent that integrating position information as part of display state information was a predictable and logical step for a POSITA. The ability to control and modify the display characteristics, including position based on user interaction, as taught by Nashida, would have been an obvious enhancement to Bennett's media swapping feature.

203. The combination of Bennett and Nashida reveals a clear motivation to incorporate position control into the display apparatus for media swapping, aiming to enhance user interaction and system responsiveness. This integration results in a predictable outcome of improving the operational efficacy of the system, rendering the feature claimed in Claim 4 not only obvious but a mere application of known techniques to improve similar technologies.

11.5. Dependent Claim 5: "The display apparatus according to claim 2, wherein said operation instructions include move and select operations."

204. Nashida further discloses various "move and selection" operations on the remote controllers. Nashida discloses in FIGS. 17A, 17B, 17C below the screen of the remote controller while the Internet information is in display. Nashida teaches that the "operation instructions" include "a scroll button D12B to move a display area," and make selections and several other button for selections: a "home

page button D17B,” a “book mark button D18B,” a “return button D13B,” a “scroll button D19B,” a “page movement button D16B” and a “cursor D21B.” EX1005, ¶¶0201-0204, FIGS. 17A, 17B, 17C. Accordingly, it is my opinion that claim 5 of the ‘020 Patent would have been obvious to a POSITA.

11.6. Dependent Claim 23: “The display apparatus according to claim 1, wherein the identifier comprises a URL.”

205. Nashida discloses the use of identifiers, such as URLs, for retrieving internet content. *See* my discussion of Element [I.3] of Claim 1 at paragraph 196 above. Accordingly, it is my opinion that claim 23 of the ‘020 Patent would have been obvious to a POSITA.

11.7. Dependent Claim 30: “The display apparatus according to claim 1, wherein the display apparatus further includes a memory storing an internet browser.”

206. Nashida discloses the display apparatus displaying an internet “browser” “carry out the WWW reading operation.” EX1005, ¶¶0124, 0126. Nashida further discloses that the display apparatus comprises a “second memory” (2008 or 2008B). EX1005, ¶¶0064, 0165. Nashida further discloses that the “second memory” comprises a “ROM region for storing programs to be carried out by the second controller” (2010 or 2010B). EX1005, ¶¶0069, 0170. Therefore, it is

obvious that the internet browser of the display apparatus is stored in the “second memory.”

207. Given that Bennett discloses a display apparatus with memory and the capability to access Internet servers, it would have been obvious to a POSITA to include an internet browser stored in the memory of the display apparatus, as disclosed by Nashida. The motivation to include an internet browser arises from the necessity to retrieve, interpret, and display web-based multimedia content on the display apparatus, a common feature in multimedia systems of that time. Given the widespread use of internet browsers in multimedia systems accessing online content at the time, it would have been obvious to include an internet browser stored in the display apparatus’s memory. Thus, it is my opinion that Claim 30 of the ‘020 Patent would have been obvious to a POSITA.

12. Secondary Considerations

208. At this stage of these proceedings, it is my understanding that Petitioner has no burden to identify and rebut secondary considerations. Rather, it is my understanding that Patent Owner must first present a prima facie case for such consideration, which Petitioners should then have the chance to rebut. That said, I have considered evidence of secondary considerations that I am aware of at

this time, and I am currently unaware of any evidence of secondary considerations that would support a finding of non-obviousness. If additional evidence of secondary considerations becomes available, I would ask to be able to opine on it at that time.

13. Availability for Cross-Examination

209. 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 as mutually agreed between the parties.

14. Right to Supplement

210. I reserve the right to supplement my opinions in the future to respond to any arguments that the Patent Owner may raise. This declaration represents only those opinions that I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new

information that becomes available to me and on my continuing analysis of the materials already provided.

15. Jurat

211. Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

November 3, 2024

Date

A handwritten signature in black ink, appearing to read 'A. Wolfe', is written over a horizontal line.

Andrew Wolfe, Ph.D.