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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

ADVANCED MICRO DEVICES, INC. AND ATI TECHNOLOGIES ULC,

Plaintiffs-Counterdefendants,

v.

LG ELECTRONICS, INC., LG ELECTRONICS U.S.A., Inc., AND LG ELECTRONICS MOBILECOMM U.S.A., INC.,

Defendants-Counterclaimants.

Case No. 3:14-cv-1012-SI

DEFENDANTS-COUNTERCLAIMANTS LG ELECTRONICS, INC., LG ELECTRONICS U.S.A., INC., AND LG ELECTRONICS MOBILECOMM U.S.A., INC.'S INVALIDITY CONTENTIONS AND PRODUCTION OF DOCUMENTS PURSUANT TO PATENT LOCAL RULES 3-3 AND 3-4

Pursuant to the Court's July 21, 2014 Order (D.I. 55) (the "Scheduling Order") and the Northern District of California Patent Local Rules ("Patent Rules" or "Patent L.R.") 3-3 and 3-4, Defendants LG Electronics, Inc. ("LGE"), LG Electronics U.S.A., Inc. ("LGEUS"), and LG Electronics Mobilecomm U.S.A., Inc. ("LGEMU") (collectively and individually "LG") hereby disclose their Invalidity Contentions. LG contends that each of the claims asserted by Plaintiffs Advanced Micro Devices, Inc. and ATI Technologies ULC (collectively and individually "AMD") is invalid under at least 35 U.S.C. §§ 101, 102, 103, and/or 112.

I. GENERAL STATEMENT AND RESERVATION OF RIGHTS

A. Asserted Claims

On August 1, 2014, AMD served LG with Infringement Contentions ("Infringement Contentions") alleging infringement of United States Patents No. 6,889,332 ("the '332 patent"), 6,895,520 ("the '520 patent"), 6,897,871 ("the '871 patent"), 7,327,369 ("the '369 patent"), 7,742,053 ("the '053 patent"), 5,898,849 ("the '849 patent"); 6,266,715 ("the '715 patent"); 6,784,879 ("the '879 patent"), and 7,095,945 ("the '945 patent") (collectively, "the Patents-In-Suit"). Specifically, AMD has alleged that LG infringes the following claims of the Patents-In-Suit (collectively, the "Asserted Claims"):[1]

- Claims 9, 10, and 13-17 of the '332 patent;
- Claims 16-18 and 20-23 of the '520 patent;
- Claims 1, 3, 6, 8-11, 13, 15, and 17-20 of the '871 patent;
- Claims 1 and 2 of the '369 patent;
- Claims 1, 2, and 5-7 of the '053 patent;
- Claims 1 and 14 of the '849 patent;
- Claims 11, 10, 13, 22, 24, and 25 of the '715 patent;

[1] LG notes that AMD's Infringement Contentions originally identified 58 claims. However, AMD has subsequently represented that it is no longer asserting claims 11 and 12 of the '332 patent, claim 19 of the '520 patent, and 'claims 2, 4, 5, 7, 12, and 21 of the '871 patent. *See* 9/17/2014 Lttr from Drew to McKeon, Sterba, May re AMD Asserted Claims. The Asserted Claims as identified herein are accordingly based on AMD's representation and LG reserves the right to disclose new or supplemental invalidity contentions to the extent AMD attempts to assert claims that have been dropped.

- Claims 1, 17, 20, 21, and 24 of the ’879 patent;
- Claims 18 and 21 of the ’945 patent

AMD asserts a total of 49 claims against LG. LG does not provide any contentions regarding any claims not asserted in AMD’s Infringement Contentions. To the extent that the Court permits AMD to assert additional claims against LG in the future, LG reserves the right to disclose new or supplemental invalidity contentions.

LG provides these disclosures consistent with the schedule currently in place, but does so without waiving any right to receive from AMD such full and complete specific infringement disclosures as should have been provided from the outset. AMD’s Infringement Contentions generally and comprehensibly lack the specificity required under the Patent Local Rules as would be necessary to fairly inform LG of the specifics of AMD’s infringement claims. LG’s compliance with the current schedule should not be viewed as a waiver of any right to seek relief regarding the deficiencies in AMD’s Infringement Contentions.

B. Claim Construction

Claim construction proceedings for this action have not yet occurred and AMD has not expressly provided its constructions of the Asserted Claims. LG thus reserves the right to modify, amend, and/or supplement its Invalidity Contentions following the claim construction rulings in accordance with P.L.R. 3-6. LG also reserves the right to modify, amend, and/or supplement its Invalidity Contentions upon AMD’s alteration/clarification of its asserted claim constructions.

LG’s Invalidity Contentions are based in part on its present understanding of AMD’s Infringement Contentions. In some instances, AMD’s Infringement Contentions contradict the teachings of the Patents-In-Suit, contradict the understanding of the claim terms by a person of ordinary skill in the art, are internally inconsistent, and are vague and conclusory concerning how the claim limitations supposedly read on the accused products or activities. As a result, LG is currently unable to fully discern AMD’s position regarding the construction of these claim limitations. To the extent that AMD supplements its Infringement Contentions, LG reserves the

right to modify, amend, and/or supplement its Invalidity Contentions, including, without limitation, pursuant to Patent L.R. 3-6.

LG's Invalidity Contentions do not represent LG's agreement or view as to the meaning of any claim term contained therein. To the extent that LG asserts that prior art is anticipatory or renders obvious claims based on the construction apparently applied by AMD to the Asserted Claims, LG's Invalidity Contentions are not—and should not be interpreted as—adoptions or admissions as to the accuracy of that scope or construction. Thus, LG's contentions herein are not, and should in no way be seen as admissions or adoptions as to any particular claim scope or construction, any priority date, any admission that any claims have been properly asserted in this case, or as any admission that any aspect of any accused products or systems meets any particular claim element in any particular way. LG objects to any attempt to imply claim construction from the attached charts. These invalidity contentions are made under a variety of alternatives and do not represent LG's agreement or view as to the meaning, definiteness, written description support for, or enablement of any claim contained therein.

LG therefore takes no position on any matter of claim construction in these Invalidity Contentions. LG reserves the right to propose any claim construction it considers appropriate and to contest any claim construction it considers inappropriate. LG also reserves the right to argue that certain claim terms, phrases, and elements are indefinite, lack written description, are not enabled, are not patentable, are not novel and/or are otherwise invalid under 35 U.S.C. § 101 or § 112.

Because of the uncertainty of claim construction, LG reserves the right to further supplement or modify the positions and information in these Invalidity Contentions, including, without limitation, the prior art and grounds of invalidity set forth herein, after the Asserted Claims have been construed, in accordance with the Patent Local Rules and the Court's Orders.

C. Doctrine of Equivalents

AMD has provided insufficient contentions regarding its allegations of infringement under the doctrine of equivalents. AMD has not sufficiently provided any contentions that identify the basis for AMD's position regarding each limitation allegedly infringed under the doctrine of

equivalents and its alleged equivalent element in the accused products. Should leave to amend be granted to AMD to add to its contentions any specific allegations of infringement under the doctrine of equivalents, LG reserves the right to amend or supplement these Invalidity Contentions as appropriate.

D. Ongoing Discovery and Disclosures

Discovery and LG's investigation, including LG's search for prior art, are ongoing. In particular, discovery has just started and LG is still investigating possible sources of prior art in the possession of AMD and third parties. LG has or will issue appropriate subpoenas to third parties requesting information relating to prior art and invalidity of the Asserted Claims. Also, AMD has not yet provided any documentation regarding prior art in its possession, custody, or control.

Accordingly, LG reserves the right to supplement, amend, and/or alter the positions taken and information disclosed in these Invalidity Contentions after review of the documents produced in response to requests for production. To the extent AMD's document production is incomplete with respect to documents relating to the invalidity of the Asserted Claims, LG further reserves the right to supplement, amend, or alter the positions taken and information disclosed in these Invalidity Contentions, if and when AMD or a third party produces additional relevant documents.

LG further reserves the right to supplement, amend, and/or alter the positions taken and information disclosed in these Invalidity Contentions including, without limitation, the prior art and grounds of invalidity set forth herein, to take into account information or defenses that may come to light as a result of LG's discovery efforts. LG further reserves the right to supplement, amend, and/or alter the positions taken and information disclosed in these Invalidity Contentions, pursuant to Patent L.R. 3-6. LG hereby incorporates by reference the relevant testimony of any fact witnesses who are deposed, provide declarations, or otherwise testify in this lawsuit. LG also hereby incorporates by reference the reports and testimony of any expert witnesses who opine on LG's behalf regarding invalidity of the Patents-In-Suit.

E. Alleged Priority Dates

LG disputes that any of the Asserted Claims are entitled to the priority dates asserted by AMD. LG reserves the right to amend this section after any claim construction ruling or after discovery reveals priority dates inconsistent with those alleged by AMD.[2]

F. Additional Reservations of Rights

The citations to the prior art provided in these contentions are intended to be exemplary, not exhaustive. LG has endeavored to cite to the most relevant portions of the identified prior art. Other portions of the identified prior art may additionally disclose, either expressly or inherently, and/or render obvious one or more elements or limitations of the asserted claims. LG reserves the right to rely on uncited portions of the identified prior art to establish invalidity. Moreover, LG reserves the right to rely on uncited portions of the identified prior art, other art, or expert testimony to provide context to or aid in understanding the cited portions of the identified prior art. LG also reserves the right to rely upon treatises, published industry standards and similar documents to demonstrate the knowledge of one of ordinary skill in the relevant art.

Subject to the foregoing statements and qualifications, LG provides the following:

II. INVALIDITY CONTENTIONS

A. U.S. Patent No. 6,889,332

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '332 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or

[2] Moreover, LG reserves the right to amend or supplement its Invalidity Contentions in view of AMD's late disclosure of conception dates for the '871, '369, and '053 Patents. *See* 9/23/2014 Plaintiffs' First Amended Responses to LG's Interrogatories, Set 1 (No. 1). Such late disclosure is improper under Local Patent L.R. 3-1 and is highly prejudicial to LG.

knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '332 patent.

The following prior art, as well as the "References Cited" on the face of the '332 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '332 patent pertains (i.e., what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '332 patent: References produced with Bates Range LG_AMD_PA_0000001 - LG_AMD_PA_0002418.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '332 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[3] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
5,451,892	United States	September 19, 1995	A-01
5,490,059	United States	February 6, 1996	A-02
5,713,030	United States	January 27, 1998	
5,798,667	United States	August 25, 1998	A-03
5,832,284	United States	November 3, 1998	A-04
5,838,578	United States	November 17, 1998	A-05
5,974,557	United States	October 26, 1999	A-06
5,978,864	United States	November 2, 1999	A-07
6,047,248	United States	April 4, 2000	A-08
6,105,142	United States	August 15, 2000	A-09
2001/0003206	United States	June 7, 2001	

[3] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

6,311,287	United States	October 30, 2001	A-10
6,363,490	United States	March 26, 2002	
6,442,700	United States	August 27, 2002	A-11
6,470,290	United States	October 22, 2002	A-12
6,510,400	United States	January 21, 2003	A-13
6,535,798	United States	March 18, 2003	A-14
6,789,037	United States	September 7, 2004	A-15
6,928,559	United States	August 9, 2005	A-16

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Advanced Configuration and Power Interface Specification, Revision 1.0b	February 2, 1999	Intel Corporation Microsoft Corporation Toshiba Corporation	
Advanced Configuration and Power Interface Specification, Revision 2.0	July 27, 2000	Compaq Computer Corporation Intel Corporation Microsoft Corporation Phoenix Technologies Ltd. Toshiba Corporation	

(c) Prior Art Systems

The asserted claims of the ’332 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit

Intel SpeedStep/Geyserville technology, embodied in Pentium II, Pentium III, XScale, and Itanium[4]	At least as early as February 24, 1999	Intel Corporation	A-17
LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM[5]	At least as early as January 19, 2000	Transmeta Corporation	A-18
AMD PowerNow! technology embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+[6]	At least as early as April 18, 2000	AMD Corporation	A-19

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

[4] *See, e.g.*, Intel Demonstrates "Geyserville" Technology – Bringing Near Desktop Performance to Mobile PCs, February 24, 1999, https://web.archive.org/web/20010208160810/http://developer.intel.com/pressroom/archive/releases/mp022499.htm; Intel Announces New Microarchitecture For Wireless And Internet Infrastructure Applications Intel® XScale™ Microarchitecture Provides Flexibility, August 23, 2000, https://web.archive.org/web/20001208135800/http://www.intel.com/pressroom/archive/releases/em082300.htm; Next Generation Itanium Processor Overview, Intel Developer's Forum, August 27-30, 2001

[5] *See, e.g.*, Crusoe – A New World of Mobility from Transmeta, January 19, 2000, https://web.archive.org/web/20000817082320/http://www.transmeta.com/press/011900-1.html; Notebooks with Transmeta chip arrive in U.S. - CNET News, October 25, 2000; EE Times, Notebook try on Crusoe processor at PC Expo, June 30, 2000. http://www.eetimes.com/document.asp?doc_id=1141693&print=yes

[6] *See, e.g.*, AMD News Release #20083, April 18, 2000, https://web.archive.org/web/20000617082528/http://www.amd.com/news/prodpr/20083.html; AMD News Release #20119, June 26, 2000, https://web.archive.org/web/20000815210041/http://www.amd.com/news/prodpr/20119.html; AMD News Release #20138, September 25, 2000, https://web.archive.org/web/20001017162155/http://www.amd.com/news/prodpr/20138.html.

The Pentium II and Pentium III chips were publicly used or known, on sale or offered for sale on or before February 24, 1999 and are thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.,* Intel Demonstrates "Geyserville" Technology – Bringing Near Desktop Performance to Mobile PCs, February 24, 1999, https://web.archive.org/web/20010208160810/http://developer.intel.com/pressroom/archive/releases/mp022499.htm. The mobile Pentium II chips are a "higher performance, more power efficient processor that are ideally suited for mobile PCs." *Id.* Similarly, the Pentium III processor are mobile PC based processors that are "enabled with Geyserville technology." *Id.*

Similarly, the XScale chips were publicly used or known, on sale or offered for sale on or before August 23, 2000 and thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.,* Intel Announces New Microarchitecture For Wireless And Internet Infrastructure Applications Intel® XScale™ Microarchitecture Provides Flexibility, August 23, 2000, https://web.archive.org/web/20001208135800/http://www.intel.com/pressroom/archive/releases/em082300.htm. The XScale architecture is designed for "for both ultra-low power and high performance in devices ranging from Internet-ready cell phones to Internet infrastructure equipment." *Id.*

Likewise, the Itanium chips were publicly used or known, on sale or offered for sale on or before February 27, 2001 and thus prior art under at least 35 U.S.C. § 102(a). *See, e.g.,* Next Generation Itanium Processor Overview, Intel Developer's Forum, August 27-30, 2001. The Itanium chips have a "programmable fail-safe thermal trip" to reduce power consumption. *Id.* On information and belief, the Pentium II, Pentium III, XScale, and Itanium chips include, among other things, the invention embodied in the '332 Patent. *See* Ex. A-17.

Separately, the alleged invention of the asserted claims was conceived at least as early as 2001 and diligently reduced to practice no later than August 27-30, 2001 by Intel Corporation. Upon information and belief, the prior invention is embodied in Itanium chips that implement the Intel Speedstep technology. Accordingly, LG's contentions are set forth in the claim chart(s) associated with Intel Speedstep. *See* Ex. A-17.

On information and belief, AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, was publicly used or known, on sale or offered for sale on or before April 18, 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See* AMD News Release #20083, April 18, 2000, https://web.archive.org/web/20000617082528/http://www.amd.com/news/prodpr/20083.html; AMD News Release #20119, June 26, 2000, https://web.archive.org/web/20000815210041/http://www.amd.com/news/prodpr/20119.html; AMD News Release #20138, September 25, 2000, https://web.archive.org/web/20001017162155/http://www.amd.com/news/prodpr/20138.html. AMD's PowerNow technology "supports up to 32 different core voltage settings ranging from 0.925 to 2.00V with voltage steps as small as 25 or 50mV" and "allow[s] steps of 33 or 50Mhz from an absolute low of 133 or 200MHz" *See* AMD PowerNow! Technology – Dynamically Manages Power and Performance, Publication #24404, Rev. A, November 2000, Page 2. Furthermore, AMD's PowerNow technology can "dynamically drop into a lower power state" as "demand for performance subsides." *See* AMD-K6-IIIE+ Embedded Processor Data Sheet, Publication #23543, Rev. A, September 2000, Page 6. On information and belief, AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, include, among other things, the invention embodied in the '332 Patent. Accordingly, LG's contentions are set forth in the claim chart(s) associated with AMD PowerNow! Technology. *See* Ex. A-19.

LG will seek discovery of AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, from AMD.

On information and belief, Transmeta's LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM, was publicly used or known, on sale or offered for sale on or before January 19, 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.,* Crusoe – A New World of Mobility from Transmeta, January 19, 2000, https://web.archive.org/web/20000817082320/http://www.transmeta.com/press/011900-1.html; Notebooks with Transmeta chip arrive in U.S. - CNET News, October 25, 2000; EE Times,

Notebook try on Crusoe processor at PC Expo, June 30, 2000. The TM5400 "operate[d] at 500-700MHz" and the DDR SDRAM memory controller had a "100-133MHz, 2.5V interface." *See* Crusoe Processor Model TM5400, January 18, 2000, Page 1. The Transmeta LongRun Dynamic Power Management technology changed frequency "in steps of 33MHz" and it changed voltage "in steps of 25mV." *See* Crusoe LongRun Power Management – Dynamic Power Management for Crusoe Processors, Marc Fleischmann, January 17, 2001, Pages 6. LongRun's "power management algorithm tracks when it is advantageous to dynamically shift frequency/voltage levels and when it is best to use conventional power management techniques." *See id.* at 7. And, the LongRun Power Management Thermal Extension "delivers higher performance at the same die temperature, or the same performance at a lower die temperature" in comparison to thermal throttling. *See id.* at 12. On information and belief, Transmeta's LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM include, among other things, the invention embodied in the '332 Patent. *See* Ex. A-18.

A claim chart comparing each claim to the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '332 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits A-01 thru A-19 (collectively "Appendix A") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix A provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '332 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix A, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix A should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix A that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '332 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '332 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '332 patent, its foreign counterparts, or any parent or child patent of the '332 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the

figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information, including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix A.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix A the prior art references that render obvious the asserted claims of the ’332 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix A, such reference may be combined with any other references listed in Appendix A for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the '332 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the '332 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether

the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the '332 patent; the existence of a known need or problem in

the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix A in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix A all generally relate to dynamically adjusting power on a processor based on temperature. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix A because at the time of the alleged invention market demands required efficient power management techniques to maximize processor performance while monitoring the temperature of the processor. Thus, because of these market demands requiring efficient power management techniques to maximize processor performance while monitoring the temperature of the processor, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix A in order to more efficiently dynamically adjust power on a processor based on temperature.

At the time of the alleged invention, the market demanded better power and thermal management techniques, such as those described in the Advanced Configure and Power Interface (ACPI). *See* Bhatia[7] at 1:13-18 (explaining that the ACPI specification "provide[d] an interface

[7] U.S. Patent No. 6,535,798 ("Bhatia")

between the operating system of a system and hardware devices to implement power and thermal management."). Such power and thermal management involved passive cooling "in which the operating system reduces the power consumption of the system by throttling the processor clock." *See* Bhatia, at 1:22-25. The market also demanded dynamically controlling the processor's power to maximize performance, manage temperature, and conserve battery charge in portable computers. *See* Michail[8] at 1:61-67 (stating that "[a] great deal of the time the microprocessor is not at its maximum power dissipation and it rarely approaches its maximum safe temperature. Even systems that attempt to stabilize performance over a variety of temperature ranges don't fully exploit the fact that most of the time the microprocessor and its system could support more operations."); *see also* Dischler[9] at 2:29-38 (explaining that adjusting the maximum frequency "is particularly important in portable computers such as notebook computers to conserve battery charge, minimize heat dissipation in the microprocessor…"); Cooper[10] at 1:36-43 (stating that "mobile systems typically operate at the lowest voltage and frequency pair required to keep the typical dissipated power below the mobile battery-powered limits" and that "voltage can be increased to deliver higher performance for a given component… at any given point in time."). Thus, one of ordinary skill in the art would have been motivated to find a solution that would allow a processor to operate at a plurality of performance states regulated in part by thermal criteria. Given that the references in Appendix A have common design features, such as dynamically adjusting power on a processor based on temperature, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a processor that efficiently and dynamically manages its power performance states to maximize its performance while monitoring its temperature. *See, e.g.,* Michail, Thomas, Dischler, Cooper.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix A, and reserves the right to identify further examples as the case proceeds.

[8] U.S. Patent No. 5,8322,284 ("Michail")
[9] U.S. Patent No. 6,311,287 ("Dischler")
[10] U.S. Patent No. 6,442,700 ("Cooper")

5. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '332 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '332 patent, or that any of the claims of the '332 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. *See* 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014).

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '332 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to

particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[11]

The Asserted Claims of the '332 patent are invalid for lack of definiteness due to the limitation "the performance states being defined by at least one of operating voltage and frequency." The phrase "the performance states being defined by at least one of operating voltage and frequency" in the claims is inconsistent with the teaching set forth in the specification of the '332 patent, which describes performance states as "operating frequency and/or voltage" and "operating frequency and voltage," *See, e.g.*, '332 Patent at 2:15-16, 2:33-35. In light of the specification, a person of ordinary skill in the art would be unable to understand the bounds of these claims as a result of this limitation. Moreover, since this ambiguity is not cured in any of the claims depending from claim 9, each asserted dependent claim (claims 10, 13, and 14) is similarly invalid for lack of definiteness. Likewise, claims 15 and 17 also suffer from the same ambiguity for using the phrase "performance operating states" and "performance states" respectively. And, since this ambiguity in claim 15 is not cured in the one claim depending from claim 15, the asserted dependent claim 16 is similarly invalid for lack of indefiniteness.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. *See* 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art,

[11] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[12]

The Asserted Claims of the '332 patent are invalid for lack of enablement and written description due to any of the limitations "the performance states being defined by at least one of operating voltage and frequency," "performance operating states" and "performance states." The phrases "the performance states being defined by at least one of operating voltage and frequency" and "performance operating states" in the claims are not set forth in the specification of the '332 patent. Thus, in light of the specification, a person of ordinary skill in the art would not be enabled to make and use the Alleged Invention without undue experimentation. Also, the specification of the '332 patent would not clearly allow a person of ordinary skill in the art to recognize that the inventor invented what is claimed because the specification does not clearly explain the meaning of any of the following phrases: "the performance state being defined by at least one of the operating voltage and frequency," "performance operating states," or "performance states." Thus, the asserted claim 9 and each asserted dependent claim of claim 9 (claims 10, 13, and 14) is invalid for lack of enablement and written description. Similarly, claims 15 and dependent claim 16 are invalid for lack of enablement and written description. Claim 17 is invalid for lack of written description.

B. U.S. Patent No. 6,895,520

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '520 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or

[12] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '520 patent.

The following prior art, as well as the "References Cited" on the face of the '520 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '520 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '520 patent: References produced with Bates Range LG_AMD_PA_0002419 - LG_AMD_PA_0005797.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '520 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[13] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
5,418,969	United States	May 23, 1995	B-01
5,719,800	United States	February 17, 1998	B-02
5,774,704	United States	June 30, 1998	B-03
5,781,783	United States	July 14, 1998	B-04
5,790,877	United States	August 4, 1998	B-05
5,798,667	United States	August 25, 1998	B-06
5,940,785	United States	August 17, 1999	B-07
5,996,083	United States	November 30, 1999	B-08
6,141,762	United States	October 31, 2000	B-09
6,195,753	United States	February 27, 2001	B-10
6,256,743	United States	July 3, 2001	B-11

[13] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

6,345,362	United States	February 5, 2002	B-12
6,647,502	United States	November 11, 2003	B-13
7,100,061	United States	August 29, 2006	

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Advanced Configuration and Power Interface Specification, Revision 1.0b	February 2, 1999	Intel Corporation Microsoft Corporation Toshiba Corporation	
Advanced Configuration and Power Interface Specification, Revision 2.0	July 27, 2000	Compaq Computer Corporation Intel Corporation Microsoft Corporation Phoenix Technologies Ltd. Toshiba Corporation	
A Survey of Design Techniques for System-Level Dynamic Power Management	June 2000	Luca Benini, Alessandro Bogliolo, Giovanni De Micheli	B-14
Operating-System Directed Power Reduction	2000	Yung-Hsiang Lu, Luca Benini, Giovanni De Micheli	B-15

(c) Prior Art Systems

The asserted claims of the ’520 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
Intel386™ SL Processor and Intel387™ SX CoProcessor[14]	At least as early as October 15, 1990	Intel Corporation	B-16
LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM[15]	At least as early as January 19, 2000	Transmeta Corporation	B-17
AMD PowerNow! technology embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+[16]	At least as early as April 18, 2000	AMD Corporation	B-18

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the Intel386™ SL Processor and Intel387™ SX CoProcessor were publicly used or known on or before October 15, 1990 and are thus prior art under at least 35

[14] *See, e.g.*, Intel® Microprocessor Quick Reference Guide, http://www.intel.com/pressroom/kits/quickrefyr.htm#1990; PERSONAL COMPUTERS – Innovative Portables From Zenith, Peter H. Lewis, May 21, 1991; EPC-21/22 Hardware Reference, Radisys Corporation, Copyright August 1993..

[15] *See, e.g.*, Crusoe – A New World of Mobility from Transmeta, January 19, 2000, https://web.archive.org/web/20000817082320/http://www.transmeta.com/press/011900-1.html; Notebooks with Transmeta chip arrive in U.S. - CNET News, October 25, 2000; EE Times, Notebook try on Crusoe processor at PC Expo, June 30, 2000. http://www.eetimes.com/document.asp?doc_id=1141693&print=yes.

[16] *See, e.g.*, AMD News Release #20083, April 18, 2000, https://web.archive.org/web/20000617082528/http://www.amd.com/news/prodpr/20083.html; AMD News Release #20119, June 26, 2000, https://web.archive.org/web/20000815210041/http://www.amd.com/news/prodpr/20119.html; AMD News Release #20138, September 25, 2000, https://web.archive.org/web/20001017162155/http://www.amd.com/news/prodpr/20138.html.

U.S.C. § 102(b). *See, e.g.*, Intel® Microprocessor Quick Reference Guide, http://www.intel.com/pressroom/kits/quickrefyr.htm#1990; PERSONAL COMPUTERS – Innovative Portables From Zenith, Peter H. Lewis, May 21, 1991. The Intel386™ SL Processor and Intel387™ SX CoProcessor were on sale or offered for sale no later than August 1993 and are thus prior art under at least 35 U.S.C. § 102(b). The Intel386™ SL Processor SupreSet components can independently control the clock frequency of the CPU, memory, I/O system, and coprocessor "by a software-selectable factor" to produce a slower, more power-efficient frequency or to "switch back to its fastest CPU frequency" during periods of intense computation. *See* Introduction to the Intel 386 SL Microprocessor SuperSet – Technical Overview, Copyright 1991, Order No. 240852-002, Page 5. Furthermore, the Intel387™ SX CoProcessor's "operating frequency can be adjusted under software control according to its computational load." *Id.* at 6. On information and belief, Radisys Corporation's EPC-22 CPU module was publicly used or known, on sale or offered for sale on or before August 1993 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, EPC-21/22 Hardware Reference, Radisys Corporation, Copyright August 1993, Pages 1, 4. The EPC-22 "contains a 25 MHz Intel 386SL processor and an 80387SX math coprocessor." *Id.* at 1. On information and belief, the EPC-22 CPU module from Radisys Corporation include, among other things, the invention embodied in the '520 Patent. *See* Ex. B-16.

On information and belief, Transmeta's LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM, was publicly used or known, on sale or offered for sale on or before January 19, 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Crusoe – A New World of Mobility from Transmeta, January 19, 2000, https://web.archive.org/web/20000817082320/http://www.transmeta.com/press/011900-1.html; Notebooks with Transmeta chip arrive in U.S. - CNET News, October 25, 2000; EE Times, Notebook try on Crusoe processor at PC Expo, June 30, 2000. The Transmeta LongRun Dynamic Power Management technology changed frequency "in steps of 33MHz" and it changed voltage "in steps of 25mV" to "match [the processor's] active operating level to the perfomance requirements of the application." *See* Crusoe LongRun Power Management – Dynamic Power Management for

Crusoe Processors, Marc Fleischmann, January 17, 2001, Pages 6. Furthermore, the Crusoe processor dynamically reduced the power consumption of the associated memory by integrating northbridge components to "allow frequency scaling within the range that the installed memories support[ed]." *See* Crusoe LongRun Power Management – Dynamic Power Management for Crusoe Processors, Marc Fleischmann, January 17, 2001, Pages 10-11. On information and belief, Transmeta's LongRun Dynamic Power Management technology, embodied in TM5400 and associated DDR SDRAM include, among other things, the invention embodied in the '520 Patent. *See* Ex. B-17.

On information and belief, AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, was publicly used or known, on sale or offered for sale on or before April 18, 2000 and is thus prior art under at least 35 U.S.C. § 102(a). *See* AMD News Release #20083, April 18, 2000, https://web.archive.org/web/20000617082528/http://www.amd.com/news/prodpr/20083.html; AMD News Release #20119, June 26, 2000, https://web.archive.org/web/20000815210041/http://www.amd.com/news/prodpr/20119.html; AMD News Release #20138, September 25, 2000, https://web.archive.org/web/20001017162155/http://www.amd.com/news/prodpr/20138.html. AMD's PowerNow technology "monitors application requirements for performance or power utilization" and "supports the ability to change the bus frequency divisor and core voltage seamlessly during run time." *See* AMD-K6-IIIE+ Embedded Processor Data Sheet, Publication #23543, Rev. A, September 2000, Page 2; AMD PowerNow! Technology Platform Design Guide for Embedded Processors, Application Note, Publication #24267, Rev. A, December 2000, Page 7. On information and belief, AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, include, among other things, the invention embodied in the '520 Patent. Accordingly, LG's contentions are set forth in the claim chart(s) associated with AMD PowerNow! Technology. *See* Ex. B-18.

LG will seek discovery of AMD PowerNow! Technology, embodied in AMD-K6-2E+, AMD-K6-IIIE+, AMD-K6-2+, AMD-K6-III+, from AMD.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the ’520 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits B-01 thru B-18 (collectively “Appendix B”) which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix B provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the ’520 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix B, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG’s reference to a particular circuitry, software program, device or product in the claim charts of Appendix B should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix B that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that

have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '520 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '520 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '520 patent, its foreign counterparts, or any parent or child patent of the '520 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been

obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix B.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix B the prior art references that render obvious the asserted claims of the ’520 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix B, such reference may be combined with any other references listed in Appendix B for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’520 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’520 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int’l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) (“*KSR*”) held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required

to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known

methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the ’520 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix B in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix B all generally relate to dynamically adjusting power based on utilization. Thus, they are all directed to features within the same field and

one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix B because at the time of the alleged invention market demands required efficient and dynamic power management techniques for balancing performance and power usage. Thus, because of these market demands, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix B in order to dynamically adjust power based on utilization.

At the time of the alleged invention, the market demanded a power management system to manage power consumption, especially on mobile electronic devices. *See* U.S. Patent No. 5,781,783 (Gunther), at 1:15-35 (explaining that "[p]ower-consumption characteristics of mobile electronic devices are particularly important as such devices have self-contained power sources. such as batteries" and that "it is highly desirable that the electronic components thereof be as power-efficient as possible."); *see also* Gupta[17] at 1:18-22 (stating that "[i]n order to extend the battery life, computer systems have employed so called 'power management' techniques. These techniques attempt to minimize the power consumption of the system by reducing the power consumption of the individual subsystems of the overall computer system."); Williams[18] at 1:65-2:1 (stating that "[a] cpu which consumes excessive power is also not suitable to mobile computer device applications, where power supply is limited (i.e., from batteries)."). Thus, one of ordinary skill in the art would have been motivated to find a solution that would allow a computer to lower its power consumption to match its utilization. Furthermore, at the time of the alleged invention, the market also demanded performance on demand while being aware of excessive and unnecessary power consumption. *See* Williams at 2:11-30 (explaining that "[a] fast cpu running [a simple software] program… confers no user perceptible performance benefit to offset excessive heat generation and other associated problems… because the cpu may in fact be idle for large periods of time" and that "what is needed is a method and apparatus which runs software programs or portions of programs, at peak

[17] U.S. Patent No. 5,996,083 ("Gupta").
[18] U.S. Patent No. 5,774,704 ("Williams").

performance for the user, yet does not lead to overheating of the cpu or other problems that may arise from running cpu's at high clock frequencies, such as excessive power consumption."); *see also* Mittal[19] at 1:46-51. Given that the references in Appendix B have common design features, such as dynamically regulating power on a computer based on processing need, and adjusting voltage and/or frequency accordingly, one of ordinary skill in the art would have been motivated to combine these references, with reasonable expectation of success, to design an integrated circuit that dynamically adjusts its power based on utilization information. *See, e.g.,* Georgiou[20] at 1:17-24, 1:43-58; Mittal at 1:37-45.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix B, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 101 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '520 patent are invalid under 35 U.S.C. § 101 because the claims are not directed to patent-eligible subject matter. LG's contentions that the following claims are invalid under 35 U.S.C. § 101 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '520 patent, or that any of the claims of the '520 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

[19] U.S. Patent No. 5,719,800 ("Mittal")
[20] U.S. Patent No. 5,940,785 ("Georgiou")

35 U.S.C. § 101 states that a patent may be granted to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." Whether or not an invention is eligible for patent protection under § 101 is a "threshold test." *See Bilski v. Kappos*, 130 S.Ct. 3218, 3225 (2010). Under this "threshold test," the Supreme Court has held that "laws of nature, natural phenomena, and abstract ideas" are not patent-eligible. *See Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S.Ct. 1289, 1293 (2012). To be eligible under § 101, patent claims reciting ineligible subject matter must contain "an 'inventive concept' sufficient to 'transform' the claimed [ineligible subject matter] into a patent-eligible application." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2357 (2014). The inventive concept must consist of more than "generic computer implementation," *id.* at 2358, or "well-understood, routine, conventional activity previously engaged in by [those] who work in the field," *Mayo*, 132 S.Ct. at 1298; *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 2014 WL 3377201, at *4 (Fed. Cir. July 11, 2014) ("[A] claim reciting an abstract idea does not become eligible merely by adding the words 'apply it.'").

Many of the asserted claims are invalid under 35 U.S.C. § 101 because they fail to claim patent-eligible subject matter. In particular, at least the following claims fail to comply with 35 U.S.C. § 101. [21]

The Asserted Claims of the '520 patent are not patent-eligible subject matter due, in part, to the limitations "functional blocks" and "match." Under the Supreme Court's threshold test in *Bilski*, "functional blocks" and "match" are abstract ideas because they describe general concepts in control systems engineering. Functional blocks, in the abstract, are used to "describe the component parts of [a] system … and shows their interconnection." Norman Nise, Control Systems Engineering, 21 (Bill Zobrist et al. eds., 4th ed. 2004). No limited or specific definition is provided in the '520 patent. Thus, the term functional blocks are abstract ideas because they are used to conceptualize relationships of the various components within a system.

[21] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 101.

The term "matching" in the context of the '520 patent describes no more than an abstract concept in a closed-loop control system where a component correlates its output response to an input stimulus. No limited or specific definition is provided in the '520 patent. Thus, the Asserted Claims of the '520 patent are not patent-eligible because they generally describe the concepts used in a closed-loop control system to maximize a system's performance.

6. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '520 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '520 patent, or that any of the claims of the '520 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014).

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the

applicants regard as their invention. The specification of the '520 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[22]

The Asserted Claims of the '520 patent are invalid for lack of definiteness due to the limitation "to match respective block utilization levels," and "functional blocks." The phrase "to match respective block utilization levels" in the claims is not explained in the specification of the '520 patent. Although the patentee uses the terms "match" and "functional blocks" in the specification, the patentee fails to describe what that terms means with the necessary degree of specificity for one of ordinary skill in the art to understand what is meant by that phraseology. For example, the patentee states that "a functional block may be a floating point unit or a cache memory" but the patentee also states that a "functional block 200 includes the functional unit 201." *See, e.g.*, '520 Patent at 3:8-11. The patentee describes a functional unit as "one or more fixed point units, load/store units, floating point units (FPU), vector arithmetic units, barrel shifters, instruction and data cache memories, bridge or tunnel circuits, memory controllers, first in first out (FIFO) buffers, and various input/output interface units (e.g., interfaces for universal asynchronous receiver/transmitters (UART), serializer/deserializer (SERDES), Hypertransmport Infiniband, PCI bus)." *See, e.g.*, '520 Patent at 1:14-22. Moreover, since this ambiguity in claim 16 is not cured in any of the claims depending from claim 16, each asserted dependent claim (claims 17, 18, 20, 21, and 22) is similarly invalid for lack of definiteness. Also, claim 23, just like claim 9, is invalid for lack of definiteness due to the same limitation "to match respective block utilization levels."

[22] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. See 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the

knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[23]

The Asserted Claims of the '520 patent are invalid for lack of enablement and written description due to the limitations "functional blocks" and "to match respective block utilization levels." Claim 16 and its asserted dependent claims 17, 18, 20, 21, and 22 are invalidity regarding the term "functional blocks" for lack of written description and enablement. In connection with the term, the specification only describes "a floating point unit or a cache memory." *See, e.g.*, '520 Patent at 3:8-9. Therefore, to the extent AMD improperly attempts to construe the term "functional blocks"' to cover content other than "a floating point unit" or "a cache memory," these claims are not adequately described as the specification fails to support such a scope; by the same token AMD's attempt to read this claim language on multiple cores on a chip is not supported or enabled by the specification. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010). Furthermore, to the extent that AMD improperly attempts to construe the term "functional blocks"' to cover content other than "a floating point unit" or "a cache memory," a person of ordinary skill in the art would not be enabled to make and use the Alleged Invention

[23] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

without undue experimentation because the specification of the ’332 Patent limits the scope of its disclosure for “functional blocks” to “a floating point unit” or “a cache memory.”

Similarly, the phrase “to match respective block utilization levels” in the claims is not set forth in the specification of the’520 patent, and it is not clear to one of ordinary skill in the art what is meant by this phraseology. Thus, in light of the specification, a person of ordinary skill in the art would not be enabled to make and use the Alleged Invention without undue experimentation, and by the same token, the public notice function has not been satisfied because the public would not be certain what is meant by this phrase in order to know what has been claimed and/or how to design around what has been claimed. Also, since the specification of the ’520 patent does not clearly explain the phrase “to match respective block utilization levels,” the specification would not clearly allow a person of ordinary skill in the art to recognize that the inventor invented what is claimed. Thus, the asserted claims 16 and 23, and each asserted dependent claim of claim 16 (claims 17, 18, 20, 21, and 22) is invalid for lack of enablement and written description.

C. U.S. Patent No. 6,897,871

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the “References Cited” on the face of the ’871 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the ’871 patent.

The following prior art, as well as the “References Cited” on the face of the ’871 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the ’871 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the ’871 patent: References produced

with Bates Range LG_AMD_PA_0005798 - LG_AMD_PA_0029640 and LG_AMD_PA_0046646 - LG_AMD_PA_0046721.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '871 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[24] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
7,015,913	United States	March 21, 2006	C-01
7,038,685	United States	May 2, 2006	C-02
7,233,335	United States	June 19, 2007	C-03
5,808,690	United States	September 15, 1998	C-05
7,363,472	United States	April 22, 2008	C-08
6,954,204	United States	October 11, 2005	C-11
7,081,895	United States	July 25, 2006	C-12
5,968,167	United States	October 19, 1999	C-13
6,630,935	United States	October 7, 2003	
7,321,369	United States	January 22, 2008	
7,673,304	United States	March 2, 2010	
6,105,127	United States	August 15, 2000	
6,731,289	United States	May 4, 2004	
6,650,327	United States	November 18, 2003	
6,208,361	United States	March 27, 2001	
6,717,599	United States	April 6, 2004	
6,573,900	United States	June 3, 2003	
6,825,843	United States	November 30, 2002	
WO9919805	World Intellectual Property Organization	April 22, 1999	

[24] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

5,333,296	United States	July 26, 1994	
6,535,905	United States	March 18, 2003	
6,728,862	United States	April 27, 2004	
6,239,810	United States	May 29, 2001	

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Polygon Rendering on a Stream Architecture	2000	Owens et al.	C-04
Polygon Rendering for Interactive Visualization on Multicomputers	1996	Ellsworth	C-06
Parallel Polygon Rendering for Message-Passing Architectures	1994	Crockett et al.	C-07
A Graphics System Architecture for Interactive Application-Specific Display Functions	1986	England	C-09
Graphics-Intensive Applications Get a Boost, Application Acceleration: Development of the TAAC-1	1988	England	C-10
Computer Graphics on a Stream Architecture	November 2002	Owens	C-14
Introduction to Multithreading, Superthreading and Hyperthreading	October 2, 2002	Stokes	
the OpenGL Graphics System: A	July 24, 2002	Silicon Graphics	

Specification, Version 1.4			
Olano, SGI OpenGL Shader, SIGGRAPH 2002	2002	Olano	
Boyd, Chapter 5: DirectX, SIGGRAPH 2002	2002	Boyd	
Weber et al., Exploring the Benefits of Multiple Hardware Contexts in a Multiprocessor Architecture: Preliminary Results, 1989 ACM	1989	Weber et al.	
Rost, Course 17: State-of-the-Art in Hardware Rendering, The OpenGL Shading Language, SIGGRAPH 2002	2002	Rost	
Randi Rost, Course 17: State-of-the-Art in Hardware Rendering, Chapter 6: The OpenGL Shading Language, Course Notes	August 5, 2002	Rost	
Microsoft DirectX 8.1 (C++), Programmers Guide	June 17, 2002	Microsoft	
Hirata et al., An Elementary Processor Architecture with Simultaneous Instruction Issuing from Multiple Threads, ACM & IEEE-CS	May 1992	Hirata et al.	
McCool, SMASH: A Next-Generation API for Programmable Graphics Accelerators, Uni. of	April 20, 2001	McCool	

Waterloo, April 20, 2001			
i860 MICROPROCESSOR FAMILY PROGRAMMER'S REFERENCE MANUAL	1991	Intel	
i860 64-BIT MICROPROCESSOR HARDWARE DESIGN GUIDE	February 1989	Intel	
Bajaj et al., Parallel Multi-PC Volume Rendering System, Uni. of Texas at Austin		Bajaj et al.	
McConnell, Massively Parallel Computing on the Fuzion Chip, August 25, 1999	1999	McConnell	
Meißner et al., Parallel volume rendering on a single-chip SIMD architecture, IEEE 2001	2001	Meißner et al.	
Rixner et al., A Bandwidth-Efficient Architecture for Media Processing, Micro-31, 1998	1998	Rixner et al.	
Rixner, Stream Processor Architecture, Rice Uni., August 1, 2001	August 1, 2001	Rixner	
Kapasi, Stream Scheduling, Micro-34, December 2, 2001	December 2, 2001	Kapasi	
Khailany et al., Imagine: Media Processing with Streams, 2001 IEEE	2001	Khailany et al.	

Rixner, A Bandwidth-efficient Architecture for a streaming Media Processor, MIT 2001	April 24, 2001	Rixner	
Mattson, A programming System for the Imagine Media Processor, Stanford Uni. 2002	2002	Mattson	
Tullsen et al., Simultaneous Multithreading: Maximizing On-Chip Parallelism, 1995 ACM	1995	Tullsen et al.	
Ungerer et al., Multithreaded Processors, British Computer Society 2002	2002	Ungerer et al.	
Eggers et al., Simultaneous Multithreading: A Platform for Next-Generation Processors, 1997 IEEE Micro	1997	Eggers et al.	
Patel et al., Architectural Features of the i860™ - Microprocessor RISC Core and On-Chip Caches, 1989 IEEE	1989	Patel et al.	
Kohn et al., Introducing the Intel i860 64-Bit Microprocessor, 1989 IEEE	1989	Kohn et al.	
Grimes et al., 64-Bit Processor The Intel i860 64-Bit Processor: A General-Purpose CPU with 3D	1989	Grimes et al.	

Graphics Capabilities, 1989 IEEE			

(c) Prior Art Systems

The asserted claims of the ’871 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
Imagine Stream Processor	2000	Stanford University	C-04
Fuzion 1 Chip	1999	ClearSpeed	C-08
i860 Microprocessor	1989	Intel	C-06 and C-07

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the Imagine Stream Processor was publicly used or known, on sale or offered for sale in or before 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Owens et al., *Polygon Rendering on a Stream Architecture*, ACM 2000 (“Owens”) at 25. On information and belief, the Imagination Stream Processor included, among other things, the invention embodied in Owens. Accordingly, LG’s contentions with regard to the Imagine Stream Processor are set forth in the claim chart(s) associated with Owens.

On information and belief, the Fuzion 1 chip was publicly used or known, on sale or offered for sale in or before 1999 and is thus prior art under at least 35 U.S.C. § 102(b). On information and belief, the Fuzion 1 chip included, among other things, the invention embodied in U.S. Patent No.

7,363,472 to Stuttard et al. ("Stuttard"). *See, e.g.*, Stuttard; McConnell, *Massively Parallel Computing on the Fuzion Chip*, August 25, 1999 at 3-4. Accordingly, LG's contentions with regard to the Fuzion 1 chip are set forth in the claim chart(s) associated with U.S. Patent No. 7,363,472.

On information and belief, the i860 Microprocessor was publicly used or known, on sale or offered for sale in or before 1989 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Intel, *i860 64-BIT MICROPROCESSOR HARDWARE DESIGN GUIDE*, February 1989. On information and belief, the i860 Microprocessor included, among other things, the invention embodied in Ellsworth, *Polygon Rendering for Interactive Visualization on Multicomputers*, the University of North Carolina at Chapel Hill, 1996 ("Ellsworth") and/or Crockett et al., *Parallel Polygon Rendering for Message-Passing Architectures*, IEEE Parallel & Distributed Technology, 1994 ("Crockett"). *See, e.g.*, Ellsworth at 9-10; Crockett at 22. Accordingly, LG's contentions with regard to the i860 Microprocessor are set forth in the claim charts associated with Ellsworth and Crockett.

The alleged invention of the asserted claims was conceived and diligently reduced to practice in this country at least as early as 2001 by John Eric Lindholm, Rui M. Bastos, and/or Harold Robert Feldman Zatz of Nvidia Corporation. Upon information and belief, the prior invention is embodied in U.S. Patent Nos. 7,038,685 and 7,015,913. Accordingly, LG's contentions under 35 U.S.C. § 102(g) are set forth in the claim chart(s) associated with U.S. Patent Nos. 7,038,685 and 7,015,913.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '871 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits C-1 thru C-14 (collectively "Appendix C") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix C provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the ’871 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix C, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG’s reference to a particular circuitry, software program, device or product in the claim charts of Appendix C should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix C that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the ’871 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the ’871 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the ’871 patent, its foreign counterparts, or any parent or child patent of the ’871 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence

that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix C.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix C the prior art references that render obvious the asserted claims of the ’871 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover,

to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix C, such reference may be combined with any other references listed in Appendix C for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the '871 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the '871 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the

principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in

the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the ’871 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix C in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix C all generally relate to graphics processing devices or similar data processing devices employing a parallel processing technique to address calculations of large amounts of data. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix C because at the time of the alleged invention market demands required graphics processor architectures to be capable of rapidly processing graphics data such as complex scenes or 3D imagery, which involved calculations of massive amounts of data. A typical problem was that certain stages in the processing pipeline were bottlenecked, which caused execution latency and load-imbalance and thereby slowed the entire process. At the time of the alleged invention, various areas of data processing, including graphics processing, had adopted multithreading and multitasking to improve execution efficiency and resolve load-inbalance. *See, e.g.*, Stokes, *Introduction to Multithreading, Superthreading and Hyperthreading*, October 2, 2002 (“Stokes”),

at 4-6; Stuttard[25] at 5:20-64. Thus, to resolve these issues, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix C in order to change the design of graphics processors to reduce the bottlenecking in the processing pipeline and thereby increase the overall processing speed. For example, a person of ordinary skill in the art would have known and been motivated to reference the teaching of other data processing areas that had adopted parallel processing techniques such as multithreading and multitasking as disclosed in one or more of the references.

Furthermore, at the time of the alleged invention, the graphics technology community was well aware of advantages in using processors capable of performing both pixel and vertex operations. *See* Ellsworth, *Polygon Rendering for Interactive Visualization on Multicomputers*, Uni. of North Carolina at Chapel Hill, 1996 ("Ellsworth"), at 43 (comparing processors dedicated to pixel or vertex operations and processors performing both operations and preferring the second design because "[k]eeping the processors all in one group means that changes in the amount of geometry processing relative to the amount of rasterization will not cause a load imbalance, which would be the case if the tasks were handled by separate groups of processors"); Crockett et al., *Parallel Polygon Rendering for Message-Passing Architectures*, IEEE Parallel & Distributed Technology, 1994 ("Crockett"), at 17 ("Unlike earlier approaches, ours multiplexes the transformation and rasterization phases on the same processors"). Thus, to design a graphics processor that resolves execution latency or load-imbalance, one of ordinary skill in the art would have been motivated to adopt processors that perform, among others, pixel and vertex operations. Given that the references in Appendix C have common design features, such as using processors that perform multiple types of operations, or applying an arbitration scheme for distributing workload across processors, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a graphics processor that has an arbiter circuit and a shader performing both pixel and vertex operations as taught by one or more of the references. *See, e.g.*, Ellsworth; Crockett.

[25] U.S. Patent No. 7,363,472 ("Stuttard").

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix C, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 101 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '871 patent are invalid under 35 U.S.C. § 101 because the claims are not directed to patent-eligible subject matter. LG's contentions that the following claims are invalid under 35 U.S.C. § 101 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '871 patent, or that any of the claims of the '871 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

35 U.S.C. § 101 states that a patent may be granted to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." Whether or not an invention is eligible for patent protection under § 101 is a "threshold test." *See Bilski v. Kappos*, 130 S.Ct. 3218, 3225 (2010). Under this "threshold test," the Supreme Court has held that "laws of nature, natural phenomena, and abstract ideas" are not patent-eligible. *See Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S.Ct. 1289, 1293 (2012). To be eligible under § 101, patent claims reciting ineligible subject matter must contain "an 'inventive concept' sufficient to 'transform' the claimed [ineligible subject matter] into a patent-eligible application." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2357 (2014). The inventive concept must consist of more than "generic computer implementation," *id.* at 2358, or "well-understood, routine, conventional activity previously engaged in by [those] who

work in the field," *Mayo*, 132 S.Ct. at 1298; *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 2014 WL 3377201, at *4 (Fed. Cir. July 11, 2014) ("[A] claim reciting an abstract idea does not become eligible merely by adding the words 'apply it.'").

Many of the asserted claims are invalid under 35 U.S.C. § 101 because they fail to claim patent-eligible subject matter. In particular, at least the following claims fail to comply with 35 U.S.C. § 101.[26]

Claim 15 and its asserted dependent claims 17-20 are directed to a patent-ineligible concept and fail to contain any inventive concept sufficient to transform the claimed concept into a patent-eligible invention. Executing two types of calculations (pixel and vertex calculations) is an abstract idea because each is "a process of organizing information . . . and is not tied to a specific structure or machine." *Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014). Under the Supreme Court's threshold test for patent-eligibility as set forth in Mayo and Alice, the additional limitations set forth in the Asserted Claims are not sufficient to confer patent-eligibility because they consist of "generic computer implementation" and/or "well-understood, routine, conventional activity." *Alice*, 134 S. Ct. at 2358; *Mayo*, 132 S. Ct. at 1298. Beyond such abstract idea, claim 15 only recites purely functional and generic components—a general purpose register block, a processor unit and a sequencer, and "the prohibition against patenting abstract ideas 'cannot be circumvented by attempting to limit the use of the [idea] to a particular technological environment.'" *Bilski*, 130 S. Ct. 3230 (quoting *Diamond v. Diehr*, 450 U.S. 175, 191-92 (1981)).

6. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the ' 871 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '871 patent, or that any of the claims of the '871 patent are not anticipated

[26] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 101.

or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014)

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '871 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[27]

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid for lack of definiteness due to the limitation "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." In particular, the phrase "control signal" in claim 1 is inconsistent with the teaching set forth in the specification of the '871 patent. In addition, the usage of the phrase

[27] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

in the context of the claim is inconsistent with the usage of this phrase in the relevant art where a control signal relates to an arbiter circuit. For example, the specification states "[a] control signal generated by an arbiter 64 is transmitted to the multiplexer 66 on line 63." *See, e.g.*, '871 Patent at 3:65-66. Claim 1 inconsistently requires that the arbiter circuit passively receives or responds to a control signal. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claims 1, 3, 6, 8-11, and 13 as to the phrase "control signal."

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid for lack of definiteness due to the limitations "performing one of the vertex operations or pixel operations based on the selected one of the plurality of inputs" and "provides a appearance attribute." A claim does not meet the requirements of 35 U.S.C. § 112, second paragraph, and is therefore invalid for indefiniteness, when it "recit[es] both an apparatus and a method of using that apparatus. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005) (citing *ex parte Lyell*, 17 U.S.P.Q.2d 1548 (B.P.A.I. 1990)). Claim 1 is clearly directed to an apparatus (*i.e.*, a graphics processor), but claim 1 recites method steps of "performing one of the vertex operations or pixel operations based on the selected one of the plurality of inputs" and "provides a appearance attribute." Therefore, claims 1, 3, 6, 8-11, and 13 are invalid as indefinite.

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid for lack of definiteness due to the limitation "provides a appearance attribute." It is unclear as to i) how the shader provides an appearance attribute and ii) how providing an appearance attribute relates to the other claim limitations. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claim 1, 3, 6, 8-11, and 13 as to the limitation "provides a appearance attribute."

Claim 6 is invalid for lack of definiteness due to the limitation "the appearance attribute is color." Because claim 5, from which claim 6 depends, already recites "the appearance attribute is position," it is unclear what appearance attribute is referenced in claim 6 or how the appearance attribute can be position and color. Therefore, a person of ordinary skill in the art would be unable

to understand, with reasonable certainty, the bounds of claim 6 as to the limitation "the appearance attribute is color."

Claim 9 is invalid for lack of definiteness due to the limitations "further including a selection circuit" and "the control signal is provided by an arbiter." Claim 1, from which claim 9 depends, recites "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." Based on the specification (which only discloses an arbiter), it is unclear how the three recited components (*i.e.*, the arbiter circuit, the selector circuit and the arbiter) relate to one another or function together. For this same reason, the bounds of these recited components is not disclosed with reasonable certainty if at all. Moreover, to the extent that AMD alleges that the arbiter is part of the arbiter circuit or vice versa, it is unclear how the arbiter/arbiter circuit can both "select[] one of a plurality of inputs in response to a control signal" and provide "the control signal." Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claim 9 as to these limitations.

Claim 13 is invalid regarding the limitations "the data" and "the instructions" for lack of antecedent bases. Accordingly, claim 13 fails to particularly point out and distinctly claim the subject matter that the inventor regards as the invention.

Claim 15 and its asserted dependent claims 17-20 are invalid for lack of definiteness due to the limitation "selected data." It is unclear as to how data is selected, what data is selected, and/or what component selects data. As a result, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claims 15 and 17-20 as to the phase "selected data."

Claim 19 is invalid regarding the limitation "the selected one of the plurality of inputs" for lack of antecedent bases. Accordingly, claim 19 fails to particularly point out and distinctly claim the subject matter that the inventor regards as the invention.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. See 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the

knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[28]

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid regarding the term "inputs" for lack of written description. In connection with this term, the specification only describes "vertex data" and "pixel data." *See, e.g.*, '871 Patent at 3:61-65. Therefore, to the extent AMD improperly attempts to construe the term "inputs" to cover content other than "vertex data" or "pixel data," these claims are not adequately described as the specification fails to support such a scope. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010).

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid for lack of written description and/or enablement with respect to the limitation "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." The specification does not provide any description for the arbiter circuit as recited in claim 1. Furthermore, the phrase "control signal" in claim 1 is not supported by the teaching set forth in the specification of the '871 patent or the usage of this phrase in the relevant art. For example, the specification states "[a] control signal generated

[28] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

by an arbiter 64 is transmitted to the multiplexer 66 on line 63." *See, e.g.*, '871 Patent at 3:65-66. Claim 1 inconsistently requires that the arbiter circuit passively receives or responds to a control signal. Therefore, the specification fails to provide a written description of the arbiter circuit as recited in claim 1 or teach a person of ordinary skill how to make or use the arbiter circuit. Thus, claims 1, 3, 6, 8-11, and 13 are invalid for lack of enablement and written description.

Claim 9 is invalid for lack of written description and/or enablement with respect to the limitations "further including a selection circuit" and "the control signal is provided by an arbiter." Claim 1, from which claim 9 depends, recites "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." The specification fails to support or teach how the three recited components (*i.e.*, the arbiter circuit, the selector circuit and the arbiter) relate to one another or function together. Moreover, to the extent that AMD alleges that the arbiter is part of the arbiter circuit or vice versa, the specification fails to support or teach how both the arbiter and the arbiter circuit can "select[] one of a plurality of inputs in response to a control signal" and provide "the control signal." Therefore, the specification fails to support the three recited components or teach a person of ordinary skill how to make or use the three recited components. Thus, claim 9 is invalid for lack of enablement and written description.

Claim 15 and its asserted dependent claims 17-20 are invalid for lack of written description and/or enablement with respect to the limitation "the sequencer maintaining instructions operative to cause the processor unit to execute vertex calculation and pixel calculation operations on selected data maintained in the general purpose register block." The specification only describes "vertex manipulation instructions" operative to cause the processor unit to execute vertex calculation operations on vertex data and "pixel manipulation instructions" operative to cause the processor unit to execute vertex calculation operations on pixel data. *See, e.g.*, '871 Patent at 5:1-34. However, claim 15 requires instructions each of which is operative to cause the processor unit to execute both vertex calculation and pixel calculation operations on selected data. Therefore, the specification fails to support the recited sequencer or teach a person of ordinary skill how to make or use the

recited sequencer. Thus, claims 15 and 17-20 are invalid for lack of enablement and written description.

Claim 15 and its asserted dependent claims 17-20 are invalid for lack of written description with respect to the limitation "selected data maintained in the general purpose register block." Claim 15 does not require an arbiter circuit. However, the specification only describes an embodiment using an arbitration scheme in selecting data. *See, e.g.*, '871 Patent at 3:60-4:8. As a result, after reading the specification, a person of skill in the art would not understand how the claimed unified shader selects data generically and would not understand that the claimed unified shader is intended to select data except by using an arbitration scheme. *See, e.g., ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-78 (Fed. Cir. 2009) (citing *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336 (Fed. Cir. 2005)). Therefore, claim 15 is not adequately described and thus invalid under § 112, ¶ 1.

Claim 20 is invalid for lack of written description and/or enablement with respect to the limitation "the processor unit executes vertex calculations while the pixel calculations are still in progress." The specification only describes "if the general purpose register block 92 does not have enough available space therein to store the incoming vertex data, such information will not be transmitted . . . In this manner, any pixel calculation operations that are to be, or are currently being, performed by the processor 96 are continued . . . until enough registers within the general purpose register block 92 become available." '871 Patent at 5:23-32. However, claim 20 requires the processor unit to simultaneously perform both pixel and vertex calculations. Therefore, the specification fails to support the unified shader as recited in the claim 20 or teach a person of ordinary skill how to make or use the unified shader as recited in the claim 20. Thus, claim 20 is invalid for lack of enablement and written description.

(c) Improper Means-Plus-Function Limitations under 35 U.S.C. § 112, Second and Sixth Paragraphs

Means-plus-function claim limitations "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112

¶ 6. An inadequate disclosure of a structure corresponding to the claimed function constitutes a violation of both paragraphs 2 and 6 of Section 112. *In Re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) (en banc) ("If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112."). Therefore, if a claim includes a means-plus-function limitation, failure to disclose adequate structure corresponding to the claimed function results in the claim being invalid for indefiniteness. *In re Dossel*, 115 F.3d 942, 946 (Fed. Cir. 1997).

Whether the patent adequately sets forth structure corresponding to the function is ascertained from the perspective of a skilled artisan. *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357, 1365-66 (Fed. Cir. 2003). But the question is not whether a skilled artisan would be capable of implementing a structure to perform the function, but whether that person would understand the written description to disclose such a structure. *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007).

A structure disclosed in the specification qualifies as "corresponding" only if the specification or prosecution history "clearly links or associates" that structure to the function recited in the claim. *Asyst Technologies, Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370 (Fed. Cir. 2001) (internal citation omitted). Furthermore, the corresponding structure "must actually perform the recited function, not merely enable the pertinent structure to operate as intended." *Id*. at 1371.

In a means-plus-function claim "in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999); *see also id.* at 1348 ("The structure of a microprocessor programmed to carry out an algorithm is limited by the disclosed algorithm."). To prevent a patentee from purely claiming functions by using generic structures like computers or processors, the Federal Circuit has "consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor." *Aristocrat Techs. Australia Pty. Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333

(Fed. Cir. 2008) (affirming summary judgment of indefiniteness for failing to disclose adequate algorithm).

Claim 1 and its asserted dependent claims 3, 6, 8-11, and 13 are invalid under 35 U.S.C. § 112, ¶¶ 2 and 6 at least for failure to describe adequate structure, material, or acts in the specification corresponding to the recited "means for performing vertex operations and pixel operations." The specification describes a general purpose processor (*i.e.*, CPU 96) as the corresponding structure to the recited function. *See, e.g.*, '871 Patent, 4:9-14; 4:21-23; 5:21-29. The specification, however, fails to disclose any algorithm for that processor to carry out. Accordingly, claim 1, 3, 6, 8-11, and 13 are invalid for failing to disclose adequate structure corresponding to the recited function under 35 U.S.C. § 112, ¶¶ 2 and 6.

D. U.S. Patent No. 7,327,369

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '369 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '369 patent.

The following prior art, as well as the "References Cited" on the face of the '369 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '369 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '369 patent: References produced with Bates Range LG_AMD_PA_0005798 - LG_AMD_PA_0029640 and LG_AMD_PA_0046646 - LG_AMD_PA_0046721.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '369 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[29] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
7,015,913	United States	March 21, 2006	D-01
7,038,685	United States	May 2, 2006	D-02
7,233,335	United States	June 19, 2007	D-03
5,808,690	United States	September 15, 1998	D-05
7,363,472	United States	April 22, 2008	D-08
6,954,204	United States	October 11, 2005	D-11
7,081,895	United States	July 25, 2006	D-12
5,968,167	United States	October 19, 1999	D-13
6,630,935	United States	October 7, 2003	
7,321,369	United States	January 22, 2008	
7,673,304	United States	March 2, 2010	
6,105,127	United States	August 15, 2000	
6,731,289	United States	May 4, 2004	
6,650,327	United States	November 18, 2003	
6,208,361	United States	March 27, 2001	
6,717,599	United States	April 6, 2004	
6,573,900	United States	June 3, 2003	
6,825,843	United States	November 30, 2002	
WO9919805	World Intellectual Property Organization	April 22, 1999	
5,333,296	United States	July 26, 1994	
6,535,905	United States	March 18, 2003	
6,728,862	United States	April 27, 2004	

[29] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

6,239,810	United States	May 29, 2001	

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Polygon Rendering on a Stream Architecture	2000	Owens et al.	D-04
Polygon Rendering for Interactive Visualization on Multicomputers	1996	Ellsworth	D-06
Parallel Polygon Rendering for Message-Passing Architectures	1994	Crockett et al.	D-07
A Graphics System Architecture for Interactive Application-Specific Display Functions	1986	England	D-09
Graphics-Intensive Applications Get a Boost, Application Acceleration: Development of the TAAC-1	1988	England	D-10
Computer Graphics on a Stream Architecture	November 2002	Owens	D-14
Introduction to Multithreading, Superthreading and Hyperthreading	October 2, 2002	Stokes	
the OpenGL Graphics System: A Specification, Version 1.4	July 24, 2002	Silicon Graphics	

Olano, SGI OpenGL Shader, SIGGRAPH 2002	2002	SIGGRAPH 2002	
Boyd, Chapter 5: DirectX, SIGGRAPH 2002	2002	SIGGRAPH 2002	
Weber et al., Exploring the Benefits of Multiple Hardware Contexts in a Multiprocessor Architecture: Preliminary Results, 1989 ACM	1989	Weber et al.	
Rost, Course 17: State-of-the-Art in Hardware Rendering, The OpenGL Shading Language, SIGGRAPH 2002	2002	SIGGRAPH 2002	
Randi Rost, Course 17: State-of-the-Art in Hardware Rendering, Chapter 6: The OpenGL Shading Language, Course Notes	August 5, 2002	SIGGRAPH 2002	
Microsoft DirectX 8.1 (C++), Programmers Guide	June 17, 2002	Microsoft	
Hirata et al., An Elementary Processor Architecture with Simultaneous Instruction Issuing from Multiple Threads, ACM & IEEE-CS	May 1992	Hirata et al.	
McCool, SMASH: A Next-Generation API for Programmable Graphics Accelerators, Uni. of Waterloo, April 20, 2001	April 20, 2001	McCool	

i860 MICROPROCESSOR FAMILY PROGRAMMER'S REFERENCE MANUAL	1991	Intel	
i860 64-BIT MICROPROCESSOR HARDWARE DESIGN GUIDE	February 1989	Intel	
Bajaj et al., Parallel Multi-PC Volume Rendering System, Uni. of Texas at Austin		Bajaj et al.	
McConnell, Massively Parallel Computing on the Fuzion Chip, August 25, 1999	1999	McConnell	
Meißner et al., Parallel volume rendering on a single-chip SIMD architecture, IEEE 2001	2001	Meißner et al.	
Rixner et al., A Bandwidth-Efficient Architecture for Media Processing, Micro-31, 1998	1998	Rixner et al.	
Rixner, Stream Processor Architecture, Rice Uni., August 1, 2001	August 1, 2001	Rixner	
Kapasi, Stream Scheduling, Micro-34, December 2, 2001	December 2, 2001	Kapasi	
Khailany et al., Imagine: Media Processing with Streams, 2001 IEEE	2001	Khailany et al.	
Rixner, A Bandwidth-efficient Architecture for a streaming	April 24, 2001	Rixner	

Media Processor, MIT 2001			
Mattson, A programming System for the Imagine Media Processor, Stanford Uni. 2002	2002	Mattson	
Tullsen et al., Simultaneous Multithreading: Maximizing On-Chip Parallelism, 1995 ACM	1995	Tullsen et al.	
Ungerer et al., Multithreaded Processors, British Computer Society 2002	2002	Ungerer et al.	
Eggers et al., Simultaneous Multithreading: A Platform for Next-Generation Processors, 1997 IEEE Micro	1997	Eggers et al.	
Patel et al., Architectural Features of the i860™ - Microprocessor RISC Core and On-Chip Caches, 1989 IEEE	1989	Patel et al.	
Kohn et al., Introducing the Intel i860 64-Bit Microprocessor, 1989 IEEE	1989	Kohn et al.	
Grimes et al., 64-Bit Processor The Intel i860 64-Bit Processor: A General-Purpose CPU with 3D Graphics Capabilities, 1989 IEEE	1989	Grimes et al.	

(c) Prior Art Systems

The asserted claims of the '369 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
Imagine Stream Processor	2000	Stanford University	D-04
Fuzion 1 Chip	1999	ClearSpeed	D-08
i860 Microprocessor	1989	Intel	D-06 and C-07

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the Imagine Stream Processor was publicly used or known, on sale or offered for sale in or before 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Owens et al., *Polygon Rendering on a Stream Architecture*, ACM 2000 ("Owens") at 25. On information and belief, the Imagination Stream Processor included, among other things, the invention embodied in Owens. Accordingly, LG's contentions with regard to the Imagine Stream Processor are set forth in the claim chart(s) associated with Owens.

On information and belief, the Fuzion 1 chip was publicly used or known, on sale or offered for sale in or before 1999 and is thus prior art under at least 35 U.S.C. § 102(b). On information and belief, the Fuzion 1 chip included, among other things, the invention embodied in U.S. Patent No. 7,363,472 to Stuttard et al. ("Stuttard"). *See, e.g.*, Stuttard; McConnell, *Massively Parallel Computing on the Fuzion Chip*, August 25, 1999 at 3-4. Accordingly, LG's contentions with regard to the Fuzion 1 chip are set forth in the claim chart(s) associated with U.S. Patent No. 7,363,472.

On information and belief, the i860 Microprocessor was publicly used or known, on sale or offered for sale in or before 1989 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Intel, *i860 64-BIT MICROPROCESSOR HARDWARE DESIGN GUIDE*, February 1989. On information and belief, the i860 Microprocessor included, among other things, the invention embodied in Ellsworth, *Polygon Rendering for Interactive Visualization on Multicomputers*, the University of North Carolina at Chapel Hill, 1996 ("Ellsworth") and/or Crockett et al., *Parallel Polygon Rendering for Message-Passing Architectures*, IEEE Parallel & Distributed Technology, 1994 ("Crockett"). *See, e.g.*, Ellsworth at 9-10; Crockett at 22. Accordingly, LG's contentions with regard to the i860 Microprocessor are set forth in the claim charts associated with Ellsworth and Crockett.

The alleged invention of the asserted claims was conceived and diligently reduced to practice in this country at least as early as 2001 by John Eric Lindholm, Rui M. Bastos, and/or Harold Robert Feldman Zatz of Nvidia Corporation. Upon information and belief, the prior invention is embodied in U.S. Patent Nos. 7,038,685 and 7,015,913. Accordingly, LG's contentions under 35 U.S.C. § 102(g) are set forth in the claim chart(s) associated with U.S. Patent Nos. 7,038,685 and 7,015,913.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '369 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits D-1 thru D-14 (collectively "Appendix D") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix D provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '369 patent. For

each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix D, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix D should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix D that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '369 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '369 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '369 patent, its foreign counterparts, or any parent or child patent of the '369 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix D.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix D the prior art references that render obvious the asserted claims of the ‘369 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references

described in Appendix D, such reference may be combined with any other references listed in Appendix D for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the '369 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the '369 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be

obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution

encompassed by the asserted claims of the ’369 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix D in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix D all generally relate to graphics processing devices or similar data processing devices employing a parallel processing technique to address calculations of large amounts of data. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix D because at the time of the alleged invention market demands required graphics processor architectures to be capable of rapidly processing graphics data such as complex scenes or 3D imagery, which involved calculations of massive amounts of data. A typical problem was that certain stages in the processing pipeline were bottlenecked, which caused execution latency and load-imbalance and thereby slowed the entire process. At the time of the alleged invention, various areas of data processing, including graphics processing, had adopted multithreading and multitasking to improve execution efficiency and resolve load-inbalance. *See, e.g.*, Stokes, *Introduction to Multithreading, Superthreading and Hyperthreading*, October 2, 2002 (“Stokes”),

at 4-6; Stuttard[30] at 5:20-64. Thus, to resolve these issues, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix D in order to change the design of graphics processors to reduce the bottlenecking in the processing pipeline and thereby increase the overall processing speed. For example, a person of ordinary skill in the art would have known and been motivated to reference the teaching of other data processing areas that had adopted parallel processing techniques such as multithreading and multitasking as disclosed in one or more of the references.

Furthermore, at the time of the alleged invention, the graphics technology community was well aware of advantages in using processors capable of performing both pixel and vertex operations. *See* Ellsworth, *Polygon Rendering for Interactive Visualization on Multicomputers*, Uni. of North Carolina at Chapel Hill, 1996 ("Ellsworth"), at 43 (comparing processors dedicated to pixel or vertex operations and processors performing both operations and preferring the second design because "[k]eeping the processors all in one group means that changes in the amount of geometry processing relative to the amount of rasterization will not cause a load imbalance, which would be the case if the tasks were handled by separate groups of processors"); Crockett et al., *Parallel Polygon Rendering for Message-Passing Architectures*, IEEE Parallel & Distributed Technology, 1994 ("Crockett"), at 17 ("Unlike earlier approaches, ours multiplexes the transformation and rasterization phases on the same processors"). Thus, to design a graphics processor that resolves execution latency or load-imbalance, one of ordinary skill in the art would have been motivated to adopt processors that perform, among others, pixel and vertex operations. Given that the references in Appendix D have common design features, such as using processors that perform multiple types of operations, or applying an arbitration scheme for distributing workload across processors, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a graphics processor that has an arbiter circuit and a shader performing both pixel and vertex operations as taught by one or more of the references. *See, e.g.*, Ellsworth; Crockett.

[30] U.S. Patent No. 7,363,472 ("Stuttard").

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix D, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '369 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '369 patent, or that any of the claims of the '369 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014)

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '369 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim

elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[31]

Claim 1 and its asserted dependent claim 2 are invalid for lack of definiteness due to the limitation "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." In particular, the phrase "control signal" in claim 1 is inconsistent with the teaching set forth in the specification of the '369 patent. In addition, the usage of the phrase in the context of the claim is inconsistent with the usage of this phrase in the relevant art where a control signal relates to an arbiter circuit. For example, the specification states "[a] control signal generated by an arbiter 64 is transmitted to the multiplexer 66 on line 63." *See, e.g.*, '369 Patent at 4:4-5. Claim 1 inconsistently requires that the arbiter circuit passively receives or responds to a control signal. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claims 1 and 2 as to the phrase "control signal."

Claim 1 and its asserted dependent claim 2 are invalid for lack of definiteness due to the limitations "performing one of the vertex operations or pixel operations based on the selected one of the plurality of inputs" and "provides a appearance attribute." A claim does not meet the requirements of 35 U.S.C. § 112, second paragraph, and is therefore invalid for indefiniteness, when it "recit[es] both an apparatus and a method of using that apparatus. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005) (citing *ex parte Lyell*, 17 U.S.P.Q.2d 1548 (B.P.A.I. 1990)). Claim 1 is clearly directed to an apparatus (*i.e.*, a graphics processor), but claim 1 recites method steps of "performing one of the vertex operations or pixel operations based on the selected one of the plurality of inputs" and "provides a appearance attribute." Therefore, claims 1 and 2 are invalid as indefinite.

Claim 1 and its asserted dependent claim 2 are invalid for lack of definiteness due to the limitation "provides a appearance attribute." It is unclear as to i) how the shader provides an

[31] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

appearance attribute and ii) how providing an appearance attribute relates to the other claim limitations. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claim 1 and 2 as to the limitation "provides a appearance attribute."

Claim 2 is invalid for lack of definiteness due to the limitation "the appearance attribute is position." Because claim 1, from which claim 2 depends, already recites "the appearance attribute is color," it is unclear what appearance attribute is referenced in claim 2 or how the appearance attribute can be position and color. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claim 2 as to this limitation.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. See 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[32]

Claim 1 and its asserted dependent claim 2 are invalid regarding the term "inputs" for lack of written description. In connection with this term, the specification only describes "vertex data" and "pixel data." *See, e.g.*, '369 Patent at 3:66-4:4. Therefore, to the extent AMD improperly attempts to construe the term "inputs" to cover content other than "vertex data" or "pixel data," these claims are not adequately described as the specification fails to support such a scope. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*,

[32] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010).

Claim 1 and its asserted dependent claim 2 are invalid for lack of written description and/or enablement with respect to the limitation "an arbiter circuit for selecting one of a plurality of inputs in response to a control signal." The specification does not provide any description for the arbiter circuit as recited in claim 1. Furthermore, the phrase "control signal" in claim 1 is not supported by the teaching set forth in the specification of the '369 patent or the usage of this phrase in the relevant art. For example, the specification states "[a] control signal generated by an arbiter 64 is transmitted to the multiplexer 66 on line 63." *See, e.g.*, '369 Patent at 4:4-5. Claim 1 inconsistently requires that the arbiter circuit passively receives or responds to a control signal. Therefore, the specification fails to provide a written description of the arbiter circuit as recited in claim 1 or teach a person of ordinary skill how to make or use the arbiter circuit. Thus, claims 1 and 2 are invalid for lack of enablement and written description.

(c) Improper Means-Plus-Function Limitations under 35 U.S.C. § 112, Second and Sixth Paragraph

Means-plus-function claim limitations "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 ¶ 6. An inadequate disclosure of a structure corresponding to the claimed function constitutes a violation of both paragraphs 2 and 6 of Section 112. *In Re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) (en banc) ("If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112."). Therefore, if a claim includes a means-plus-function limitation, failure to disclose adequate structure corresponding to the claimed function results in the claim being invalid for indefiniteness. *In re Dossel*, 115 F.3d 942, 946 (Fed. Cir. 1997).

Whether the patent adequately sets forth structure corresponding to the function is ascertained from the perspective of a skilled artisan. *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357,

1365-66 (Fed. Cir. 2003). But the question is not whether a skilled artisan would be capable of implementing a structure to perform the function, but whether that person would understand the written description to disclose such a structure. *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007).

A structure disclosed in the specification qualifies as "corresponding" only if the specification or prosecution history "clearly links or associates" that structure to the function recited in the claim. *Asyst Technologies, Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370 (Fed. Cir. 2001) (internal citation omitted). Furthermore, the corresponding structure "must actually perform the recited function, not merely enable the pertinent structure to operate as intended." *Id*. at 1371.

In a means-plus-function claim "in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999); *see also id.* at 1348 ("The structure of a microprocessor programmed to carry out an algorithm is limited by the disclosed algorithm."). To prevent a patentee from purely claiming functions by using generic structures like computers or processors, the Federal Circuit has "consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor." *Aristocrat Techs. Australia Pty. Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008) (affirming summary judgment of indefiniteness for failing to disclose adequate algorithm).

Claim 1 and its asserted dependent claim 2 are invalid under 35 U.S.C. § 112 ¶¶ 2 and 6 at least for failure to describe adequate structure, material, or acts in the specification corresponding to the recited "means for performing vertex operations and pixel operations." The specification describes a general purpose processor (*i.e.*, CPU 96) as the corresponding structure to the recited function. *See, e.g.*, '369 Patent, 4:15-20; 4:27-29; 5:26-38. The specification, however, fails to disclose any algorithm for that processor to carry out. Accordingly, claims 1 and 2 are invalid for

failing to disclose adequate structure corresponding to the recited function under 35 U.S.C. § 112, ¶¶ 2 and 6.

E. U.S. Patent No. 7,742,053

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '053 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '053 patent.

The following prior art, as well as the "References Cited" on the face of the '053 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '053 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '053 patent: References produced with Bates Range LG_AMD_PA_0005798 - LG_AMD_PA_0029640 and LG_AMD_PA_0046646 - LG_AMD_PA_0046721.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '053 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[33] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

[33]Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
7,015,913	United States	March 21, 2006	E-01
7,038,685	United States	May 2, 2006	E-02
7,233,335	United States	June 19, 2007	E-03
6,630,935	United States	October 7, 2003	E-04
6,239,810	United States	May 29, 2001	E-06
6,545,683	United States	April 8, 2003	E-07
The Admitted Prior Art of the '053 patent	United States	June 22, 2010	E-08
7,321,369	United States	January 22, 2008	E-09
7,673,304	United States	March 2, 2010	E-10
5,968,167	United States	October 19, 1999	E-11
6,105,127	United States	August 15, 2000	E-13
7,363,472	United States	April 22, 2008	E-14
5,808,690	United States	September 15, 1998	E-15
6,731,289	United States	May 4, 2004	
6,650,327	United States	November 18, 2003	
6,208,361	United States	March 27, 2001	
6,717,599	United States	April 6, 2004	
6,954,204	United States	November 30, 2004	
7,081,895	United States	July 25, 2006	

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Polygon Rendering on a Stream Architecture	2000	Owens et al.	E-05
Introduction to Multithreading, Superthreading and Hyperthreading	October 2, 2002	Stokes	E-12
Computer Graphics on a Stream Architecture	November 2002	Owens	E-16

in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

the OpenGL Graphics System: A Specification, Version 1.4	July 24, 2002	Silicon Graphics	
Olano, SGI OpenGL Shader, SIGGRAPH 2002	2002	Olano	
Boyd, Chapter 5: DirectX, SIGGRAPH 2002	2002	Boyd	
Ellsworth, Polygon Rendering for Interactive Visualization on Multicomputers, the University of North Carolina at Chapel Hill, 1996	1996	Ellsworth	
Crockett et al., Parallel Polygon Rendering for Message-Passing Architectures, IEEE Parallel & Distributed Technology, 1999	1994	Crockett et al.	
England et al., A Graphics System Architecture for Interactive Application-Specific Display Functions, IEEE CG&A 1986	1986	England et al.	
England, Graphics-Intensive Applications Get a Boost, Application Acceleration: Development of the TAAC-1, Sun Technology 1988	1988	England	
Rost, Course 17: State-of-the-Art in Hardware Rendering, The OpenGL Shading	2002	Rost	

Language, SIGGRAPH 2002			
Randi Rost, Course 17: State-of-the-Art in Hardware Rendering, Chapter 6: The OpenGL Shading Language, Course Notes, SIGGRAPH 2002	August 5, 2002	Rost	
Microsoft DirectX 8.1 (C++), Programmers Guide	June 17, 2002	Microsoft	
i860 MICROPROCESSOR FAMILY PROGRAMMER'S REFERENCE MANUAL	1991	Intel	
i860 64-BIT MICROPROCESSOR HARDWARE DESIGN GUIDE	February 1989	Intel	
Bajaj et al., Parallel Multi-PC Volume Rendering System, Uni. of Texas at Austin		Bajaj et al.	
McConnell, Massively Parallel Computing on the Fuzion Chip, August 25, 1999	1999	McConnell	
Meißner et al., Parallel volume rendering on a single-chip SIMD architecture, IEEE 2001	2001	Meißner et al.	
Rixner et al., A Bandwidth-Efficient Architecture for Media Processing, Micro-31, 1998	1998	Rixner et al.	
Rixner, Stream Processor	August 1, 2001	Rixner	

Architecture, Rice Uni., August 1, 2001			
Kapasi, Stream Scheduling, Micro-34, December 2, 2001	December 2, 2001	Kapasi	
Khailany et al., Imagine: Media Processing with Streams, 2001 IEEE	2001	Khailany et al.	
Rixner, A Bandwidth-efficient Architecture for a streaming Media Processor, MIT 2001	April 24, 2001	Rixner	
Mattson, A programming System for the Imagine Media Processor, Stanford Uni. 2002	2002	Mattson	
Tullsen et al., Simultaneous Multithreading: Maximizing On-Chip Parallelism, 1995 ACM	1995	Tullsen et al.	
Ungerer et al., Multithreaded Processors, British Computer Society 2002	2002	Ungerer et al.	
Eggers et al., Simultaneous Multithreading: A Platform for Next-Generation Processors, 1997 IEEE Micro	1997	Eggers et al.	
McCool, SMASH: A Next-Generation API for Programmable Graphics Accelerators, Uni. of Waterloo, April 20, 2001	April 20, 2001	McCool	

Patel et al., Architectural Features of the i860™ - Microprocessor RISC Core and On-Chip Caches, 1989 IEEE	1989	Patel et al.	
Kohn et al., Introducing the Intel i860 64-Bit Microprocessor, 1989 IEEE	1989	Kohn et al.	
Grimes et al., 64-Bit Processor The Intel i860 64-Bit Processor: A General-Purpose CPU with 3D Graphics Capabilities, 1989 IEEE	1989	Grimes et al.	

(c) Prior Art Systems

The asserted claims of the '053 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
Imagine Stream Processor	2000	Stanford University	E-05
Fuzion 1 Chip	1999	ClearSpeed	E-14

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the Imagine Stream Processor was publicly used or known, on sale or offered for sale in or before 2000 and is thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, Owens et al., *Polygon Rendering on a Stream Architecture*, ACM 2000 ("Owens") at 25. On information and belief, the Imagination Stream Processor included, among other things, the invention embodied in Owens. Accordingly, LG's contentions with regard to the Imagine Stream Processor are set forth in the claim chart(s) associated with Owens.

On information and belief, the Fuzion 1 chip was publicly used or known, on sale or offered for sale in or before 1999 and is thus prior art under at least 35 U.S.C. § 102(b). On information and belief, the Fuzion 1 chip included, among other things, the invention embodied in U.S. Patent No. 7,363,472 to Stuttard et al. ("Stuttard"). *See, e.g.*, Stuttard; McConnell, *Massively Parallel Computing on the Fuzion Chip*, August 25, 1999 at 3-4. Accordingly, LG's contentions with regard to the Fuzion 1 chip are set forth in the claim chart(s) associated with U.S. Patent No. 7,363,472.

The alleged invention of the asserted claims was conceived and diligently reduced to practice in this country at least as early as 2001 by John Eric Lindholm, Rui M. Bastos, and/or Harold Robert Feldman Zatz of Nvidia Corporation. Upon information and belief, the prior invention is embodied in U.S. Patent Nos. 7,038,685 and 7,015,913. Accordingly, LG's contentions under 35 U.S.C. § 102(g) are set forth in the claim chart(s) associated with U.S. Patent Nos. 7,038,685 and 7,015,913.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '053 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits E-1 thru E-16 (collectively "Appendix E") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix E provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the ’053 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix E, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG’s reference to a particular circuitry, software program, device or product in the claim charts of Appendix E should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix E that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the ’053 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the ’053 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the ’053 patent, its foreign counterparts, or any parent or child patent of the ’053 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence

that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix E.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix E the prior art references that render obvious the asserted claims of the ’053 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover,

to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix E, such reference may be combined with any other references listed in Appendix E for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the '053 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the '053 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the

principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in

the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the '053 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix E in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix E all generally relate to multithreaded graphics processors or similar data processing devices employing a multithreaded processor. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix E because at the time of the alleged invention, various areas of data processing, including graphics processing, had adopted multithreaded processors to improve execution efficiency and reduce wasted processing cycles in executing different programs. *See, e.g.*, Stokes, *Introduction to Multithreading, Superthreading and Hyperthreading*, October 2, 2002 ("Stokes"), at 4-6; Stuttard[34] at 5:20-64. Furthermore, at the time of the alleged invention, it was well known that typical graphics processors were required to process pixel and vertex command threads. *See*,

[34] U.S. Patent No. 7,363,472 ("Stuttard").

e.g., the OpenGL Graphics System: A Specification, Version 1.4, July 24, 2002 ("OpenGL"), at 10-11 (explaining typical graphics processing architectures receive and process commands for vertex operations and commands for pixel operations); the background of the '053 patent ("In a typical graphics processing system, the processing elements, such as vertices and/or pixels, are processed . . . .").

Therefore, in designing a multithreaded graphics processor that receives and processes vertex and pixel command threads, one of ordinary skill in the art would have been motivated to find a solution that would store and arbitrate such command threads. Given that the references in Appendix E have common design features, such as using multithreaded processors, using an arbitration scheme for context switches (*e.g.*, switching between vertex and pixel command threads), or using a memory storing command threads, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a graphics processor that can store and arbitrate vertex and pixel command threads for processing as taught by one or more of the references.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix E, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '053 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '053 patent, or that any of the claims of the '053 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at

issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014)

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '369 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[35]

Claim 1 and its asserted dependent claim 2 are invalid for lack of definiteness due to the limitation "relative priorities of the plurality of pixel command threads and the plurality of vertex command threads." The meaning of the term "relative priorities" is unclear because the specification does not provide any description for that term. Therefore, a person of ordinary skill in the art would be unable to understand, with reasonable certainty, the bounds of claims 1 and 2 as to the limitation "relative priorities of the plurality of pixel command threads and the plurality of vertex command threads."

[35] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. See 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the

knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[36]

Claim 1 and its asserted dependent claim 2 are invalid for lack of written description in connection with the limitation "select . . . based on relative priorities of the plurality of pixel command threads and the plurality of vertex command threads." The specification only describes an arbiter that bases its selection of a command thread on "specific commands" that have been executed or are to be executed within that command thread. *See, e.g.*, '053 Patent at 3:29-35. Therefore, to the extent AMD improperly attempts to construe "select . . . based on relative priorities" to cover priority schemes that are based on considerations other than specific commands, claims 1 and 2 are not adequately described as the specification fails to support such a scope. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010).

Claims 1 and 5 and their asserted dependent claims 2 and 6-7 are invalid for lack of written description in connection with the limitation "at least one memory device comprising a first portion operative to store a plurality of pixel command threads and a second portion operative to store a

[36] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

plurality of vertex command threads." The specification only describes a "pixel reservation station" (or a first reservation station) for storing pixel command threads and a "vertex reservation station" (or a second reservation station) for storing vertex command threads. *See, e.g.*, '053 Patent at 3:63-4:4. The '053 patent defines the term "reservation station" as "any type of memory device capable of reserving and storing command threads." '053 Patent at 3:63-4:4. However, because claims 1 and 5 require two portions of a memory operative to store pixel and vertex command threads, respectively, claims 1-2 and 5-7 are not adequately described as the specification fails to support such a scope. Thus, claims 1-2 and 5-7 are invalid for lack of written description.

Claim 2 does not comply with the enablement and written description requirements of 35 U.S.C. § 112, ¶ 1 and are, therefore, invalid. Claim 2 recites "the arbiter is further operable to provide the command thread to the command processing engine." The specification fails to teach a person of ordinary skill how to make and use a command processing engine that is capable of performing both vertex and pixel operations. Therefore, to the extent AMD improperly attempts to construe "the arbiter is further operable to provide the command thread to the command processing engine" to require the command processing engine to perform both vertex and pixel operations, claim 2 does not comply with the enablement requirement and is invalid.

Similarly, claim 5 and its asserted dependent claims 6-7 do not comply with the enablement and written description requirements of 35 U.S.C. § 112, ¶ 1 and are, therefore, invalid. Claim 5 recites "each [command processing engine] operative to receive and process the command thread." The specification only describes a manner in which a command thread is switched between two command processing engines, and fails to teach a person of ordinary skill how to make and use a command processing engine that is capable of performing both vertex and pixel operations. *See, e.g.*, '053 Patent at 4:28-47. Therefore, to the extent AMD improperly attempts to construe "each [command processing engine] operative to receive and process the command thread" to require each engine to perform both vertex and pixel operations, these claims do not comply with the enablement and written description requirements and are invalid.

F. U.S. Patent No. 5,898,849

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '849 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '849 patent.

The following prior art, as well as the "References Cited" on the face of the '849 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '849 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '849 patent: References produced with Bates Range LG_AMD_PA_0029641 – LG_AMD_PA_0033335 and LG_AMD_PA_0046722 - LG_AMD_PA_0046726.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '849 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[37] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

[37] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
4,833,601	United States	May 23, 1989	F-01
5,592,679	United States	January 7, 1997	F-02
5,613,152	United States	March 18, 1997	F-03
5,696,985	United States	December 9, 1997	F-04
5,784,630	United States	July 21, 1998	F-05
5,828,895	United States	October 27, 1998	F-06
6,111,584	United States	August 29, 2000	F-07
0 594 240 A2	Europe	April 27, 1994 (date of publication)	F-03
0 594 240 B1	Europe	January 5, 2000 (issue date)	F-03

The disclosure in European Patent No. 0 594 240 A2 is substantially similar to the disclosure in European Patent Application Publication No. 0 594 240 B1, as well as U.S. Patent No. 5,613,152. Accordingly, LG's contentions with respect to European Patent Application Publication No. 0 594 240 B1 and U.S. Patent No. 5,613,152 are set forth in the claim chart associated with European Patent No. 0 594 240 A2.

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
A Split Data Cache for Superscalar Processors	October 1993	Rodney Boleyn et al., IEEE, Proceedings of 1993 IEEE International Conference on Computer Design: VLSI in Computers & Processors	F-08
Video DSP Architecture for MPEG2 CODEC	April 1994	T. Araki et al., IEEE, Proceedings of 1994 IEEE International Conference on Acoustics, Speech,	F-09

		and Signal Processing, Volume II	
The Nano Processor: a Low Resource Reconfigurable Processor	1994	Wirthlin et al.	F-10

(c) Prior Art Systems

The asserted claims of the ’849 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
4D/340 system	1992	Silicon Graphics, Inc. (now Silicon Graphics International Corp.)	
iPSC/860	1993	Intel Corporation	
BBN Butterfly E2000 multiprocessor	1993	BBN Technologies (now Raytheon Company)	
X2 sound card	1994	National Technologies Inc.	F-10
Video Digital Signal Processor version 2 (“VDSP2”)	1994	Matsushita Electric Industrial Co. (now Panasonic Corporation)	F-09
GLINT FX, GLINT 300 SX, GLINT 300 TX, GLINT 400 TX and PERMEDIA graphics processors	1995	3DLABS (now Intel Corporation)	F-07

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the X2 Sound Card was publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the X2 Sound Card included, among other things, the invention embodied in U.S. Patent No. 5,898,849. *See* Wazlowski, *A Reconfigurable Architecture Superscalar Coprocessor* (1992).

On information and belief, the Silicon Graphics 4D/340 system was publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the Silicon Graphics 4D/340 system included, among other things, the invention embodied in U.S. Patent No. 5,898,849. *See* Daniel Lenoski, et. aI., "The DASH Prototype: Implementation and Performance", Proc. 19th Int. Symp. on Computer Architecture.

On information and belief, the iPSC/860 was publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the iPSC/860 included, among other things, the invention embodied in U.S. Patent No. 5,898,849. *See* Crockett et al., *A MIMD Rendering Algorithm for Distributed Memory Architectures*, IEEE (1993).

On information and belief, the BBN Butterfly E2000 multiprocessor was publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the BBN Butterfly E2000 multiprocessor included, among other things, the invention embodied in U.S. Patent No. 5,898,849. *See* Whitman, *A Task Adaptive Parallel Graphics Renderer*, IEEE (1993).

On information and belief, Matsushita's Video Digital Signal Processor version 2 ("VDSP2") was publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the VDSP2 included, among other things, the invention embodied in U.S. Patent No. 5,898,849. See document A Task Adaptive Parallel Graphics Renderer. *See* Araki et al., IEEE, Proceedings of 1994 IEEE International Conference on Acoustics, Speech, and Signal Processing, Volume II.

On information and belief, the GLINT FX, GLINT 300 SX, GLINT 300 TX, GLINT 400 TX and PERMEDIA graphics processors were publicly used or known, on sale or offered for sale on or before April 4, 1997, and thus prior art under at least 35 U.S.C. § 102(a). On information and belief, the GLINT and PERMEDIA graphics processors included, among other things, the invention embodied in U.S. Patent No. 5,898,849. See U.S. Patent No. 6,111,584; PERMEDIA Testimonials, October 1995, available at http://www.thefreelibrary.com/PERMEDIA+ Testimonials+Oct+95.-a017424284.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '849 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits F-1 thru F-10 (collectively "Appendix F") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix F provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '849 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix F, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix F should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix F that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '849 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '849 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '849 patent, its foreign counterparts, or any parent or child patent of the '849 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely

upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix F.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix F the prior art references that render obvious the asserted claims of the ’849 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix F, such reference may be combined with any other references listed in Appendix F for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’849 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’849 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the ’849 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix F in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix F all generally relate to computer systems with multiple functional units coupled to local memory. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix F because at the time of the alleged invention market demands required computer systems with caches with faster access times and greater accuracy. *See, e.g.*, Rafael H. Saavedra & Alan Jay Smith, "Measuring Cache and TLB Performance and Their Effect on Benchmark Run Times," IEEE Transactions on Computers, Vol. 44, No. 10, October 1995, pp. 1223-1235, at 1223 ("The performance of a computer system is a function of the speed of the individual functional units, such as the integer, branch, floating-point units, caches, bus, memory system, I/O units, and of the workload presented to the system. . . . It is well known that caches are a critical component of any high performance computer system, and that access time to the cache and the associated misses are frequently the single factor most constraining performance."). There was also a trend toward designing systems with multiple caches and caches closer to the functional units that need to access them, thereby reducing access time and lowering miss rates. *See, e.g.*, Alan Jay Smith, "Cache Memory Design: An Evolving Art," IEEE Spectrum, Vol. 24, No. 12, December 1987, pp. 40-44, at 40 ("The success of a cache design can be evaluated quantitatively by two primary factors: • The probability of finding the needed information in the cache (making a hit) instead of having to go to main memory (a miss) . . . . • The mean time it takes to access the cache in a hit."); *id.* at 44 ("But there are advantages to splitting data and instructions into two separate caches. Conflicts between simultaneous instruction fetches and data reads and writes are eliminated, as is, consequently, arbitration time; and each cache can be placed near the CPU component that most often needs it,

which further reduces access time."). Thus, because of the market demands requiring computer systems with caches with faster access times and greater accuracy, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix F in order to design a system with multiple caches close to the functional units that need to access them. Given that the references in Appendix F have common design features, such as multiple functional units coupled to local memory, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a more efficient system.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix F, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '849 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '849 patent, or that any of the claims of the '849 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. *See* 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for

indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014).

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '849 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[38]

The Asserted Claims of the '849 patent are invalid for lack of definiteness due to either of the following phrases in asserted claim 1: "wherein said first functional unit, responsive to a first plurality of address operands specified by a first instruction, is configured to generate a first memory address corresponding to a first memory operand of said first instruction" and "wherein said second functional unit, responsive to a second plurality of address operands specified by a second instruction, is configured to generate a second memory address corresponding to a second memory operand of said second instruction." The '849 patent specification fails to describe what these phrases mean with the necessary degree of specificity for one of ordinary skill in the art to understand the scope of the invention.

The Asserted Claims of the '849 patent are also invalid for lack of definiteness due to the limitations in claim 1 directed to a first and a second "functional unit" and to a first and second "local cache." Although the '849 patent specification uses the terms "functional unit" and "local cache," the patent fails to describe the terms with the necessary degree of specifity for one of ordinary skill in the art to understand the scope of the invention. Moreover, the '849 patent fails to

[38] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

provide an objective standard by which one of ordinary skill in the art could determine the meaning of the "functional unit" and "local cache" terms.

Accordingly, asserted claim 1 is invalid for lack of definiteness. Because the lack of definiteness of claim 1 is not cured in any of the claims depending from claim 1, the asserted dependent claim 14 is similarly invalid for lack of definiteness.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. *See* 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed

subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[39]

The Asserted Claims of the '849 patent are invalid for lack of enablement and written description due to either of the following phrases in asserted claim 1: "wherein said first functional unit, responsive to a first plurality of address operands specified by a first instruction, is configured to generate a first memory address corresponding to a first memory operand of said first instruction" and "wherein said second functional unit, responsive to a second plurality of address operands specified by a second instruction, is configured to generate a second memory address corresponding to a second memory operand of said second instruction." The '849 patent lacks disclosure relating to these claim phrases and fails to teach a person of ordinary skill in the art how to make and use the alleged invention as claimed without undue experimentation. Also, the specification of the '849 patent does not clearly allow a person of ordinary skill in the art to recognize that the inventor invented what is claimed because the specification does not clearly explain these phrases.

[39] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

The Asserted Claims of the ’849 patent are also invalid for lack of enablement and written description due to the terms “functional unit” and “local cache” in asserted claim 1. The ’849 patent fails to teach a person of ordinary skill in the art how to make and use the full scope of the claimed invention without undue experimentation. Also, the specification of the ’849 patent does not clearly allow a person of ordinary skill in the art to recognize that the inventor had possession of the claimed invention as of the filing date of the application.

Moreover, the specification only describes “local cache” as being dedicated to a corresponding functional unit. *See, e.g.*, ’849 Patent at 3:11-14. Therefore, to the extent AMD improperly attempts to interpret the term “local cache” to cover anything other than a cache that is dedicated to a corresponding functional unit, the asserted claims are not adequately described as the specification fails to support such a scope. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010).

Accordingly, the asserted claim 1 and the asserted dependent claim 14 are invalid for lack of enablement and written description.

G. U.S. Patent No. 6,266,715

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the “References Cited” on the face of the ’715 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the ’715 patent.

The following prior art, as well as the "References Cited" on the face of the '715 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '715 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '715 patent: References produced with Bates Range LG_AMD_PA_0033336 – LG_AMD_PA_0042327.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '715 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

(a) Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[40] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
6,122,676	United States	September 19, 2000	G-01
6,185,641	United States	February 6, 2001	G-02

(b) Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
SL-11 USB Controller Technical	December 1996	ScanLogic Corporation (now	G-03

[40] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

Reference, Revision 1.1		Cypress Semiconductor Corporation)	
SL-11 USB Controller Technical Reference, Revision 1.11	January 1997	ScanLogic Corporation (now Cypress Semiconductor Corporation)	G-03
SL11-R-USB RISC Processor Product Information, Revision 1.0	August 1997	ScanLogic Corporation (now Cypress Semiconductor Corporation)	G-04
USS-620 USB Device Controller with DMA Bridge Advance Data Sheet, Revision 4	October 1997	Lucent Technologies (now Alcaltel-Lucent)	G-05
USBN9602 (Universal Serial Bus) Full Speed Function Controller with DMA Support	November 1997	National Semiconductor Corporation (now Texas Instruments)	G-06
USB97C100 Advance Information	February 11, 1998	Standard Microsystems Corporation (now Microchip Technology Inc.)	G-07
ST72671	March 1998	SGS-Thomson Microelectronics (now STMicroelectronics)	G-08
USBFC (USB Function Controller) EIFUFAL501 User's Manual	March 24, 1998	Seiko Epson Corporation	G-09
PowerPC MPC823 User's Manual	April 1998	Motorola, Inc. (now Freescale Semiconductor, Inc.)	G-10
Universal Serial Bus Specification, Revision 1.0	January 15, 1996	Compaq Computer Corporation, Digital Equipment Corporation, IBM PC Company, Intel Corporation, Microsoft	G-11

		Corporation, NEC, Northern Telecom	
Am186TMED/EDLV Microcontrollers User's Manual	1997	Advanced Micro Devices, Inc.	G-11
"8237/8237-2 High Performance Programmable DMA Controller," Component Data Catalog	January 1981	Intel Corporation	G-01 – G-11
SN54153, SN54LS153, SN54S153 SN74153, SN74LS153, SN74S153 Dual 4-Line to 1-Line Data Selectors/Multiplexers	March 1988	Texas Instruments	G-01 – G-11

(c) Prior Art Systems

The asserted claims of the '715 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
SL-11 USB Controller	At least as early as December 1996	ScanLogic Corporation (now Cypress Semiconductor Corporation)	G-03
SL11-R USB RISC Based Controller	At least as early as August 1997	ScanLogic Corporation (now Cypress Semiconductor Corporation)	G-04
USS-620 USB Device Controller with DMA Bridge	At least as early as November 7, 1996	Lucent Technologies (now Alcatel-Lucent)	G-05
USBN9602 (Universal Serial	At least as early as November 1997	National Semiconductor	G-06

Bus) Full Speed Function Controller with DMA Support		Corporation (now Texas Instruments)	
USB97C100 Multi-Endpoint USB Peripheral Controller	At least as early as November 1997	Standard Microsystems Corporation (now Microchip Technology Inc.)	G-07
ST72671	At least as early as March 1998	SGS-Thomson Microelectronics (now STMicroelectronics)	G-08
USBFC (USB Function Controller) EIFUFAL501	At least as early as March 24, 1998	Seiko Epson Corporation	G-09
MPC823 PowerPC Portable Systems Microprocessor	At least as early as 1996	Motorola, Inc. (now Freescale Semiconductor, Inc.)	G-10

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

On information and belief, the PowerPC MPC823 Microprocessor (and/or a product that incorporated or was used with the PowerPC MPC823) was publicly used or known, on sale, or offered for sale as early as, if not before, 1996. Similarly, on information and belief, the PowerPC MPC823 was conceived and diligently reduced to practice in this country by Motorola, Inc. at least as early as 1996. On information and belief, the PowerPC MPC823 that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the PowerPC MPC823 at that time embodied the technology described in "PowerPC MPC823 User's Manual." Accordingly, the PowerPC MPC823 is available as prior art under 35 U.S.C. §§ 102(a), (b), and (g), and LG's contentions with respect to the PowerPC MPC823 (and/or a product that incorporated or was used with the PowerPC MPC823) are set forth in the claim chart associated with "PowerPC MPC823 User's Manual."

On information and belief, the SL-11 USB Controller (and/or a product that incorporated or was used with the SL-11) was publicly used or known, on sale, or offered for sale as early as, if not before, December 1996. Similarly, on information and belief, the SL-11 USB Controller was conceived and diligently reduced to practice in this country by ScanLogic Corporation at least as early as December 1996. On information and belief, the SL-11 that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the SL-11 at that time embodied the technology described in "SL-11 USB Controller Technical Reference," Revisions 1.1 and 1.11. Accordingly, the SL-11 USB Controller is available as prior art under 35 U.S.C. §§ 102(a), (b), and (g), and LG's contentions with respect to the SL-11 USB Controller (and/or a product that incorporated or was used with the SL-11) are set forth in the claim chart associated with "SL-11 USB Controller Technical Reference," Revisions 1.1 and 1.11.

On information and belief, the SL11-R USB RISC Based Controller (and/or a product that incorporated or was used with the SL11-R) was publicly used or known, on sale, or offered for sale as early as, if not before, August 1997. Similarly, on information and belief, the SL11-R USB RISC Based Controller was conceived and diligently reduced to practice in this country by ScanLogic Corporation at least as early as August 1997. On information and belief, the SL11-R that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the SL11-R at that time embodied the technology described in "SL11-R-USB RISC Processor Product Information," Revision 1.0, and/or "SL11R Hardware Specification Technical Reference," Revision 1.20. Accordingly, the SL11-R USB RISC Based Controller is available as prior art under 35 U.S.C. §§ 102(a) and (g).

On information and belief, the USS-620 USB Device Controller with DMA Bridge (and/or a product that incorporated or was used with the USS-620) was publicly used or known, on sale, or offered for sale as early as, if not before, November 7, 1996. *See* "USB Products Keep Rollin," EDN Magazine, November 7, 1996. Similarly, on information and belief, the USS-620 was conceived and diligently reduced to practice in this country by Lucent Technologies at least as early

as November 7, 1996. On information and belief, the USS-620 that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the USS-620 at that time embodied the technology described in "USS-620 USB Device Controller with DMA Bridge Advance Data Sheet," Revision 4. Accordingly, the USS-620 is available as prior art under 35 U.S.C. §§ 102(a), (b), and (g).

On information and belief, the USB97C100 Multi-Endpoint USB Peripheral Controller (and/or a product that incorporated or was used with the USB97C100) was publicly used or known, on sale, or offered for sale as early as, if not before, November 1997. *See* "Standard Microsystems Corporation Reports Net Income from Continuing Operations for the Third Quarter of Fiscal 1998," Business Wire, Dec. 16, 1997. Similarly, on information and belief, the USB97C100 was conceived and diligently reduced to practice in this country by Standard Microsystems Corporation at least as early as November 1997. On information and belief, the USB97C100 that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the USB97C100 at that time embodied the technology disclosed in "USB97C100 Advance Information," Rev. 2/11/98. Accordingly, the USB97C100 is available as prior art under 35 U.S.C. §§ 102(a) and (g), and LG's contentions with respect to the USB97C100 Multi-Endpoint USB Peripheral Controller (and/or a product that incorporated or was used with the USB97C100) are set forth in the claim chart associated with "USB97C100 Advance Information," Rev. 2/11/98.

On information and belief, the ST72671 HCMOS microcontroller unit (and/or a product that incorporated or was used with the ST72671) was publicly used or known, on sale, or offered for sale as early as, if not before, March 1998. On information and belief, the ST72671 that was disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the ST72671 at that time embodied the technology described in "ST72671," Revision 1.1. Accordingly, the ST72671 is available as prior art under 35 U.S.C. § 102(a) and (g), and LG's contentions with respect to the ST72671 HCMOS microcontroller unit (and/or a product that

incorporated or was used with the ST72671) are set forth in the claim chart associated with "ST72671," Revision 1.1.

On information and belief, the USBFC (USB Function Controller) EIFUFAL501 (and/or a product that incorporated or was used with the EIFUFAL501) was publicly used or known, on sale, or offered for sale as early as, if not before, March 24, 1998. On information and belief, the EIFUFAL501 that was disclosed at that time embodied the invention claimed in the '715 patent. Additionally, on information and belief, the EIFUFAL501 at that time embodied the technology described in "USBFC (USB Function Controller) EIFUFAL501 User's Manual," dated March 24, 1998. Accordingly, the ST72671 is available as prior art at least under 35 U.S.C. § 102(a) and (g), and LG's contentions with respect to the USBFC EIFUFAL501 (and/or a product that incorporated or was used with the EIFUFAL501) are set forth in the claim chart associated with "USBFC (USB Function Controller) EIFUFAL501 User's Manual."

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '715 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits G-1 thru G-11 (collectively "Appendix G") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix G provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '715 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix G, LG further contends that the Asserted Claims

are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix G should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix G that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '715 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '715 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '715 patent, its foreign counterparts, or any parent or child patent of the '715 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other

material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix G.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

(a) Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix G the prior art references that render obvious the asserted claims of the ’715 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix G, such reference may be combined with any other references listed in Appendix G for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’715 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes

patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the '715 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

(b) Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re*

Inland Steel Co., 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the '715 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix G in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix G all generally relate to communications and data transfer between computer systems and peripheral devices, and more specifically to Universal Serial Bus (USB) technology and/or direct memory access (DMA). Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix G because at the time of the alleged invention there was a demand for, and a trend toward, designing systems that combined USB with DMA. For many years before the time of the alleged invention, DMA had been used to improve data transfer between peripheral devices and computer systems, and to free up system processors to perform other tasks. *See, e.g.*, Component Data Catalog, Intel Corporation, January 1981, at 6-91 (explaining that the 8237 DMA Controller is designed to improve system performance by allowing external devices to directly transfer information to or from the system memory"). When USB was developed, it would have been obvious to design systems with USB to use existing computer architectures, including DMA. And, in fact, as shown by the prior art cited in Appendix G, by the time of the alleged invention of the '715 patent, there was already a well-established trend of designing systems that combined USB with DMA. *See, e.g.*, Dunnihoo[41]; SL-11 USB Controller; SL11-R USB RISC Based Controller;

[41] U.S. Patent No. 6,185,641 ("Dunnihoo")

USS-620 USB Device Controller with DMA Bridge; USB97C100 Multi-Endpoint USB Peripheral Controller; USBN9602 (Universal Serial Bus) Full Speed Function Controller with DMA Support. Thus, because of this trend, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix G in order to design a system that could transfer data quickly and efficiently using USB and DMA. Given that the references in Appendix G have common design features, such as DMA and/or USB endpoints configured for DMA transfers, one of ordinary skill in the art would have been motivated to combine these references, with a reasonable expectation of success, to design a system with a USB controller that efficiently and dynamically transfers data via DMA channels.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix G, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '715 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '715 patent, or that any of the claims of the '715 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. *See* 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014).

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '715 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[42]

The Asserted Claims of the '715 patent are invalid for lack of definiteness due to the phrases "a plurality of DMA channels for performing data transfer between the USB device and a USB host" and "a plurality of DMA channels for performing data transfer between the USB host and a USB device" in asserted claims 1 and 13. The '715 patent fails to describe what these phrases mean with the necessary degree of specificity for one of ordinary skill in the art to understand the scope of the invention.

The Asserted Claims of the '715 patent are also invalid for lack of definiteness due to the phrase "a plurality of USB endpoints, each selectively programmed for one of the [or a] plurality of DMA channels during the DMA mode of the USB controller" in asserted claims 1, 13, and 25. The '715 patent fails to describe what this phrase means with the necessary degree of specificity for one of ordinary skill in the art to understand the scope of the invention.

[42] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

Accordingly, asserted claims 1, 13, and 25 are invalid for lack of definiteness. Because the lack of definiteness of these claims is not cured in any of the claims depending from them, each asserted dependent claim (claims 10, 22, and 24) is similarly invalid for lack of definiteness.

Dependent claims 10 and 22 are also invalid for lack of definiteness due to the phrases "at least one DMA control register configured to select each of the plurality of USB endpoints as a source for data to be provided to the USB host" and "at least one DMA control register configured to select each of the plurality of USB endpoints as a source for data to be provided to the USB device." As with the phrases above, the '715 patent fails to describe what these phrases mean with the necessary degree of specificity for one of ordinary skill in the art to understand the scope of the invention.

(b) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. *See* 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.[43]

The Asserted Claims of the '715 patent are invalid for lack of written description and enablement due to the phrase "a plurality of USB endpoints, each selectively programmed for one of the [or a] plurality of DMA channels during the DMA mode of the USB controller" in each of the asserted independent claims (claims 1, 13, and 25). The '715 patent fails to convey to those skilled in the art that the inventors had possession of the claimed invention as of the filing date of the application. The '715 patent specification also fails to enable a person of ordinary skill in the art to

[43] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 112, first paragraph.

make and use the full scope of the invention without undue experimentation. Moreover, the applicants relied on the claimed selective programming during prosecution to distinguish the prior art. *See* AMDLG0001165 at AMDLG0001172-1174. Accordingly, the knowledge of one skilled in the art cannot supply the missing aspects of the invention. *See Genentech*, 108 F.3d at1366.

Additionally or alternatively, to the extent AMD improperly attempts to construe the Asserted Claims to cover USB endpoints having fixed relationships with DMA channels, the claims are not adequately described as the specification fails to support such a scope. *See Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1478-80 (Fed. Cir. 1998); *Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1159 (Fed. Cir. 1998); *Lizardtech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1344-46 (Fed. Cir. 2005); *ICU Med., Inc. v. Alaris Med. Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009); *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1335-40 (Fed. Cir. 2010). Accordingly, asserted claims 1, 13, and 25 and their asserted dependent claims (claims 10, 22, and 24) are invalid for failure to satisfy both the written description and enablement requirements.

H. U.S. Patent No. 6,784,879

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '879 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '879 patent.

The following prior art, as well as the "References Cited" on the face of the '879 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '879 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time prior to the date of alleged invention of the asserted claims of the '879 patent: References produced with Bates Range LG_AMD_PA_42328 - LG_AMD_PA_0044417.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '879 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

1. Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[44] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
5,528,304	United States	June 18, 1996	H-01
5,751,373	United States	May 12, 1998	H-02
6,141,003	United States	October 31, 2000	H-03
4,745,402	United States	May 17, 1988	
5,146,210	United States	September 8, 1992	
5,327,160	United States	July 5, 1994	
5,436,676	United States	July 25, 1995	
5,438,372	United States	August 1, 1995	
5,517,257	United States	May 14, 1996	
5,532,753	United States	July 2, 1996	
5,545,857	United States	August 13, 1996	
5,570,108	United States	October 29, 1996	
5,589,893	United States	December 31, 1996	
5,621,456	United States	April 15, 1997	
5,654,748	United States	August 5, 1997	
5,675,358	United States	October 7, 1997	
5,682,511	United States	October 28, 1997	
5,721,829	United States	February 24, 1998	
5,737,029	United States	April 7, 1998	
5,781,247	United States	July 14, 1998	
5,828,370	United States	October 27, 1998	
5,850,218	United States	December 15, 1998	
5,886,690	United States	March 23, 1999	

[44] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

6,020,912	United States	February 1, 2000	
6,147,714	United States	November 14, 2000	
6,151,059	United States	November 21, 2000	
6,184,877	United States	February 6, 2000	
6,323,911	United States	November 27, 2001	
2002/0054146	United States		
1994-217271	Japan	August 5, 1994	
1995-154626	Japan	June 16, 1995	
1995-222027	Japan	August 18, 1995	
1996-106421	Japan	August 4, 1996	
1996-331415	Japan	December 13, 1996	
1997-167260	Japan	June 24, 1997	
0 737 007 A2	Europe	October 9, 1996	
0 737 006 B2	Europe	October 10, 2001	
0 840 504 A1	Europe	May 6, 1998	

2. Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
Film-to-Video Imaging; Concepts and Applications	August 1990	J. R. Fredlund et al.	
Enhanced On-Screen Displays for Simpler TV Control	June 5, 1992	J. R. Kinghorn	
Television Control by Hand Gestures	December 1994	William T Freeman & Craig D. Weissman	
Standardization of Set Top Box Design for Interactive Television	1994	Eric Miller	
Point & Pick User Interface for Projection Television	1995	Sang-Su Lee & James D. Richards III	
The Trials and Travails of Interactive TV	April 1996	Tekla S. Perry	
Multimedia Services in the HDTV MUSE System	September 1996	Kazuya Usui et al.	

An MPEG-1 & 2 Decoder and GUI System for a Multimedia Home Terminal (STB)	1996	Hideo Sakamoto et al.	

3. Prior Art Systems

The asserted claims of the ’879 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
IBM Aptiva	1995	The International Business Machines Corporation	H-04
Frox System Home Entertainment System	1991	Frox Inc.	H-05
Sony Trinitron KV-27XBR26	1993	Sony Corporation	H-06

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

The IBM Aptiva was publicly used or known, on sale or offered for sale on or before December 1995, with Microsoft Windows 95 preinstalled and thus prior art under at least 35 U.S.C. § 102(b). *See* IBM Aptiva Hardware Maintenance Service for Service Level I, Machine Types 2144 and 2168 and IBM Monitors, at ii; *See also* http://en.wikipedia.org/wiki/IBM_Aptiva - accessed September 24, 2014. On information and belief, the IBM Aptiva running Microsoft Windows 95 includes, among other things, the invention embodied in the ’879 Patent. *See* Ex. H-04.

On information and belief, the Frox System Home Entertainment System ("Frox System") was publicly used or known, on sale or offered for sale on or before September 25, 1991 and thus prior art under at least 35 U.S.C. § 102(b). *See* Frox Press Kit, at 1. On information and belief, the Frox System includes, among other things, the invention embodied in the '879 Patent. *See* Ex. H-05.

On information and belief, the Sony Trinitron KV-27XBR26 ("Sony Trinitron") was publicly used or known, on sale or offered for sale in 1993 and thus prior art under at least 35 U.S.C. § 102(b). On information and belief, the Sony Trinitron includes, among other things, the invention embodied in the '879 Patent. *See* Ex. H-06.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '879 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits H-1 thru H-06 (collectively "Appendix H") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix H provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '879 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b).

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix H, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve

the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix H should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix H that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '879 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '879 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '879 patent, its foreign counterparts, or any parent or child patent of the '879 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior

art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix H.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

1. Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix H the prior art references that render obvious the asserted claims of the ’879 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix H, such reference may be combined with any other references listed in Appendix H for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’879 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’879 patent is not anticipated, no asserted claim goes beyond combining familiar

elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

2. Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . .

patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the '879 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary

skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix H in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix H all generally relate to graphical user interfaces for controlling video attributes. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix H because at the time of the alleged invention there was a trend toward integrating television and personal computer functionality. *See, e.g.*, Chor[45] at 3:35-56. Because of this trend toward integrating television and personal computer functionality, one of ordinary skill in the art would have been motivated to modify the graphical user interfaces for the control of video attributes disclosed by the references in Appendix H in order to arrive at the alleged invention of the '879 patent. For example, a person of ordinary skill in the art would have known and been motivated to replace text-based menus commonly found in televisions at the time of the invention with pictorial icons as disclosed in one or more of the references. *See, e.g.*, Ohyama[46] at 16:60-63.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix H, and reserves the right to identify further examples as the case proceeds.

5. 35 U.S.C. § 101 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '879 patent are invalid under 35 U.S.C. § 101 because the claims are not directed to patent-eligible subject matter. LG's contentions that the following claims are invalid under 35 U.S.C. § 101 are made in the alternative and do not

[45] U.S. Patent No. 6,141,003 ("Chor")
[46] U.S. Patent No. 5,751,373 ("Ohyama")

constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '879 patent, or that any of the claims of the '879 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

35 U.S.C. § 101 states that a patent may be granted to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." Whether or not an invention is eligible for patent protection under § 101 is a "threshold test." *See Bilski v. Kappos*, 130 S.Ct. 3218, 3225 (2010). Under this "threshold test," the Supreme Court has held that "laws of nature, natural phenomena, and abstract ideas" are not patent-eligible. *See Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S.Ct. 1289, 1293 (2012). To be eligible under § 101, patent claims reciting ineligible subject matter must contain "an 'inventive concept' sufficient to 'transform' the claimed [ineligible subject matter] into a patent-eligible application." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2357 (2014). The inventive concept must consist of more than "generic computer implementation," *id.* at 2358, or "well-understood, routine, conventional activity previously engaged in by [those] who work in the field," *Mayo*, 132 S.Ct. at 1298; *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 2014 WL 3377201, at *4 (Fed. Cir. July 11, 2014) ("[A] claim reciting an abstract idea does not become eligible merely by adding the words 'apply it.'").

Many of the asserted claims are invalid under 35 U.S.C. § 101 because they fail to claim patent-eligible subject matter. In particular, at least the following claims fail to comply with 35 U.S.C. § 101.[47]

Claims 1, 17, 20, 21, and 24 are not patent-eligible subject matter because they are generally directed to the abstract idea of displaying graphics and background video and lack an inventive concept sufficient to transform them into patentable inventions. Displaying graphics and background video is an abstract idea because it is neither tied to any particular end use nor any particular structure or machinery. *Gottschalk v. Benson*, 409 U.S. 63, 68 (1972). Under the Supreme Court's threshold test for patent-eligibility as set forth in *Mayo* and *Alice*, the additional limitations set forth in the Asserted Claims are not sufficient to confer patent-eligibility because they consist of "generic computer implementation," and/or "well-understood, routine, conventional activity." *Alice*, 134 S. Ct. at 2358; *Mayo*, 132 S. Ct. at 1298. Additionally, many of the limitations are merely steps taken to apply the abstract idea of displaying graphics and background video "since they are steps that must be taken in order to apply the [idea] in question, the effect is simply to tell [those of skill in the art] to apply the [idea]." *See Mayo*, 132. S. Ct. at 1299-1300. Appending such "conventional steps, specified at a high level of generality," to the idea of controlling background video "cannot make [that idea] patentable." *Id.* at 1300.

6. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '879 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '879 patent, or that any of the claims of the '879 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil

[47] Dependent claims are also invalid as being dependent upon a base claim that is invalid under 35 U.S.C. § 101.

Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014)

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '879 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions.[48]

Claim 1 is invalid pursuant to 35 U.S.C. § 112, second paragraph, because it improperly claims a Markush group consisting of "a DVD player, live television broadcast, a recording device, a satellite television broadcast and a cable television broadcast." Markush groupings are proper only where there is unity of invention with respect to the claim—i.e., where the specification concludes "with one or more claims . . . *distinctly* claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. To have the requisite unity of invention, each and every

[48] Dependent claims are also invalid as being dependent upon a base claim that is indefinite under 35 U.S.C. § 112, second paragraph.

member of a Markush group must share "a single structural similarity." *In re Harnisch*, 631 F.2d 716, 722 (C.C.P.A. 1980). Here, the claimed Markush group lacks any unifying structural similarity. Claim 1 is therefore invalid pursuant to 35 U.S.C. § 112, second paragraph.

Claims 17, 20, 21, and 24 are also invalid for lack of definiteness due to the terms "first storage means," "second storage means," and "third storage means." The scope of the Asserted Claims containing one or more of these limitations is not reasonably certain as required by 35 U.S.C. § 112, second paragraph because, for example, the claims are ambiguous as to whether or not each storage means refers to a separate structure. This ambiguity is particularly acute in light of claims 21 and 24, which specifically require that the "second storage means" store programming instructions for performing two separate functions, whereas the "first storage means" of claims 21 and 24 and the first, second, and third storage means of claims 17 and 20 each perform a single function. Claims 17, 20, 21, and 24 are therefore invalid for lack of definiteness.

Claims 1, 17, 20, 21, and 24 are also invalid for lack of definiteness due to the term "wherein the video control icon *relates to* live video that is being presented as a background on a display." In particular, the '879 patent fails to describe what it means for a video control icon to "relate to" live video with reasonable certainty. The specification of the '879 patent only mentions the term "relate to" twice and merely parrots the claim language without providing any explanation of what is meant by "relate to." Claims 1, 17, 20, 21, and 24 are therefore invalid for lack of definiteness.

Claims 1, 17, 20, 21, and 24 are also invalid for lack of definiteness due to the term "live video." Although the term "live video" is repeated throughout the specification of the '879 patent, the patent fails to describe the terms with the necessary degree of specifity for one of ordinary skill in the art to understand the scope of the invention with reasonable certainty. Moreover, the claims and specification of the '879 patent suggest that "live video" may be received from devices such as DVD players, VCRs, and recording devices, even though the video would no longer be "live" at the time of receipt according to the plain and ordinary meaning of the term. This suggestion is inconsistent with the ordinary meaning of "live" video. *See, e.g.*, Merriam-Webster's Online Dictionary, http://www.merriam-webster.com/dictionary/live ("broadcast directly at the time of

production"). Thus, it is clear that "live video" does not have its plain and ordinary meaning in the '879 patent. Because no other meaning is readily apparent from the specification, the '879 patent fails to provide reasonable certainty regarding the meaning of the claim term "live video" as used in the '879 patent, and claims 1, 17, 20, 21, and 24, all of which contain the term "live video," are indefinite.

(b) Improper Means-Plus-Function Limitations under 35 U.S.C. § 112, Second and Sixth Paragraphs

Means-plus-function claim limitations "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 ¶ 6. An inadequate disclosure of a structure corresponding to the claimed function constitutes a violation of both paragraphs 2 and 6 of Section 112. *In Re Donaldson Co.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994) (en banc) ("If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112."). Therefore, if a claim includes a means-plus-function limitation, failure to disclose adequate structure corresponding to the claimed function results in the claim being invalid for indefiniteness. *In re Dossel*, 115 F.3d 942, 946 (Fed. Cir. 1997).

Whether the patent adequately sets forth structure corresponding to the function is ascertained from the perspective of a skilled artisan. *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357, 1365-66 (Fed. Cir. 2003). But the question is not whether a skilled artisan would be capable of implementing a structure to perform the function, but whether that person would understand the written description to disclose such a structure. *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007).

A structure disclosed in the specification qualifies as "corresponding" only if the specification or prosecution history "clearly links or associates" that structure to the function recited in the claim. *Asyst Technologies, Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370 (Fed. Cir. 2001) (internal citation omitted). Furthermore, the corresponding structure "must actually perform the recited function, not merely enable the pertinent structure to operate as intended." *Id*. at 1371.

Claims 17 and 20 are invalid for lack of definiteness due to the term "first storage means for storing programming instructions that, when read by the processing unit, causes the processing unit to provide a video control icon that is visible on the display, wherein the video control icon relates to live video that is being presented as a background on a display." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to provide a video control icon that is visible on the display, wherein the video control icon relates to live video that is being presented as a background on a display." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs., Inc. v. Yahoo! Inc.*, 2014 WL 2782019, at *8 (Fed. Cir. June 20, 2014). The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 17 and 20 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claims 17 and 20 are also invalid for lack of definiteness due to the term "second storage means for storing programming instructions that, when read by the processing unit, causes the programming unit to detect selection of the video control icon." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the programming unit to detect selection of the video control icon." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs.*, 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 17 and 20 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claims 17 and 20 are also invalid for lack of definiteness due to the term "third storage means for storing programming instructions that, when read by the processing unit, causes the processing unit to provide a control panel while the live video remains in the background and an application

that was in focus remains in focus when the video control icon has been selected." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to provide a control panel while the live video remains in the background and an application that was in focus remains in focus when the video control icon has been selected." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs.*, 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 17 and 20 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claim 20 is also invalid for lack of definiteness due to the term "means for storing programming instructions that, when read by the processing unit, causes the processing unit to remove the control panel when another displayed element is selected." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to remove the control panel when another displayed element is selected." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs.*, 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claim 20 is indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claims 21 and 24 are invalid for lack of definiteness due to the term "first storage means for storing programming instructions that, when read by the processing unit, causes the processing unit to detect selection of a video control icon, wherein the video control icon relates to live video that is being presented as a background on a display." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to detect selection of a video

control icon, wherein the video control icon relates to live video that is being presented as a background on a display." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs*., 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 21 and 24 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claims 21 and 24 are also invalid for lack of definiteness due to the term "second storage means for storing programming instructions that, when read by the processing unit, causes the processing unit to provide a control panel while the live video remains in the background and an application that was in focus remains in focus when the video control icon has been selected." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to provide a control panel while the live video remains in the background and an application that was in focus remains in focus when the video control icon has been selected." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs*., 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 21 and 24 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claims 21 and 24 are also invalid for lack of definiteness due to the term "second storage means for storing programming instructions that, when read by the processing unit, causes the processing unit to adjust at least one attribute of the live video based on an input received via the control panel." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "for storing programming instructions that, when read by the processing unit, causes the processing unit to adjust at least one attribute of the live video based on an input received via the control panel." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the

specification must disclose an algorithm for performing the claimed-function." *Augme Techs*., 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claims 21 and 24 are indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

Claim 24 is also invalid for lack of definiteness due to the term "means for storing programming instructions that, when read by the processing unit, causes the processing unit to remove the control panel when another displayed element is selected." This claim element is subject to 35 U.S.C. § 112, sixth paragraph. The function performed by this claim element is "storing programming instructions that, when read by the processing unit, causes the processing unit to remove the control panel when another displayed element is selected." As a computer-implemented means-plus-function limitation, "to meet the definiteness requirements of 35 U.S.C. § 112, second paragraph, the specification must disclose an algorithm for performing the claimed-function." *Augme Techs*., 2014 WL 2782019, at *8. The '879 patent specification does not disclose any algorithm for performing the function. Therefore, claim 24 is indefinite under 35 U.S.C. § 112, second paragraph. *Id.* at 9.

I. U.S. Patent No. 7,095,945

1. General State of the Art at the Time of the Alleged Invention

The prior art identified below (including the "References Cited" on the face of the '945 patent) may provide background and context pertinent to the teachings, and interpretation of, the prior art referenced by the claim charts. This prior art is exemplary only, and is not in any way intended to limit the scope of what one of ordinary skill in the art would have understood at the time of the alleged invention. LG reserves the right to rely upon additional prior art, information, and/or knowledge to demonstrate what one of ordinary skill would have understood prior to the date of alleged invention of the asserted claims of the '945 patent.

The following prior art, as well as the "References Cited" on the face of the '945 patent (which are incorporated herein by reference), are illustrative of the general state of the art to which the '945 patent pertains (*i.e.*, what one of ordinary skill in the art would have understood) at a time

prior to the date of alleged invention of the asserted claims of the '945 patent: References produced with Bates Range LG_AMD_PA_0044418 - LG_AMD_PA_46642.

2. Disclosure of Prior Art References (Patent L.R. 3-3(a))

LG asserts that the asserted claims of the '945 patent are anticipated or rendered obvious by each of the following references on its own and/or in combination with the knowledge of one skilled in the art or with one or more references as set forth in the attached charts:

1. Prior Art Patents and Patent Applications

The following patents and patent applications are prior art under 35 U.S.C. §§ 102(a), (b), and/or (e).[49] The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Patent or Patent Application No.	Country of Origin	Date of Issue (if Issued Patent)	Exhibit
5,517,250	United States	May 14, 1996	I-01
5,521,922	United States	May 28, 1996	I-02
5,881,245	United States	March 9, 1999	I-03
6,226,447	United States	May 1, 2001	I-04
6,233,389	United States	May 15, 2001	I-05
6,327,418	United States	December 4, 2001	I-06
6,397,000	United States	May 28, 2002	I-07
6,490,000	United States	December 3, 2002	I-08
6,591,058	United States	July 8, 2003	I-09
7,024,100	United States	April 4, 2006	I-10
Admitted Prior Art of the '945 patent	United States	November 6, 2000	I-11
4,544,950	United States	October 1, 1985	
4,821,261	United States	April 11, 1989	
5,241,428	United States	August 31, 1993	
5,729,280	United States	March 17, 1998	
5,793,980	United States	August 11, 1998	
5,920,572	United States	July 6, 1999	
5,923,755	United States	July 13, 1999	
5,930,444	United States	July 27, 1999	

[49] Under the recently enacted America Invents Act ("AIA"), invalidating prior art is defined in 35 U.S.C. § 102(a). However, AIA Section 102(a) was not effective until March 17, 2013. The Patent-in-Suit predates March 17, 2013, and therefore pre-AIA Section 102 (including sub-sections 102(a), (b), (e) and (g)) apply to the prior art identified in these Invalidity Contentions and the attached exhibits.

6,128,653	United States	October 3, 2000	
6,724,825	United States	April 20, 2004	
6,762,797	United States	July 13, 2004	
6,788,710	United States	September 7, 2004	
6,952,520	United States	October 4, 2005	
7,197,229	United States	March 27, 2007	
7,272,298	United States	September 18, 2007	
7,366,407	United States	April 29, 2008	
7,529,465	United States	May 5, 2009	
8,285,109	United States	October 9, 2012	
8,463,110	United States	June 11, 2013	
0185947	Korea (South)	December 28, 1998	
0191731	Korea (South)	January 26, 1999	
1997-0077143	Korea (South)		
1154629 A	China	July 16, 1997	
0 762 769 B1	Europe	May 17, 2000	
1 039 750 A2	Europe	September 27, 2000	
09/19560	World Intellectual Property Organization		

2. Prior Art Publications

The following publications are prior art under 35 U.S.C. §§ 102(a) and/or (b). The specific provision(s) of section 102 for each such prior art reference is identified in the accompanying claim charts.

Title	Date of Publication	Author/Publisher	Exhibit
ISO/IEC 13818-1 Information technology — Generic coding of moving pictures and associated audio information: Systems	April 1, 1996	International Organization for Standarization	I-12
48-bit Absolute Internet and Ethernet Host Numbers	July 1981	Yogen K. Dalal & Robert S. Printis	
Request for Comments: 793 Transmission Control Protocol	September 1981	Information Sciences Institute, University of Southern California	
Request for Comments: 1498	August 1993	Jerome H. Saltzer	

On the Naming and Binding of Network Destinations			
Video On Demand Technologies and Demonstrations	May 1998	Mark Podgorny & Geoffrey C. Fox	
TCP/IP Tutorial and Technical Overview	October 1998	Martin W. Murhammer et al.	
Implementing Multiplexing, Streaming and Server Interaction for MPEG-4	December 1999	Hari Kalva et al.	
The SICMA Teleteaching Trial on ADSL and Intranet Networks	1999	F. Cortes et al.	
Broadband Network Set-Top Box System	October 25, 2000	Florin Lahan, Prakash Sastry & Irek Defee	

3. Prior Art Systems

The asserted claims of the ’945 Patent are invalid for public use or knowledge or sales or offers for sale of products and services that anticipate such claims under 35 U.S.C. § 102(a) or (b), or the purported invention of the claims was made in this country by another inventor who had not abandoned, suppressed, or concealed it under 35 U.S.C. § 102(g).

System Name	Use/Knowledge/Offer Date	Person/Entity	Exhibit
RealPlayer 5.0	1996	RealNetworks, Inc.	I-13
Microsoft NetShow	1996	Microsoft Corporation	I-14
Intel ProShare Video Conferencing System	April 1996	Intel Corporation	
PictureTel Video Conferencing System	1997	PictureTel Corporation	
TiVo Digital Video Recording System	January 1999	TiVo, Inc.	I-05 and I-06
EchoStar DISH Player DVR	January 7, 1999	EchoStar Corporation	I-08

Philips HDR110	1999	Koninklijke Philips N.V.	I-05 and I-06
Sony SVR-2000 DVR	May 2000	Sony Corporation	I-05 and I-06

The following description and events are provided on information and belief and are supported by the information and documents that are being produced concomitant with these Invalidity Contentions and/or are subject to a third party subpoena that LG has issued or expects to issue.

RealPlayer 5.0 was publicly used or known, on sale or offered for sale in 1996 and thus prior art under at least 35 U.S.C. § 102(b). *See, e.g.*, RealPlayer 5.0 Release Notes, http://service.real.com/help/player/free5.0/notes.htm – accessed September 24, 2014. On information and belief, RealPlayer 5.0 includes, among other things, the invention embodied in the '945 patent.

Microsoft NetShow was publicly used or known, on sale or offered for sale in 1996 and thus prior art under at least 35 U.S.C. § 102(b). *See* http://en.wikipedia.org/wiki/NetShow - accessed September 24, 2014. On information and belief, NetShow includes, among other things, the invention embodied in the '945 patent.

On information and belief, the Intel ProShare videoconferencing system was publicly used or known, on sale or offered for sale in April 1996 and thus prior art under at least 35 U.S.C. § 102(b). On information and belief, the Intel ProShare videoconferencing system includes, among other things, the invention embodied in the '945 patent.

On information and belief, the PictureTel videoconferencing system was publicly used or known, on sale or offered for sale in 1997 and thus prior art under at least 35 U.S.C. § 102(b). On information and belief the PictureTel videoconferencing system includes, among other things, the invention embodied in the '945 patent.

The TiVo digital video recording service was publicly used or known, on sale or offered for sale in January 1999. *See* http://www3.tivo.com/jobs/questions/history-of-tivo/index.html - accessed September 24, 2014. Similarly, on information and belief, the the TiVo digital video

recording service was conceived and diligently reduced to practice in this country by TiVo, Inc. at least as early as 1999. On information and belief, the TiVo digital video recording service that was conceived, reduced to practice, and/or disclosed at that time embodied the invention claimed in the '945 patent. On information and belief the TiVo digital video recording service includes, among other things, the invention embodied in the '945 patent. On information, the TiVo digital video recording service embodies U.S. Patent Nos. 6,233,389 and 6,327,418. Accordingly, the TiVo digital video recording service is available as prior art under 35 U.S.C. §§ 102(a), (b), and (g), and LG's contentions with respect to the TiVo digital video recording service are set forth in the claim charts associated with those patents. *See* Ex. I-05, I-06.

The EchoStar DISH Player digital video recorder was publicly used or known, on sale or offered for sale on January 7, 1999 and thus prior art under at least 35 U.S.C. § 102(b). *See* Jimmy Shaeffler, Digital Video Recorders: DVRs Changing TV and Advertising Forver, at 39 (2013). On information and belief the EchoStar DISH Player digital video recorder includes, among other things, the invention embodied in the '945 patent. On information, the EchoStar DISH Player digital video recorder embodies U.S. Patent No. 6,490,000. Accordingly, LG's contentions with respect to the TiVo digital video recording service are set forth in the claim charts associated with those patents. *See* Ex. I-08.

The Philips HDR110 digital video recorder was publicly used or known, on sale or offered for sale in 1999 and thus prior art under at least 35 U.S.C. § 102(b). *See* http://www.tivopedia.com/model-philips-hdr110.php - accessed September 24, 2014. On information and belief the Philips HDR110 digital video recorder includes, among other things, the invention embodied in the '945 patent. On information, the Philips HDR110 incorporates TiVo technology embodying U.S. Patent Nos. 6,233,389 and 6,327,418. Accordingly, LG's contentions with respect to the Philips HDR110 digital video recorder are set forth in the claim charts associated with those patents. *See* Ex. I-05, I-06.

On information and belief, the Sony SVR-2000 digital video recorder was publicly used or known, on sale or offered for sale no later than May 2000 and thus prior art under at least 35 U.S.C.

§ 102(a). On information and belief the Sony SVR-2000 digital video recorder includes, among other things, the invention embodied in the '945 patent. On information, the Sony SVR-2000 incorporates TiVo technology embodying U.S. Patent Nos. 6,233,389 and 6,327,418. Accordingly, LG's contentions with respect to the Sony SVR-2000 digital video recorder are set forth in the claim charts associated with those patents. *See* Ex. I-05, I-06.

A claim chart comparing each claim of the references identified above, on its own and/or in a combination, is attached to these contentions as further discussed below. To the extent, LG is seeking discovery on such references, LG will revise, amend, and/or supplement these contentions after such additional information becomes available.

3. Anticipation Under Patent L.R. 3-3(a) and (c)

Each of the asserted claims of the '945 patent is anticipated and/or rendered obvious by prior art. Pursuant to Patent L.R. 3-3(a), LG identifies the prior art references that anticipate or render obvious an Asserted Claim in the claim charts of Exhibits I-1 thru I-14 (collectively "Appendix I") which are hereby incorporated by reference as if fully set forth herein.

The claim charts of Appendix I provide an explanation showing how these prior art references teach or suggest each and every element of the asserted claims of the '945 patent. For each reference or combination of references suggested by each chart, LG indicates whether the prior art renders the claim anticipated and/or obvious pursuant to Patent L.R. 3-3(b). For the purposes of these claim charts, LG assumes, without conceding, that every claim element of each asserted claim is limiting and non-optional.

In addition to contending that the Asserted Claims are invalid in view of the prior art references cited in the claim charts of Appendix I, LG further contends that the Asserted Claims are invalid as anticipated and/or obvious under U.S.C. §§ 102(a) and/or (b) in view of public knowledge and uses and/or offers for sale of products and services related to the subject matter of the cited references. As discovery is ongoing, LG continues to investigate these items and to reserve the right to amend or supplement these contentions to include additional information or documents regarding such products and/or systems.

LG's reference to a particular circuitry, software program, device or product in the claim charts of Appendix I should be interpreted as a reference to the product itself and any corresponding patents, publications, or product literature cited in Appendix I that relates to the cited circuitry, software program, device, or product. In addition, LG may rely on other documents or things that have not yet been located to support its contentions regarding such prior art circuit(s), software program(s), device(s) or product(s) that are referenced in the charts.

LG incorporates by reference, as if set forth fully herein, all prior art cited during the prosecution of the '945 patent. In addition, LG identifies and hereby incorporates by reference as if set forth fully herein the prior art references that anticipate or render obvious an asserted claim as described in a future reexaminations or *inter partes* reviews of the '945 patent, if any, that a requestor may file or the PTO may grant.

LG further identifies and hereby incorporates by reference as if set forth fully herein the prior art references and invalidity contentions as described in any other lawsuits wherein invalidity contentions have been, or will be, provided regarding the '945 patent, its foreign counterparts, or any parent or child patent of the '945 patent. LG reserves the right to use any and all portions of the publication, related publications, commercial embodiments of the publication, and other evidence that is discovered in these lawsuits to demonstrate and/or evidence the components, functionality, and capabilities of the devices and systems disclosed in the references charted.

Where LG identifies a particular figure in a prior art reference, the identification should be understood to encompass the caption and description of the figure, as well as any text relating to the figure in addition to the figure itself. Similarly, where an identified portion of text refers to a figure or other material, the identification should be understood to include the referenced figure or other material as well. It should be recognized that a person of ordinary skill in the art would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a person of ordinary skill in the art would rely upon other information including other publications and general scientific or engineering knowledge. LG therefore reserves the right to rely

upon other unidentified portions of the prior art references and on other publications and expert testimony to provide context and to aid understanding and interpretation of the identified portions.

LG also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions would have been obvious to a person of ordinary skill in the art, including the basis of modifying or combining certain cited references. To the extent any limitation is deemed not to be exactly met by an item of prior art, then any purported differences are such that the claimed subject matter as a whole would have been obvious to one skilled in the art at the time of the alleged invention, in view of the state of the art and knowledge of those skilled in the art. To the extent that an element of an Asserted Claim is not anticipated, the claim is rendered obvious by combination with one or more other prior art references identified in Appendix I.

4. Obviousness Under Patent L.R. 3-3(a) and (b)

1. Prior Art Rendering Asserted Claims Obvious

Pursuant to Patent L.R. 3-3(a) and (b), LG identifies in Appendix I the prior art references that render obvious the asserted claims of the ’945 patent and includes an identification of combinations showing the obviousness of the Asserted Claims in view of the prior art. Moreover, to the extent AMD contends that an element is not disclosed in any one of the anticipatory references described in Appendix I, such reference may be combined with any other references listed in Appendix I for such element, thereby rendering the claim invalid for obviousness.

To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’945 patent is not disclosed by one of the references identified above pursuant to Patent L.R. 3-3(a), the claims are nevertheless unpatentable as obvious because they contain nothing that constitutes patentable innovation. To the extent a finder of fact determines that a limitation of any of the asserted claims of the ’945 patent is not anticipated, no asserted claim goes beyond combining familiar elements according to known methods to achieve predictable results or does more than choose between clear alternatives known to those of ordinary skill in the art.

2. Teaching, Suggestion, or Motivation to Combine References

The U.S. Supreme Court decision in *KSR Int'l Co. v. Teleflex Inc., et al.* 127 S. Ct. 1727, 1739 (2007) ("*KSR*") held that a claimed invention can be obvious even if there is no explicit, written teaching, suggestion, or motivation for combining the prior art to produce that invention. Accordingly, LG believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed in the attached charts, as each combination of art would have no unexpected results, and, at most, would simply represent a known alternative to one of ordinary skill in the art. *See KSR*, 127 S. Ct. at 1739-40 (rejecting the Federal Circuit's "rigid" application of the teaching, suggestion, or motivation to combine test, and instead espousing an "expansive and flexible" approach). The Supreme Court in *KSR* held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill in the art will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id*. at 1742. "In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. What matters is the objective reach of the claim." *Id.* at 1741-42. "Under the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." *Id.* at 1742. In particular, the Supreme Court emphasized the principle that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 1739. A key inquiry is whether the "improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740.

The rationale to combine or modify prior art references is significantly stronger when the references seek to solve the same problem, come from the same field, and correspond well. *In re Inland Steel Co.*, 265 F.3d 1354, 1362 (Fed. Cir. 2001). The Federal Circuit allowed two references to be combined as invalidating art when "[the prior art] focus[es] on the same problem that the . . . patent addresses. . . . Moreover, both [prior art references] come from the same field. . . . Finally, the solutions to the identified problems found in the two references correspond well." *Id.* at 1364.

Although LG contends that no specific motivation to combine is necessary for the references cited in the attached exhibits, in keeping with the Patent Rules, LG hereby identifies additional motivations and reasons to combine the cited art.

One or more combinations of the prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because these references would have been combined using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or a teaching, suggestion, or motivation in the prior art generally. In addition, it would have been obvious to try combining the prior art references identified above pursuant to Patent L.R. 3-3(a) because there were only a finite number of predictable solutions and/or because known work in one field of endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. In addition, the combination of prior art references identified above pursuant to Patent L.R. 3-3(a) would have been obvious because the combinations represent known potential options with a reasonable expectation of success.

Additional evidence that there would have been a motivation to combine the prior art references identified in the attached exhibits includes, for example, the interrelated teachings of multiple prior art references; the effects of demands known to the design community or present in the marketplace; the existence of a known problem for which there was an obvious solution encompassed by the asserted claims of the '945 patent; the existence of a known need or problem in the field of the endeavor at the time of the invention(s); and the background knowledge that would have been possessed by a person having ordinary skill in the art. Thus, a skilled artisan seeking to solve this problem would look to these cited references in combination.

Accordingly, the motivation to combine the teachings of the prior art references disclosed herein is found in the references themselves and: (1) the nature of the problem being solved; (2) the express, implied and inherent teachings of the prior art; (3) the knowledge of persons of ordinary skill in the art; (4) the fact that the prior art is generally directed towards relevant methods and systems; or (5) the predictable results obtained in combining the different elements of the prior art.

Furthermore, a person of ordinary skill at the time of the alleged invention had reason to combine or modify one or more of the references listed and charted in Appendix I in light of the knowledge of a person of ordinary skill in the art at the time of the invention and information in the prior art cited herein. For example, the references in Appendix I all generally relate to receiving, storing, and/or decoding multiplexed packetized multimedia data. Thus, they are all directed to features within the same field and one of ordinary skill in the art at the time of the alleged invention would have been motivated to look to these teachings in the field and combine any of these known technologies.

One of ordinary skill in the art would have been motivated to combine any of the references in Appendix I because at the time of the alleged invention there was increasing interest in the use of random access storage media for recording multimedia programs in order to enable the multimedia programs to be viewed with VCR-like functionality while they continued to be recorded. *See, e.g.*, O'Connor[50] at 1:14-30, 4:9-36; Sasaki[51] at 1:20-45, 5:1-31. Additionally, those of skill in the art recognized at the time of the alleged invention that increases in bandwidth permitted the on-demand streaming of multimedia programs via traditional computer networks. *See, e.g.*, Marek Podgorny & Geoffrey C. Fox, Video On Demand Technologies and Demonstrations, at 4, 32-35 (1998). Because of these well-known industry trends, one of ordinary skill in the art would have been motivated to modify any of the references in Appendix I in order to provide VCR-like functionality to recorded multimedia programs while the programs continued to be recorded and/or to provide the multimedia programs via computer networks. For example, a person of ordinary skill in the art would have known and been motivated to replace television broadcasts with streaming on-demand video delivered via a computer network as disclosed in one or more of the references.

These exemplary motivations, suggestions, or reasons to combine are not exclusive or exhaustive. LG identifies additional examples in the charts attached as Appendix I, and reserves the right to identify further examples as the case proceeds.

[50] U.S. Patent No. 6,591,058 ("O'Connor")
[51] U.S. Patent No. 6,226,447 ("Sasaki")

5. 35 U.S.C. § 101 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '871 patent are invalid under 35 U.S.C. § 101 because the claims are not directed to patent-eligible subject matter. LG's contentions that the following claims are invalid under 35 U.S.C. § 101 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '945 patent, or that any of the claims of the '945 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

35 U.S.C. § 101 states that a patent may be granted to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." Whether or not an invention is eligible for patent protection under § 101 is a "threshold test." *See Bilski v. Kappos*, 130 S.Ct. 3218, 3225 (2010). Under this "threshold test," the Supreme Court has held that "laws of nature, natural phenomena, and abstract ideas" are not patent-eligible. *See Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 132 S.Ct. 1289, 1293 (2012). To be eligible under § 101, patent claims reciting ineligible subject matter must contain "an 'inventive concept' sufficient to 'transform' the claimed [ineligible subject matter] into a patent-eligible application." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S.Ct. 2347, 2357 (2014). The inventive concept must consist of more than "generic computer implementation," *id.* at 2358, or "well-understood, routine, conventional activity previously engaged in by [those] who work in the field," *Mayo*, 132 S.Ct. at 1298; *see also Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 2014 WL 3377201, at *4 (Fed. Cir. July 11, 2014) ("[A] claim reciting an abstract idea does not become eligible merely by adding the words 'apply it.'").

Many of the asserted claims are invalid under 35 U.S.C. § 101 because they fail to claim patent-eligible subject matter. In particular, at least the following claims fail to comply with 35 U.S.C. § 101.

Claims 18 and 21 are not patent-eligible subject matter because they are generally directed to the abstract idea of data buffering and/or time shifting and lack an inventive concept sufficient to transform them into patentable inventions. Data buffering and/or time shifting are abstract ideas because each is "a process of organizing information . . . and is not tied to a specific structure or machine." *Digitech Image Techs., LLC v. Elecs. For Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014). Under the Supreme Court's threshold test for patent-eligibility as set forth in *Mayo* and *Alice*, the additional limitations set forth in the Asserted Claims are not sufficient to confer patent-eligibility because they consist of "generic computer implementation," and/or "well-understood, routine, conventional activity." *Alice*, 134 S. Ct. at 2358; *Mayo*, 132 S. Ct. at 1298. Additionally, many of the limitations of the asserted claims merely serve to limit the scope of the claims to the field of digital video processing, and "the prohibition against patenting abstract ideas 'cannot be circumvented by attempting to limit the use of the [idea] to a particular technological environment.'" *Bilski*, 130 S. Ct. 3230 (quoting *Diamond v. Diehr*, 450 U.S. 175, 191-92 (1981)).

6. 35 U.S.C. § 112 Invalidity Under Patent L.R. 3-3(d)

Pursuant to 3-3(d), LG contends that certain claims of the '945 patent are invalid under 35 U.S.C. § 112 because the claims are indefinite, not enabled, or lack written description. LG's contentions that the following claims are invalid under 35 U.S.C. § 112 are made in the alternative and do not constitute, and should not be interpreted as, admissions regarding the construction or scope of the claims of the '945 patent, or that any of the claims of the '945 patent are not anticipated or rendered obvious by prior art. The following contentions, made pursuant to Patent L.R. 3-3(d), are subject to revision and amendment pursuant to Patent L.R. 3-6 and Federal Rule of Civil Procedure 26(e) and the Orders of record in this matter to the extent appropriate, *e.g.*, in light of further investigation and discovery regarding the defenses, the Court's construction of the claims at issue, and/or review and analysis of expert witnesses. LG offers these contentions in response to

AMD's Infringement Contentions and without prejudice to any position it may ultimately take as to any claim construction issues.

(a) Lack of Enablement and Written Description under 35 U.S.C. § 112, First Paragraph

35 U.S.C. § 112, paragraph 1, includes an enablement requirement. See 35 U.S.C. § 112, ¶ 1 ("The specification shall contain a written description . . . of the manner and process of making and using [the invention] in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.").

To satisfy the enablement requirement of 35 U.S.C § 112, ¶ 1, the disclosure "must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (citations omitted). Moreover, "[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of [the] invention in order to constitute adequate enablement." *Genentech*, 108 F.3d at1366. The Federal Circuit has enumerated several factors to consider in determining whether a disclosure would require "undue experimentation": (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

To satisfy the written description requirement, the description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (internal citation omitted). In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. *Id.* The test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the

inventor actually invented the invention claimed. "Whether the written description requirement is satisfied is a fact-based inquiry that will depend on the nature of the claimed invention, and the knowledge of one skilled in the art at the time an invention is made and a patent application is filed." *Carnegie Mellon Univ. v. Hoffmann La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008). Actual "possession" or reduction to practice outside of the specification is not enough. Rather, as stated above, it is the specification itself that must demonstrate possession. A description that merely renders the invention obvious does not satisfy the requirement. *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571-72 (Fed. Cir. 1997).

Many of the asserted claims are invalid as under 35 U.S.C. § 112, first paragraph because such claims are not enabled and/or lack written description. In particular, at least the following claims and/or claim terms are invalid as under 35 U.S.C. § 112, first paragraph.

Claim 18 is invalid for lack of written description due to the limitations "receiving a multiplexed packetized data stream at a first demultiplexer" and "providing the first program portion to a second demultiplexer." The phrases "receiving a multiplexed packetized data stream at a first demultiplexer" and "providing the first program portion to a second demultiplexer" in the claims are not set forth in the specification of the '945 patent. Additionally, even to the extent that the specification discloses "receiving a multiplexed packetized data stream at a first demultiplexer," it does not describe an embodiment in which a first program portion is then provided to a second demultiplexer as required by claim 18. Thus, the specification of the '945 patent would not clearly allow a person of ordinary skill in the art to recognize that the inventor invented what is claimed, and claim 18 is invalid for lack of written description.

(b) Indefiniteness under 35 U.S.C. § 112, Second Paragraph

35 U.S.C. § 112 includes a definiteness requirement. See 35 U.S.C. § 112, ¶ 2 ("[T]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the

prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S.Ct. 2120, 2124 (U.S. 2014)

Many of the asserted claims are invalid as indefinite under 35 U.S.C. § 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicants regard as their invention. The specification of the '945 patent provides no objective standard by which one of ordinary skill in the art could determine the meaning of the asserted claim elements. In particular, at least the following claim terms are indefinite because they fail to particularly point out and distinctly claim the subject matter which the applicants regarded as their alleged inventions:

Claim 18 is invalid for lack of definiteness due to the claim terms "determining a mode of operation," "during a first mode of operation," "during a second mode of operation," and "during a third mode of operation." Although the phrase "mode of operation" appears in the '945 patent specification, the patent fails to describe the terms with the necessary degree of specifity for one of ordinary skill in the art to understand the scope of the invention with reasonable certainty. Furthermore, it is not reasonably certain as to what constitutes "determining" a mode of operation, what performs "determining a mode of operation," or how "determining a mode of operation" relates to the other recited claim elements (*i.e.*, "during a first mode of operation," "during a second mode of operation," and "during a third mode of operation.").

Claim 18 is also invalid for lack of definiteness because the structure of the claim leaves the bounds of the claim ambiguous. For example, if, at the "determining a mode of operation" step the first mode of operation is determined, it is unclear whether the method is completed upon performance of all of the steps to be performed "during a first mode of operation," or if the additional steps associated with the "second mode of operation," and "third mode of operation" must also be performed even though neither a second mode nor third mode of operation was determined. Moreover, if the additional steps associated with the second and third modes of operation must also be performed, it is not reasonably certain whether the steps already performed as part of the first

mode of operation must be repeated. Because the bounds of claim 18 are not reasonably certain and the '945 patent specification fails to resolve that uncertainty, claim 18 is indefinite.

III. ACCOMPANYING DOCUMENT PRODUCTION UNDER PATENT L.R. 3-4(A) AND (B)

Pursuant to Patent L.R. 3-4(a), based on its investigation to date, LG is producing documentation and making available for inspection pursuant to the operative protective order source code "sufficient to show the operation of any aspects or elements" of the instrumentalities AMD "identified ... in its Patent L.R. 3-1(c) chart" on August 1, 2014. A copy of the identified documentation will be produced as: LG_AMD_0011244 - LG_AMD_0100138. By producing or making available the materials as required by Patent L.R. 3-4(a), LG does not treat any of the accused products as representative.

Pursuant to Patent L.R. 3-4(b), LG is producing, or making available for inspection, each item of prior art identified pursuant to Patent L.R. 3-3(a) and (b) which does not appear in the file history of the Patents-In-Suit. A copy of all prior art documents identified will be produced as: LG_AMD_PA_0000001 - LG_AMD_PA_0046726. To the extent that such item is not in English, translation of documents is ongoing and an English translation will be produced.

LG further reserves the right to supplement its Patent L.R. 3-4 document production pursuant to the Patent Local Rules and the Orders of the Court. LG will further comply with its obligations under Patent L.R. 3-4(a) pursuant to the Court's Discovery Order (D.I. 51).

Dated: October 1, 2014

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PROOF OF SERVICE

I am employed in the County of San Diego. My business address is Fish & Richardson P.C., 12390 El Camino Real, San Diego, California 92130. I am over the age of 18 and not a party to the foregoing action.

On October 1, 2014, I caused a copy of the foregoing document(s) to be served on the interested parties by email:

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I declare that I am employed in the office of a member of the bar of this Court at whose direction the service was made. I declare under penalty of perjury that the above is true and correct. Executed on October 1, 2014, at San Diego, California.

/s/ Olga May
Olga May