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United States District Court,
D. Massachusetts.

VERACODE, INC., a Delaware Corporation, and ROVI SOLUTIONS CORPORATION, a Delaware Corporation,
Plaintiffs,
v.
APPTHORITY, INC., a Delaware Corporation, Defendant.

CIVIL ACTION NO. 12-10487-DPW | Filed 09/30/2015

<u>MEMORANDUM AND ORDER</u>

DOUGLAS P. WOODLOCK UNITED STATES DISTRICT JUDGE

Plaintiffs Veracode, Inc. and Rovi Solutions Corporation (collectively, "Veracode," except where otherwise noted) brought this action against Defendant Appthority, Inc., for infringing two patents, U.S. Patent No. 5,854,924 (the " '924 Patent") and U.S. Patent No. 7,752,609, (the " '609 Patent"), relating to the analysis and manipulation of computer code. The jury found that Appthority willfully infringed two claims (1 and 5) of the '924 Patent but did not infringe any claims of the '609 Patent. The jury also found that all asserted claims of the patents-in-suit were valid. Following a separate presentation of evidence as to damages, the jury awarded $781,857 to Veracode. Before me now is an array of post-trial motions. For the reasons that follow, I conclude that the jury's findings and its damages award were supported by substantial evidence, that the claims of the patents-in-suit were valid, that Appthority's infringement of claims 1 and 5 of the '924 Patent was willful, that an award of enhanced damages or attorneys' fees is unwarranted, and that a permanent injunction is appropriate to prevent further infringement of the '924 Patent.

I. BACKGROUND

A. Factual Background
*2 The underlying claims are described in greater detail in my order on claim construction, see *Veracode, Inc.* v. *Appthority, Inc.*, 2013 WL 5587946 (D. Mass. Oct. 9, 2013), but a brief summary may be helpful here. Veracode is a computer security company founded in 2006 that provides a cloud-based platform for analyzing flaws and security risks in software applications, as well as providing remediation services to help developers fix the flaws in their code. Appthority, Veracode's competitor, provides a similar cloud-based platform for analyzing the enterprise risk — specifically through the identification of malware and risky behaviors — in mobile phone applications. Appthority first made its platform available to the public in 2012.

Veracode is the exclusive licensee of the '924 Patent issued in 1998 and owned by Rovi. The '924 Patent is a "static debugging tool ... to detect the presence of program errors and potential errors" in the machine-code version of a piece of software without actually running the analyzed software. Veracode also owns the '609 Patent issued in 2010 but claiming priority to 2002. The '609 Patent is a "software analysis framework" that consists of a method of decompiling machine code — which humans cannot interpret — into a form "that one of a certain skill can analyze."

Both patents generate an intermediate file from a program's binary code. Binary code is a machine-readable form of code

that allows a computer to run a particular piece of software; it is originally written as source code by software developers and then compiled into binary form by a computer. Although binary code is not readable by humans, the intermediate file the patented technology generates is intelligible to persons of ordinary skill in the art of software development. A software developer can reverse engineer the intermediate code to reconstruct or approximate the program's original source code.

B. Procedural History

1. Initial Complaint and Pre-Trial Proceedings
Veracode filed its initial complaint on March 16, 2012, alleging willful infringement of the '924 and '609 Patents by

Appthority. Appthority asserted affirmative defenses of non-infringement and invalidity with respect to both patents. Following the completion of fact discovery, I conducted a *Markman* hearing and construed relevant claim terms. *See generally Veracode*, 2013 WL 5587946. Although the parties initiated summary judgment practice, I chose to bring the matter to trial for jury fact-finding.

Prior to trial, the parties agreed on limited claims and defenses each could assert at trial. The trial accordingly concerned asserted infringement by Appthority of claims 1, 5, and 17 of the '924 Patent[1] and claims 1, 13, and 14 of the '609 Patent.[2] Appthority's defenses for the jury were limited to anticipation, obviousness, and invalidity for lack of written description as to each patent. *Id.* Appthority's indefiniteness and other invalidity defenses were reserved for the court. *Id.*

2. Jury Verdict

*3 I held a ten-day trial on liability followed by a two-day trial on damages. The jury returned a split verdict. It found that Veracode established by a preponderance of the evidence that the Appthority Platform infringes claims 1 and 5 of the '924 Patent but not claim 17 or any of the claims of the '609 Patent. It further found that Veracode established by clear and convincing evidence that Appthority's infringement of the '924 Patent was willful. The jury rejected all of the invalidity defenses submitted to it, finding that Appthority did not establish by clear and convincing evidence that any of the asserted claims of the '924 or '609 Patents were anticipated, obvious, or invalid for lack of written description. After a separate presentation of evidence on damages, the jury found that Veracode had sustained damages in the amount of $781,857 as a result of Appthority's infringement.

3. Post-Trial Motions

Following the verdict, the parties submitted a total of eleven post-trial motions. Both parties renewed (at least in part) their earlier Fed. R. Civ. P. 50(a) motions for judgment as a matter of law, filed motions for judgment on partial findings pursuant to Fed. R. Civ. P. 52(c), and seek the award of attorneys' fees under 35 U.S.C. § 285. Veracode also filed motions for a permanent injunction, the award of enhanced damages under 38 U.S.C. § 284, and for entry of judgment. Appthority has filed a motion for a new trial and/or remittitur, and seeks a stay of any injunction. After a hearing on these motions, I invited the parties to submit further briefing.[3] I address these motions as a basis for entering a final judgment in this case.

C. Applicable Standards of Review

In considering these motions, I am guided by several distinct standards of review, dictated by the standards applied in this circuit. *See Jennings* v. *Jones*, 587 F.3d 430, 435-36 (1st Cir. 2009); *see also i4i Ltd. P'ship* v. *Microsoft Corp.*, 598 F.3d 831, 841 (Fed. Cir. 2010), *aff'd* 131 S. Ct. 2238 (2011).

Most of the parties' motions seek judgment as a matter of law. A motion for judgment as a matter of law on patent claims is reviewed according to First Circuit case law. *See Abbott GmbH & Co., KG* v. *Centocor Ortho Biotech, Inc.*, 971 F. Supp. 2d 171, 175 (D. Mass. 2013); *see also Versata Software, Inc.* v. *SAP Am., Inc.*, 717 F.3d 1255, 1261 (Fed. Cir. 2013), *cert. denied*, 134 S. Ct. 1013 (2014). Under Fed. R. Civ. P. 50(a)(1), a party may seek judgment as a matter of law on an issue after it has been fully heard by the jury on the basis that "a reasonable jury would not have a legally sufficient evidentiary basis to find for the [other] party on that issue." Where, as here, the court reserves the legal questions raised by the motion until after the jury returns a verdict, a party may file a renewed JMOL motion and may request in the alternative a new trial under Fed. R. Civ. P. 59. *See* Fed. R. Civ. P. 50(b). A Rule 50(b) motion may be granted only on a ground that was also raised in the preverdict motion.[4] *See Parker* v. *Gerrish*, 547 F.3d 1, 12 (1st Cir. 2008) ("a renewed motion for judgment as a matter of law under Fed. R. Civ. P. 50(b) is bounded by the movant's earlier Rule 50(a) motion" (quoting *Correa* v. *Hosp. S.F.*, 69 F.3d 1184, 1196 (1st Cir. 1995)).

*4 The burden for judgment as a matter of law, particularly after a jury verdict, is demanding. *See Ortiz* v. *Jordan*, 131 S. Ct. 884, 892 (2011); *Monteagudo* v. *Asociación de Empleados del Estado Libre Asociado de Puerto Rico*, 554 F.3d 164, 170 (1st Cir. 2009). To prevail on a renewed motion for JMOL following a jury trial, the moving party must show that "the evidence points so strongly and overwhelmingly in favor of the moving party that no reasonable jury could have returned a verdict

adverse to that party." *Id.* (quoting *Marcano Rivera* v. *Turabo Med. Ctr. P'ship*, 415 F.3d 162, 167 (1st Cir. 2005)); *see Pannu* v. *Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998) (citing *Perkin-Elmer Corp.* v. *Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir. 1984)). In reviewing a JMOL motion, I view the evidence in the light most favorable to the non-moving party, and may not substitute my own view for that of the jury where the evidence is in conflict. *See Osorio* v. *One World Techs., Inc.*, 659 F.3d 81, 84 (1st Cir. 2011); *see also Perkin-Elmer Corp.*, 732 F.2d at 893.

The standard for a new trial pursuant to Fed. R. Civ. P. 59 is slightly different, and my authority to grant a new trial is much broader than my authority to grant judgment as a matter of law. *See Jennings*, 587 F.3d at 436. A new trial is appropriate only where "the verdict is against the weight of the evidence, ... the damages are excessive, or ... for other reasons, the trial was not fair to the party moving." *Cigna Fire Underwriters Co.* v. *Macdonald & Johnson, Inc.*, 86 F.3d 1260, 1262-63 (1st Cir. 1996). I will grant a new trial only where the verdict "amount[s] to a manifest miscarriage of justice." *Federico* v. *Order of Saint Benedict in R.I.*, 64 F.3d 1, 5 (1st Cir. 1995); *see Chedd-Angier Prod. Co.* v. *Omni Publ'ns Int'l, Ltd.*, 756 F.2d 930, 934 (1st Cir. 1985) ("A party is not entitled to a new trial merely because the evidence introduced at trial would have supported an opposite verdict.").

The parties also seek judgment on partial findings on several issues under Fed. R. Civ. P. 52(c). Rule 52(c) is designed to parallel Rule 50(a) and permit the court to enter a judgment when "it can appropriately make a dispositive finding of fact on the evidence." Fed. R. Civ. P. 52, advisory committee note, 1991 amend. However, "[t]he standards that govern judgment as a matter of law in a jury case have no bearing on a decision under Rule 52(c)." Fed. R. Civ. P. 52, advisory committee note, 2007 amend. In addressing a Rule 52(c) motion, the court is to weigh the evidence, assess the credibility of the witnesses, resolve evidentiary conflicts, and decide based on the preponderance of the evidence whether judgment should be granted in the moving party's favor. *See* 9C Charles Allen Wright & Arthur R. Miller, Federal Practice and Procedure § 2573.1 (3d ed. 2008). A Rule 52(c) judgment "must be supported by findings of fact and conclusions of law." Fed. R. Civ. P. 52(c); *see* Fed. R. Civ. P. 52(a). My findings and conclusions are set forth in this Memorandum and Order.

II. DEFENDANT'S INVALIDITY DEFENSES

Appthority bears the burden of establishing its invalidity defenses by clear and convincing evidence. *See Microsoft Corp.* v. *i4i Ltd. P'ship*, 131 S. Ct. 2238, 2242 (2011); *see also Colorado* v. *New Mexico*, 467 U.S. 310, 316 (1984) (proof by clear and convincing evidence requires "plac[ing] in the ultimate factfinder an abiding conviction that the truth of its factual contentions are 'highly probable' " (citation omitted)). I consider separately those defenses that were submitted to a jury – for which Appthority seeks judgment as a matter of law or a new trial under Fed. R. Civ. P. 50(b)[5] – and those that were reserved for the court – for which Appthority seeks judgment on partial findings under Fed. R. Civ. P. 52(c).[6]

A. Invalidity Defenses Submitted to the Jury (Doc. 250)

1. Background

*5 The jury considered whether the asserted claims of the '924 Patent were anticipated, obvious, or invalid for lack of written description due to the inclusion of the term "program error or potential program error." It also considered whether the asserted claims of the '609 Patent were anticipated or invalid for lack of written description due to the inclusion of the term "exhaustive." The jury found that Appthority did not establish by clear and convincing evidence that any of the asserted claims of the patents-in-suit were invalid on the grounds presented to it. Appthority now seeks judgment as a matter of law or a new trial as to its obviousness defense for the '924 Patent and its written description defenses for the '924 Patent and the '609 Patent.[7]

2. Obviousness of '924 Patent

a. Legal Standard

Under 35 U.S.C. § 103, a patent may not be obtained "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." Obviousness is a question of law, but it is predicated on factual underpinnings. *i4i Ltd.*, 598 F.3d at 845. A party seeking to invalidate a patent on obviousness grounds must demonstrate "by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Procter & Gamble Co.* v. *Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (quoting *Pfizer, Inc.* v. *Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)). In other words, the fact finder must determine whether each of the elements of the claimed invention was independently known in the prior art, and whether a reason existed at the time of the invention that would have prompted a person of ordinary skill in the art to combine the known elements in a way the claimed invention does. This entails consideration of "(1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any, of nonobviousness." *Uniroyal, Inc.* v. *Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050 (Fed. Cir. 1988); *see Graham* v. *John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966).

Secondary considerations suggesting that the claimed invention was not obvious include: commercial success of the products covered by the claim; a recognized need for a solution that was satisfied by the claimed invention; response to the invention, including industry acclaim and/or skepticism; superior results over closely related prior art; licensing of the patent due to the merits of the claimed invention; and attempts by the alleged patent infringer to patent the same or a similar invention. *See Transocean Offshore Deepwater Drilling, Inc.* v. *Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1305 (Fed. Cir. 2010); *Iron Grip Barbell Co.* v. *USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004); *B.F. Goodrich Co.* v. *Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582 (Fed. Cir. 1996). This evidence of secondary considerations "may often be the most probative and cogent evidence [of nonobviousness] in the record." *Stratoflex, Inc.* v. *Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983).

In assessing the evidence, the fact finder cannot rely on the benefit of hindsight and instead must "return to the time the invention was made," *Uniroyal*, 837 F.3d at 1050-51 (citing *Interconnect Planning Corp.* v. *Feil*, 774 F.2d 1132, 1138 (Fed. Cir. 1985)), to determine whether the obviousness of the claimed invention was highly probable. *Procter & Gamble*, 566 F.3d at 994. Although expert testimony is often critical to the question of obviousness, the Federal Circuit has consistently indicated that conclusory statements of obviousness by experts are inadequate to support a finding of obviousness. *Innogenetics, N.V.* v. *Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). An expert testifying as to obviousness should "provide the glue to combine [prior art] references," "explain what reason or motivation one of ordinary skill in the art at the time of the invention would have had to place these pieces together," and incorporate any "objective evidence of nonobviousness into her obviousness analysis." *InTouch Techs., Inc.* v. *VGO Commc'ns, Inc.*, 751 F.3d 1327, 1348-49 (Fed. Cir. 2014). *b. Analysis*

*6 Appthority asserts that the claimed invention of the '924 Patent simply combined known techniques of disassembling and decompiling for the purpose of debugging, which were articulated in an article published in 1995 by Australian computer scientists (the "Cifuentes article"), with known techniques of debugging assembly-level code, which were articulated in a patent filed in 1992 (the "Hansen patent"). *See* Cristina Cifuentes & K. John Gough, *Decompilation of Binary Programs*, 25 Software—Practice & Experience 811-829 (July 1995); Assembly Language Programming Potential Error Detection Scheme Sensing Apparent Inconsistency with a Previous Operation, U.S. Patent No. 5,132,972 (filed July 21, 1992). These publications were introduced at trial by Dr. Paul Clark, Appthority's expert, who testified that all of the elements of the '924 Patent existed in these publications, with the potential exception of the output arrangement.

Veracode does not dispute that aspects, if not all of the relevant elements, of the asserted claims of the '924 Patent were present in the prior art; instead, they contend that Appthority did not present any evidence that a person of ordinary skill in the art would have found each claim of the patent obvious in light of the prior art of the 1995 Cifuentes article and the 1992 Hansen patent. The parties agreed for the purposes of the invalidity defenses to the '924 Patent that the level of ordinary skill in the art is that of a person in the field of computer science with an undergraduate Bachelor of Science degree and/or about two years of practical programming experience or other software engineer experience, and an understanding of basic principles of analyzing computer programs in the 1996 time frame when the invention in the '924 Patent was conceived.

The only evidence Appthority offered at trial regarding a motive to combine these references or some perception of this combination as desirable was through Dr. Clark, its expert. Although expert opinions can be valuable in this context, "an

expert's opinion on the legal conclusion of obviousness is neither necessary nor controlling." *Avia Grp. Int'l* v. *L.A. Gear Cal., Inc.*, 853 F.2d 1557, 1564 (Fed. Cir. 1988), *abrogated on other grounds*, *Egyptian Goddess, Inc.* v. *Swisa, Inc.*, 543 F.3d 665 (Fed. Cir. 2008). At trial, defense counsel asked Dr. Clark:

> We talked earlier in your testimony about when you combine references, if we're using the Cifuentes '95 and the Hans[e]n patent together, that there are some things you consider about whether you can combine that. I'd like you to tell us why you think it is obvious to combine these two references.

Dr. Clark stated that:

> [T]his is assembly language, so it's intermediate code which is clearly mentioned by the Cifuentes article. And it talks about error detection, which it would include bugs. So there's certainly somebody who wanted to display an error list, if that was somehow inventive, would be able to look to both these references.

When asked whether this combination "would be intuitive or obvious to a programmer in the '95 or '96 time frame," Dr. Clark testified, "Sure. You would have, as I said, assemblers and assembly language were known and available tools to a programmer before 1996, to be sure."

That one *could* combine the references and had the tools to do so, however, is not the same as having the motive or suggestion to do so. To succeed on an obviousness defense, not only must "each and every element of [the] claimed invention" be presented in the prior art, *Procter & Gamble*, 566 F.3d at 994, but there must also be "some teaching or suggestion, in the prior art, to combine the elements." *Innogenetics*, 512 F.3d at 1374; *see Panduit Corp.* v. *Dennison Mfg. Co.*, 810 F.2d 1561, 1565 (Fed. Cir. 1987). I find Dr. Clark's conclusory testimony inadequate to satisfy this requirement, absent any indication that one *would* have connected the dots between the Cifuentes article and the Hansen patent in this way. *See InTouch*, 751 F.3d at 1348-49; *Innogenetics*, 512 F.3d at 1374.

*7 More importantly, the inferences Appthority asks to be drawn from Dr. Clark's direct testimony are rebutted by his cross-examination and the testimony of other witnesses. On cross-examination, Dr. Clark acknowledged that in his deposition he had testified that a person of ordinary skill in the art would *not* "simply provide the output of Cifuentes '95 into the Hansen debugging program and run the program." This position regarding the prospect of combining the concepts was supported by testimony from Dr. Aviel Rubin, who testified on behalf of Veracode that "the Cifuentes article and the Hansen invention are completely incompatible" because the Hansen patent processed only a certain type of assembly code with which the decompiler articulated in the Cifuentes article could not work. According to Dr. Rubin, because of this incompatibility, "Cifuentes actually teaches away from combining [with] something like Hansen," rather than motivating such a combination. Dr. Rubin further testified that, because of this apparent incompatibility, modifying the Cifuentes program to be compatible with the Hansen patent required skill far beyond that of a person of ordinary skill in the art, as the parties had defined it. The lack of motivation to combine the existing tools was also evidenced by the testimony of Mr. Christien Rioux, the inventor, who stated that, at the time, no one thought a practical decompiler was feasible. *Cf. ATD Corp.* v. *Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998) (no substantial evidence to support obviousness defense because "some of the cited references cautioned against" combining the prior art elements as the patented concept did, and the defendant's "witnesses themselves expressed the view that such [an invention] would be undesirable, providing cogent evidence that one of ordinary skill would not have deemed it obvious" to create such a product).

In short, Appthority failed to present evidence of a teaching or suggestion in the prior art to combine the references in the Hansen patent and the Cifuentes article, and that contention was affirmatively contested by Veracode. Where "the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful," it is appropriate to reject "hindsight claims of obviousness," which is a fair characterization of Dr. Clark's initial statements regarding the obviousness of the combination. *In re Kubin*, 561 F.3d 1351, 1359 (Fed. Cir. 2009) (citation omitted).

In addition to the absence of evidence of a motive or suggestion to combine the known concepts, several objective indicia of non-obviousness support the jury's finding. Commercial success is a key consideration – that occurs when "the product met an unsolved need and was quickly adopted by the ... industry." *ATD Corp.*, 159 F.3d at 546; *see Graham*, 383 U.S. at 17. This consideration "is only significant if there is a nexus between the claimed invention and the commercial success." *Ormco*

Corp. v. *Align Tech., Inc.*, 463 F.3d 1299, 1311-12 (Fed. Cir. 2006). There is a presumption that the commercial success of a patentee's product "is due to the patented invention" when "the successful product is the invention disclosed and claimed in the patent." *Id.* at 1312 (quoting *J.T. Eaton & Co.* v. *Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997)). When this presumption applies, the defendant bears the burden of presenting evidence that the "commercial success ... was due to any factor other than its patented structure." *See Demaco Corp.* v. *F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1394 (Fed. Cir. 1988). If, however, "the commercial success is due to an unclaimed feature of the device" or "was known in the prior art," the success is irrelevant. *Id.*

Appthority contends that there is an insufficient nexus between Veracode's commercial success and the claimed invention of the '924 Patent, because the patent did not bring any commercial success to the initial assignee or to Rovi for seven years after its issuance, and because Veracode paid only $2 million for the patent license but has invested over $65 million in research and development of its products. These arguments are not sufficiently specific to identify an alternative reason for or factor in Veracode's success other than the patented technology, and therefore do not serve to rebut the presumption that the success of Veracode's products that incorporate the '924 Patented technology is due to their inclusion of this technology. Indeed, Veracode presented evidence that it advertises the '924 Patent as part of the innovative nature of its products, pointing specifically to marketing materials indicating that its products that scan mobile applications to detect the presence of program errors and potential program errors are patent-protected, and to its interactions with potential customers, in which it articulated the license to the '924 Patent as a distinguishing feature of its products. There is no basis to believe that Veracode's investment in the license of the '924 Patent, and its investment in first deciding to obtain the license and then undertaking to harness that technology most effectively in the market, was not the basis for its commercial success.

*8 Veracode also points to other indicia of non-obviousness that support the jury's verdict. Ms. Samskriti King, Veracode's Executive Vice President for Product Strategy & Corporate Development, testified that Veracode has received several awards for its technology, including one in 2008 specifically for software that tests for security risks in binary code, as well as being recognized in the industry from 2009 through 2014 for its work in applications security testing. These recognitions specifically contemplate the claimed technology as the defining and innovative component of Veracode's products and therefore bear a sufficient nexus to the '924 Patent. *See Rambus Inc.* v. *Rea*, 731 F.3d 1248, 1256-57 (Fed. Cir. 2013); *Vulcan Eng'g Co.* v. *Fata Aluminum, Inc.*, 278 F.3d 1366, 1373 (Fed. Cir. 2002). In addition, Veracode offered evidence that Appthority had filed a provisional patent application seeking to patent very similar technology to the '924 Patented technology. *See Polaroid Corp.* v. *Eastman Kodak Co.*, 641 F. Supp. 828, 848 (D. Mass. 1985) (considering defendant's "own application concerning the patentability" of the underlying technology as "some evidence" that the patent's claims "are valid against the prior art"), *aff'd*, 789 F.2d 1556 (Fed. Cir. 1986).

These objective indicia suggest that the invention was not obvious in light of the prior art. *See Stratoflex*, 713 F.2d at 1538. For these reasons, I find that substantial evidence supported the jury's conclusion that the claims of the '924 Patent were not obvious.

3. Lack of Written Description

a. Legal Standard

Under 35 U.S.C. § 112, a patent specification must "contain a written description of the invention, and of the manner and process of making and using it, 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." That description must "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Vas-Cath Inc.* v. *Mahurkar*, 935 F.2d 1555, 1562-63 (Fed. Cir. 1991). The lack of an adequate written description can be a basis for finding the patent invalid. "[T]he 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." *Ariad Pharm., Inc.* v. *Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (citing *Vas-Cath*, 935 F.2d at 1555).

As with the nonobviousness requirement, compliance with the written description requirement is a question of fact focused on the time at which the patent process for the claimed invention began. *Ariad Pharm.*, 598 F.3d at 1351. Determining

whether the patentee "possessed" the claimed subject matter "requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art" at the time to assess whether the specific articulation in the disclosure demonstrates possession. *Id.* Articulated examples or "an actual reduction to practice" are not necessary to satisfy the written description requirement; rather, "the specification itself ... must demonstrate possession." *Id. at 1352.* A party challenging the validity of a patent based on lack of written description must demonstrate by clear and convincing evidence that the inventors did not possess the invention. *See Union Oil Co. of Cal.* v. *Atl. Richfield Co.*, 208 F.3d 989, 996-97 (Fed. Cir. 2000).

b. '924 Patent

Appthority contends that no reasonable jury could find that the '924 Patent is supported by an adequate written description regarding the claim term "program error or potential program error." Although Appthority's argument on this point is somewhat convoluted, its direction seems to be as follows: Appthority contends that Veracode interpreted my earlier construction of "program errors" – as "the result of an invalid or impossible maneuver" – to include the subjective opinion of an end-user or enterprise regarding a wanted or unwanted behavior, and that it is the end user's subjective preference that makes the behavior "invalid." *Veracode*, 2013 WL 5587946, at *5-7. According to Appthority, the testimony of Dr. Clark, its expert, establishes that the specification in the '924 Patent does not demonstrate to a person of ordinary skill in the art that the inventor of the '924 Patent had possession of a method or mechanism to determine an end user's opinion regarding specific behaviors, and consequently to determine whether such a behavior was in fact "invalid." Veracode simply responds that the term "program error" was well known in the art at the time and therefore that the specification is adequate.

*9 Appthority's argument is unpersuasive. Appthority seeks to reinvigorate a definition of "program error" that was rejected during claim construction, and to attribute a "subjective opinion" element to Veracode that it has not asserted.[8] Although Appthority is correct that Dr. Clark testified that the '924 Patent did not disclose a "user preference" or user privilege type of program error, or "things like access to a calendar or location tracking," and that "the written description of the '924 Patent would be insufficient "if you interpret the claims to include those types of errors" because they were not known to a person of ordinary skill in the art at the time, the term "program error" as it has been construed does not include such types of errors. In contrast, Dr. Rubin (Veracode's expert) testified, and the actual language of the '924 Patent demonstrates, that the '924 Patent provides multiple examples of a program error or potential program error, including "uninitialized memory, array bounds violations, accesses outside of allocated memory," and more. Dr. Clark acknowledged that the '924 Patent written description provided such a list of recognizable program errors. That Dr. Rubin did not testify as to the inclusion of any end-user preference error in "program error" is inapposite, where the term was not construed to include such errors. Accordingly, there was substantial evidence to support the jury's conclusion that the written description was adequate as to "program error" or "potential program error."[9]

c. '609 Patent

As for the '609 Patent, Appthority contends that no reasonable jury could find that the specification demonstrates possession of the claim term "exhaustive." Here, again, the dispute centers on the definition of the term itself. During claim construction, I concluded that the term "exhaustive" did not require construction because it was used in the claims according to its plain meaning. *See Veracode*, 2013 WL 5587946, at *15-16. In making its post-trial arguments, Appthority employs a definition of an "exhaustive" model as one that represents all necessary states and branches within the code – a definition that focuses on completeness of the representation – and contends that because such a model is impossible, as Dr. Clark testified, the patentee could not have possessed it. Veracode correctly observes that this construction of "exhaustive" was rejected during the claim construction process. *See id.* at *15. In turn, Veracode argues that an appropriate reading of the term "exhaustive" – that the model looks at every single line or instruction in the binary program file when building the claimed data and control flow models – is clearly supported in the specification (even though it does not appear in the specification), is understandable to persons of ordinary skill in the art at the time, and allowed such persons to recognize that the patentee invented what is claimed.

There is substantial evidence in the record to support Veracode's argument and the jury's verdict. Dr. Rubin identified the relevant language in the '609 Patent specification as: "What is also needed is a complete decompiling process and toolset that allows a full representation of the control and data flows of a target program such that all instructions and internal processes are fully represented at the nanocode level." He testified that it was clear from this language that the patent was aimed at creating a complete model "by looking at every single instruction in a program," and that this satisfactorily defined the "optimized, exhaustive model" claimed in the '609 Patent. The testimony of Dr. Steven Hanna, an expert for Appthority, is consistent with this understanding. Dr. Hanna testified that an optimized, exhaustive data and control flow model is one that "consider[s] all these instructions and how they are interrelated before pruning," rather than throwing away instructions *before* calculating dependencies between them. In other words, what is exhaustive is the model rather than the outcome. This is consistent with the use of the term "exhaustive" in the '609 Patent itself as modifying the word "model," and is consistent with my own construction of the term "complete" as being used in the claims "only to describe the intermediate representation, ... but not to directly describe the optimized model itself." *See Veracode*, 2013 WL 5587946, at *15.

*10 Dr. Clark's testimony is not inconsistent with this. Rather than employ the plain meaning of "exhaustive," Dr. Clark testified that he understood "exhaustive" to mean "to model all of the executable code then using current computer technology." He stated that such a feat is "computationally infeasible for a program of a certain size, depending upon the hardware." In his opinion, using this definition, the written description in the '609 Patent was inadequate, because "if we understand exhaustive not as it's being asserted but as I understand it, there's no disclosure that I can see that would tell me how to implement it." As the claim construction order makes clear, however, this definition of exhaustive is not the one relevant here.

Appthority misreads Mr. Rioux's testimony as supporting its argument when in fact it bolsters Veracode's appropriate reading of "exhaustive" as referring to the method used rather than the completeness of the final product. Mr. Rioux testified that a data flow graph could be "exhaustive just in how it's generated. Again, this covers the modeling, not what you do with it after." He further explained that "[y]ou can't be searchably complete. You can be transformably complete," and that the '609 Patent claimed technology did not aim to produce a data flow graph of a program that is one-hundred percent complete, because "it's not part of the modeling process." He emphasized that the modeling process in the claims is "structurally" complete, but not "searchably complete."

Appthority argues in the alternative that it presented sufficient evidence at trial to establish that Mr. Rioux, the inventor, did not have "possession of the claimed subject matter as of the filing date," as required under § 112, because a commercial product using the patented technology was not prototyped until at least two years later, and not released until at least five years later. *See Ariad*, 598 F.3d at 1351. Section 112, however, does not require an affirmative showing of possession of the invention. Instead, "a *purpose* of the written description requirement" is "to ensure that the applicant had possession of the invention as of the desired filing date." *Enzo Biochem, Inc.* v. *Gen-Probe Inc.*, 323 F.3d 956, 969 (Fed. Cir. 2002) ("A showing of 'possession' is ancillary to the *statutory* mandate that '[t]he specification shall contain a written description of the invention' "). The emphasis is on "the patentee's disclosure of such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention." *Id.* (internal quotation marks and citations omitted). Possession may be shown "by means of an affidavit or a declaration during prosecution." *Id.* Mr. Rioux's statements at trial that at least some of the products he worked on did not contain the patented technology after 2002 thus do not serve to defeat the presumption of validity of the patent where the written description adequately describes the claimed invention.

In sum, Veracode's asserted definition of the term "exhaustive" – understood by its plain meaning in the context of the '609 Patent – as referring to the model, rather than the product, was supported by the testimony at trial. Further, there was substantial evidence to support the conclusion that the description in the '609 Patent of the model adequately explained that it operates in an exhaustive fashion in a way that a person of ordinary skill in the art could understand at the time. *See Ariad*, 598 F.3d at 1351. Although the term does not appear in the specification, the specification describes the invention adequately. As a result, there is substantial evidence to support the jury's conclusion that the written description of the '609 Patent was sufficient.

4. Conclusion

*11 After reviewing the record, I am persuaded that the jury had a legally sufficient evidentiary basis to conclude that

Appthority did not demonstrate by clear and convincing evidence that either the '924 or '609 Patents are invalid on the basis of obviousness or lack of written description. Accordingly, I will deny Appthority's motion for judgment as a matter of law as to these invalidity defenses.

B. Invalidity Defenses Reserved for the Court (Doc. 229)

1. Background
The parties agreed that the invalidity defenses Appthority could assert during the jury trial would be limited to anticipation, obviousness, and invalidity due to lack of written description, as to both patents-in-suit. This agreement also permitted Appthority to present an invalidity defense of indefiniteness to the court, which it did following the close of evidence in the liability portion of the trial.

Appthority now asserts in addition that the '609 Patent is invalid because it consists of unpatentable subject matter. Veracode contends that this defense should not be considered because Appthority expressly waived it in the agreement with Veracode, and because Appthority did not pursue a patentable subject matter defense until raising it in its Rule 50(a) motion after the close of evidence and before the jury verdict.[10] Instead of including this claim in its renewed Rule 50(b) motion after trial, Appthority raises it in its separate motion for judgment on partial findings pursuant to Rule 52(c).

Appthority has resurrected a defense that had indeed been effectively abandoned. However, this defense was not necessarily waived, as Veracode contends, by the agreement between the parties. That agreement appears designed to limit the claims and invalidity defenses that would be presented *at trial*, and does not expressly preclude Appthority from raising this defense in a post-trial motion. *Cf. Wood* v. *Milyard*, 132 S. Ct. 1826, 1832 & n.4, 1833 n.5 (2012) (courts may resurrect forfeited defenses that party failed to preserve, but may not resurrect waived defenses that "party has knowingly and intelligently relinquished"). There is a practical consequence of this belated assertion, however: Veracode did not present evidence related to this defense and must – in theory – resort to arguing on a potentially incomplete record against the defense.

At the hearing on these post-trial motions, I afforded Veracode an opportunity to offer additional evidence regarding the patentability of the subject matter under the '609 Patent, which it did in the form of a declaration from Mr. Rioux. Appthority also submitted a declaration from Paul Clark in support of its position, and both parties offered additional argument on the issue by reference to the witnesses and exhibits offered at trial. Because Veracode has had an adequate opportunity to respond to this defense, I will not invoke principles of equitable estoppel to prevent consideration of this belatedly reasserted defense.

2. Unpatentable Subject Matter of '609 Patent

a. Legal Standard

As a threshold requirement for patent protection, the patented technology or subject matter of a patent must be patentable. 35 U.S.C. § 101. If this requirement is not satisfied, the patent is invalid. The purpose of § 101 is to ensure "that patent protection promotes, rather than impedes, scientific progress and technological innovation." *I/P Engine, Inc.* v. *AOL Inc.*, 576 F. App'x 982, 996 (Fed. Cir. 2014) (nonprecedential) (Mayer, J., concurring).

*12 Section 101 defines patentable subject matter as "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." The Supreme Court has identified three categories of unpatentable subject matter (or patent-ineligible concepts) because they fail to meet this definition: laws of nature, physical phenomena, and abstract ideas, including mental processes. *In re Bilski*, 545 F.3d 943, 952 (Fed. Cir. 2008) (en banc) (citing Supreme Court decisions), *aff'd sub nom. Bilski* v. *Kappos*, 561 U.S. 593 (2010). These categories are not patentable because "they are the basic tools of scientific and technological work," *Gottschalk* v. *Benson*, 409 U.S. 63, 67 (1972), and must be available for future use by others. Inventions relying on such patent-ineligible concepts become patentable only when they apply the concept "to a new and useful end." *Funk Bros. Seed Co.* v. *Kalo Innoculant Co.*, 333 U.S. 127, 130 (1948).

The Supreme Court has recently focused its attention on the patentability requirement, particularly in the realm of abstract ideas and mathematical processes. *See Alice Corp. Pty. Ltd.* v. *CLS Bank Int'l*, 134 S. Ct. 2347 (2014); *Mayo Collaborative Servs.* v. *Prometheus Labs., Inc.*, 132 S. Ct. 1289 (2012). Under *Alice* and *Mayo*, a defendant asserting that a patent covers unpatentable subject matter must satisfy a two-part test. *Alice*, 134 S. Ct. at 2354.

First, the defendant must show that the claims at issue are directed toward one of the patent-ineligible concepts. *Id.*; *see Mayo*, 132 S. Ct. at 1296-97. This step requires ascertaining the purpose of the claimed invention and analyzing whether that purpose is, for example, abstract. *See Cal. Inst. of Tech.* v. *Hughes Commc'ns Inc.*, 59 F. Supp. 3d 974, 980 (C.D. Cal. 2014).

If the defendant satisfies this burden, it must then satisfy the second step by demonstrating that there is no "inventive concept" in the claimed matter or technology that would "transform the nature of the claim into a patent-eligible application." *Alice*, 134 S. Ct. at 2354 (citing *Mayo*, 132 S. Ct. at 1294, 1297-98 (internal quotation marks omitted)). An "inventive concept" is one that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself." *Id.* (quoting *Mayo*, 132 S. Ct. at 1294 (alteration in original)). Looking for an inventive concept requires consideration of "the elements of each claim both individually and as an ordered combination." *Id.* (citing *Mayo*, 132 S. Ct. at 1297-98 (internal quotation marks omitted)). "[R]ecitation of conventional, routine, or well-understood activity will not save an abstract claim. ... But a claim element is not conventional just because it appears in prior art." *Cal. Inst.*, 59 F. Supp. 3d at 980. If the ordered combination of elements, considering all of the elements together, "constitutes conventional activity, the claim is not patentable." *Id.* However, even if a claim element individually is abstract (standing alone), "a series of conventional elements may together form an unconventional, patentable combination." *Id.*

b. Findings of Fact and Conclusions of Law

The '609 Patent claims a software analysis framework that consists of methods and systems of analyzing executable software code using a computer. As explained above, when a programmer writes a computer program, he or she does so in source code. That source code is not readable by computers, and as a result must be compiled into an intermediate file, which is then assembled into a binary that is readable by a computer; this final result is the executable file. Binary is not readable by humans. When the original source code is not available, decompilers and similar tools are used to translate a binary into an intermediate representation that is then readable by a programmer and can be used to determine, at least to some degree of accuracy, what the original source code for the program was.

*13 The claimed method in the '609 Patent processes executable software code to generate "an optimized, exhaustive data flow model" and "an optimized, exhaustive control flow model." In so doing, it decompiles the executable software code into an intermediate file form "that one of a certain skill can analyze." This provides "a complete model of the executable software code based on the optimized data flow model and the optimized control flow model," which "facilitate[s] analysis of the executable software code" by comparison to the intermediate file.[11]

Appthority contends that the '609 Patent claims are directed to a computerized, automated approach to software analysis that is based on longstanding technological approaches (data flow and control flow), which were previously done by hand using human mental processes, and are therefore unpatentable. Veracode apparently concedes that the concepts of control flow and data flow analysis are abstract ideas, but instead contends that the invention is directed at much more than these concepts and contains inventive components, because the specific processes articulated in the '609 Patent claims cannot be performed by humans and contain meaningful limitations on the abstract idea underlying the patent claims.

i. Directed to a Patent-Ineligible Concept

The focus in the first part of the *Alice/Mayo* test is on the purpose of the claimed invention, rather than its novelty. *See Enfish, Inc.* v. *Microsoft Corp.*, 56 F. Supp. 3d 1167, 1170-71 (C.D. Cal. 2014). The claimed invention here involves a

method of processing code to generate optimized, exhaustive data flow and control flow models. The specific features of these models – that they are optimized and exhaustive, for example – are relevant to the second part of the analysis, but not to the first, as Veracode contends.

Mathematical relationships and formulas, including algorithms, are considered abstract ideas. *DDR Holdings, LLC* v. *Hotels.com, L.P.*, 773 F.3d 1245, 1256 (Fed. Cir. 2014); *see Parker* v. *Flook*, 437 U.S. 584, 585 n.1, 594-95 (1978); *Gottschalk*, 409 U.S. at 67. The basic concept of translating binary code into an equivalent, legible code is, in essence, an idea of mathematics implemented by a mental process. *See Gottschalk*, 409 U.S. at 67 (concluding that "conversion of [binary-coded decimal] numbers to pure binary numerals can be done mentally" through "ordinary arithmetic steps a human would use," and that claim for computer to run conversion was patent-ineligible because these mathematical procedures require "no new machinery" to be carried out by computers); *Cal. Inst.*, 59 F. Supp. 3d at 993 ("concepts of encoding and decoding are longstanding steps in the process of error correction," and therefore claims that "explicitly recite the fundamental concepts of encoding and decoding data" are directed to abstract ideas).

Appthority has presented substantial evidence that the primary functions of the invention at issue here – control flow and data flow analysis – are longstanding, recognized building blocks of computer science. *See generally* Alfred V. Aho et al., Compilers: Principles, Techniques, and Tools (reprint 1988). Consistent with the policy purposes of the patent system, these basic principles are not patent-eligible. *See Enfish*, 56 F. Supp. 3d at 1174 ("Longstanding practices are often the building blocks of future research and development. Patents on these practices would significantly impede productive or inventive activity, to the detriment of society.").

*14 In addition, both parties recognize that it is possible to analyze binary code manually or mentally. "[A] method that can be performed by human thought alone is merely an abstract idea and is not patent-eligible .... because computational methods which can be performed *entirely* in the human mind are the types of methods that embody the 'basic tools of scientific and technological work' that are free to all men and reserved exclusively to none." *See CyberSource Corp.* v. *Retail Decisions, Inc.*, 654 F.3d 1366, 1372-73 (Fed. Cir. 2011) (citing *Gottschalk*, 409 U.S. at 67).

It is clear, then, that the claimed invention of the '609 Patent is directed at a building block of computer science and a fundamental practice in the industry, and therefore is directed at a patent-ineligible concept.

ii. Presence of an Inventive Concept

I ask next whether the patent consists exclusively of a building block concept, or whether it forms an inventive concept by offering "additional features that provide practical assurance that the process is more than a drafting effort designed to monopolize [the abstract, ineligible concept] itself." *Mayo*, 132 S. Ct. at 1297; *see Alice*, 134 S. Ct. at 2354. To survive this inquiry, the claims must do more than employ a generic computer to perform a task that has been long-recognized. This was the thrust of *Alice*, in which the Supreme Court stated that a claim "directed to [an] abstract idea" does not "transform that abstract idea into a patent-eligible invention" by "merely requir[ing] generic computer implementation.' "[12] *Alice*, 134 S. Ct. at 2357-58 (citing *Flook*, 437 U.S. at 594); *see Bilski* v. *Kappos*, 561 U.S. 610-11 (2010) ("the prohibition against patenting abstract ideas cannot be circumvented by attempting to limit the use of [the idea] to a particular technological environment").

Indeed, the case law makes clear that a process that simply automates a known transaction and requires nothing more than a generic computer to perform conventional computer functions and activities already known in the industry is not patent-eligible. *See Versata Dev. Grp., Inc.* v. *SAP Am., Inc.*, 793 F.3d 1306, 1327 (Fed. Cir. 2015) ("the presence of a general purpose computer to facilitate operations through uninventive steps does not change the fundamental character of an invention"); *see also buySAFE, Inc.* v. *Google, Inc.*, 765 F.3d 1350, 1351, 1355 (Fed. Cir. 2014) (claims not patent-eligible because they "are squarely about creating a contractual relationship ... that is beyond question of ancient lineage," and their "invocation of computers adds no inventive concept" because "[t]he computer functionality is generic")[13]; *Digitech Image Techs., LLC* v. *Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (claim employing "algorithms to manipulate existing information to generate additional information" not patent-eligible)[14]; *Planet Bingo, LLC* v. *VKGS LLC*, 576 F. App'x 1005, 1006 (Fed. Cir. 2014) (nonprecedential) (computerization of bingo game not patent-eligible because claim "consists solely of mental steps which can be carried out by a human using pen and paper"); *see also CyberSource*, 654 F.3d

at 1370 (invocation of the Internet to perform the transaction does not transform an ineligible claim into an eligible one). Even the addition of steps for implementing the abstract idea will not render the claim patent-eligible if the additional steps are routine and conventional, and therefore "add nothing of practical significance to the underlying abstract idea" or serve to limit it in some meaningful fashion. *See Versata Dev.*, 793 F.3d at 1334; *Ultramercial, Inc.* v. *Hulu, LLC*, 772 F.3d 709, 716-17 (Fed. Cir. 2014), *cert. denied sub nom. Ultramercial, LLC* v. *WildTangent, Inc.*, 135 S. Ct. 2907 (2015); *see also Mayo,* 132 S. Ct. at 1299 ("[w]ell-understood, routine, conventional activity," without more, is insufficient); *Enfish*, 56 F. Supp. 3d at 1176-77 (additional limitations on claims must supply sufficiently inventive concepts).

*15 Despite this limitation on patent eligibility for claims involving computer implementation of abstract ideas or known mathematical algorithms, *Alice* left open the possibility that a method that "purport[s] to improve the functioning of the computer itself" or "effect an improvement in any other technology or technical field" could be patent-eligible. *Alice*, 134 S. Ct. at 2359; *see Enfish*, 56 F. Supp. 3d at 1172-73; *Cal. Inst.*, 59 F. Supp. 3d at 980.[15] A claim for a computer-implemented process that solves a technological problem the industry faces, for example, is patentable under the *Alice* framework. *Cf. Diamond* v. *Diehr*, 450 U.S. 175, 177-78 (1981) (computer-implemented process that employed widely used mathematical equation to solve technological problem was patentable); *Versata Dev.*, 793 F.3d at 1327 (claim that "solve[s] a technical problem using a technical solution" may be patentable). *DDR Holdings* provides an example of such a process. In that case, the Federal Circuit upheld an Internet-based claim as a patent-eligible inventive concept where the claimed solution was "necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks," because it "amount[ed] to an inventive concept for resolving this particular Internet-centric problem" and was narrowly defined. *See DDR Holdings*, 773 F.3d at 1257, 1259. Judge Pfaelzer similarly concluded that a claim for a particular computer-based process survived the *Alice* test because it presented "a unique computing solution that addresses a unique computing problem." *Cal. Inst.*, 59 F. Supp. 3d at 1000.[16]

With these principles in mind, I turn to the specific language of the claims of the '609 Patent, focusing primarily on claim 1.[17] Claim 1 consists of "[a] method for analyzing executable software code using a computer comprising a processor and a memory." As stated above, the method includes the following elements: "processing the executable software code to generate an optimized, exhaustive data flow model including parsing the executable software code to facilitate identification of data flows for inclusion in the exhaustive data flow model," "processing the executable software code to generate an optimized, exhaustive control flow model," and "storing, in the memory, an intermediate representation of the executable software code that provides a complete model of the executable software code based on the optimized data flow model and the optimized control flow model, thereby facilitating analysis of the executable software code according to comparison of the intermediate representation to reference models."

*16 Standing alone, the method is an abstract idea. The translation of binary code and storing of an intermediate representation that can be used to analyze the underlying executable software code – in other words, decompilation – is not of ancient lineage like the contract, bank transaction, and bingo games at issue in *buySAFE*, *Digitech*, and *Planet Bingo*, but it is sufficiently well-established that there must be some meaningful innovative concept to render it patent-eligible. *See Gottschalk*, 409 U.S. at 67; *Cal. Inst.*, 59 F. Supp. 3d at 993-94. This was illustrated by Mr. Rioux's own testimony at trial that the process could, at least in some limited capacity, be performed manually. That this method is implemented "using a computer" is not enough to render it patentable. *See Alice*, 134 S. Ct. at 2358.

Appthority - seizing on Mr. Rioux's testimony that the claimed method could be performed manually[18] - argues that the patent does not indicate any mechanism by which the computer-implemented method improves this longstanding process rather than simply automating it. To the contrary, however, the claimed method's focus on the generation of an optimized, exhaustive model, as these descriptors have been defined in the claim construction process, renders the claimed invention more complex than what could be done by humans and transforms the claimed invention from an abstract idea simply automated by a computer into an inventive concept.[19]

During claim construction, I found that "optimized" meant "refined by iteration until substantially all data variables or control branches are modeled." *See Veracode*, 2013 WL 5587946, at *13. An optimized model "models 'substantially all data variables or control branches.' " *Id.* I found that "exhaustive" did not require construction because it was used in the ordinary sense of the word. *See Veracode*, 2013 WL 557946, at *15-16.[20]

The evidence presented at trial and through the subsequent submissions of the parties demonstrates that the optimized and

exhaustive features of the claimed method "effect an improvement" in the technical field and the preexisting technology, compared to what could be done by humans or simply by automating a manual process. *See Alice*, 134 S. Ct. at 2359. The evidence demonstrates that in the mid-1990's, software security analysts had three options available for analyzing software for bugs and program errors. First, they could conduct static analysis by looking at the source code for the software, mentally building a model of it, and looking for potential security problems. This method was often incomplete because the software developer would not provide the complete source code, resulting in gaps or "blind spots" in the security analysis. Second, they could conduct a dynamic analysis by running or executing the program, trying out various inputs, and watching how the program responds. This too had major deficiencies because it was limited to the time and creativity of the security analyst inputting various commands and activities into the program. Third, they could attempt to manually decompile the binary into an intermediate representation, a task that was described by Dr. Rubin - Veracode's expert - as impossible without the assistance of a decompiler. The available decompilers, however, were impractical and ineffective, because they lost program elements in translation and therefore did not adequately preserve the meaning of the underlying program. The result, according to Dr. Rubin, was an approximation of the program that was "very rough" and "missing a lot of information from the actual ... program." Even Appthority's expert, Dr. Clark, described decompilation as akin to taking something that had been translated from English to Chinese (i.e., source code to binary) and using a different translator to translate it back to English. The consequence of these omissions was that "any bugs or program errors that there might have been in that binary may not even be represented in the high level language output that you would get from decompiling."

*17 It was this third method that the claimed method under the '609 Patent sought to improve upon. By employing a method that involves multiple iterations or progressive steps to achieve as comprehensive as possible models, essentially mimicking the process employed for compilation, Mr. Rioux's decompilation method overcame numerous shortcomings of existing methods for identifying security risks in producing a more complete and accurate model of the underlying software. By including both control flow and data flow models that aim for both optimization and exhaustion, the method achieves a more accurate and more complete translation of the binary for security analysts to review than what the existing methods could provide. An optimized data flow model, Dr. Rubin testified, is built up by iteration by "going through a loop in the code in the analyzer, and modeling substantially all of the variables that write to memory and read from memory." Similarly, an optimized control flow model "models substantially all of the control flow branches in the program."

These achievements – that is, the process and result of producing a more complete model of the computer program being analyzed – are ones that could not be done using the technology as it existed at the time, according to the trial testimony, and that rely upon the complex functions of the patented computer system. The claimed method performs steps that a human mind can take only so far; it thus continues the iterative process further toward completion than a human mind could, and than the existing technology could. *Cf. Enfish*, 56 F. Supp. 3d at 1181 (program that "recites a modern, computer-specific concept to solve the modern, computer-specific problem of scarce memory" would be patentable because "it is addressed to an inventive computing concept"). If the invention merely improved the speed and accuracy of a particular task through computer implementation, that would not be enough to generate a patent-eligible concept. *See Intellectual Ventures I LLC* v. *Capital One Bank (USA)*, 792 F.3d 1363, 1368, 1370 (Fed. Cir. 2015); *OIP Techs., Inc.* v. *Amazon.com, Inc.*, 788 F.3d 1359, 1363 (Fed. Cir. 2015); *Enfish*, 56 F. Supp. 3d at 1181. But the claimed method exceeds mere automation of a well-known process by harnessing and improving upon the unique properties and complex capacities of computer technology. The claimed method both improved the speed and accuracy of the process and produced a largely *complete* result through optimization and exhaustion that was unobtainable using existing methods.

The '609 Patent claims share important characteristics with those at issue in *DDR Holdings*. In that case, the Federal Circuit observed that the claims at issue did "not recite an invention as technologically complex as an improved, particularized method of digital data compression," but they also did not "recite a commonplace business method aimed at processing business information, applying a known business process to the particular technological environment of the Internet, or creating or altering contractual relations using generic computer functions and conventional network operations, such as the claims in *Alice, Ultramercial, buySAFE, Accenture*, and *Bancorp*." *DDR Holdings*, 773 F.3d at 1259; *see Bancorp Servs., L.L.C.* v. *Sun Life Assurance Co. of Can. (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012). Rather, the claims were directed to more than an abstract concept because they included "additional features" that specified how certain Internet-based interactions would be "manipulated to yield a desired result." *Id.* at 1259. As the Federal Circuit later observed, "[t]he patent at issue in *DDR* provided an Internet-based solution to solve a problem unique to the Internet that (1) did not foreclose other ways of solving the problem, and (2) recited a specific series of steps that resulted in a departure from the routine and conventional sequence of events after the click of a hyperlink advertisement." *Intellectual Ventures*, 792 F.3d at 1371 (citing

DDR Holdings, 773 F.3d at 1256-57, 1259).

*18 Here, the '609 Patent claims do not claim a monopoly over all decompiling methods, but rather focus on a specific method for generating as-complete-as-possible data and control flow models in the form of an intermediate representation that can be used to identify flaws in the executable software code. In so doing, the '609 Patent does not claim the broad concept of an intermediate representation, but rather a narrower manifestation of it, by articulating an iterative process that had previously been unavailable to programmers and security risk analysts that addressed the problem of analyzing illegible binary code. As in *DDR Holdings*, 773 F.3d at 1258, the claims here are directed to a "solution [that] is necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer[s]." *Cf. Versata Dev.*, 793 F.3d at 1334 (claim that "involve[s] arranging a hierarchy of organizational and product groups," storing, retrieving, and sorting pricing information, "eliminating less restrictive pricing information, and determining the price" does not impose "sufficient additional limitations to transform" "basic conceptual framework for organizing information" into something inventive and is not patent-eligible); *Digitech*, 758 F.3d at 1349-50 (claim that "recites a process of taking two data sets" that are "generated by taking existing information," and "combining them into a single data set, the device profile," and does not add any additional limitations, simply employs mathematical algorithms to manipulate existing information to generate additional information'' and is not patent-eligible); *Bascom Research, LLC* v. *LinkedIn, Inc.*, 77 F. Supp. 3d 940, 950-954 (N.D. Cal. 2015) (analogizing to *Digitech*, observing that "[e]stablishing relationships between document objects and making these relationships accessible is not meaningfully different from classifying and organizing data," and therefore concluding that claims at issue were not patent-eligible because they did not include any additional features other than computer implementation).

In sum: the fact of having to translate from one language (source code) to another (binary) is in many respects unique to the world of software and computers. The claimed method, by offering an iterative process for achieving an optimized and as-near-to-exhaustive modeling of the underlying software as possible to enable a more complete security analysis to be conducted than could be performed through basic automation of human processes, presents "a unique computing solution that addresses a unique computing problem." *Cal. Inst.*, 59 F. Supp. 3d at 1000; *see Enfish*, 56 F. Supp. 3d at 1181. For the reasons more fully set forth above, I find and conclude that Claims 1, 13, and 14 of the '609 Patent are patent-eligible under § 101.

3. Indefiniteness

Appthority contends that the '924 Patent is invalid due to indefiniteness of the term "program errors or potential program errors" and that the '609 Patent is invalid due to indefiniteness of the term "exhaustive."

a. Legal Standard

Under 35 U.S.C. § 112, ¶ 2, a patent must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [the] invention."[21] An indefinite specification is a basis for invalidity.

As with patent eligibility, the Supreme Court has recently revisited the standard for definiteness. *See Nautilus, Inc.* v. *Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). Under *Nautilus*, the definiteness requirement focuses on whether "a patent's claims, viewed in the light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Id.*; *see Biosig Instruments, Inc.* v. *Nautilus, Inc.*, 783 F.3d 1374, 1379-80 (Fed. Cir. 2015) ("reasonable certainty" is defined on a spectrum but is clearer than earlier indefiniteness standard). The inquiry looks specifically at "the understanding of a skilled artisan at the time of the patent application," *Nautilus*, 134 S. Ct. at 2130, and requires that the specification be sufficiently specific to "provide objective direction to one of skill in the art." *DDR Holdings*, 773 F.3d at 1260 (citing *Datamize, LLC* v. *Plumtree Software, Inc.*, 417 F.3d 1342, 1350 (Fed. Cir. 2005)). Although this definiteness standard "must allow for a modicum of uncertainty" and "recogniz[es] that absolute precision is unattainable," it requires "clear notice of what is claimed, thereby appris [ing] the public of what is still open to them." *Nautilus*, 134 S. Ct. at 2128, 2129. Examples in the specification may be adequate for some terms, such as those of degree, but are not adequately directive for "some facially subjective terms." *Id.* As with other invalidity defenses, the defendant

bears the burden of proving indefiniteness by clear and convincing evidence. *See* Tech. *Licensing Corp.* v. *Videotek, Inc.*, 545 F.3d 1316, 1327 (Fed. Cir. 2008). A patent is presumed valid unless and until it is proven otherwise. *See Bancorp Servs., L.L.C.* v. *Hartford Life Ins. Co.*, 359 F.3d 1367, 1371 (Fed. Cir. 2004). I look to the language of the patent itself, the evidence presented at trial and at the indefiniteness hearing I held outside the presence of the jury, and other sources of intrinsic and extrinsic evidence adduced by the parties. *See Nautilus*, 134 S. Ct. at 2129.

b. *'924 Patent – "Program Errors or Potential Program Errors" –Findings of Fact and Conclusions of Law*

*19 The '924 Patent claim specification does not provide an explicit definition for "program errors." However, it offers a long list of examples of the types of errors the claimed technology could detect, including "errors such as uninitialized memory, array bounds violations, accesses outside of allocated memory, inconsistent argument types or returns between calls and called functions, and functions that are not consistent in their returns or that do not return may all be readily detected using the inventive static debugging tool," and "a wide variety of other program errors such as invalid references to automatic memory (either through function returns or by assignments to globals which are referenced after the owning function has returned), accessing freed memory, and frees of non-allocated memory." '924 Patent, at 9:3-13.

During the claim construction process, I construed the term "program errors" to mean "the result of an invalid or impossible maneuver." *Veracode*, 2013 WL 5587946, at *7. In so doing, I observed that "[t]here are a variety of conceivable reasons why a software developer might purposefully include a function that would return an impossibility or conduct an illegal maneuver in order to advance the purposes of the program," and that the specification itself included "as examples of potential errors that the patented analyzer detects, certain errors that might be either intentional or unintentional." *Id.* at *6-7. The specification, I concluded, made clear that the Patent was not limited to unintentional errors. *Id.* at *7.

Appthority argues that the term "program errors" is ambiguous because it could include a full range of behaviors, and that the inclusion in the specification of examples of types of errors and a catch-all provision for "potential program errors" does not cure this ambiguity. The testimony does not support this argument. Dr. Rubin, Veracode's expert, testified that the specification adequately explains to one of ordinary skill in the art what "program errors" means in the context of the patent, particularly in light of the examples provided. Dr. Clark, Appthority's expert, also testified that he knows what a program error is as defined within the specification, and listed certain types of program errors known at the time of the invention and consistent with the examples given in the patent specification – bugs, viruses, Trojan Horses, malware, adware, and other errors within the program file – that "nobody would argue are not program errors."

Interval Licensing LLC v. *AOL, Inc.*, 766 F.3d 1364, 1373 (Fed. Cir. 2014), on which Appthority relies for this argument, is distinguishable. In that case, the court rejected the argument that "a single 'e.g.' phrase from a lengthy written description [could] serve as the exclusive definition of a facially subjective claim term." *Id.* The specification in that case "offer[ed] no indication" of the scope of the undefined term, "thus leaving the skilled artisan to consult the 'unpredictable vagaries of any one person's opinion.' " *Id.* at 1374 (quoting *Datamize*, 417 F.3d at 1350). However, the court recognized "that a patent which defines a claim phrase through examples may satisfy the definiteness requirement." *Id.* at 1373. Whether examples are adequate, particularly "when a claim limitation is defined in purely functional terms," is "highly dependent on context (e.g., the disclosure in the specification and the knowledge of a person of ordinary skill in the relevant art area)." *Enzo Biochem*, 599 F.3d at 1332-33 (internal quotation marks and citation omitted); *see Halliburton Energy Servs., Inc.* v. *M-I LLC*, 514 F.3d 1244, 1255 (Fed. Cir. 2008).

Here, the specification provides nine examples of the types of included program errors. During claim construction, I observed that "[m]any of the examples of errors listed in the specification—such as accessing invalid memory and array bounds violations—are useful tools for exploitation or subversion," that is, they are errors that could be recognized as malware or viruses. *See Veracode*, 2013 WL 5587946, at *15. These examples are sufficiently definite and descriptive to enable a person of ordinary skill in the art at the time to determine whether some other, non-listed type of program error is "the result of an invalid or improper maneuver" and of the type the patented technology was designed to detect. *Cf. Enzo Biochem*, 599 F.3d at 1336.

*20 Much of Appthority's argument of indefiniteness hinges on a specific subset of errors it contends was intended to be

captured by the '924 Patent claims but is not. It asserts that in the mobile application context, whether application behavior constitutes a "program error or potential program error" is based on the subjective opinion and preferences of an individual user. Where individuals set their own preferences and permissions for mobile application resource access, what constitutes a "program error" or what is "the result of an invalid or impossible maneuver" cannot be known on a global scale, because what is "invalid" or "impossible" is locally defined. Under this definition, Appthority argues, any behavior at all in a mobile application could be considered a program error, as an individual user could deny permission to any type of behavior. *Cf. Geneva Pharms., Inc.* v. *GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003) (rejecting proposed construction of term at issue because it constituted "the epitome of indefiniteness," as "one of skill would not know from one bacterium to the next whether a particular composition standing alone is within the claim scope or not"). Appthority accordingly argues that the term "program error" as it is used in the '924 Patent cannot be understood with any reasonable certainty, because it does not make any reference to such user-driven errors, and a person of ordinary skill would not know whether the patent claimed detection of such errors. *Cf. Interval Licensing*, 766 F.3d at 1369 (where "the determination of whether an accused product would meet the claim limitations depends on its usage in changing circumstances," the definition is not an objective one that can produce reasonable certainty of what is claimed).

This argument misses the mark for several reasons. First, there is substantial evidence that the term program errors does not include user-driven errors, and that the term would have been understood by a person of ordinary skill in the art at the time in a way that did not include such errors. Dr. Clark testified that there was no indication that the '924 Patent contemplated program errors or potential program errors that are driven by user permissions external to the program; instead, "program error" contemplated features internal to the program. Dr. Rubin agreed that there was nothing in the claim specification about user configurations. This is because errors that constitute errors merely because of an individual user's preferences are not the type of errors detected by the claimed invention or understood to be included in the meaning of "program errors" as that term is used in the '924 Patent language. As discussed above, these experts testified that they had no problem understanding the meaning and limits of the term "program errors" when they employed the definition identified during claim construction. Appthority has not presented any evidence that the Patent intended to capture user-driven errors based on circumstances external to the program or application, or that a person of ordinary skill in the art would have been unsure whether "program errors" was intended to include such errors. Indeed, Appthority has recognized that there is no basis in the specification for including as "program errors" those errors that are generated based on external permission schemas as opposed to errors in the program code itself.

Second, although Appthority argues that user-driven errors are the type of error that Veracode alleges the Appthority Platform detects in infringing the '924 Patent, and therefore that this type of error must have been intended to be included in the '924 Patent claims but is not clearly encompassed, Veracode could prove infringement using the definition of "program errors" adopted in claim construction and without including user-driven errors.

That there was testimony regarding the potential for user preferences to make all sorts of behaviors into "program errors" does not mean that Appthority's product did not infringe upon the '924 Patent claims using the narrower definition of "program errors." The Appthority Platform could detect such user-driven errors while also detecting precisely the type of program errors identified in the '924 Patent specification using static analysis.[23] Indeed, Dr. Rubin and Dr. Hanna (another expert for Appthority) testified that the Appthority Platform detects precisely the type of program errors contemplated by the '924 Patent and does so without knowledge of subjective user preferences. Dr. Rubin's testimony as a whole makes clear that he understood that whether a certain behavior constitutes a program error or potential program error is not based on what the subjective user preferences are, but rather on the nature of the given mobile application, its purpose and function, and what permissions it would employ in its regular and proper functioning. What constitutes a program error in this context is an objective determination rather than a subjective, user-preference-based one. Dr. Rubin's testimony that malware is a program error because it "isn't something that they want" does not refer to subjective user preferences; rather, it is an objective conclusion that no user would want malware.[24] Dr. Rubin's conclusion that the Appthority Platform detected such program errors was therefore based on a definition that is made reasonably certain by the specification and the knowledge of persons of ordinary skill in the art at the time, and one that was adopted in this case during claim construction.

*21 The crux of the inquiry is whether a person of ordinary skill in the art at the time would have any "*reasonable* uncertainty about the governing scope of the claims." *Ancora Techs., Inc.* v. *Apple, Inc.*, 744 F.3d 732, 737 (Fed. Cir. 2014), *cert. denied*, 135 S. Ct. 957 (2015). There is no evidence that any aspect of the specification would "engender confusion" whether the claim was directed at user-driven errors; it can be inferred from both the specification and the testimony at trial

that any confusion would be unreasonable in this context. *See id.* There is simply no support in the specification or the testimony and evidence presented at trial for Appthority's assertion otherwise. I conclude that the term "program errors," as read through the examples provided in the claim specification, provides "objective boundaries for those of skill in the art" and is not indefinite. *Interval Licensing*, 766 F.3d at 1371 (citing *Nautilus*, 134 S. Ct. at 2130 & n.8).

c. '609 Patent – "Exhaustive" – Findings of Fact and Conclusions of Law

The '609 Patent claims a method and system that generates "an optimized, exhaustive data flow model" and an "optimized, exhaustive control flow model." The term "exhaustive" appears in the claims themselves but not in the specification. During claim construction, Appthority advocated a definition of "exhaustive" as "testing all program possibilities, or considering all program elements, from entry to exit," which I considered overly complicated where the term is not a technical or ambiguous one. *Id.* at *15. Accordingly, I declined to construe the term "exhaustive" because it is used in the Patent "according to its plain, ordinary meaning." *Veracode*, 2013 WL 5587946, at *15-16.

In asserting that the term "exhaustive" is indefinite, Appthority renews the argument I rejected during claim construction. Appthority asserts that the focus in the '609 Patent is on the "complete," "exhaustive," nature of the claimed data flow and control flow modeling, as this comprehensive nature is what distinguishes the patented technology from the prior art decompilers, which were known to use imprecise and incomplete statement modeling tools that result in incompletely defined data flow or control flow. However, truly exhaustive flow modeling is impossible, as demonstrated by the prior art and by the testimony of both Dr. Clark and Mr. Rioux at trial. Where complete flow modeling is impossible, the term "exhaustive" – absent any indication of how thorough or complete the modeling must be if it is to be something better than the prior art but less than 100% – is indefinite when defined as Appthority seeks to define it.

The parties do not dispute that complete flow modeling as Appthority defines it is not possible. Instead, Veracode argues that because such modeling was impossible, persons of ordinary skill in the art at the time would have known that "exhaustive" did not carry this definition. Instead, a person of ordinary skill in the art at the time would have reasonably understood "exhaustive," as it is used in the '609 Patent, to refer to a data or control flow model that has been generated by examining every single line of the executable software code (the binary). As discussed in greater detail above, this understanding is supported by the specification itself and by the testimony of Dr. Rubin, Dr. Hanna, Dr. Clark, and the inventor, Mr. Rioux, at trial. *See supra*, II.B.3.C (lack of written description).

Importantly, the language of the '609 Patent and the testimony at trial demonstrate how the patented technology is different from the prior art. *See Halliburton*, 514 F.3d at 1252 ("[A] claim's definiteness [can] include whether the patent expressly or at least clearly differentiates itself from specific prior art. Such differentiation is an important consideration ... because ... a person of ordinary skill is likely to conclude that the definition does not encompass that which is expressly distinguished as prior art."). The background section of the patent explains that "[w]hat is ... needed is a complete decompiling *process* and toolset that allows a full representation of the control and data flows."

*22 Further, in making clear that "exhaustive" refers to the process of creating the model rather than the completeness of the model itself, the '609 Patent adequately defines the parameters of what is arguably a term of degree. *See Biosig*, 783 F.3d at 1378 ("When a word of degree is used, the court must determine whether the patent provides some standard for measuring that degree." (quoting *Enzo Biochem*, 599 F.3d at 1332 (internal quotation marks omitted))); *see Interval Licensing*, 766 F.3d at 1370 ("Claim language employing terms of degree has long been found definite where it provided enough certainty to one of skill in the art when read in the context of the invention."). Here, the explanation in the '609 Patent makes clear that the process of preparing the intermediate representation was exhaustive in that it looked through all of the underlying binary code. A person of ordinary skill in the art would know, based on the prior art, that it is impossible to generate a one-hundred-percent complete model, and that the "exhaustive" nature of the model referred to the process of creating it.

I find that the claim description and specification adequately explained the term "exhaustive" such that a person of ordinary skill in the art at the time would know with reasonable certainty what the claimed invention was.

4. **Conclusion**

Based on the factual findings and reasons set forth above, I conclude that Appthority did not prove by clear and convincing evidence that the '609 Patent is based on unpatentable subject matter or that any of the terms of the '609 Patent or the '924 Patent are indefinite.

III. WILLFUL INFRINGEMENT

Having put the invalidity defenses to rest, I turn to the question of infringement. Both parties challenge the jury's findings of direct infringement. Veracode claims that Appthority infringed all of the claims-in-suit for both patents, and not merely Claims 1 and 5 of the '924 Patent as the jury found, whereas Appthority contends that it did not infringe any of the claims-in-suit. In addition, Appthority challenges the jury's finding that its infringement of the '924 Patent was subjectively willful, and seeks a determination in its favor that any infringement on its part was not objectively willful. Veracode, for its part, seeks confirmation of the jury's willfulness finding and a ruling that Appthority's infringement was objectively willful as a matter of law.

A. Direct Infringement **(Docs. 191, 198, 238, 250)**

1. **Legal Standard**

A party directly infringes a patent when it "without authority makes, uses, offers to sell, or sells any patented invention, within the United States ... during the term of the patent therefor." 35 U.S.C. § 271(a); *see Cross Med. Prods., Inc.* v. *Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1310 (Fed. Cir. 2005). To be liable for direct infringement under 35 U.S.C. § 271(a), a party must commit all of the acts necessary to infringe the patent. *See Cross Med.*, 424 F.3d at 1310. Accordingly, to prove infringement, a patentee "must establish that the accused device includes every limitation of the claim or an equivalent of each limitation." *Dolly, Inc.* v. *Spalding & Evenflo Cos.*, 16 F.3d 394, 397 (Fed. Cir. 1994); *see Frank's Casing Crew & Rental Tools, Inc.* v. *Weatherford Int'l, Inc.*, 389 F.3d 1370, 1378 (Fed. Cir. 2004). To do so, "a patentee must either point to specific instances of direct infringement or show that the accused device necessarily infringes the patent in suit." *ACCO Brands, Inc.* v. *ABA Locks Mfrs. Co., Ltd.*, 501 F.3d 1307, 1312 (Fed. Cir. 2007).

2. **'609 Patent**

The jury found that the Appthority Platform did not infringe any of the claims at issue of the '609 Patent. Veracode now seeks judgment as a matter of law that Appthority directly and willfully infringes claims 1, 13, and 14 of the '609 Patent.

Claim 1 of the '609 Patent consists of a method that processes the executable software code to generate "optimized, exhaustive" data flow and control flow models and then stores "an intermediate representation of the executable software code that provides a complete model of [the code] based on" the optimized data and control flow models. Claim 13, which is dependent on Claim 1, consists of the method in Claim 1 and the function of analyzing the intermediate representation and identifying "one or more flaws in the executable software code." Claim 14 consists of a system for achieving the method described in Claim 1.

*23 In defending the jury verdict on the '609 Patent, Appthority reasserts its argument regarding the meaning of "exhaustive" as focusing on the completeness of the models, rather than on the process of creating them. This argument has been rejected previously in this case and elsewhere in this Memorandum and Order, and does not speak to the question of whether the Platform itself infringed the '609 Patent.

Leaving Appthority's unhelpful argument aside, there is nonetheless sufficient support in the record for the jury's verdict. Dr. Hanna, Appthority's expert, testified that the Appthority Platform engages in a "pruning process" in which it throws away numerous instructions before it refines the intermediate representation by iteration. In other words, the Platform discards instructions, including "all kinds of functions," before evaluating which instructions are needed to construct exhaustive data

and control flow models, "hoping we got things right," because doing so "save[s] some computational time." In Dr. Hanna's opinion, the Platform did not generate an exhaustive, optimized model of data flow or control flow because of this pruning process. That the Platform did not achieve models meeting the criteria of the '609 Patent is supported by the meaning of the term "optimized" adopted during claim construction as "refined by iteration until substantially all data variables or control branches are modeled." *Veracode*, 2013 WL 5587946, at *15.

Because the jury heard testimony it was entitled to credit that directly stated that the Platform did not model substantially all of the components of the binary file, the jury reasonably could have concluded that the Platform did not generate "optimized, exhaustive" data flow and control flow models, even if it also heard evidence to the contrary.[25]

3. '924 Patent

The jury found that the Appthority Platform infringes Claims 1 and 5 of the '924 Patent, but does not infringe claim 17 of the '924 Patent. Appthority now seeks judgment as a matter of law that there was not substantial evidence to support the jury's verdict as to Claims 1 and 5. Veracode seeks judgment as a matter of law that there was not substantial evidence to support the jury's verdict as to Claim 17, or in the alternative, a new trial on the issue.

a. Claim 1

To prove that the Appthority Platform infringes Claim 1 of the '924 Patent, Veracode was required to present sufficient evidence that the Platform (1) statically analyzes binary files; (2) statically analyzes intermediate files that represent the binary files to detect the presence of (3) program errors or potential program errors, as defined and contemplated by the '924 Patent; and (4) outputs an error list of the errors or potential errors detected.

The parties do not dispute, and the testimony and evidence at trial makes clear, that at least some part of the Appthority Platform statically analyzes Android and iOS binary files and statically analyzes intermediate files to detect the presence of program errors or potential program errors. There was ample evidence at trial that the Platform uses rules and signatures to detect the presence of program errors and potential program errors in intermediate representations of binary files (called smali files for Android applications and otool output files for iOS applications). The parties also do not dispute that the Platform outputs an error list of detected errors.

*24 The crux of Appthority's argument is that the Platform defines "program errors" by way of user preferences, because the Platform asks users to identify which permissions they have provided for specific applications, and therefore the errors that the Platform identifies are not the type of errors contemplated by the '924 Patent. For this reason, Appthority contends the Platform does not directly infringe Claim 1 of the '924 Patent. This argument is unavailing.

Program errors, as construed in this case, include the result, whether intentional or unintentional, "of an invalid or impossible maneuver." *Veracode*, 2013 WL 5587946, at *7. Program errors accordingly include intentional, malicious errors, and not merely mistakes. *Id*. This includes malware, a type of program error that is explicitly contemplated by the '924 Patent. Hypothetically, there can be program errors that are errors regardless of user preferences (e.g., malware), and program errors that are errors <u>because of</u> user preferences. As discussed above, the '924 Patent does not, however, contemplate the inclusion of user-driven errors. Accordingly, what matters here is whether there is substantial evidence that the Platform detects the former category.

Veracode presented substantial evidence at trial, through the testimony of Dr. Rubin, Dr. Hanna, and others, that the Platform detects malware and potential malware.[26] The most substantial example provided at trial was Dr. Rubin's assessment of an application called "Cut the Rope." Appthority does not dispute Dr. Rubin's testimony that the Platform can detect location tracking in Cut the Rope. Instead, Appthority contends that location tracking in a given application becomes classified as an error only when subjective user preferences so dictate. Appthority is correct that an infringement determination cannot depend on user perception or opinion. *See Hilgraeve Corp.* v. *McAfee Assocs., Inc.*, 224 F.3d 1349, 1352 (Fed. Cir. 2000); *Datamize*, 417 F.3d at 1350. However, Dr. Rubin testified that, in his opinion, there is no reason why a user would want an

application like Cut the Rope to track his or her location; as a result, the access was likely to be the result of an invalid maneuver. A reasonable juror could have credited Dr. Rubin's expert opinion and considered location tracking in the Cut the Rope application to be an objective program error or potential program error – such as malware – rather than one that is based on an individual user's preferences.

Beyond this example, there was ample evidence that the Platform detects program behaviors that would objectively be considered program errors or potential program errors, regardless of user preference, because they are behaviors that no user would want, and that the Platform does so using static analysis of a binary through an intermediate representation. Speaking more generally, Dr. Rubin testified that the Platform detects "certain things that would be considered universally wrong, like if an app were to delete the data on your phone." Dr. Rubin explained that "[u]nless it's the erase app, I don't think that anybody would consider that to be a reasonable behavior."

*25 The jury was entitled to credit Dr. Rubin's assessment that behaviors of an application accessing a mobile phone function that is not directly relevant to the purpose of the application constitute program errors within the meaning of the term as it is contemplated by the '924 Patent – that is, an objective program error, and one that is the result of an invalid or impossible maneuver. This objective parsing of programs and what behaviors they would perform based on their functionality was supported further by Dr. Hanna, who testified that "accessing the camera is a perfectly valid maneuver from Facebook to Instagram to any of the other apps [because] [i]t's something that is a functionality provided by the operating system to be used in applications."

In addition, the jury heard testimony from Dr. Rubin that the Platform analyzes applications "without any knowledge of who the consumer is or what their expectations are." This is because the static analysis is performed on a server before an application is ever downloaded to a device. This was corroborated, at least in part, by Dr. Hanna's testimony.

Appthority's focus on all the other functions that the Platform performs, including dynamic analysis and detection of application behaviors that are outside of the scope of the program errors contemplated by the '924 Patent, is irrelevant and does not change the fact that some part of the Platform infringes the patent. Although these functions may be relevant in shaping injunctive relief for Veracode, if it is to be afforded, they are irrelevant to the question of direct infringement. I conclude that the jury's finding on Claim 1 was supported by substantial evidence.

b. Claim 5

Claim 5 of the '924 Patent adds to Claim 1 "a flow determining arrangement for determining and symbolically representing the function flow of the representation of the binary program file." The phrase "determining and symbolically representing the function flow" was defined during claim construction to mean "identifying how functions are associated and interconnected with other functions and representing those associations and connections through symbols." *Veracode*, 2013 WL 5587946, at *13. Dr. Rubin testified that the Platform generates a call graph that symbolically represents the functions of the analyzed iOS application as nodes and function flows as edges, and identifies each function associated and interconnected with other functions. Dr. Hanna also testified that the Platform builds a call graph to "determine which functions might actually be called from the program." This is sufficient evidence to support the jury's verdict that the Platform infringed Claim 5.

c. Claim 17

Claim 17 of the '924 Patent is distinct from Claim 1 in its inclusion of an "intermediate program file" that specifically "includes flow paths and flow structure associated with the binary program." It is also distinct from Claim 5, which claims the tool in Claim 1 with the inclusion of "a flow determining arrangement for determining and symbolically representing the function flow of the representation of the binary program file." Because I have concluded that there is substantial evidence to support the jury's verdict on Claim 1, I need only assess whether there was substantial evidence to support the jury's

determination that this additional feature to Claim 17 was not infringed upon by the Appthority Platform.

The parties agree that "flow paths and flow structure" means "information that identifies each function flow branch, the end function of each branch, and how that branch is interconnected with other branches." Dr. Rubin testified that the intermediate files generated by the Appthority Platform were the smali file on Android and the otool output file on iOS. There was no evidence at trial that these files contained flow paths and flow structures. Instead, Dr. Rubin testified that these files were processed iteratively to build an intermediate representation that contains the data flow and control flow models. That intermediate representation, according to Dr. Rubin, includes a call graph that represents functions and the relationships between functions. Accordingly, while there may have been call graphs containing flow paths and flow structures in the intermediate *representation*, the jury reasonably could have found that these call graphs were not included in the intermediate *files*. Although in practice this could be a distinction without a difference, the jury was presented with two distinctly different terms – intermediate program file and intermediate representation – and could reasonably have concluded that they did not refer to the same thing.[27] This conclusion is not inconsistent with the jury's finding on Claim 5; the jury reasonably could have found that a flow determining arrangement was part of the static debugging tool (as Claim 5 requires), but that flow paths and structure were not part of the intermediate files (as Claim 17 requires). Given that I am to view the evidence in the light most favorable to Appthority and assess only whether there was "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion," *Z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1353 (Fed. Cir. 2007), *cert. dismissed*, 553 U.S. 1028 (2008), I conclude that there was substantial evidence to support the jury's verdict as to Claim 17 of the '924 Patent.[28]

B. Willfulness

*26 Because I conclude that there was substantial evidence to support the jury's verdict as to both patents-in-suit, I need only consider the willfulness of the infringement of Claims 1 and 5 of the '924 Patent. Willful infringement requires findings of both objective and subjective willfulness. *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 769 F.3d 1371, 1382 (Fed. Cir. 2014), *petition for rehearing en banc denied*, 780 F.3d 1357 (Fed. Cir. 2015), *petition for cert. filed* (U.S. June 24, 2015) (No. 15-121). Typically, a finding of subjective willfulness is made by a jury, *Powell v. Home Depot USA Inc.*, 663 F.3d 1221, 1236 (Fed. Cir. 2011), whereas a finding of objective willfulness is reserved for judicial determination. *Bard Peripheral Vascular, Inc. v. W.L. Gore & Assocs. (Bard Peripheral II)*, 682 F.3d 1003, 1005, 1189-90 (Fed. Cir. 2012), *cert. denied sub nom. W.L. Gore & Assocs., Inc. v. C.R. Bard, Inc.*, 133 S. Ct. 932 (2013). Consistent with this division of labor, Appthority moves for judgment as a matter of law on subjective willfulness to overturn the jury's determination that Appthority's infringement of the '924 Patent was willful, in part based on an argument that the jury instruction was inadequate. Veracode, for its part, moves for a judgment on partial findings as to objective willfulness, and for judgment as a matter of law on willfulness overall.

1. <u>Subjective Willfulness</u> (Docs. 311, 319)

a. Challenge to Jury Instruction

In its post-trial filings, Appthority challenges the propriety of the jury instruction I gave on willfulness. The instruction was as follows:

> If you find that it is more likely than not that Appthority infringed the claims of the '924 patent or the '609 patent, then you must decide whether Appthority's infringement was willful. ...

Willfulness requires Veracode to prove that it is highly probable that: Appthority either knew or should have known that there was a high likelihood of infringement.

In determining whether Appthority knew of a high likelihood of infringement or the likelihood was so obvious that Appthority should have known of that likelihood, you must consider the totality of all the circumstances. The totality of the circumstances comprises a number of factors, which include, but are not limited to, whether Appthority intentionally

copied the claimed invention or a product covered by a patent, whether Appthority relied on competent legal advice. And understand that that's at the time of the infringement, not some legal advice that they may have gotten at a later point. You're asking yourself whether they had legal advice at the time of the alleged infringement to make an evaluation of the totality of the circumstances. And whether Appthority has presented a substantial defense to infringement, including the defense that the patent is invalid.

This instruction was a departure from that proposed by the parties but ultimately consistent with the approach advocated by Veracode.

In post-trial motion practice, Appthority renews its challenge to the willfulness instruction given.[29] Appthority's preferred instruction would have told the jury that Appthority must have known of the existence of the patent <u>before</u> the lawsuit, and, separately, that Appthority must have known, or should have known, that there was an objectively high likelihood that it infringed the patent.

Appthority's main contention at this stage is that the given instruction did not focus the jury temporally on Appthority's knowledge prior to the instigation of this litigation. Appthority asserts that absent instruction on this requirement, the jury was left to find that even merely negligent conduct would constitute willful infringement, which is inconsistent with the legal standard established in *In re Seagate Tech., LLC,* 497 F.3d 1360, 1371 (Fed. Cir. 2007). This erroneous instruction materially affected the jury's finding of willful infringement, Appthority argues, and requires either judgment as a matter of law or a new trial on this issue. *See Cigna Ins. Co.* v. *Oy Saunatec*, 241 F.3d 1, 8 (1st Cir. 2001).

b. Willful Infringement Test After Seagate

*27 In the wake of *Seagate*, there has been some confusion whether actual knowledge of the patent-in-suit prior to the lawsuit is required to prove willful infringement. Before *Seagate*, in a case addressing the import of a "patent pending" notice, the Federal Circuit stated that "[t]o willfully infring *a patent*, the patent must exist and one must have knowledge of it." *State Indus., Inc.* v. *A.O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985); *see Gustafson, Inc.* v. *Intersystems Indus. Prods., Inc.,* 897 F.2d 508, 510-11 (Fed. Cir. 1990) ("a party cannot be found to have 'willfully' infringed a patent of which the party had no knowledge"). The emphasis in *State Industries* was on the actual existence of a patent; this was significant because the standard for willfulness at the time appeared to require actual notice of a patent in order to demonstrate willfulness. *See State Indus.*, 751 F.2d at 1236; *Underwater Devices Inc.* v. *Morrison-Knudsen Co.*, 717 F.2d 1380, 1389 (Fed. Cir. 1983) ("Where, as here, a potential infringer has actual notice of another's patent rights, he has an affirmative duty to exercise due care to determine whether or not he is infringing.").

In *Seagate*, the Federal Circuit overruled the duty of care standard for willfulness articulated in *Underwater Devices* and replaced it with a two-part objective recklessness standard, consisting of objective and subjective prongs. *See Seagate*, 497 F.3d at 1371. The *Seagate* court observed that the *Underwater Devices* standard set too low a threshold for willful infringement by equating willful infringement with merely negligent conduct, rather than requiring "at least a showing of objective recklessness" that is consistent "with the general understanding of willfulness in the civil context." *Id.*

The *Seagate* court accordingly shifted the focus away from actual knowledge of the patent to knowledge – either actual or constructive – of a risk of infringement of a patent. *See id.*; *see also Tomita Techs. USA, LLC* v. *Nintendo Co.*, No. 11 Civ. 4256(JSR), 2012 WL 2524770, at *9-10 (S.D.N.Y. June 26, 2012), *reconsideration denied*, 2013 WL 163975 (S.D.N.Y. Jan. 15, 2013) (acknowledging absence of actual knowledge requirement in *Seagate*); *Sargent Mfg. Co.* v. *Cal-Royal Prods., Inc.*, Civ. Action No. 3:08-cv-408(VLB), 2012 WL 603268, at *9 (D. Conn. Feb. 24, 2012) (*Seagate* "soundly rejected" "contention that actual notice is a prerequisite to a finding of willful infringement" in abrogating *Underwater Devices*). After *Seagate*, actual knowledge is sufficient but not necessary to prove willful infringement. *See i4i Ltd.*, 598 F.3d at 860 (infringer "knew or should have known that there was an objectively high risk of infringement"); *see also Seagate,* 497 F.3d at 1371.

Under the *Seagate* standard, a defendant who is merely negligent will not be liable, but a defendant who is aware of the risk of infringement, or who is recklessly indifferent to the existence of a patent and the risk of infringement, will face liability.

The object of the knowledge under *Seagate* is the risk of infringement rather than the patent itself, and the knowledge of that risk may be either actual or constructive.[30]

*28 This reading of *Seagate* is supported by the Federal Circuit's post-*Seagate* decisions, in which it has not referenced an actual knowledge requirement. *See, e.g.*, *WesternGeco L.L.C.* v. *ION Geophysical Corp.*, 791 F.3d 1340, 1353-54 (Fed. Cir. 2015) (articulating objective and subjective prongs of *Seagate* but not stating actual knowledge requirement); *Aqua Shield* v. *Inter Pool Cover Team*, 774 F.3d 766, 773 (Fed. Cir. 2014) (same); *Halo Elecs.* 769 F.3d at 1381-82 (same); *K-TEC, Inc.* v. *Vita-Mix Corp.*, 696 F.3d 1364, 1378 (Fed. Cir. 2012) (same); *see also Kilopass Tech., Inc.* v. *Sidense Corp.*, 738 F.3d 1302, 1309-10 (Fed. Cir. 2013) (discussing what is required to prove subjective bad faith for an "exceptional" case finding for purposes of awarding attorneys' fees, and observing that "a plaintiff can demonstrate exceptionality by proving willful infringement, which only requires a showing of recklessness," as opposed to requiring actual knowledge). The most logical reading of *Seagate* and the Federal Circuit cases applying it, then, is that *Seagate* replaced the prior *Underwater Devices* standard requiring actual knowledge.[31]

i4i Ltd., a case Appthority relies upon heavily, is not inconsistent with this reading. In that case, the Federal Circuit indicated that willful infringement requires "aware[ness] of the asserted patent." *See i4i Ltd.*, 598 F.3d at 860.[32] Many district courts have included this language in reciting the standard for willful infringement post-*Seagate*. *See, e.g.*, *3D Sys., Inc.* v. *Formlabs, Inc.*, No. 13 Civ. 7973, 2014 WL 1904365, at *6 (S.D.N.Y. May 12, 2014); *Irori Techs., Inc.* v. *Luminex Corp.*, No. 13-CV-2647-BEN(NLS), 2014 WL 769435, at *2 (S.D. Cal. Feb. 25, 2014); *Brandywine Commc'ns Techs., LLC* v. *Casio Comput. Co.*, 912 F. Supp. 2d 1338, 1352 (M.D. Fla. 2012). But being "aware" of a patent involves a broader range of scenarios than having actual knowledge of it. I do not read this language in *i4i Ltd.* as re-narrowing willful infringement to the limited universe of infringers with actual knowledge of the patent.

c. Adequacy of the Jury Instruction and Substantial Evidence Supporting the Jury's Finding

*29 With this standard in mind, I return to the jury instruction and the sufficiency of the evidence. When an objection has been timely asserted, as here, "[a] jury instruction ... constitutes reversible error only if it (i) is 'misleading, unduly complicating, or incorrect as a matter of law,' ... and (ii) cannot be considered harmless, *viz.*, as adversely affecting the jury verdict and the 'substantial rights' of the objecting party." *Davignon* v. *Clemmey*, 322 F.3d 1, 9 (1st Cir. 2003) (citations omitted); *see Eli Lilly & Co.* v. *Aradigm Corp.*, 376 F.3d 1352, 1359 (Fed. Cir. 2004) (Federal Circuit "appl[ies] law of the regional circuit in which the district court sits" to review of jury instructions). When considering the adequacy and accuracy of the instruction given, "the test ... is not abstract perfection." *Hopkins* v. *Jordan Marine, Inc.*, 271 F.3d 1, 4 (1st Cir. 2001). Rather, jury instructions must be considered "as a whole to determine whether they correctly summarize the relevant law." *Id.*

Upon careful review of the law and the jury instructions as a whole, I conclude that the instruction was sufficiently accurate and adequate under the circumstances. I instructed the jury that "[w]illfulness requires Veracode to prove that it is highly probable that: Appthority either knew or should have known that there was a high likelihood of infringement." I further instructed the jury to "determin[e] whether Appthority knew of a high likelihood of infringement or the likelihood was so obvious that Appthority should have known of that likelihood" considering "the totality of all the circumstances." A short while later, I instructed the jury to consider Appthority's conduct and any legal advice it had received "at the time of the infringement."

Under *Seagate*, 497 F.3d at 1371, the objective prong of willfulness requires proof "that the infringer acted despite an objectively high likelihood that its actions constituted infringement of a valid patent," and the subjective prong requires "that this objectively-defined risk ... was either known or so obvious that it should have been known to the accused infringer." Here, only the subjective prong of willfulness was for the jury to decide, and the instruction tracked the language of that prong as articulated in *Seagate*. Although the instruction did not provide the jury with a full picture of what is required for willful infringement overall, giving the complete instruction Appthority requested would have been very likely to mislead the jury, just as it has lawyers and judges who have sought to apply it. *See Febres* v. *Challenger Caribbean Corp.*, 214 F.3d 57, 63-64 (1st Cir. 2000). At a minimum, the instruction directed the jury to the time at which the infringement occurred — that is, before the lawsuit — and what Appthority's knowledge was or should have been at that time. Although the temporal aspect could have been more precise, the instruction was adequate.

Moreover, I do not find that any arguable inadequacy in the instruction affected Appthority's substantial rights, because even if actual, pre-suit knowledge of the patent were to have been required, the jury's finding would be supported by substantial evidence. *See Powell*, 663 F.3d at 1236. Appthority knew that Veracode offered a similar product. Ms. King, an executive vice president at Veracode, testified that she had spoken with Mr. Anthony Bettini, a co-founder of Appthority, at a conference in February 2012, the month before this lawsuit was filed, and informed him that Veracode held patents in the area of static binary analysis when he indicated that Appthority was working in that area. Mr. Bettini also testified that he was informed about Veracode's patents at that conference, at least in a broad sense. Ms. Maria Cirino, the Chairperson of the Board of Directors of Veracode, testified that after the conference, she followed up with Mr. Bettini to give him more information about the patents Veracode held, although she also stated that she did not recall giving Mr. Bettini the specific numbers of Veracode's patents.

*30 Based on this evidence, a reasonable jury would necessarily have concluded that Appthority willfully infringed the '924 Patent. That Veracode may not have provided Appthority with the specific patent numbers is not determinative, where the evidence was uncontested that Appthority was aware Veracode was operating in a similar area and could have identified the patents through its own research. Accordingly, there was a legally sufficient evidentiary basis for the jury's finding of willfulness, regardless of whether actual, pre-suit knowledge is required. Even if the instruction were in error, it did not adversely affect Appothority's substantial rights.

2. Objective Willfulness (Docs. 221, 238)

a. Legal Standard

Although the objective prong is described by the Federal Circuit as a threshold inquiry, a court can "decid[e] the objective prong of willfulness after submitting the question of subjective willfulness to the jury," and I regard it as prudent to delay a ruling on this prong until after the jury verdict. *Cf. WBIP, LLC v. Kohler*, Civ. No. 11-10374-NMG, 2014 WL 585854, at *5 (D. Mass. Feb. 12, 2014).

An alleged infringer's conduct is objectively willful if the infringer acted "despite an objectively high likelihood that its actions constituted infringement of a valid patent." *Bard Peripheral II*, 682 F.3d at 1005 (quoting *Seagate*, 497 F.3d at 1371). "The state of mind of the accused infringer is not relevant to this objective inquiry." *Seagate*, 497 F.3d at 1371. Courts should consider "the totality of the record evidence, including the obviousness defense that [the defendant] developed during the litigation, to determine whether there was an objectively-defined risk of infringement of a valid patent." *Halo Elecs.*, 769 F.3d at 1382. This analysis necessarily requires some revisiting of prior discussions of claim construction, infringement, and the reasonableness of the asserted defenses. *Robert Bosch, LLC v. Pylon Mfg. Corp.*, 719 F.3d 1305, 1326 (Fed. Cir. 2013). My ruling on this is also necessarily informed by the factual determinations made by the jury at trial. *Bard Peripheral II*, 682 F.3d at 1008.

b. Findings of Fact and Conclusions of Law

I begin by considering the reasonableness of Appthority's defenses. An infringer's conduct will not be considered objectively willful if the infringer "presents in the litigation a defense, including an invalidity defense, that is objectively reasonable (though ultimately rejected)." *Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd.*, No. 2014-1492, 2015 WL 4639309, at *12 (Fed. Cir. Aug. 4, 2015); *see Spine Solutions, Inc. v. Medtronic Sofamor Danek USA, Inc.*, 620 F.3d 1305, 1319 (Fed. Cir. 2010). This is a question of law "based on the underlying facts." *Carnegie Mellon*, 2015 WL 4639309, at *12, *15; *see Bard Peripheral II*, 682 F.3d at 1007.

I find that Appthority's defenses, discussed above, were objectively unreasonable.[33] No "reasonable litigant could realistically expect" the defenses Appthority advanced regarding the '924 Patent to succeed. *See Aqua Shield v. Inter Pool Cover Team*,

774 F.3d 766, 774 (Fed. Cir. 2014) (quoting *Bard Peripheral II*, 682 F.3d at 1008); *see also Bard Peripheral Vascular, Inc.* v. *W.L. Gore & Assocs., Inc.*, 776 F.3d 837, 844 (Fed. Cir. 2015) (quoting *Uniloc USA, Inc.* v. *Microsoft Corp.*, 632 F.3d 1292, 1310 (Fed. Cir. 2011)), *petition for cert. filed* (U.S. July 10, 2015) (No. 15-41). Appthority's non-infringement defense regarding the '924 Patent was based on a definition of "program error" that was rejected early in this litigation, and otherwise was aimed at distracting the jury from the portions of the Platform that infringe the '924 Patent by highlighting all of the other functions of the Platform. *See Veracode*, 2013 WL 5587946, at *5-7; *cf. Tomita Techs.*, 2012 WL 2524770, at *9 ("defenses rely[ing] on strained interpretations" of patent are unpersuasive and objectively unreasonable); *Krippelz* v. *Ford Motor Co.*, 675 F. Supp. 2d 881, 899, 900-02 (N.D. Ill. 2009) (non-infringement defenses that rely on objectively unreasonable claim construction arguments cannot themselves be objectively reasonable), *vacated on other grounds*, 667 F.3d 1261 (Fed. Cir. 2012). The invalidity defenses relevant to the '924 Patent similarly did not involve "reasonable differences of opinion or close questions."[34] *Ricoh Co.* v. *Quanta Comp. Inc.*, No. 06-cv-462-bbc, 2009 WL 3925453, at *1 (W.D. Wis. Nov. 18, 2009); *see Carnegie Mellon*, 2015 WL 4639309, at *14. That some of Appthority's defenses could have survived summary judgment – at least to the extent that I summarily declined to grant summary judgment before moving directly to trial – does not render them any more reasonable in this inquiry.[35] *See Cognez Corp.* v. *Microscan Sys., Inc.*, No. 13-cv-2027(JSR), 2014 WL 2989975, at *7 (S.D.N.Y. June 30, 2014).

*31 Upon review of the record as a whole, I find that there was "an objectively high likelihood that [the defendant's] actions constituted infringement of a valid patent." *Seagate,* 497 F. 3d at 1371. This finding is based on the evidence presented at trial demonstrating that the Platform "was designed to and did perform the same methods as" Veracode's products using its patented technology. *i4i Ltd.*, 598 F.3d at 860.

To determine whether Appthority acted despite this high likelihood of infringement, I consider a variety of factors. Ample evidence was presented at trial that Appthority knew about Veracode's product and considered it a direct competitor, but nonetheless did not conduct a freedom to operate search. Veracode began advertising that some of its technology – namely that used in its products scanning mobile applications to detect the presence of program errors – was patented as early as February 2011. Meanwhile, in the summer of 2011, Appthority began developing its Platform product. During this product development stage, Appthority met with former Veracode customers and collected information about what they liked and did not like about Veracode's product. In submitting an application to DARPA for a government grant, Appthority acknowledged that Veracode was the only company that provided a similar commercial solution. In December 2011, Mr. Bettini acknowledged in a conversation with Ms. Cirino that the work of Appthority and Veracode was potentially in conflict. Although Mr. Bettini was aware of his competitors, he considered them "irrelevant." The Platform launched in February 2012 at an industry conference, where it presented itself as essentially engaging in similar program error detection work for mobile applications as what Veracode offered. It was at that conference that Ms. King informed Mr. Bettini of Veracode's patents in the area of static binary analysis. Even with this information, Appthority still did not conduct a freedom to operate search, obtain an opinion of counsel, or otherwise investigate Veracode's patents further. Although, as discussed above, Appthority may not have had specific knowledge of the patent numbers, there is sufficient evidence to infer that Appthority had knowledge of the high likelihood that Veracode held patents that were directly relevant to Appthority's Platform.[36] Although "*Seagate* removed the presumption of willful infringement flowing from an infringer's failure to exercise due care to avoid infringement," it is still relevant whether an infringer conducted a freedom to operate search, obtained advice of counsel, or conducted some other form of investigation upon receiving notice of the likelihood of a relevant patent. *See Spectralytics, Inc.* v. *Cordis Corp.*, 649 F.3d 1336, 1349 (Fed. Cir. 2011).

Appthority's lack of effort to investigate the '924 Patent after it received notice of the likely existence of the patent, and, more significantly, its lack of effort to design around the '924 Patent, weigh strongly in favor of a finding of willfulness. *See Cordance Corp.* v. *Amazon.com, Inc.*, 639 F. Supp. 2d 406, 416 (D. Del. 2009); *Mass. Eng'g Design, Inc.* v. *Ergotron, Inc.*, 633 F. Supp. 2d 361, 379 (E.D. Tex. 2009). Even after the jury verdict against it, Appthority has continued to make, use, and sell its infringing Platform, apparently without modification.[37]

*32 Based on these factual findings and legal conclusions, I conclude that Appthority's infringement of the '924 Patent was willful.

IV. DAMAGES

A. Appthority's Motion for a New Trial Based on the Damages Award (Doc. 245)
After a separate trial on damages, the jury returned a verdict finding $781,857 in damages for Veracode. Appthority now moves for a new trial and/or remittitur,[38] asserting that the jury's verdict is against the clear weight of the evidence because the damages award is "untethered to any arguments or evidence presented to the jury by any party."

1. Legal Standard
Under 35 U.S.C. § 284, a prevailing plaintiff is entitled to damages "adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer." A jury's award of damages must be supported by substantial evidence and not "based on speculation and guesswork." *Baxter Healthcare Corp.* v. *Spectramed, Inc.*, 49 F.3d 1575, 1582-83 (Fed. Cir. 1995) (internal quotation marks and citation omitted); *Smith & Nephew, Inc.* v. *Interlace Med., Inc.*, 955 F. Supp. 2d 69, 82 (D. Mass. 2013) (citation omitted); *see Powell*, 663 F.3d at 1228-29. However, calculating a reasonable royalty "is not an exact science." *State Indus., Inc.* v. *Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1576-77 (Fed. Cir. 1989). Any doubts about the amount of the damages must be resolved against the infringer. *Lam, Inc.* v. *Johns-Manville Corp.*, 718 F.2d 1056, 1065 (Fed. Cir. 1983).

A common method for determining a reasonable royalty is the hypothetical negotiation. *VirnetX, Inc.* v. *Cisco Sys., Inc.*, 767 F.3d 1308, 1326 (Fed. Cir. 2014). This method attempts to identify what the parties would have agreed upon if they had successfully negotiated on the date the infringement started. *Id.*; *see Rite-Hite Corp.* v. *Kelley Co.*, 56 F.3d 1538, 1554 (Fed. Cir.) (en banc), *cert. denied*, 516 U.S. 867 (1995); *State Indus.*, 883 F.2d at 1580. A reasonable royalty damages award is typically calculated by identifying a percentage royalty rate and multiplying it by a royalty base. *See Georgia-Pacific Corp.* v. *U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120, 1143 (S.D.N.Y. 1970), *aff'd* 446 F.2d 295 (2d Cir. 1971). A reasonable royalty may be equivalent to or informed by an established royalty, if one exists, and is "merely the floor below which damages shall not fall." *Bandag, Inc.* v. *Gerrard Tire Co.*, 704 F.2d 1578, 1583 (Fed. Cir. 1983). The amount may be adjusted using the fifteen *Georgia-Pacific* factors, which have been adopted by the Federal Circuit as "admissible factors informing a reliable economic analysis." *Energy Transp. Grp., Inc.* v. *William Demant Holding A/S*, 697 F.3d 1342, 1357 (Fed. Cir. 2012), *cert. denied sub nom. Widex A/S* v. *Energy Transp. Grp., Inc.*, 133 S. Ct. 2010 (2013); *see Uniloc USA*, 632 F.3d at 1317; *LaserDynamics, Inc.* v. *Quanta Comput., Inc.*, 694 F.3d 51, 60 & n.2 (Fed. Cir. 2012); *see also Georgia-Pacific*, 318 F. Supp. at 1120, 1143. Where supported by the evidence, a jury may award a reasonable royalty that consists of both an upfront payment and a running royalty based on a percentage of the sales. *See Transocean Offshore*, 699 F.3d at 1359.

2. Analysis
*33 Appthority makes several claims of error as to the damages award. First, it contends that the jury award is not supported by substantial evidence, and that it is grossly excessive in relation to Appthority's revenues. Next, it contends that two components of Veracode's damages theory –the incorrect identification of the hypothetical negotiation date by Veracode's expert, Mr. Christopher Martinez, and his reliance on the entire market value rule – rendered the damages award incorrect and unsupportable. Finally, Appthority argues that the jury instruction on the entire market value rule was erroneous. I consider each of these arguments in turn.

a. Sufficiency of the Evidence and Reasonableness of the Damages Award

Appthority contends that the jury could only have based its verdict on speculation or guesswork, and that the ultimate amount awarded shocks the conscience, particularly in relation to Appthority's revenues, of which the award constitutes approximately 99.8%. As the Federal Circuit has observed, "[a]sking whether a damages award is 'reasonable,' 'grossly excessive or monstrous,' 'based only on speculation or guesswork,' or 'clearly not supported by the evidence,' are simply different ways of asking whether the jury's award is supported by the evidence." *i4i Ltd.*, 598 F.3d at 857 (citations omitted).

i. Evidence at Trial

The evidence presented at the damages phase of trial included the following. Mr. Martinez, Veracode's expert on damages, opined that damages should be some amount more than $547,382. His opinion was based on a hypothetical negotiation between Veracode and Appthority and the *Georgia-Pacific* factors. *See Georgia-Pacific*, 318 F. Supp. at 1120.

Mr. Martinez looked to the Rovi license to Veracode as a starting point, consistent with the first *Georgia-Pacific* factor. This license agreement consisted of an upfront payment, a tiered royalty, and a minimum royalty. As an upfront payment, Veracode agreed to pay approximately $523,000, equaling 5% of Veracode's equity, but only if they closed a round of funding of at least $4 million. Under the tiered royalty structure, Veracode agreed to pay 3% of the first $10 million worth of sales from products incorporating the '924 Patent, 2% on the next $10 million, and 1% on all sales thereafter. As a minimum royalty guarantee, Veracode agreed to pay no less than $500,000 in royalties over the first five years of the agreement. As of the trial in this case, Veracode had paid approximately $1.8 million in royalties – $1.3 million in cash and 5% equity valued at $523,000 – based on $69 million in net sales of products including the '924 Patent. Veracode did not begin making royalty payments until 2007, once it had products on the market; as a result, in the first five years it paid only $258,000 in royalties, and had to pay Rovi a lump sum of $242,000 in order to meet the $500,000 minimum royalty.

Mr. Martinez reasoned that the Rovi-Veracode agreement was translatable to the Veracode-Appthority relationship in part because Veracode was in a position at the time of its negotiation with Rovi in 2005 similar to Appthority at the time of its hypothetical negotiation with Veracode – that is, both companies were unfunded or underfunded startups seeking to obtain intellectual property rights to pursue their business ventures. In addition, Mr. Martinez reasoned that the 1-3% royalty range used in the Rovi-Veracode agreement made sense for the Veracode-Appthority relationship, because this low percentage reflected the fact that the products using the patented technology did not consist exclusively of the patented technology, but also incorporated other functionality. Using the Rovi-Veracode agreement framework, Mr. Martinez calculated that Appthority would owe an upfront payment of $523,889 and running royalties under the tiered royalty structure of approximately $23,493, based on Appthority's sales of $783,000. This was the basis for his calculation of minimum damages of $547,382.

*34 With these baseline royalty numbers, and with a hypothetical negotiation date of March 2012 (the date of the filing of this lawsuit), Mr. Martinez considered the other relevant *Georgia-Pacific* factors as they applied to the relationship between Veracode and Appthority, and concluded that an upward modification of an unspecified amount – to be determined by the jury - was appropriate.

Although Veracode likely would have negotiated a nonexclusive, and therefore less valuable, license with Appthority, Mr. Martinez opined that other differences in the Rovi-Veracode and Veracode-Appthority relationships demonstrated that the Veracode-Appthority license would be more valuable than the one that Rovi and Veracode negotiated. These differences include (1) that Veracode and Appthority are direct competitors, and were at the time of the hypothetical negotiation, whereas Veracode and Rovi were not; (2) that Rovi did not use the patented technology at all, whereas Veracode had established commercial success of its products using the patented technology at the time of the hypothetical negotiation, thereby making the technology demonstrably valuable; (3) that certain of Veracode's products using the patented technology are avenues for promoting other Veracode products and obtaining customers for Veracode's business overall; and (4) that the patented technology was core to the functionality of the products of both Veracode and Appthority, such that a meaningful portion of the profit of the products can be attributable to the '924 Patent. In addition, Mr. Martinez opined that both Rovi and Veracode have been protective of the patent rights in declining to sublicense them, suggesting a desire for exclusivity. In short, Rovi licensed a patent it did not intend to use to Veracode at a time when there was no evidence that the technology could be used for commercial success; in contrast, at the time of a hypothetical negotiation between Veracode and Appthority, they would have been direct competitors using the patented technology as a central feature of products that Veracode had already demonstrated were commercially viable.

The jury also heard testimony from Appthority's expert, Dr. Bruce Abramson. Dr. Abramson testified that instead of converting the upfront equity stake of 5% in the Rovi-Veracode license to a cash payment of approximately $523,000 –as Mr. Martinez did - he would turn it into a larger revenue sharing agreement. This was particularly significant to Dr. Abramson because Appthority did not have any financial resources at the time of the hypothetical negotiation, which he placed in late 2011. Dr. Abramson also opined, contrary to Mr. Martinez's opinion, that the patented technology was not central to Appthority's product. With these considerations, Dr. Abramson testified that he would convert the equity share into

a 1.5% revenue share and combine it with the 3% equity share, resulting in a royalty payment of a 4.5% share. If this calculation had been used by Veracode and Rovi in their agreement, it would have produced more revenue for Rovi, Dr. Abramson opined.

With Dr. Abramson's framework of 4.5% of the revenues, Veracode would have obtained $35,240 in damages, based on Appthority's total revenues of $783,113. However, because Dr. Abramson opined that the '924 Patent was less important to Appthority than it was to Veracode – the patented technology was not as central to Appthority's product, he contended – Dr. Abramson concluded that this amount should be reduced further under the *Georgia-Pacific* factors. Accordingly, Dr. Abramson reduced the 4.5% by 2.35%, on the basis that only 2.35% (20 out of 850) of the signatures in the Appthority Platform infringe, producing a total royalty percentage of 0.11%. However, he concluded that this number was too difficult to work with, and that a 0.5% royalty would be more appropriate and more generous to Veracode. Applying the 0.5% royalty rate to the $783,113 total revenues, Dr. Abramson opined that damages should be $3,916.

ii. Analysis

*35 In the absence of specific questions on the verdict form, it cannot be known with certainty how the jury reached the $781,857 damages award, and whether it parsed out a lump-sum entry fee and a running royalty.[39] One plausible explanation of the jury's calculations is that it adopted the recommendation of Mr. Martinez, Veracode's expert, of a $523,889 entry fee or upfront payment, and further relied on Mr. Martinez's evaluation of the *Georgia-Pacific* factors to conclude that a 33% royalty rate was reasonable. This would result in royalty fees of $234,475 (which, when combined with the entry fee, produces a damages award of $781,857).[40] This combination damages award is a permissible one supported by the Rovi-Veracode agreement, which contained a similar arrangement. *See Transocean Offshore*, 699 F.3d at 1357-58 (jury free to decide how high royalty award to make, and "could conclude from [plaintiff's] past licenses ... that a hypothetical negotiation between the parties would result in ... [an] upfront payment"); *Third Wave Techs., Inc.* v. *Stratagene Corp.*, 405 F. Supp. 2d 991, 1011-12 (W.D. Wis. 2005) (appropriate to award upfront fee and running royalty "when the evidence shows that it is commonly utilized in the industry").

Appthority's primary argument in support of a new trial or remittitur is that a 33% royalty rate was not supported by the evidence and vastly exceeded the suggested royalty rates of both experts. It is true that Mr. Martinez did not offer a specific royalty rate recommendation other than to advocate an upward modification of the 1-3% royalty rate in the Rovi-Veracode agreement, and that Dr. Abramson, Appthority's expert, offered a recommended royalty rate well below this figure. However, it was permissible for the jury to fashion a reasonable royalty rate from the evidence that differed from the rates suggested by the damages experts. *See SmithKline Diagnostics, Inc.* v. *Helena Labs. Corp.*, 926 F.2d 1161, 1167-68 (Fed. Cir. 1991) (noting that "the factual determination of a reasonable royalty ... need not be supported, and indeed frequently is not supported by the specific figures advanced by either party," and concluding that a 25% royalty rate was reasonable "based on all of the credible evidence"); *see also Fuji Photo Film Co.* v. *Jazz Photo Corp.*, 394 F.3d 1368, 1378 (Fed. Cir. 2005) (jury not required to accept any expert's proffered royalty rate).

A 33% royalty rate is supported by the record. The jury could have concluded, based on the hypothetical negotiation approach, that "the value of the patented technology to the parties in the marketplace" at the time the infringement began was far greater than it was at the time that Rovi and Veracode negotiated their agreement, and that this increased value warranted an upward modification. *See LaserDynamics*, 694 F.3d at 76. This would be a reasonable conclusion, given the evidence that Veracode had successfully commercialized the '924 Patented technology by the time of the hypothetical negotiation, and that Appthority saw itself as a direct competitor to Veracode in that arena. *Cf. State Indus.*, 883 F.2d at 1580. In addition, the jury could have credited the testimony that Appthority's products rely largely on the '924 Patented technology, and accordingly determined that the vast majority of Appthority's revenues constituted a reasonable royalty. The considerations raised through Mr. Martinez's application of the *Georgia-Pacific* factors, including the loss of exclusivity of Veracode's access to the patented technology, and the extent to which Appthority used the patented technology - including its development and possession of a database containing the results of using the Platform to scan over 2.5 million mobile applications – warranted a reasonable royalty rate greater than that agreed upon by Rovi and Veracode. With these considerations in the record, a 33% royalty rate is not "so outrageously high or so outrageously low as to be unsupportable." *Rite-Hite*, 56 F.3d at 1554 (citation omitted); *cf. AstraZeneca AB* v. *Apotex Corp.*, 782 F.3d 1324, 1333-37 (Fed. Cir. 2015) (upholding 50% royalty rate applied

to sales of infringing product); *SmithKline*, 926 F.2d at 1168 (upholding 25% royalty rate); *Marine Polymer Techs., Inc.* v. *HemCon, Inc.*, Civ. No. 06-cv-100-JD, 2010 WL 3070201, at *4 (D.N.H. Aug. 3, 2010) (upholding jury verdict based on 30% royalty rate); *Union Carbide Chems. & Plastics Tech. Corp.* v. *Shell Oil Co.*, No. Civ. 99-cv-274-SLR, 99-846-SLR, 2004 WL 1305849, at *14-15 (D. Del. June 9, 2004) (upholding jury verdict based on 33% royalty rate, where evidence could have also supported 50% royalty rate), *aff'd in part and rev'd in part, in other grounds*, 425 F.3d 1366 (Fed. Cir. 2005).

*36 Where the damages award is "within the universe" of what the evidence would support, *Clark* v. *Taylor*, 710 F.2d 4, 13 (1st Cir. 1983), it is immaterial that the award effectively matches Appthority's revenues.[41] *See State Indus.*, 883 F.2d at 1580 ("There is no rule that a royalty be no higher than the infringer's net profit margin." (citation omitted)); *see also Monsanto Co.* v. *Ralph*, 382 F.3d 1374, 1384 (Fed. Cir. 2004) ("the law does not require that an infringer be permitted to make a profit"); *Golight, Inc.* v. *Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1338 (Fed. Cir. 2004) (reasonable royalty need not be capped at infringer's profit forecast for product, or at what infringer "might have preferred to pay"); *Rite-Hite*, 56 F.3d at 1555 (reasonable royalty need not be based on infringer's profits); *cf. Kolb* v. *Goldring, Inc.*, 694 F.2d 869, 872 (1st Cir. 1982) ("jury is free to select the highest figures for which there is adequate evidentiary support").[42] Indeed, the hypothetical negotiation approach looks to how the parties would have negotiated at the time the infringement began, without particular consideration of the ultimate success of the infringing products. *Cf. Third Wave Techs.*, 405 F. Supp. 2d at 1011-12 (appropriate for expert and court "to look solely at the situation as it would have appeared to two companies attempting to enter into a licensing agreement ... [on] the date the infringement began," and not to take into account subsequent sales). "None of the *Georgia-Pacific* factors relate to events taking place after the hypothetical negotiations—for good reason. The point of the analysis is its focus on the information the negotiators would have had at the time of their negotiations." *Id.* at 1012. *But see Fromson* v. *Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1575 (Fed. Cir. 1988) (hypothetical negotiation approach "permits and often requires a court to look to events and facts that occurred thereafter and that could not have been known to or predicted by the hypothesized negotiators"), *overruled on other grounds by Knorr-Bremse Systeme Fuer Nutzfahrzeuge GmbH* v. *Dana Corp.*, 383 F.3d 1337, 1343, 1347 (Fed. Cir. 2004) (en banc). Whether an award based on a hypothetical negotiation is grossly excessive, then, is not measured in relation to what actually transpired, but rather in relation to the maximum amount that the evidence presented on the hypothetical negotiation would permit. *See i4i Ltd.*, 598 F.3d at 857.

Here, the jury verdict on damages does not surpass "any rational appraisal or estimate of the damages that could be based on the evidence before the jury" and accordingly is not "so clearly against the weight of the evidence as to amount to a manifest miscarriage of justice." *Rivera Castillo* v. *Autokirey, Inc.*, 379 F.3d 4, 13 (1st Cir. 2004) (internal quotation marks and citations omitted); *Brooktree Corp.* v. *Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1580 (Fed. Cir. 1992). There was ample, credible evidence to support the jury's damages verdict, and the jury was free to weigh the evidence as it saw fit. *See i4i Ltd.*, 598 F.3d at 856; *Unisplay, S.A.* v. *Am. Elec. Sign Co.*, 69 F.3d 512, 519 (Fed. Cir. 1995).

b. Hypothetical Negotiation Date

Appthority contends that Mr. Martinez selected an improper hypothetical negotiation date, and therefore that his opinions could not have served as an appropriate basis for the jury's verdict. The Federal Circuit has consistently held that "the date of the hypothetical negotiation is the date that the infringement began." *LaserDynamics*, 694 F.3d at 75 (citing *Georgia-Pacific*, 318 F. Supp. at 1123); *see Transocean Offshore*, 699 F.3d at 1358-59. Mr. Martinez selected March 2012 as the hypothetical negotiation date, based on the filing of the complaint in this case, despite acknowledging that "the hypothetical negotiation is to take place at the date of first infringement."[43] Dr. Abramson selected approximately October 2011 as the date the infringement began. Consistent with the Federal Circuit's stance on this issue, I instructed the jury that the date for the hypothetical negotiation is just before the infringement began.[44]

*37 The chronological premise of Mr. Martinez's testimony was indeed flawed. However, a new trial requires some injustice, and a remittitur requires some meaningful difference in what the damages would have been but for an error. I cannot find such a consequence here. First, the jury was instructed properly as to the date of the hypothetical negotiation. As the First Circuit has made clear:

Providing the jury with timely and appropriate curative instructions to ignore the offending testimony is a common way to obviate the need for ordering a mistrial. ... Curative instructions are sufficient for this purpose unless the offending testimony could not have been reasonably ignored by the jury despite the instructions.

Rodriguez-Torres v. *Caribbean Forms Mfr., Inc.*, 399 F.3d 52, 63 (1st Cir. 2005) (citing *United States* v. *Sepúlveda*, 15 F.3d 1161, 1184 (1st Cir. 1993)). Here, the instruction, while not pointed as to Mr. Martinez's error, was sufficient to cure any potential prejudice to Appthority from Mr. Martinez's erroneous identification of the hypothetical negotiation date.

In addition, Mr. Martinez testified, and the record demonstrates, that there was no substantive difference in the parties' positions in late 2011 and March 2012. Appthority did not receive its initial venture capital investment until April 2012 and did not make a sale until December 2012, and at both times Veracode was selling patented products. In any event, the jury was free to consider events taking place after the date of the hypothetical negotiation, to the extent they were foreseeable at the time. *See Lucent Techs., Inc.* v. *Gateway, Inc.*, 580 F.3d 1301, 1333 (Fed. Cir. 2009) (post-infringement evidence can be probative in certain circumstances); *Sun Studs, Inc.* v. *ATA Equip. Leasing, Inc.*, 872 F.2d 978, 994 (Fed. Cir. 1989) ("We have recognized that compensation for infringement can take cognizance of the actual commercial consequences of the infringement ...."), *overruled on other grounds by A.C. Aukerman Co.* v. *R.L. Chaides Const. Co.*, 960 F.2d 1020, 1038 (Fed. Cir. 1992); *Fromson*, 853 F.2d at 1575. Accordingly, I will deny Appthority's requests on this basis.

c. Jury Instruction and Application of the Entire Market Value Rule

Finally, Appthority argues that the damages award necessarily and improperly applies the entire market value rule, and attributes this error in part to Mr. Martinez's reliance on the rule in his testimony and in part to the jury instruction given. I agree with Appthority that the verdict suggests that the jury may have calculated the damages award based on the entire market value of the Platform, but disagree that there was error in either the jury instruction or the jury's potential application of the rule.

As a general principle, damages are limited to the value of the individual, infringing component of a multi-component product, unless certain circumstances – identified below - merit consideration of the market value of the entire product in which the infringing components are contained. *See LaserDynamics*, 694 F.3d at 67-68. If the entire market value cannot be considered, then "principles of apportionment apply," so that the patentee may obtain "only those damages attributable to the infringing features." *VirnetX*, 767 F.3d at 1326; *see Versata Software*, 717 F.3d at 1268 ("The entire market value rule is a narrow exception to the general rule that royalties are awarded based on the smallest salable patent-practicing unit."); *see also Garretson* v. *Clark*, 111 U.S. 120, 121 (1884).

i. Jury Instruction

*38 After the submission of bench memoranda from the parties and two lengthy discussions with counsel, I instructed the jury that a damages award may be "based on the value of the entire Appthority Platform product" if it found, by a preponderance of the evidence, one of the following scenarios: (1) "the unpatented and patented components are physically part of the same product and the patented feature is what motivates consumers to purchase the entire product," or (2) "the separate unpatented components function together with the patented components to constitute a single unitary product or functional unit."

I further instructed the jury that:

> [I]f you find that customers' demand for the Appthority Platform is based at least in part on something other than the patented features and the separate unpatented components do not function together with the patented component to constitute a single unitary product or functional unit, you may award damages based only on the value of the patented features and not the total value of the entire Appthority Platform.

In choosing this language, I was cognizant of the challenges of apportionment when a program like the Platform, rather than a physical product, is at issue.

The case law supports the application of the entire market value rule in either of these scenarios. *See Uniloc USA*, 632 F.3d at 1318 ("entire market value rule allows a patentee to assess damages based on the entire market value of the accused product only where the patented feature creates the 'basis for customer demand' or 'substantially create[s] the value of the component parts" (alteration in original) (quoting *Lucent Techs.*, 580 F.3d at 1336; *Rite-Hite*, 56 F.3d at 1549-50)); *Rite-Hite*, 56 F.3d at 1550 (entire market value rule allows recovery "on sales of unpatented components sold with patented components" where "the unpatented components ... function together with the patented component in some manner so as to produce a desired end product or result," meaning that "[a]ll the components together [are] analogous to components of a single assembly or [are] parts of a complete machine, or they ... constitute a functional unit"); *see also LaserDynamics*, 694 F.3d at 67 (market value of entire product may be used "[i]f it can be shown that the patented feature drives the demand for an entire multi-component product").

VirnetX - a case to which Appthority draws a misplaced analogy – does not hold otherwise. In *VirnetX*, the judge instructed the jury that the entire market value of the product could be used in determining a royalty base if: "(1) the patented feature creates the basis for the customers' demand for the product, or the patented feature substantially creates the value of the other component parts of the product; or (2) the product in question constitutes the smallest saleable unit containing the patented feature." *VirnetX*, 767 F.3d at 1327. This instruction captures the first scenario for appropriate application of the entire market value rule – basis for consumer demand, or substantial creation of value – but then offers an overly broad articulation of the second scenario. The Federal Circuit on review concluded that the instruction did not acknowledge a "further constraint on the selection of the [royalty] base": that the smallest salable unit containing the patented feature bear a "close relation to the claimed invention." *Id.* (quoting *Cornell Univ.* v. *Hewlett-Packard Co.*, 609 F. Supp. 2d 279, 287-88 (N.D.N.Y. 2009) (emphasis omitted)). If the smallest salable infringing unit "contain[s] several non-infringing features with no relation to the patented feature," then the entire market value of the smallest salable unit cannot serve as the basis for a reasonable royalty, and a better effort at apportionment is necessary. *Id.* The *VirnetX* instruction omitted this critical qualification, and the Federal Circuit accordingly concluded that it was erroneous.[45] *Id.* at 1327-28.

*39 The *VirnetX* Court made clear that "the smallest salable patent-practicing unit" – if it contains infringing and non-infringing features - may be used as the basis for a reasonable royalty only if the unit overall bears "a sufficiently close relation to the claimed functionality." *Id.* at 1329. *VirnetX* therefore does not foreclose a reasonable royalty calculation based on the smallest salable unit; it requires only that the patentee "do more to estimate what portion of the value of that product is attributable to the patented technology" than simply identifying the smallest unit, *id.* at 1327, such as considering "the contribution of the patented feature to the entire product." *See AstraZeneca AB*, 782 F.3d at 1338.

This is consistent with Federal Circuit precedent – tracing back to the Supreme Court's 1884 *Garretson* opinion – that when apportionment is possible, a reasonable effort must be made to do so, at least approximately. *See VirnetX*, 767 F.3d at 1327, 1329 ("the requirement that a patentee identify damages associated with the smallest salable patent-practicing unit is simply a step toward meeting the requirement of apportionment"); *see also Ericsson, Inc.* v. *D-Link Sys., Inc.*, 773 F.3d 1201, 1226 (Fed. Cir. 2014); *Good Tech. Corp.* v. *MobileIron, Inc.*, Case No. 5:12-cv-05826-PSG, 2015 WL 4090431, at *1 (N.D. Cal. July 5, 2015). Where, however, separate unpatented components function together with patented components such that they constitute a single unitary product or functional unit, *see Rite-Hite*, 56 F.3d at 1550, the value of that unit can constitute "a reasonable estimate of the value of [the patentee's] claimed technology." *See VirnetX*, 767 F.3d at 1329. This is the instruction I gave to the jury. Accordingly, I conclude that there was no error in the jury instruction on this rule.

ii. Substantial Evidence to Support Application of Entire Market Value Rule

Appthority next contends that Veracode did not present any evidence that consumer demand for the Platform was based on the '924 Patented technology, and therefore that the entire market value rule could not apply. I disagree. There was substantial evidence for the jury to find first that the infringing features of the Platform are not separable from the Platform itself, such that the infringing and non-infringing components function together as a single unit, and second that the infringing features are the basis for consumer demand of the product. Therefore, it was appropriate for the jury to consider

the entire market value of the Platform overall in calculating the damages award.[46]

First, there was substantial evidence to support a finding that the static binary analysis capabilities of the Platform are so integrated with the other components of the Platform that they constitute a single unitary product. *See Rite-Hite*, 56 F.3d at 1550. Numerous witnesses, including Mr. Domingo Guerra (Appthority's president and co-founder), Dr. Hanna (Appthority's expert), and Mr. Martinez (Veracode's expert), testified that static binary analysis is a core function of the Platform in analyzing mobile applications. Mr. Guerra stated that the dynamic analysis is designed to catch "whatever the static analysis misses." Mr. Kevin Watkins, Appthority's co-founder and the primary developer of the Platform, testified that the Platform benefits substantially from including static analysis, because that analysis can find behaviors that cannot be detected using other methods, and that feed into the dynamic analysis and increase the speed and efficiency of the product. Dr. Hanna testified that the results of static and dynamic analysis are combined within the Platform and in the report file that is generated, which provides for the consumer a score assessing the threat level of the mobile application and a list of behaviors identified within the application. The application report does not distinguish between those behaviors identified through static analysis and those identified through dynamic analysis. In addition, Mr. Guerra testified that Appthority does not market or sell a product that uses only static analysis technology. Integration of the infringing and non-infringing features into a single product is further illustrated in Appthority's marketing materials, where Appthority touts that it provides "the industry's first and only fully automated App Risk Management (ARM) service that employs static, dynamic and behavioral analysis to discover the hidden actions of apps and calculate their total risk within minutes."

*40 This testimony supports the conclusion that the static binary analysis of program errors and potential program errors is an integrated, inseparable part of the Platform, both on the back end, in which the static and dynamic analyses occur during the same stage, and on the front end, in what the consumers ultimately see. Even if there were evidence suggesting that the value of the infringing features could be apportioned, "the jury was free to 'make credibility determinations and believe the witness it considers more trustworthy.' " *Kinetic Concepts, Inc.* v. *Smith & Nephew, Inc.*, 688 F.3d 1342, 1362 (Fed. Cir. 2012).

There is also sufficient evidence to demonstrate that consumer demand for the Platform is driven by the inclusion of the infringing features. In addition to the evidence described above, Mr. Guerra confirmed that the speed and accuracy in behavior detection – which Mr. Watkins attributed to static analysis - is important to consumers. *See Uniloc USA*, 632 F.3d at 1321.

Appthority's reliance on *LaserDynamics* and *Lucent Technologies* to argue that this evidence is insufficient to prove consumer demand is unpersuasive. In *Laser Dynamics*, 694 F.3d at 68, the Federal Circuit concluded that the plaintiff "failed to present evidence showing that the patented disc discrimination method drove demand for the laptop computers." The court reasoned that it was insufficient to show that "the disc discrimination method is viewed as valuable, important, or even essential to the use of the laptop computer," and that "a laptop computer [without the infringing method] would be commercially unviable," because many other "important or essential" laptop features, such as high resolution screens, responsive keyboards, and extended-life batteries, could then "be deemed to drive demand for the entire product." *Id.* Accordingly, "proof that consumers would not want a laptop computer without such features is not tantamount to proof that any one of those features alone drives the market for laptop computers." *Id.* Similarly, in *Lucent Technologies*, 580 F.3d at 1333, 1338-39, the Federal Circuit acknowledged that "numerous features other than the date-picker appear to account for the overwhelming majority of the consumer demand and therefore significant profit. The only reasonable conclusion ... is that the infringing use of [the] date-picker feature is a minor aspect of a much larger software program and that the portion of the profit that can be credited to the infringing use of the date-picker tool is exceedingly small."

In contrast to the laptop computers and comprehensive email software at issue in *LaserDynamics* and *Lucent Technologies*, here the product at issue has a very specific consumer purpose: to scan mobile applications for threats. *See LaserDynamics*, 694 F.3d at 69; *Lucent Techs.*, 580 F.3d at 1334. The Platform achieves this in large part through static binary analysis. There was sufficient evidence – summarized above – to support the conclusion that this infringing analysis is crucial to the marketable features of the Platform and accordingly forms the basis for consumer demand for the Platform. Although market studies and consumer surveys are useful mechanisms for demonstrating consumer demand, see *LaserDynamics*, 694 F.3d at 69, any evidence probative of "the extent to which the infringing method is used by consumers," or similar data, can be relevant in supporting the application of the entire market value rule. *See Lucent Techs.*, 580 F.3d at 1334-35. Here, there was such evidence adequate to support the jury's use of the market value of the entire Platform to calculate a reasonable royalty.

*41 A reasonable jury could accept or reject the expert testimony provided and either parties' theory of the damages. *See i4i Ltd.*, 598 F.3d at 856. For the reasons articulated above, I will deny Appthority's motion for a new trial or remittitur based on the damages the jury chose to award.

B. Supplemental Damages

Supplemental damages are permitted – and indeed required - under 35 U.S.C. § 284, which requires that the court award damages "adequate to compensate" the plaintiff for the infringement, and "in no event less than a reasonable royalty for the use made of the invention by the infringer." Although Veracode has not yet formally filed a motion for supplemental damages, I directed the parties to submit briefing on the issue so that it could be addressed in conjunction with the request for injunctive relief. *See Carborundum Co.* v. *Molten Metal Equip. Innovations, Inc.*, 72 F.3d 872, 881 (Fed. Cir. 1995) ("[i]njunctions and damages must be tailored to the circumstances and be correlatively determined" (internal quotation marks and citation omitted; alteration in original)). I provide the following observations in anticipation of a motion for supplemental damages.

The damages calculations presented at trial were based on financial data through March 31, 2014. Accordingly, there are two time periods for which supplemental damages could conceivably be available: (1) the post-discovery, pre-verdict time period, from April 1, 2014 through August 26, 2014 (the date of the jury verdict on damages), and (2) the post-damages verdict time period, from August 26, 2014 through the entry of judgment or issuance of an injunction. Appthority raises two arguments in an attempt to limit Veracode's recovery of additional damages for these time periods.

Appthority first argues that Veracode has waived any claim for an accounting to update computations of pre-verdict damages to reflect the entire period through the verdict, because it did not specifically make this argument or present evidence supporting it at trial, and because the parties did not agree on how to address such damages revisions. There is some support in the case law for Appthority's position. *See, e.g.*, *Oscar Mayer Foods Corp.* v. *ConAgra, Inc.*, 869 F. Supp. 656, 668 (W.D. Wis. 1994), *aff'd*, 45 F.3d 443 (Fed. Cir. 1994); *Braintree Labs., Inc.* v. *Nephro-Tech, Inc.*, 81 F. Supp. 2d 1122, 1140 (D. Kan. 2000). However the Federal Circuit and the majority of lower courts to address this issue "have found a waiver unjustified" on this basis. *See Metso Minerals, Inc.* v. *Powerscreen Int'l Distrib. Ltd.*, 833 F. Supp. 2d 333, 350 (E.D.N.Y. 2011) (collecting cases).

Similarly, I conclude that Veracode has not waived its right to request an accounting and to seek on a post-verdict basis damages unaddressed by the jury. *See Mikohn Gaming* v. *Acres Gaming, Inc.*, No. CV-S-97-1383-EJW, 2001 WL 34778689, at *19-22 (D. Nev. Aug. 2, 2001) ("[d]amages suffered as a result of infringement include those for the entire period of infringement," and plaintiff is entitled to seek accounting for defendant's "obligation to pay damages for the remainder of the period of infringement" not included in damages verdict); *see also Finjan, Inc.* v. *Secure Computing Corp.*, 626 F.3d 1197, 1213 (Fed. Cir. 2010). That the parties did not previously resolve how to calculate or whether to provide additional damages is no bar to such a request. Veracode's potential request, however, is cabined in the sense that it may seek only "an extension of the same remedy presented to the jury" – that is, a full calculation of the "damages adequate to compensate ... for infringement" it sought in the Complaint - and may not pursue a different theory of damages. *Mikohn Gaming*, 2001 WL 34778689, at *19.

*42 Appthority next contends that it is entitled to a jury trial on post-verdict monetary damages because there is no basis on which a reasonable royalty could be calculated from the jury verdict, which did not indicate the royalty rate or base used. The Federal Circuit has made clear that a party does not necessarily have a Seventh Amendment right to a jury trial simply because monetary relief is at issue. *See Paice LLC* v. *Toyota Motor Corp.*, 504 F.3d 1293, 1316 (Fed. Cir. 2007). "The amount of supplemental damages following a jury verdict 'is a matter committed to the sound discretion of the district court.' " *SynQor, Inc.* v. *Artesyn Techs., Inc.*, 709 F.3d 1365, 1384 (Fed. Cir. 2013) (quoting *Amado* v. *Microsoft Corp.*, 517 F.3d 1353, 1362 n.2 (Fed. Cir. 2008)).

Typically, supplemental damages are calculated based on the jury's damages verdict. *See, e.g.*, *Mikohn*, 2001 WL 34778689, at *23; *Aero Prods. Int'l, Inc.* v. *Intex Recreation Corp.*, No. 02 C 2590, 2005 WL 1498667, at *2-3 (N.D. Ill. June 9, 2005) (citing *Stryker Corp.* v. *Davol, Inc.*, 75 F. Supp. 2d 746, 747 (W.D. Mich. 1999), *aff'd*, 234 F.3d 1252 (Fed. Cir. 2000); *Oscar Mayer*, 869 F. Supp. at 668). In some cases, the royalty rate can be extrapolated from a general verdict. *Aero Prods.*, 2005 WL 1498667, at *2-3. Here, where the jury could have used any number of combinations of a royalty rate, royalty base,

and upfront payment, and where the parties disagree on these calculations, extrapolating a royalty rate from the verdict is not a reasonable option. Supplemental damages need not necessarily be derived from the royalty rate applied by the jury, however. *Cf. Amado*, 517 F.3d at 1361-62 ("There is a fundamental difference ... between a reasonable royalty for pre-verdict infringement and damages for post-verdict infringement" because of context in which such damages are calculated and change in relative positions of parties (citing *Paice*, 504 F.3d at 1317)). It is permissible for a judge to determine a royalty rate to be used in an accounting based on the post-trial submissions of the parties where the jury has not specified the allocation within its damages award. *See Paice LLC* v. *Toyota Motor Corp.*, 609 F. Supp. 2d 620, 622, 623-25, 631 (E.D. Tex. 2009); *cf. ActiveVideo Networks, Inc.* v. *Verizon Commc'ns*, 827 F. Supp. 2d 641, 655-58 & n.5 (E.D. Va. 2011), *aff'd in part, rev'd in part*, 694 F.3d 1312 (Fed. Cir. 2012). In so doing, the judge must consider any "new factual circumstances, including the change in the parties' bargaining positions and the infringer's ability to immediately comply with the injunction." *SynQor*, 709 F.3d at 1384 (citing *Amado*, 517 F.3d at 1362). These factual matters permissibly may be determined by the judge, and need not be submitted to a jury for resolution.

Although this question is not yet ripe in this case, because Veracode has not moved for post-verdict damages and Appthority has not formally requested a jury trial on this question, my inclination upon such motion practice is to invite the submission of evidentiary materials on post-verdict damages and rule on the papers, or following an evidentiary hearing if one is needed, and not to submit the issue to a jury absent the identification by the parties of a compelling reason to do so. *See Paice*, 609 F. Supp. 2d at 622, 623-25, 631.

C. Veracode's Motion for Enhanced Damages (Doc. 240)

1. Legal Standard
Section 284 of Title 35 of the United States Code permits the court to "increase the damages up to three times the amount found or assessed." The Federal Circuit has consistently held, in accordance with Supreme Court precedent, that "an award of enhanced damages requires a showing of willful infringement." *Seagate*, 497 F.3d at 1368. A finding of willfulness permits an award of enhanced damages, however, it does not require it. *Id.*; *see i4i Ltd.*, 598 F.3d at 859; *see also Robert Bosch*, 719 F.3d at 1327 ("*Seagate* was careful to distinguish between the determination that infringement was willful and the decision of whether damages should be enhanced").

*43 I concluded in Section III.B, *supra*, that Appthority willfully infringed Claims 1 and 5 of the '924 Patent. With that threshold requirement satisfied, the factors set forth in *Read Corp.* v. *Portec, Inc.*, 970 F.2d 816, 826-27 (Fed. Cir. 1992), *superseded on other grounds as recognized by Hoechst Celanese Corp.* v. *BP Chems. Ltd.*, 78 F.3d 1575, 1578 (Fed. Cir. 1996), guide the analysis of whether enhancement of damages is appropriate due to "the egregiousness of the defendant's conduct based on all the facts and circumstances." *Id.* at 826.

The *Read* factors include:

> (1) whether the infringer deliberately copied the ideas or design of another; (2) whether the infringer, when he knew of the other's patent protection, investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed; (3) the infringer's behavior as a party to the litigation; (4) defendant's size and financial condition; (5) closeness of the case; (6) duration of defendant's misconduct; (7) remedial action by the defendant; (8) defendant's motivation for harm; and (9) whether defendant attempted to conceal its misconduct.

Liquid Dynamics Corp. v. *Vaughan Co.*, 449 F.3d 1209, 1225 (Fed. Cir. 2006) (citing *Read*, 970 F.2d at 826-27). Because the award of enhanced damages is at the discretion of the trial judge, I must balance these considerations as relevant to the particular case at hand. *See i4i Ltd.*, 598 F.3d at 858-59; *SRI Int'l* v. *Advanced Tech. Labs., Inc.*, 127 F.3d 1462, 1468-69 (Fed. Cir. 1997). The touchstone of the inquiry, however, is the "egregiousness of the defendant's conduct" in light of the totality of the circumstances. *Spectralytics*, 649 F.3d at 1349 (quoting *Read*, 970 F.2d at 826)). In applying these factors, I focus primarily on the claims on which Veracode prevailed; those are the claims on which the damages are based. But I also consider the nature of the litigation as a whole where relevant.

2. Analysis

a. Whether Enhancement Is Warranted

i. Factors Favoring Enhancement

At least one court has found certain *Read* factors presumptively satisfied where they are effectively addressed by the jury instruction. *See Informatica Corp.* v. *Bus. Objects Data Integration, Inc.*, 489 F. Supp. 2d 1075, 1084-85 (N.D. Cal. 2007). Here, the jury instructions captured factors 1 and 2. Further evidence supports a finding that these factors weigh in favor of enhanced damages. Appthority did not perform a freedom to operate search and instead considered competitors "irrelevant." The evidence at trial reflects that Appthority knew about Veracode's product and technology and developed its similar, infringing product after obtaining at least a general knowledge of Veracode's product. Judge Gorton recently found such competing product development after learning about the patentee's product to permit the inference of copying for factor 1. *See WBIP, LLC*, 2014 WL 585854, at *6. An additional consideration relevant to these factors is whether the defendant failed to obtain an opinion of counsel prior to commencing the infringing activity. *See Spectralytics*, 649 F.3d at 1347-48. Appthority has not presented any evidence that it solicited or followed the advice of counsel.

Factor 7 also weighs in favor of enhanced damages. The record before me indicates that Appthority has not taken any remedial action to remove its infringing product from the marketplace or alter it to cease the infringement since the complaint was filed in March 2012, despite a jury verdict finding willful infringement. *See, e.g., Advanced Cardiovascular Sys., Inc.* v. *Medtronic, Inc.*, No. C-95-03577 DLJ, 2000 WL 34334583, at *15 (N.D. Cal. Mar. 31, 2000). Instead, Appthority has chosen to await a final order from this court entering judgment or imposing an injunction. Factor 6, regarding the duration of the infringement, similarly weighs in favor of enhancement for this reason.[47] Although I recognize that Appthority continues to present challenges to the jury verdict and its legal liability, which are its prerogative to do, Appthority's public defiance of the jury verdict and delay in constructing a workaround to the infringing features of its Platform suggests that these factors should weigh in favor of enhanced damages.

ii. Factors Neutral on, or Against, Enhancement

*44 Factors 3 and 5, discussed in greater detail in relation to the request for attorneys' fees, are neutral. The jury's split verdict finding infringement of the '924 Patent but not the '609 Patent suggests that the case was not wholly a victory for Veracode. Veracode asserts, however, that Appthority's non-infringement contentions were unsupportable and were based on rejected claim constructions, and that its invalidity and damages defenses were "far-fetched" and not based in evidence.

With regard to only the '924 Patent infringement, the case for direct infringement was not a close one; the evidence overwhelmingly demonstrated that the Platform incorporates the patented technology. *See nCube Corp.* v. *Seachange Int'l, Inc.*, 436 F.3d 1317, 1325 (Fed. Cir. 2006). But with regard to the '609 Patent, Appthority's arguments were largely reasonable and in fact successful. I am not persuaded that Appthority's conduct here was so unreasonable, aside from perhaps its post-verdict remarks to the public. Its continued assertion of previously rejected arguments, while ineffective, was at least consistent. The fact that Appthority's arguments may have been successfully rebutted by Veracode does not render Appthority's position necessarily unreasonable. There is little to suggest that Appthority acted in bad faith as opposed to willfully, and there is no indication that it did so in the course of this litigation.

Factor 8 is also neutral. Evidence of a desire to engage in normal business competition, particularly where there are commercial advantages to entering the mobile application security market during its early stages, does not constitute an improper motive. *See WBIP, LLC*, 2014 WL 585854, at *7 (citing *i4i Ltd.*, 598 F.3d at 858). However, where parties are in direct competition with one another, I recognize the inference can be made of a motivation to harm by offering an infringing product where the patentee holds an effective monopoly on the patented technology. *See Bos. Sci. Corp.* v. *Cordis Corp.*, 838 F. Supp. 2d 259, 280 (D. Del. 2012), *aff'd*, 497 F. App'x 69 (Fed. Cir. 2013).

Factor 4 is largely neutral and may weigh against enhanced damages. Appthority is a smaller company, having received approximately $10 million in venture capital funding compared with Veracode's revenues of $100 million.

Finally, factor 9 is neutral, and Veracode concedes as much. Veracode cites to no evidence that Appthority attempted to conceal its misconduct; indeed, Appthority was a known direct competitor of Veracode and has promoted its products as offering the same services as those of Veracode. There is no evidentiary basis to find that this factor weighs in favor of enhanced damages.

iii. Summary

I find that four of the factors weigh significantly in favor of enhancement, while five are relatively neutral. The totality of the circumstances demonstrate that the jury could have found differently on some of Appthority's invalidity defenses, and that it "could have awarded substantially less damages," consistent with the recommendation of even Veracode's expert. *Cf. Riles* v. *Shell Exploration & Prod. Co.*, 298 F.3d 1302, 1313 (Fed. Cir. 2002). Appthority's litigation behavior was not so unreasonable as to counteract these considerations completely. After balancing the *Read* factors, I conclude that Veracode is not entitled to enhanced damages.

D. Prejudgment Interest
Veracode seeks prejudgment interest at the rate of twelve percent per annum running from March 16, 2012, the date this suit was filed, to the date of judgment. Appthority argues that Veracode has not shown that it is entitled to prejudgment interest, and that if prejudgment interest is awarded, it should be at either the 52-week Treasury bill rate or the prime rate.

*45 Prejudgment interest is a matter entrusted to the discretion of the court. *See* 35 U.S.C. § 284 (damages award should be not "less than a reasonable royalty ... together with interests and costs as fixed by the court"). Its purpose is consistent with the goal of ensuring "that the patent owner is placed in as good a position as [it] would have been in had the infringer entered into a reasonable royalty agreement," *Gen. Motors Corp.* v. *Devex Corp.*, 461 U.S. 648, 655-57 (1983), and it accordingly serves "to compensate for the delay a patentee experiences in obtaining money [it] would have received sooner if no infringement had occurred." *Paper Converting Machine Co.* v. *Magna-Graphics Corp.*, 745 F.2d 11, 23 (Fed. Cir. 1984); *cf. TMTV, Corp.* v. *Mass Prods. Inc.*, 645 F.3d 464, 474 (1st Cir. 2011) ("Prejudgment interest dating from the [copyright] infringements compensated the plaintiff for the time value of monies it should have had — just as if a contract debt had not been paid on time."). For this reason, "prejudgment interest should ordinarily be awarded absent some justification for withholding such an award." *Devex*, 461 U.S. at 657. I conclude that an award of prejudgment interest is appropriate here.

The Federal Circuit has affirmed the use of the Treasury bill rate and the prime rate for prejudgment interest, but has not limited prejudgment interest to these two measures. *See Mars, Inc.* v. *Coin Acceptors, Inc.*, 513 F. Supp. 2d 128, 133-34, 136 (D.N.J. 2007) (considering prime rate and T-Bill rate, and electing to use the latter); *Laitram Corp.* v. *NEC Corp.*, 115 F.3d 947, 955 (Fed. Cir. 1997) (affirming judge's use of Treasury bill rate, compounded annually, for calculating prejudgment interest), *Uniroyal, Inc.* v. *Rudkin-Wiley Corp.*, 939 F.2d 1540, 1545 (Fed. Cir. 1991) (affirming judge's use of prime rate, compounded daily, for calculating prejudgment interest).

It is my practice to look to the Massachusetts state law of prejudgment interest for contract damages, because the reasonable royalty rate is essentially a contract measure of damages. *See Cohesive Techs., Inc.* v. *Waters Corp.*, 526 F. Supp. 2d 84, 125-26 (D. Mass. 2007), *aff'd in part, rev'd in part on other grounds*, 543 F.3d 1351 (Fed. Cir. 2008); *see also Real View, LLC* v. *20-20 Techs., Inc.*, 811 F. Supp. 2d 553, 561 (D. Mass. 2011) (similarly applying Massachusetts rate); *cf. TMTV, Corp.*, 645 F.3d at 474-75 ("[t]he choice of the local rate" for prejudgment interest rather than "the lower federal rate" employed for postjudgment interest is "within the sound discretion of the district judge"). This approach is consistent with the Federal Circuit's acceptance of the use of simple statutory rates in computing prejudgment interest. *See Gyromat Corp.* v. *Champion Spark Plug Co.*, 735 F.2d 549, 556-57 (Fed. Cir. 1984); *Scott* v. *Bos. Hous. Auth.*, 835 N.E.2d 278, 281 (Mass. App. Ct. 2005).

Massachusetts General Laws ch. 231, § 6C, directs prejudgment interest "at the rate of twelve per cent per annum from the date of the commencement of the action." This "comprehends the damages necessary to afford the patentee full compensation for infringement." *Cohesive Techs.*, 526 F. Supp. 2d at 125-26. Accordingly, I will award Veracode prejudgment, simple interest at the statutory rate of 12% per annum to run from March 16, 2012, to the date of judgment. *See Nickson Indus. v. Rol Mfg. Co.*, 847 F.2d 795, 800 (Fed. Cir. 1988). Given the disparity between this interest rate and market interest rates generally during the relevant period, I decline to direct compounding. Simple interest is sufficient but not more than necessary to serve the purposes of the damages remedy imposed here. *Cf. Sec'y. of Admin. & Fin. v. Labor Relations Comm'r*, 749 N.E.2d 137, 143 (Mass. 2001).

V. INJUNCTIVE RELIEF

A. Background

Veracode seeks a permanent injunction prohibiting Appthority from continuing to infringe claims 1 and 5 of the '924 Patent. Appthority asserts that an injunction is not necessary because monetary damages are adequate. Following a hearing on these matters, both parties submitted proposed language for an order of injunction. If an injunction is granted, Appthority moves for a stay pending appeal or for sixty days to enable it to revise its Appthority Platform so it does not infringe the '924 Patent.

A. Legal Standard

*46 Protection of the right conveyed by a patent — "to exclude others from making, using, offering for sale, or selling the invention" — may require the remedy of a permanent injunction for its vindication. *See* 35 U.S.C. § 154(a)(1); *i4i Ltd.*, 598 F.3d at 862-63; *see also Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1328 (Fed. Cir. 2008). Under the Patent Act, an injunction may be ordered "in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable." 35 U.S.C. § 283. Consistent with these principles, a plaintiff seeking a permanent injunction must demonstrate "(1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction." *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006).[48] If an injunction is ordered, its scope must be appropriately tailored to the foreseen injury and its terms stated specifically and in reasonable detail. Fed. R. Civ. P. 65(d)(1); *see Oakley, Inc. v. Sunglass Hut Int'l*, 316 F.3d 1331, 1346 (Fed. Cir. 2003).

C. Findings of Fact and Conclusions of Law

1. Appropriateness of a Permanent Injunction

a. Irreparable Injury

The Federal Circuit requires that a plaintiff make two showings in order for the irreparable injury factor to weigh in its favor for a permanent injunction. *See Apple, Inc. v. Samsung Elecs. Co. (Apple III)*, 735 F.3d 1352, 1361, 1363-64 (Fed. Cir. 2013). The plaintiff must not only demonstrate that it will suffer irreparable harm absent an injunction, but also that "a sufficiently strong causal nexus relates the alleged harm to the alleged infringement." *Id.* at 1359-60 (quoting *Apple, Inc. v. Samsung Elecs. Co. (Apple II)*, 695 F.3d 1370, 1374 (Fed. Cir. 2012)); *id.* at 1363 ("Without a showing of causal nexus, there is no relevant irreparable harm."). In other words, the plaintiff must make some showing "that the infringement caused the harm in the first place." *Id.* at 1360 (quoting *Apple, Inc. v. Samsung Elecs. Co. (Apple I)*, 678 F.3d 1314, 1324 (Fed. Cir. 2012)).

i. Irreparable Harm

Irreparable harm can be demonstrated by establishing a variety of consequences, including lost market share, lost future sales, and reputational injury. *See Douglas Dynamics LLC v. Buyers Prods. Co.*, 717 F.3d 1336, 1344 (Fed. Cir. 2013); *Robert Bosch, LLC v. Pylon Mfg. Corp.*, 659 F.3d 1142, 1150 (Fed. Cir. 2011). "Where two companies are in competition against one another, the patentee suffers the harm — often irreparable — of being forced to compete against products that incorporate and infringe its own patented inventions." *Douglas Dynamics*, 717 F.3d at 1345; *see Presidio Components, Inc. v. Am. Tech. Ceramics Corp.*, 702 F.3d 1351, 1363 (Fed. Cir. 2012) ("Direct competition in the same market ... suggest[s] strongly the potential for irreparable harm without enforcement of the right to exclude."). Veracode and Appthority are in direct competition with each other: they provide the same service of scanning mobile applications for security risks, target the same customers (large enterprise customers), and compete directly for sales of their related products. That other entities may participate in the mobile application security market does not render their competition any less direct. *See Robert Bosch*, 659 F.3d at 1151; *Smith & Nephew*, 955 F. Supp. 2d at 77.

Veracode has also presented evidence, albeit somewhat limited, that it has lost business opportunities to Appthority, including direct sales and collateral sales. This is "a paradigmatic example of irreparable injury." *Smith & Nephew*, 955 F. Supp. 2d at 77. This general evidence of market share loss is adequate to support a finding of irreparable injury. *See i4i Ltd.*, 598 F.3d at 862 (patentee "not required to prove that its specific customers stopped using [its] products because they switched to the infringing ... products"). Veracode also invested in a licensing agreement with Rovi instead of developing other products or pursuing other endeavors.

*47 Reserving for discussion below my consideration of whether the monetary damages Veracode will receive are adequate to address the harm it suffered, which is also relevant to the irreparable harm inquiry, I find that this prong is satisfied.

ii. Causal Nexus

Veracode must also satisfy the causal nexus requirement. A plaintiff must demonstrate "some connection between the patented feature and demand for [the infringer's] products." *Apple III*, 735 F.3d at 1364. It is not required to show "that a patented feature is *the sole reason* for consumers' purchases," but instead should focus on "the importance of the claimed invention in the context of the accused product." *Id.* This can be satisfied through "evidence that the inclusion of a patented feature makes a product significantly more desirable" or "that the absence of a patented feature would make a product significantly less desirable." *Id.*

Few courts have had the occasion to apply the causal nexus requirement since *Apple III*; as a result, I navigate somewhat uncharted waters. In *Riverbed Tech., Inc. v. Silver Peak Sys., Inc.*, Civ. No. 11-484-RGA, 2014 WL 4695765, at *12 (D. Del. Sept. 12, 2014), Judge Andrews concluded that the plaintiff failed to satisfy this requirement because it demonstrated only that the defendant advertised its products in a way that showed the defendant's products have all the functionality of the plaintiff's products.[49] He found this "evidence of copying or mimicking" insufficient to establish a nexus, because it did not demonstrate "that customer demand is driven by the patented functionality of the [patents-in-suit] as opposed to [the defendant's] global support structure, greater company stability, existing customer base, etc." *Id.* Because there were "other plausible explanations ... for why a customer would purchase [the defendant's] products instead of [the plaintiff's]" besides consumer demand for the infringed invention, he found that the irreparable harm factor did not weigh in favor of the plaintiff. *Id.* at *13.

Similarly, in *Apple, Inc. v. Samsung Elecs. Co. (Apple V)*, Case No: 11-cv-01846-LHK, 2014 WL 976898, at *1, *19 (N.D. Cal. Mar. 6, 2014), Judge Koh determined on remand from the Federal Circuit that Apple had not proven the requisite causal nexus between the irreparable harm it purported to suffer from Samsung's infringement of its patented touchscreen user interface software features and the infringement itself. She reasoned that "[s]martphones and tablets are complex devices embodying hundreds of features, inventions, and components," and Apple had not demonstrated "that Samsung's inclusion of the patented features made Samsung's products 'significantly more desirable.' " *Id.* at *19 (citation omitted). Instead, the evidence presented by Apple simply demonstrated that the patented features "add to a device's appeal" but do not drive consumer purchasing decisions. *Id.*

*48 Clearly, district courts have interpreted the Federal Circuit's *Apple* decisions as imposing a demanding bar for satisfaction of the irreparable harm factor, while implementing the Federal Circuit's statement that harm caused by otherwise lawful competition — and not by the infringement — should not weigh in favor of an injunction. *Apple III*, 735 F.3d at 361; *see, e.g.*, *Carnegie Mellon Univ.* v. *Marvell Tech. Grp.*, Civ. No. 09-290, 2014 WL 1320154, at *33 (W.D. Pa. Mar. 31, 2014) (plaintiff did not demonstrate irreparable harm because, among other reasons, "these are multi-feature products which have many valuable non-infringing aspects," and plaintiff offered no showing "as to how customers and/or the market valued the other numerous features ... vis-à -vis the features of the patented methods"), *rev'd in part and vacated in part on other grounds*, 2015 WL 4639309 (Fed. Cir. Aug. 4, 2015).

These opinions might suggest that *Apple III* presents a substantial hurdle for a plaintiff seeking to establish that customers choose particular products because of specific features they offer, absent a large-scale survey of a customer base. However, the language of *Apple III* need not result in an overly austere interpretation. Instead, "evidence that a patented feature makes a product significantly more desirable" or its absence less desirable can be adequate to establish a causal connection under *Apple III*, 735 F.3d at 1364.

Along these lines, at least three judges have found a causal nexus after *Apple III* where there is evidence that the infringing feature is a central part of the defendant's product, and the inference can be made that this centrality drives consumer demand to some extent. *See TransPerfect Global, Inc.* v. *MotionPoint Corp.*, No. C 10-2590 CW, 2014 WL 6068384, at *6 (N.D. Cal. Nov. 13, 2014) (finding causal nexus based on testimony of defendant's director of software development that allegedly infringing features of defendant's system "were integral parts of the system" and that system would be "impossible to use if you didn't have implicit navigation," and acknowledging "context of head-to-head competitors in a crowded field" of language translation firms); *Covidien Sales LLC* v. *Ethicon Endo-Surgery, Inc.*, Civ. No. 3:14-cv-917(JCH), 2014 WL 5242872, at *12 (D. Conn. Oct. 15, 2014) (finding causal nexus because defendant knowingly incorporated patented curved blade into product, despite awareness of prior litigation, suggesting that defendant would not have taken risk "if the curved blade was not a desirable feature to consumers," and acknowledging findings in prior litigation that "consumers valued the curved blades"), *appeal filed* (2d Cir. Oct. 16, 2014) (No. 14-2898); *Sealant Sys. Int'l, Inc.* v. *TEK Global S.R.L.*, Case No. 5:11-cv-00774-PSG, 2014 WL 1008183, at *23 (N.D. Cal. Mar. 7, 2014) (finding causal nexus because defendant's product – an onboard tire repair kit – "could not operate without" a feature of the infringed patent, and therefore the "infringement is traceably tied to its products' success causing irreparable injury"), *aff'd in part, vacated in part, rev'd in part*, Nos. 2014-1405, 2014-1428, 2015 WL 3622097, at *9-10 (Fed. Cir. June 11, 2015) (vacating jury's infringement verdict and damages award, and vacating injunction, because court erred in denying motion for judgment as a matter of law on anticipation defense).

With these recent interpretations of *Apple III* in mind, I turn to the record in this case. The parties make the same arguments as on the issue of consumer demand as a basis for application of the entire market value rule in calculating damages.

Veracode points to the testimony of Mr. Guerra and Mr. Watkins, who stated that the '924 Patented technology is responsible for the speed and efficiency of the Appthority Platform and is part of its "core." Veracode therefore asserts that the speed and efficiency of the Platform - features directly attributable to the '924 Patented technology - make the product "significantly more desirable" to customers. *See Apple III*, 735 F.3d at 1364. In addition, as discussed above, Dr. Hanna (Appthority's expert) and Mr. Guerra (Appthority's president and co-founder) made clear that the infringing and non-infringing features of the Platform are fully integrated in the consumer product, and other evidence demonstrated that Appthority markets the Platform as offering a unique combination of these features.

*49 Appthority contends that it is static analysis — but not necessarily only of binary files, to which the '924 Patent is limited — that increases the speed and efficiency of the Platform. It further asserts that Veracode has not established that customers use either the Appthority or the Veracode products because of the claimed functionality of the '924 Patent.

Consistent with my analysis above regarding the entire market value rule, I find that Veracode has presented evidence that "the inclusion of [the] patented feature[s] makes [the Appthority] product significantly more desirable." *Apple III*, 735 F.3d at 1364. This case more closely resembles *TransPerfect Global* and *Sealant Systems* than those cases in which a causal nexus is not established. To be sure, the patented inventions and the infringing products in the cases where a causal nexus has been found appear to be far simpler than those at issue here. The *Apple III* court expressly acknowledged that the causal nexus

requirement "may be more easily satisfied (indeed, perhaps even conceded) for relatively 'simple' products," but denied any stricter standard for more complex ones. *Apple III*, 735 F.3d at 1362. Surely a plaintiff in the technology business cannot be effectively barred from obtaining injunctive relief because, as a practical matter, an infringing component is so substantially integrated with the product's other features that its isolation and specific attribution of consumer demand to it is exceedingly difficult. I decline to hold Veracode to such a high standard of proof and to interpret *Apple III* to require such a standard. Rather, as with my approach to the applicability of the entire market value rule, I find the record as a whole in this case satisfies the causal nexus requirement.

b. Inadequate Remedies Available at Law

Monetary damages may be inadequate where "[t]here is no reason to believe that [the defendant] will stop infringing, or that the irreparable harms resulting from its infringement will otherwise cease, absent an injunction." *Robert Bosch*, 659 F.3d at 1155; *see Smith & Nephew*, 955 F. Supp. 2d at 78-79. Where the plaintiff can point to a loss in market share, business opportunities, or reputation, there is a strong indication that the available legal remedies will be inadequate in preserving the patent rights of the plaintiff, because these losses are not easily quantifiable. *See i4i Ltd.*, 598 F.3d at 862.

Veracode makes numerous claims of losses that are exceedingly difficult to value, particularly where the infringement has been ongoing for several years. *See Polymer Techs., Inc.* v. *Bridwell*, 103 F.3d 970, 975-76 (Fed. Cir. 1996). It claims that its reputation has been diminished because Appthority's infringement enables it to offer consumers a directly competing product, and that it has indeed lost several actual and potential customers to Appthority. *See Douglas Dynamics*, 717 F.3d at 1345; *Novozymes A/S* v. *Genencor Int'l, Inc.*, 474 F. Supp. 2d 592, 613 (D. Del. 2007) (where parties "are head-to-head competitors," plaintiff has statutory right "not to assist its rival with the use of proprietary technology"). Further, Veracode points to the fact that it has maintained an exclusive license to the '924 Patent and has not sublicensed it to suggest a goal of market exclusivity, which has been compromised by Appthority's invasion of its assigned right to exclude others from using or selling the patented technology.[50]

*50 Appthority asserts that Veracode's damages are fully compensated and compensable by reasonable royalty fees under the damages theory it presented to the jury. As support for its position, Appthority relies on *Innogenetics*, 512 F.3d at 1380, a case in which the Federal Circuit determined that a permanent injunction was not appropriate because the damages award ensured that the plaintiff would not be irreparably harmed by future sales.

Innogenetics is distinguishable. In *Innogenetics*, 512 F.3d at 1380, the jury was instructed that a reasonable royalty could "include both an up-front payment and an ongoing royalty payment," and the ultimate damages award included both a market entry fee and an ongoing royalty amount. The Federal Circuit concluded that the damages award was not only a royalty for the defendant's past infringement, but also included a market entry fee "as an amount paid in anticipation of [the defendant's] long-term license to sell its products." *Id.* Because the damages award included such a fee that contemplated future sales by the defendant, a permanent injunction was not necessary, and indeed was inappropriate, because the plaintiff could not establish any irreparable harm or the inadequacy of monetary damages. *Id.* at 1380-81.

Here, in contrast, the jury was instructed only to award "damages," "which by definition covers only past harm." *Whitserve, LLC* v. *Comput. Packages, Inc.*, 694 F.3d 10, 35 (Fed. Cir. 2012). Indeed, the jury verdict slip speaks in the past tense, asking the jury to find the amount of damages Veracode "sustained as a result of Appthority's infringement."

Although it is possible – and likely – that the jury included an entry fee as part of the damages award, this does not compensate adequately for continued damage of uncertain dimension inflicted post-verdict by Appthority. Even if the jury did contemplate the inclusion of an entry fee, the evidence demonstrated that the equity stake entry fee paid by Veracode to Rovi in exchange for the '924 Patent license was not a payment made in contemplation of future sales in the long run, but rather a partial consideration for the license. It cannot be said that the jury award here contemplated any compensation for future infringement, as it did in *Innogenetics*. *Cf. Innogenetics*, 512 F.3d at 1380 (jury verdict "was not a royalty for [defendant's] past infringement only," because "record [was] replete with references to the market entry fee as an amount paid in anticipation of [defendant's] long-term license to sell its products"). Importantly, Veracode has presented compelling evidence that Appthority has no intention of ceasing to use and promote its infringing products, and that Veracode will

continue to suffer irreparable harm moving forward if Appthority is not prevented from doing so.[51] Although an ongoing royalty may in some cases be an appropriate substitute for a permanent injunction, this is not such a case. *See Bard Peripheral Vascular, Inc.* v. *W.L. Gore & Assocs., Inc. (Bard Peripheral I)*, 670 F.3d 1171, 1192 (Fed. Cir. 2012), *vacated in part on other grounds*, 682 F.3d 1003 (Fed. Cir. 2012), *cert. denied sub nom. W.L. Gore & Assocs., Inc.* v. *C.R. Bard, Inc.*, 133 S. Ct. 932 (2013). I find that the inadequacy of legal remedies weighs in favor of Veracode.[52]

c. Balance of Hardships

*51 Veracode has identified, as has already been discussed, numerous harms that it will suffer if Appthority is not enjoined from continuing to use the infringing technology, including continued lost sales and frustrated business development. More importantly, without an injunction Veracode continues to lack control over an invention to which it has successfully asserted an exclusive right. *See Robert Bosch*, 659 F.3d at 1156 (requiring plaintiff "to compete against its own patented invention" places substantial hardship on plaintiff). Particularly where Appthority has not indicated an intent to cease infringing or come forward with the design of a workaround absent an express order to do so, Veracode's identified hardships are legitimate.

I must also consider Appthority's hardships, but here they have little weight. Where a defendant is found to have willfully infringed a patent, the hardships that may appropriately be considered under this factor are limited. "One who elects to build a business on a product found to infringe cannot be heard to complain if an injunction against continuing infringement destroys the business so elected." *Windsurfing Int'l, Inc.* v. *AMF, Inc.*, 782 F.2d 995, 1003 n.12 (Fed. Cir. 1986); *see Broadcom Corp.* v. *Qualcomm Inc.*, 543 F.3d 683, 704 (Fed. Cir. 2008). In such circumstances, the cost of redesigning the infringing products or the loss to the business of the income derived from the infringing products is irrelevant. *See i4i Ltd.*, 598 F.3d at 863.

Appthority attempts to bolster its own hardships by pointing to those that would result for its customers and its business partners if a permanent injunction issued and it was forced to discontinue the Appthority Platform and database. But "the balance considered is only between a plaintiff and a defendant, and thus the effect on customers ... is irrelevant under this prong of the injunction test." *Acumed*, 551 F.3d at 1330. Appthority's relatively small size and revenue compared to Veracode, which are otherwise relevant considerations, do not serve to tip the balance in these circumstances.[53] *See i4i Ltd.*, 598 F.3d at 862; *Bell & Howell Document Mgmt. Prods. Co.* v. *Altek Sys.*, 132 F.3d 701, 708 (Fed. Cir. 1997); *see also Robert Bosch*, 659 F.3d at 1156 ("a party cannot escape an injunction simply because it is smaller than the patentee or because its primary product is an infringing one"). I find that this factor does not weigh against Veracode.

d. Public Interests at Stake

In general, the public interest "favors protecting the rights of patentees and enforcing the patent system." *Smith & Nephew*, 955 F. Supp. 2d at 79 (citing *ActiveVideo Networks, Inc.* v. *Verizon Commc'ns*, 694 F.3d 1312, 1341 (Fed. Cir. 2012); *Douglas Dynamics*, 717 F.3d at 1345-46). Although "competition serves the public interest .... [,] ensures competitive pricing and fosters innovation," "cheap copies of patented inventions have the effect of inhibiting innovation and incentive." *Douglas Dynamics*, 717 F.3d at 1346. As a result, protection of patent rights takes precedence over public interest in competition. *Id.*; *see Sanofi-Synthelabo* v. *Apotex, Inc.*, 470 F.3d 1368, 1383-84 (Fed. Cir. 2006).

In order for this factor to weigh in favor of Appthority, it must point to sufficient objective evidence of some public interest that would be disserved by a permanent injunction. *See Acumed*, 551 F.3d at 1331; *cf. Smith & Nephew*, 955 F. Supp. 2d at 80 (evidence of strong countervailing public interest in making defendant's medical device available for treatment where some doctors considered it more effective than plaintiff's product). Appthority meekly suggests a public interest in having access to the pervasive non-infringing features of the Appthority Platform and the entirely non-infringing database to manage mobile applications in a fully informed way. But these concerns regarding the non-infringing portions of Appthority's products are better addressed in defining the scope of an injunction than in assessing the propriety of one. I find that this favor weighs in favor of Veracode, and accordingly conclude that a permanent injunction of a reasonably tailored scope is

appropriate here.

2. Scope of the Injunction

*52 Calibrating the scope of the injunction when one is to be issued is important to prevent further litigation and provide an appropriate equitable remedy. *See* Fed. R. Civ. P. 65; *Additive Controls & Measurement Sys., Inc.* v. *Flowdata, Inc.*, 986 F.2d 476, 479-80 (Fed. Cir. 1993). Veracode requests that the entirety of the Appthority Platform and the Appthority database be included in the injunction because they infringe the relevant claims of the '924 Patent. Appthority, for its part, requests that any injunction issued be limited in scope to those parts of the Platform that would specifically infringe the patent, that is, static analysis of a representation of a mobile application binary file to detect the presence or potential presence of the specific types of program errors or potential program errors (which Appthority refers to as underlying application behaviors) discussed at trial, including: user location tracking (with or without user permission), sending and accessing SMS text messages, obtaining device information, detecting specific types of malware, use of the device camera or microphone, using Bluetooth, and others, as well as all of the types of program errors or potential program errors listed as examples in the '924 Patent specification.[54] Appthority contends that any injunction should not extend to the other functionality of the Platform, including its detection of behaviors that are not errors, its dynamic analysis, and its static analysis of non-binary files. Veracode argues that Appthority's proposed injunction is too narrow in limiting the list of program errors and potential program errors and in permitting Appthority to continue to use its database.

I first consider whether the database should be included in the injunction in some fashion. The database consists of reports for more than 2.5 million mobile applications that Appthority has scanned to detect program errors and potential program errors using the Platform's analyzer. When an application is submitted for analysis through the Platform, Appthority first cross-references its database to determine if the application has already been analyzed; if it has, then a full report of the application's behaviors and risks is generated from the database. If it has not, then the application is run through the Platform for error detection. Neither the database itself nor the information contained within it, standing alone, infringes the '924 Patent — rather, it is the tool by which the information therein was obtained that infringes the claimed invention.

Because the database was built on acts of past infringement, for which Veracode will be compensated through the reasonable royalty award, I conclude an injunction as to this database is overly broad and does not serve the purpose of equitable relief. *See Johns Hopkins Univ.* v. *CellPro, Inc.*, 152 F.3d 1342, 1366 (Fed. Cir. 1998) ("proper purpose of an injunction" is to "prevent infringement," and as such an injunction should only enjoin those activities "that either have infringed the ... patent or are likely to do so"). Indeed, "[s]ection 283 does not provide remedies for past infringement; it only provides for injunctive relief to prevent future infringement." *Id.* at 1367. Damages, not an injunction, are the appropriate remedy for past conduct.

Veracode's counterpoint – that future use of the database could be considered continued infringement – is inadequately developed. Although Veracode seems to offer a "fruits of our labor" argument, it is unclear how Appthority's reliance on or use of the database would constitute continued infringement, except that it would entail the use or distribution of a product generated by its infringing technology. This proposition finds little support in the case law as a basis for an injunction.[55]

*53 Because I agree with Appthority that Veracode is adequately compensated for its past infringement by the damages award, I will issue only a limited injunction as to Appthority's use of the database. Appthority will be enjoined from using any mobile application reports that were generated using the infringing technology, as described below, and that were added to the database after March 31, 2014, the date through which the jury's damages award covers (or after a later date through which supplemental damages are ultimately awarded, if such an award is determined applicable). I will further enjoin the addition of any reports for new mobile applications to the database if they were generated using the infringing technology. This approach will ensure that the injunctive relief is "narrowly tailored to fit the specific legal violations" and does not overcompensate for injury that has already been captured in the damages award. *Gemveto Jewelry Co.* v. *Jeff Cooper Inc.*, 800 F.2d 256, 259 (Fed. Cir. 1986).

I turn next to the Appthority Platform itself, and whether the injunction must include the Platform as a whole or can reasonably segregate only those infringing portions. On the one hand, enjoining the use of the Platform as a whole would certainly achieve the goal of ceasing Appthority's infringement, and comprehensive injunctions of this nature have been upheld by the Federal Circuit. *See, e.g.*, *Nat'l Instruments Corp.* v. *MathWorks, Inc.*, 113 F. App'x 895, 900 (Fed. Cir. 2004) (per curiam) (injunction that "use[s] specific terms and describe[s] with reasonable detail the acts sought to be restrained and

limit[s] its prohibition to the infringing ... software," is permissible even if it encompasses non-infringing uses, unless the defendant can "separat[e] out the infringing uses through reprogramming or the like," and the defendant failed to do so).

On the other hand, Appthority has demonstrated that the Platform engages in numerous functions that, standing alone, do not infringe the '924 Patent, including dynamic analysis, detection of behaviors not reasonably classified as program errors, and static analysis of non-binary files. It has further represented that the Platform can continue to perform these functions without engaging in the infringing activity. Following the hearing on these post-trial motions, Appthority implemented changes to its Platform consistent with its own proposed injunction language. Appthority represents that the Platform no longer "statically analyze[s] any representation of mobile app binary files, wherein the representation of the binary file is an intermediate file, to detect the presence or potential presence of" twenty-two specific types of program errors or potential program errors. These twenty-two include the fourteen behaviors for which some evidence was offered at trial and the seven examples articulated in the '924 Patent claim specification of "program errors or potential program errors."

Tailoring an injunction only to infringing activity makes a permanent injunction prohibiting the manufacture, use, or sale of the Platform *as a whole* unnecessary. *Cf. Int'l Rectified Corp.* v. *IXYZ Corp.*, 383 F.3d 1312, 1316 (Fed. Cir. 2004) ("actual scope of the injunction cannot be [so] expansive" as to "apply to many more devices than those actually adjudicated"). However, consistent with the jury's findings and my own factual findings articulated above, I find that the program errors and potential program errors that the Platform detects, thereby infringing the '924 Patent, are more comprehensive than the twenty-two that Appthority has identified. The '924 Patent contemplates a wide range of program errors not specifically enumerated therein, and there was testimony at trial that the Platform detects hundreds of such errors. That only certain program errors were focused upon at trial does not mean that the Platform does not detect other errors that infringe the claimed invention.

*54 A more appropriate injunction covers all program errors and potential program errors, as the term was defined during claim construction, except those that are deemed program errors solely because of a subjective user's preference settings. This is consistent with the evidence presented at trial that the '924 Patent does not contemplate errors generated by such user preferences, and consistent with the reasonable inference from the evidence that more than the specific signatures identified at trial infringe the '924 Patent. I conclude that this approach more appropriately achieves the balance of interests required for equitable relief and minimizes confusion as to how Appthority can comply with the injunction order. *See Oakley*, 316 F.3d at 1346; *see also Schmidt* v. *Lessard* 414 U.S. 473, 476 (1974) (per curiam).

3. Appthority's Request for a Stay of the Injunction

In its original briefing on the issue of an injunction, Appthority requested a stay of the injunction pending its appeal or, alternatively, for sixty days to modify the Platform to avoid infringement. Although Appthority has modified its Platform to render it largely non-infringing, it presumably continues to seek a stay due to the additional work that will be needed to render it and the database entirely non-infringing. Veracode asserts that Appthority has not met its burden of showing that a stay is warranted, and further that a stay would cause substantial injury to Veracode.

When determining whether to grant a stay of a permanent injunction pending an appeal pursuant to Fed. R. Civ. P. 62(c), the court considers "(1) whether the stay applicant has made a strong showing that he is likely to succeed on the merits; (2) whether the applicant will be irreparably injured absent a stay; (3) whether issuance of the stay will substantially injure the other parties interested in the proceeding; and (4) where the public interest lies." *Hilton* v. *Braunskill*, 481 U.S. 770, 776 (1987). The party seeking the stay "bears the burden of showing that the circumstances justify an exercise of [judicial] discretion" based on these factors. *NSK Corp.* v. *United States*, 431 F. App'x 910, 911 (Fed. Cir. 2011). The strength of any of these factors can outweigh a weaker showing on any other factor. Where, for example, "denial of a stay will utterly destroy the status quo, irreparably harming appellants, but the granting of a stay will cause relatively slight harm to appellee, appellants need not show an absolute probability of success in order to be entitled to a stay." *Providence Journal Co.* v. *Fed. Bureau of Investigation*, 595 F.2d 889, 890 (1st Cir. 1979). Nonetheless, the party requesting the stay must still show some "potential merit" to the appeal. *Id.; see Honeywell Int'l, Inc.* v. *Universal Avionics Sys. Corp.*, 397 F. Supp. 2d 537, 548 (D. Del. 2005).

As the extensive discussion of Appthority's myriad post-trial claims in this Memorandum and Order suggests, Appthority has failed to demonstrate a likelihood of success on the merits of an appeal, nor has it even identified the basis on which it

contemplates an appeal. *See NSK Corp.*, 459 F. App'x at 53. Further, as discussed above, there are compelling reasons for granting an immediate injunction, including preventing continued, irreparable harm to Veracode (whose right to the '924 Patent Appthority has continued to infringe throughout the course of this litigation) and serving the public interest in enforcing patent protections. In addition, Appthority has already substantially complied with the injunction, and Appthority has not demonstrated that the work required to achieve full compliance would result in irreparable injury. The request for a stay pending appeal accordingly will be denied.

*55 The request for a sixty-day stay is somewhat more compelling. "[A] delayed injunction may be more likely to prevent only infringing *features* rather than the sale of entire *products*, because the defendant would have time to implement a non-infringing alternative. For that reason, a delay in enforcement may make an injunction more equitable and, thus, more justifiable in any given case." *Apple III,* 735 F.3d at 1363; *see Verizon Servs. Corp.* v. *Vonage Holdings Corp.,* 503 F.3d 1295, 1311 n.12 (Fed. Cir. 2007) (sunset provisions allow time for infringer to implement non-infringing alternative). However, Appthority has already demonstrated that it is capable of modifying its Platform to render it non-infringing by doing so in alignment with the scope of its proposed injunction. Appthority apparently completed its own modification in a period of just over one month including the Christmas and New Year's holidays. Under the circumstances, it is apparent that the further modifications required by the permanent injunction can be completed in a month. The request for a durational stay will be granted only to the extent of thirty days from the issuance of this Memorandum.

VI. MOTIONS FOR ATTORNEYS' FEES

Both parties move for attorneys' fees, and following the hearing on these motions submitted additional briefing in support of their respective positions.

A. Legal Standard

Although parties typically must bear their own litigation costs, the Patent Act contains a fee-shifting provision authorizing the award of attorneys' fees in certain circumstances. Under 35 U.S.C. § 285, a court may award reasonable attorneys' fees to the prevailing party in "exceptional cases." The Supreme Court has defined an "exceptional case" as "simply one that stands out from others with respect to the substantive strength of a party's litigating position (considering both the governing law and the facts of the case) or the unreasonable manner in which the case was litigated." *Octane Fitness, LLC* v. *ICON Health & Fitness, Inc.*, 134 S. Ct. 1749, 1752, 1756 (2014) (displacing standard of *Brooks Furniture Mfg., Inc.* v. *Dutailier Int'l, Inc.*, 393 F.3d 1378 (Fed. Cir. 2005)).

The exceptional nature of the case must be established by a preponderance of the evidence through a case-by-case analysis of the totality of the circumstances. *Id.* at 1756, 1758. The "simple discretionary inquiry" *Octane Fitness* instructs judges to conduct can include considerations of "frivolousness, motivation, objective unreasonableness (both in the factual and legal components of the case) and the need in particular circumstances to advance considerations of compensation and deterrence." *Id.* at 1756 n.6, 1758 (quoting *Fogerty* v. *Fantasy, Inc.*, 510 U.S. 517, 534 n.19 (1994)).

Litigation brought in bad faith or with objectively baseless claims may be considered exceptional, as may litigation demonstrating inequitable conduct or willful infringement.[56] *See id.* at 1756; *Spectralytics*, 649 F.3d at 1349; *Serio-US Indus., Inc.* v. *Plastic Recovery Techs. Corp.*, 459 F.3d 1311, 1321-22 (Fed. Cir. 2006) ("Exceptional cases usually feature some material, inappropriate conduct related to the matter in litigation, such as willful infringement, fraud or inequitable conduct in procuring the patent, misconduct during litigation, vexatious or unjustified litigation, conduct that violates Federal Rule of Civil Procedure 11, or like infractions."); *WBIP, LLC*, 2014 WL585854, at *8 (concluding that defendant's "willful infringement renders this case exceptional"); *see also nCube Corp*, 436 F.3d at 1319 (concluding that case was exceptional for same reasons that enhanced damages were awarded: no good faith belief excusing clear, literal infringement, and no effort to investigate scope of patent after deliberately copying invention). However, such a finding does not necessarily compel a finding that the case is exceptional. *See Consol. Aluminum Corp.* v. *Foseco Int'l Ltd.*, 910 F.2d 804, 814 (Fed. Cir. 1990).

B. *Analysis*

1. **Prevailing Party Status**

*56 As a threshold matter, I must determine whether either or both Veracode and Appthority may be considered the "prevailing party." A prevailing party is one "who has established his entitlement to some relief on the merits of his claims." *Hanrahan* v. *Hampton*, 446 U.S. 764, 756-57 (1980) (per curiam). Appthority contends that it is the prevailing party on the '609 Patent claim, and Veracode contends that it is the prevailing party on the '924 Patent claim and the invalidity defenses.

The Federal Circuit recently affirmed a district court judge's classification of the plaintiff, and not the defendant, as the prevailing party in a case returning a split verdict similar to the one here; that affirmance was based on an assessment of "the parties' respective successes." *See SSL Servs., LLC* v. *Citrix Sys., Inc.*, 769 F.3d 1073, 1087 (Fed. Cir. 2014). In *SSL Services*, the jury found willful infringement as to the three asserted claims of one patent and awarded $10 million in damages (which the judge subsequently enhanced), rejected the defendant's claims of invalidity, and found that the defendant did not infringe the asserted claim of another patent-in-suit. *Id.* Recognizing that the defendant had "some success" at trial, the Federal Circuit nonetheless agreed that the plaintiff was the prevailing party, because it "has a judgment for damages against [the defendant]" that constitutes " 'relief on the merits [that] alters the legal relationship' of the parties." *Id.* (quoting *Farrar* v. *Hobby*, 506 U.S. 103, 111 (1992)) (alteration in original).

In these circumstances, *SSL Services* counsels that only Veracode may be considered the "prevailing party." Although a party need not succeed on every issue in order to be considered prevailing, *In re Omeprazole Patent Litig.*, 483 F.3d 1364, 1376 (Fed. Cir. 2007), it must obtain some "judicially sanctioned change in the legal relationship of the parties." *Highway Equip. Co.* v. *FECO, Ltd.*, 469 F.3d 1027, 1033 (Fed. Cir. 2006) (quoting *Buckhannon Bd. & Care Home, Inc.* v. *West Va. Dep't of Health & Human Res.*, 532 U.S. 598, 605 (2001)). The finding that Appthority has not infringed the '609 Patent does not change the overall verdict returned by the jury: that Appthority willfully infringed certain claims of one of the patents-in-suit, that it owes damages to Veracode for this infringement, and that none of its invalidity defenses were adequately proven as to either patent-in-suit. Accordingly, I will deny Appthority's request for attorneys' fees and consider only Veracode's request.

2. **Exceptional Nature**

Following the guidance of *Octane Fitness*, I also assess the exceptional nature of the case by looking to the totality of the circumstances. Although Veracode asks that I limit my review to only the '924 Patent issues, I interpret *Octane Fitness* to direct consideration of the litigation as a totality, with a particular focus on the parts which were successful for the moving party. With this in mind, I consider whether the case "stands out from others with respect to the substantive strength of a party's litigating position (considering both the governing law and the facts of the case) or the unreasonable manner in which the case was litigated." *Octane Fitness*, 134 S. Ct. at 1756.

First, the substantive strength of Veracode's litigating position here was not so much greater than Appthority's position that it can be considered exceptional. *Cf. SFA Sys., LLC* v. *Newegg Inc.*, 793 F.3d 1344, 1347-48 (Fed. Cir. 2015) (what matters is "substantive *strength*," "not the *correctness* or eventual success of that position" (emphasis in original)). Veracode contends that Appthority's expert witness in particular, Dr. Clark, presented disorganized, conclusory, and ineffective testimony that did not support Appthority's asserted defenses, and that its damages witness was similarly unpersuasive. Although Appthority's proffered expert testimony may not have been entirely compelling or adequate to reach a complete judgment in its favor, that alone does not merit a finding of decisively disparate strengths where Appthority did prevail on some of the asserted claims. This case does not present the indicia of a deeply lopsided case. *Cf. Gametek LLC* v. *Zynga, Inc.*, No. CV 13-2546 RS, 2014 WL 4351414, at *3 (N.D. Cal. Sept. 2, 2014) (although opposing party's briefing "consisted of granular parsing of the claimed steps rather than any substantive explanation of how this differed from the underlying abstract idea[,] [i]t did not ... descend to the level of frivolous argument or objective unreasonableness"). The litigation positions taken by Appthority, as a whole, were not "*exceptionally* meritless." *See EON Corp. IP Holdings LLC* v. *Cisco Sys. Inc.*, 12-cv-01011-JST, 2014 WL 3726170, at *4 (N.D. Cal. July 25, 2014) (emphasis supplied); *see also Small* v. *Implant Direct Mfg. LLC*, No. 06 Civ. 683 (NRB), 2014 WL 5463621, at *3 (S.D.N.Y. Oct. 23, 2014), *aff'd*, 2015 WL 4237935 (Mem.) (Fed. Cir. July 14, 2015) (per curiam); *cf. Cognex Corp.* v. *Microsan Sys., Inc.*, No. 13-CV-2027, 2014 WL 2989975, at *3 (S.D.N.Y. June 30, 2014) (case was exceptional because "defendants' post-trial motions simply re-litigate[d] issues that had already been decided").

*57 I find it relevant that this case arises in a highly technical area of rapid growth and development – the governing law has shifted even while these motions have been under advisement. In this context, I see no reason why Appthority should not have asserted all of its available defenses (in good faith) against Veracode's claims, or should be penalized simply for not putting on the best defense case it could. *See Small*, 2014 WL 5463621, at *3; *see also Octane Fitness*, 134 S. Ct. at 1753 (fee awards are not to be used "as a penalty for failure to win a patent infringement suit" (citation omitted)).

Second, I cannot say this case was litigated in an unreasonable manner. *See SFA Sys.*, 793 F.3d at 1349 (recognizing that pre-*Octane Fitness* cases on litigation misconduct under § 285 are still good law). There certainly were some unreasonable positions taken. For example, continued and repeated pursuit of a rejected claim construction is an objectively unreasonable litigation tactic. *See Chicago Bd. Options Exch., Inc.* v. *Sec. Exch., LLC*, Case No. 07 C 623, 2014 WL 6978644, at *6 (N.D. Ill. Dec. 10, 2014); *TNS Media Research, LLC* v. *TiVo Research & Analytics, Inc.*, No. 11 CIV. 4039, 2014 WL 5639930, at *8 (S.D.N.Y. Nov. 4, 2014). In addition, Appthority's apparently defiant statements to the public following the jury verdict were arguably unprofessional and certainly disrespectfully mounted in response to the jury process. However, Veracode has not sought sanctions for this behavior, nor do I find *sua sponte* that it descended to the level of "substantial litigation misconduct." *See Small*, 2014 WL 5463621, at *4 (collecting post-*Octane Fitness* cases finding substantial misconduct relevant to award of fees).

For the most part, however, the parties proceeded reasonably. The post-trial motions, while extensive and in some instances repetitive of previously rejected theories, present legitimate questions of law that I had reserved for resolution following the jury's verdict. The filings were specific to this case and replete with citations to the record. *Cf. Logic Devices, Inc.* v. *Apple Inc.*, No. C 13-02943 WHA, 2014 WL 6844821, at *4 (N.D. Cal. Dec. 4, 2014) (case was exceptional because plaintiff "blindly adopted and filed a complaint drafted (but not filed) by another firm, waited four months before serving [defendant], misrepresented that a terminal disclaimer had been filed when no such terminal disclaimer existed, demanded $977.3 million in reasonable royalties," and engaged in other unreasonable litigation conduct leading up to and following summary judgment ruling in defendant's favor).

I also take into account "considerations of compensation and deterrence," although they are not particularly instructive here. *Octane Fitness*, 134 S. Ct. at 1756 n.6. Veracode incurred significant expenses pursuing this lawsuit and obtained a damages award that does not even approximate those costs. *See Romag Fasterners, Inc.* v. *Fossil, Inc.*, Civ. No. 3:10cv1827(JBA), 2014 WL 4073204, at *1, *4 (D. Conn. Aug. 14, 2014). Denying attorneys' fees in such a case, Veracode argues, could deter patentees from enforcing their patent rights in the future where doing so would be prohibitively expensive. But as with all coinage, this argument has two sides. Where the defendant's positions overall were not objectively unreasonable, an award of attorneys' fees to the plaintiffs could also have the perverse consequence of deterring defendants from presenting reasonable and appropriate defenses to patent infringement claims for fear of facing additional monetary consequences if unsuccessful. *See Octane Fitness*, 134 S. Ct. at 1756 n.6.

*58 Although *Octane Fitness* lowered the bar for an exceptional case finding, it did not eliminate it. *See Small*, 2014 WL 5463621, at *3. This case, in any event, does not clear that bar, especially when reviewed in comparison to those cases considered exceptional by other courts since *Octane Fitness*. *Cf. Homeland Housewares, LLC* v. *Sorensen Research*, 581 F. App'x 877, 877 (Fed. Cir. 2014) (judge did not abuse discretion in deeming case exceptional because patentee's litigation approach crossed line from vigorous enforcement to pursuit of claims not reasonably based in law and not brought in good faith, as evidenced by patentee's lack of submission of admissible evidence of infringement and repetitive, unsolicited filings); *Chicago Bd.*, 2014 WL 6978644, at *5 (case was exceptional because substantive strength of one party's litigation position "was so weak that to advocate it at all was unreasonable," given that party "made arguments that had clearly been foreclosed by previous rulings" by Federal Circuit in earlier appeal, continued to press explicitly rejected claim constructions including in reply to motion for attorneys' fees, and failed to acknowledge *Octane Fitness* standard).

I therefore conclude that under the totality of the circumstances, this case is not exceptional. *See Am. Nat'l Ins. Co.* v. *Am. Nat'l Inv. Advisors, LLC*, Case No. 11-cv-4016, 2014 WL 6613342, at *20 (N.D. Ill. Nov. 21, 2014) (case not warranting award of attorneys' fees because "[a]lthough this case was hard-fought, there is no evidence that [defendant] proceeded in bad faith or that its arguments were frivolous," and even though court rejected its affirmative defenses, those defenses survived summary judgment); *Momenta Pharms., Inc.* v. *Teva Pharms. USA, Inc.*, 60 F. Supp. 3d 261, 262 (D. Mass. 2014) (case not warranting award of attorneys' fees because plaintiff had objective basis for filing suit, was warranted in litigating its claims through summary judgment, and did not engage in misconduct in securing a related patent); *see also L.C. Eldridge*

Sales Co. v. *Jurong Shipyards, Ptd., Ltd.*, No. 6:11-cv-599 (E.D. Tex. Sept. 23, 2014), slip op at 2. Because the case is not exceptional, I need not consider further in what amount an award of Veracode's attorneys' fees might be warranted.

VII. CONCLUSION

For the reasons set forth more fully above, I:

- DENY the plaintiffs' motion for summary judgment on infringement, Dkt. No. 70, as moot;

- DENY the defendant's corrected motion for summary judgment on non-infringement, Dkt. No. 76, as moot;

- DENY the defendant's motion for summary judgment on invalidity, Dkt. No. 81, as moot;

- DENY the plaintiffs' motion in limine no. 6, Dkt. No. 111, as moot;

- DENY the defendant's motion in limine no. 1, Dkt. No. 121, as moot;

- DENY the defendant's preverdict motion for judgment as a matter of law, Dkt. No. 191, as moot;

- DENY the plaintiffs' preverdict motion for judgment as a matter of law on invalidity, Dkt. No. 196, as moot;

- DENY the plaintiffs' preverdict motion for judgment as a matter of law on direct and willful infringement, Dkt. No. 198, as moot;

- DENY the defendant's preverdict motion for judgment as a matter of law, Dkt. No. 200, as moot;

- GRANT the plaintiffs' motion for judgment on partial findings on objective willfulness, Dkt. No. 221;

- DENY the defendant's corrected motion for judgment on partial findings on indefiniteness and unpatentable subject matter, Dkt. No. 229;

- GRANT the plaintiffs' motion for a permanent injunction, Dkt. No. 235, as reflected in the final judgment entered this date;

- DENY the plaintiffs' renewed motion for judgment as a matter of law on direct and willful infringement, Dkt. No. 238;

- DENY the plaintiffs' motion for enhanced damages and attorney's fees, Dkt. No. 240;

- DENY the defendant's motion for a new trial and/or remittitur, Dkt. No. 245;

- DENY the defendant's renewed motion for judgment as a matter of law, Dkt. No. 250;

- DENY the defendant's motion for attorney's fees, Dkt. No. 261;

*59 - GRANT in part (by way of a durational stay of 30 days for compliance with the permanent injunction) and DENY in part the defendant's motion for a stay of the execution of judgment, Dkt. No. 265;

- GRANT the plaintiffs' motion for entry of judgment, Dkt. No. 302; and

GRANT in part and DENY in part the defendant's motion to strike the plaintiff's brief (Dkt. No. 330), Dkt. No. 334;

and

Further, I will separately enter the FINAL JUDGMENT AND PERMANENT INJUNCTION consistent with this MEMORANDUM AND ORDER disposing of this case.

Should the plaintiff seek supplemental damages, the parties shall submit a status report on or before October 16, 2015 proposing a schedule for motion practice, briefing, and the submission of evidentiary materials regarding that issue.

All Citations

Slip Copy, 2015 WL 5749435

Footnotes

1 Claim 1 of the '924 Patent consists of "A static debugging tool for use with a computer and for debugging a binary program file without requiring the execution of the binary program file in order to detect the presence of program errors and potential program errors, the static debugging tool comprising: an analyzer for causing die computer to statically analyze a representation of the binary program file to detect the presence of program errors or potential program errors in the representation of the binary program file without executing the binary program file, wherein the representation of the binary program file is an intermediate file; and an output arrangement for causing the computer to output an error list of the errors or potential errors detected by the analyzer."
 Claim 5 is dependent on claim 1 and consists of "A static debugging tool according to claim 1 wherein the static debugging tool includes a flow determining arrangement for determining and symbolically representing the function flow of the representation of the binary program file."
 Claim 17 consists of "A computer readable medium having program instructions for: causing a computer to statically analyze a representation of a binary program file that takes the form of an intermediate program file that includes flow paths and flow structure associated with the binary program, to detect the presence of program errors or potential program errors in the binary program file without executing the binary program file; and causing the computer to output an error list of the errors or potential errors detected."

2 Claim 1 of the '609 Patent consists of "A method for analyzing executable software code using a computer comprising a processor and a memory, the method comprising: processing the executable software code to generate an optimized, exhaustive data flow model including parsing the executable software code to facilitate identification of data flows for inclusion in the exhaustive data flow model; processing the executable software code to generate an optimized, exhaustive control flow model; and storing, in the memory, an intermediate representation of the executable software code that provides a complete model of the executable software code based on the optimized data flow model and the optimized control flow model, thereby facilitating analysis of the executable software code according to comparison of the intermediate representation to reference models."
 Claim 13 is dependent on claim 1 and consists of "The computer-implemented method of claim 1 further comprising: analyzing the intermediate representation; and based on the analysis, identifying identify [sic] one or more flaws in the executable software code."
 Claim 14 consists of "A system for analyzing executable software code, the system comprising a processor, a memory, and a computer-implemented modeler executable by the processor for: causing the processor to process the executable software code to generate an optimized, exhaustive data flow model of the executable software code including parsing the executable software code to facilitate identification of data flows for inclusion in the exhaustive data flow model; causing the processor to process the executable software code to generate an optimized, exhaustive control flow model based on the executable software code; and storing, in the memory, an intermediate representation of the executable software code that provides a complete model of the executable software code based on the optimized data flow model and the optimized control flow model, thereby facilitating analysis of the executable software code according to comparison of the intermediate representation to reference models."

3 Among this briefing is a document filed by Veracode titled "Plaintiffs' Memorandum in Response to Defendant's Supplemental Briefs Concerning Indefiniteness and the Scope of the Permanent Injunction." Appthority moves to strike this memorandum as an improper reply brief. The memorandum responds to a notice of supplemental authority Appthority filed directing attention to *Interval Licensing LLC* v. *AOL, Inc.*, 766 F.3d 1364 (Fed. Cir. 2014), a case relevant to the issue of indefiniteness. To the extent Veracode's memorandum addresses indefiniteness, I will consider it. However, the arguments regarding a permanent injunction will be disregarded, because they were submitted well after the deadline for briefing on that issue and without leave of court. Veracode had ample opportunity to address this issue in its prior, timely briefing. *See* Local Rule 7.1(b)(1)-(2); *CMM Cable Rep., Inc.* v. *Ocean Coast Props., Inc.*, 97 F.3d 1504, 1526 (1st Cir. 1996) ("courts are ... entitled to expect represented parties to incorporate all relevant arguments in the papers that directly address a pending motion"); *cf. In re Bos. Reg. Med. Ctr., Inc.*, 328 F. Supp. 2d 130, 142-43 (D. Mass. 2004) (declining to consider additional arguments raised in supplemental briefing that were "outside the scope of the court's briefing orders" to address certain limited issues). The motion to strike will thus be granted to the extent of the memorandum's discussion of a permanent injunction. For the same reason, I have correspondingly disregarded the defendant's briefing in response.

4   If the preverdict motion did not state the ground on which a party seeks judgment as a matter of law, the only available recourse is a motion to set aside the verdict and/or a motion for a new trial. *See* 9B Charles Alan Wright & Arthur R. Miller, Federal Rules of Civil Procedure § 2537 (3d ed. 2008).

5   All of the invalidity defenses asserted in Appthority's renewed JMOL motion were also raised in its preverdict motion and therefore are properly before me.

6   Appthority has also filed a separate motion for a new trial and/or remittitur pursuant to Fed. R. Civ. P. 59, regarding claims of invalidity submitted to the jury. In addition, Veracode moved prior to the jury verdict for judgment of a matter of law as to all of Appthority's invalidity defenses for all asserted claims of both patents-in-suit pursuant to Fed. R. Civ. P. 50(a). In essence, Veracode contended that Dr. Clark's testimony formed the entirety of Appthority's invalidity case presented to the jury, and that his testimony did not present clear and convincing evidence to support any of the asserted invalidity defenses. They did not renew the substance of this motion after the verdict. Rather, Veracode's renewed motion for judgment as a matter of law pursuant to Fed. R. Civ. P. 50(b) pertained to its other preverdict motion under Fed. R. Civ. P. 50(a), that regarding direct and willful infringement. Because Veracode's renewed JMOL motion did not articulate the invalidity defenses as a ground for seeking the judgment, I may not enter judgment for them on this motion. In any event, I will consider it moot in light of my treatment of related motions upholding the jury verdict and denying Appthority's Rule 50 motions for judgment on its invalidity defenses. *See* 9B Charles Alan Wright & Arthur R. Miller, Federal Rules of Civil Procedure § 2537 (3d ed. 2008).

7   Appthority does not appear to challenge the jury verdict as to the anticipation defense for either patent-in-suit. In any event, such a challenge would be unavailing.

8   Veracode does not appear to make this argument in the post-trial motions. Rather, it is Appthority that develops this argument in its Rule 52 motion as a basis for claiming indefiniteness of the term "program error or potential program error." Veracode contends that I construed the term "program error or potential program error" in a manner consistent with the understanding of one skilled in the art and that what such program errors consist of was knowable with reasonable certainty by a person skilled in the art.

9   I observe that some of the testimony which the parties have cited regarding written description was actually proffered during the non-jury indefiniteness proceeding that followed the jury trial. I did not consider such evidence here, because it was not part of the record considered by the jury in reaching its verdict.

10   Appthority states that it raised this defense only in response to Mr. Rioux's testimony at trial, which unexpectedly revealed Mr. Rioux's view that the benefit of his invention was simply automation of a task that could be completed manually.

11   For the purposes of analysis here, I consider all of the claims to articulate a similar method. *See* *Accenture Global Servs.* v. *Guidewire Software, Inc.*, 728 F.3d 1336, 1339 (Fed. Cir. 2013) ("[S]ystem claims that closely track method claims and are grounded by the same meaningful limitation will generally rise and fall together." (citation omitted)).

12   In *Alice*, the patent claims articulated a process for creating shadow records for parties to a transaction, obtaining start-of-day balances of those parties' accounts, adjusting the shadow records when transactions capable of fulfillment occur, and then issuing end-of-day instructions to the institutions holding the accounts to carry out the transactions that could be fulfilled based on available balances. *See* *Alice Corp. Pty. Ltd.* v. *CLS Bank Int'l*, 134 S. Ct. 2347, 2359 (2014). The computer creates the electronic records, tracks the transactions, and issues instructions, thereby serving as the intermediary. *Id.* The court concluded that the computer was merely performing conventional activities such as electronic recordkeeping that were "previously known to the industry." *Id.* "[E]ach step does no more than require a generic computer to perform generic computer functions." *Id.* As a result, the "method claims simply recite the concept of intermediated settlement as performed by a generic computer," and therefore did not recite an inventive concept. *Id.*

13   In *buySAFE, Inc.* v. *Google, Inc.*, 765 F.3d 1350, 1351 (Fed. Cir. 2014), the plaintiff held a patent for a method for processing by computer a request for a performance guarantee for an online commercial transaction and offering a transaction guarantee that binds to the transaction upon the closing of the transaction. Judge Stark had concluded in the District Court that the patent "describes a well-known, and widely-understood concept – a third party guarantee of a sales transaction – and then applied that concept using conventional computer technology and the Internet," and accordingly was not patent-eligible. *Id.* (quoting *buySAFE, Inc.* v. *Google, Inc.*, 964 F. Supp. 2d 331, 335-36 (D. Del. 2013)). The Federal Circuit, on review, emphasized that the claims "do not require specific programming" and are not "tied to any particular machine." *Id.*

The Federal Circuit affirmed Judge Stark's ruling. *Id.* at 1351. It reasoned that the claimed method created a particular type of "long-familiar" contractual relationship or commercial transaction, and therefore was directed to an abstract idea. *Id.* at 1355. "The claims' invocation of computers adds no inventive concept" because "[t]he computer functionality is generic" and "not even arguably inventive." *Id.* As in *Alice*, the claimed role of the computer in performing the long-established transaction was inadequate to transform what was otherwise an abstract idea into an inventive concept. *Id.* (citing *Alice*, 134 S. Ct. at 2358).

14   In *Digitech Image Techs., LLC* v. *Electronics for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014), the Federal Circuit concluded that method claims that generated data sets for a device profile and combined the data sets were patent-ineligible. As Judge Pfaelzer has rightly observed, however, *Digitech* cannot stand for the proposition that the manipulation of existing data and the generation of additional data through algorithms is unpatentable; that proposition would eviscerate patent protection for software. *Cal. Inst. of Tech.* v. *Hughes Commc'ns Inc.*, 59 F. Supp. 3d 974, 986-87 (C.D. Cal. 2014); *accord Paone* v. *Broadcom Corp.*, Nos. 15 Civ. 0596(BMC)(GRB) *et seq.*, 2015 WL 4988279, at *5, *9 (E.D.N.Y. Aug. 19, 2015); *Modern Telecom Sys. LLC* v. *Earthlink, Inc.*, No. SA CV 14-0347-DOC, 2015 WL 1239992, at *8 n.2, *10 (C.D. Cal. Mar. 17, 2015). Instead, *Digitech* must be understood as falling within the class of cases holding that something more than implementation of a known process or method is required for patent eligibility.

15   As Judge Pfaelzer has observed, *Alice* and other recent Supreme Court decisions show some skepticism toward patenting algorithms –which form the building blocks of computer software and computer code – but they have not outright rejected the patentability of such technology. *Cal. Inst*, 59 F. Supp. 3d at 980. Nonetheless, in exercising caution in interpreting *Alice*, few district courts have found software claims patentable after *Alice*. *See id.* at 984 n.9, 990-91, 1000 (summarizing themes from district court decisions after *Alice* and citing only two post-*Alice* decisions holding software claims patentable); *see also Enfish, Inc.* v. *Microsoft Corp.*, 56 F. Supp. 3d 1167, 1172-73 (C.D. Cal. 2014).

16   In *California Institute*, 59 F. Supp. 3d at 996, after a detailed analysis of *Alice* and the subsequent status of the law, Judge Pfaelzer concluded that the inclusion of "irregular repetition of message bits and the use of a prior parity bit for calculating a subsequent parity bit" in the mathematical formula in the claim added "a significant benefit [to] th[e] invention," because they "balance[d] the goals of efficiency and accuracy in error correction" and served to improve efficiency. Accordingly, the mathematical formula described in the claim was not merely "a preexisting relationship but rather" a series of "unconventional steps for achieving error correction." *Id.* Further, because these particular elements were "not necessary for achieving error correction" and were not obvious, they limited the claim in such a way that it "capture[d] only one effective form of error correction" and therefore would not serve to "preempt the field of error correction" if patented. *Id.*

17   Claim 13 of the '609 Patent, which is dependent on claim 1, adds the element of "identifying ... one or more flaws in the executable software code" by "analyzing the intermediate representation." This is a specific application of Claim 1 that narrows it to a particular technological problem, and therefore is patentable if claim 1 is patentable. Claim 14 is a nearly identical system claim to the method claim of claim 1, and therefore will rise or fall together with it. *See Accenture*, 728 F.3d at 1339.

18   Appthority repeatedly cites Mr. Rioux's testimony that "[y]ou could apply your own eyeballs to the problem ... You could look at the binary," arguing that the only contribution the '609 Patent makes is automation of an existing process that can be done manually. Mr. Rioux's testimony continued, however: "You wouldn't want to use your eyeballs to do this. This is painful. After the tenth binary somebody asks you to determine what it's doing and look inside it, it's just like, this is for the birds." To be sure, Mr. Rioux's efforts at simplifying his testimony for a non-technical audience might be read to suggest a lack of complexity or inventiveness, but the testimony as a whole – corroborated by that of Dr. Rubin and not refuted by Dr. Clark – demonstrates that manual binary analysis was only minimally possible, and even then not with much precision.
     In his subsequent declaration, Mr. Rioux further clarified that in his testimony he was referring to static analysis through a manual review of the source code, rather than the binary, which would be "an extremely difficult process that could not be readily performed by hand."

19   Although I find that it is the optimized, exhaustive nature of the method that renders it inventive, I agree with Appthority that storing an intermediate representation of the software code is not an inventive concept. *See generally* Alfred V. Aho et al., Compilers: Principles, Techniques, and Tools (reprint 1988).

20   To the extent Appthority argues that that term is indefinite and therefore cannot serve as a basis for an inventive element to the claimed method, I reject that argument, as discussed below.

21   As the Federal Circuit has regularly noted, paragraph 2 of 35 U.S.C. § 112 was replaced with § 112(b) by § 4(c) of the LeahySmith America Invents Act ("AIA"), Pub. L. No. 112-29, which took effect on September 16, 2012. Because the applications resulting in the patents at issue here were filed before that date, the pre-AIA version of § 112 applies. *See Biosig Instruments, Inc.* v. *Nautilus, Inc.*, 783 F.3d 1374, 1380 n.2 (Fed. Cir. 2015); *Interval Licensing*, 766 F.3d at 1369 n.5.

22   Appthority asserts that after *Nautilus*, the fact that a claim term was construed during *Markman* proceedings does not prevent a finding of indefiniteness with respect to that term, but it provides no citation for this assertion. Where the claim construction process involves application of "the same understanding [of claims] as that of persons knowledgeable in the field of the invention," however, the analysis employed during claim construction is plainly relevant. *See Merck & Co.* v. *Teva Pharms. USA, Inc.*, 347 F.3d 1367, 1370 (Fed. Cir. 2003).

23   In discussing the functionality of the Appthority Platform, Dr. Rubin testified that of the general class of signatures and rules that he reviewed, "some of them can be representative of things that are program errors and some of them could be representative of things that are not program errors." In addition, Mr. Guerra testified that the status of various behaviors as violations is explicitly configured by Appthority's customers, and therefore what is defined as a program error by Appthority is based on subjective user preferences. That the Appthority Platform may go beyond the claimed invention of the '924 Patent, however, does not mean that it did not incorporate the claimed invention into its product. As discussed in greater detail below, Veracode demonstrated at trial how the Appthority Platform detects precisely the types of errors the '924 Patent was designed to detect: invalid or impossible maneuvers that may be intentional and designed to impede some purpose of the program (such as malware, adware, viruses, and malicious code), as well as invalid or impossible maneuvers that are unintentional.

24   Dr. Rubin's complete statement was: "Anyone that has malware on their program would consider that to be something that's invalid, that isn't something that they want."

25   That the jury did not find that the Appthority Platform infringed the '609 Patent does not mean that the claims themselves were necessarily indefinite, inadequately defined in the written description, or invalid for any other reason. The validity of the patent and whether it has been infringed are, of course, distinct issues.

26   Although Veracode points to many more types of program errors and behaviors that the Platform detects, its emphasis on the detection of known malware and access to certain functions on a mobile phone that are not relevant to the particular service provided by the application is enough to provide substantial support for the jury's verdict.

27   Appthority also emphasizes Dr. Hanna's testimony that the Appthority platform disregards information about flow paths and flow structure for Android applications and does not process it for iOS applications. On cross-examination, however, Dr. Hanna acknowledge that the call flow or function flow represents the paths through the call graph, consistent with Dr. Rubin's testimony on this point. On the assumption the jury could have credited this part of Dr. Hanna's testimony, there is additional support for the jury's verdict on Claim 17.

28   To the extent Appthority asks that I "order that the balance of the platform, outside of the functionality specifically accused at trial, does not infringe as a matter of law," I decline to do so. The scope of the infringement will be taken into account in the damages calculation and will be factored into the measure of injunctive relief. Further declaratory action as to the scope of infringement is unnecessary.

29   Appthority objected both before and after I gave the instruction.

30   Several other district court judges have adopted this interpretation. For example, in a 2012 case, Judge Rakoff read *Seagate* as requiring recklessness, which "depends not upon knowledge of any specific facts, but instead upon knowledge or near-knowledge of an objective risk." *Tomita Techs. USA, LLC* v. *Nintendo Co.*, No. 11 Civ. 4256(JSR), 2012 WL 2524770, at *9-10 (S.D.N.Y. June 26, 2012), *reconsideration denied*, 2013 WL 163975 (S.D.N.Y. Jan. 15, 2013). Judge Rakoff reasoned that "in certain circumstances, an alleged infringer can know of an 'objectively high likelihood' of infringement even though she does not know that the relevant patent has issued." *Id.* at *10. In that case, "where evidence suggest[ed] that the alleged infringer knew of the value of an invention, of the investor's intention to obtain a patent, and of the similarity between the allegedly infringing product and the invention," requiring actual knowledge of the patent "would allow even copiers to shelter themselves from liability for willfulness merely by avoiding confirmation of what they, in essence, already knew." *Id.*
       Similarly, in another 2012 case, Judge Bryant interpreted the *Seagate* standard to require that the infringer "either kn[ew] of the *risk* of infringement, or the risk of infringement was *so obvious that it should have been known.*" *Sargent Mfg. Co.* v. *Cal-Royal Prods., Inc.*, Civ. Action No. 3:08-cv-408(VLB), 2012 WL 603268, at *9 (D. Conn. Feb. 24, 2012); *see St. Clair Intellectual Prop. Consultants, Inc.* v. *Hewlett-Packard Co.*, C.A. No. 10-425-LPS, 2012 WL 1134318, at *2 (D. Del. Mar. 28, 2012) ("actual knowledge of infringement or the infringement risk is not necessary to plead a claim for willful infringement; rather, a plaintiff may plead facts giving rise to 'at least a showing of objective recklessness' of the infringement risk" (citations omitted)).
       More recently, Judge Gilstrap reasoned that knowledge of a patent application "is probative evidence of whether Defendants knew or should have known about the likelihood of infringement and may be supplemented by other disputed facts that could support a finding of willfulness by a jury." *See Smartflash LLC* v. *Apple Inc.*, Nos. 6:13cv447-JRG-KNM, 6:13cv448-JRG-KNM, 2015 WL 661276, at *1 (E.D. Tex. Feb. 13, 2015) (citing *Tomita*, 2012 WL 2524770, at *10, and other cases).

31   The myriad district court opinions Appthority cites as support for its position – all appearing to require actual, pre-suit knowledge of the patent-in-suit after *Seagate* by citing to *i4i Ltd.*, *State Industries*, or *Gustafson* — do not call for a different result. *See, e.g., Irori Techs., Inc.* v. *Luminex Corp.*, No. 13-CV-2647-BEN(NLS), 2014 WL 769435, at *2 (S.D. Cal. Feb. 25, 2014) (willful infringement requires that "defendants had knowledge of the patents and that their products infringed on those patents"); *Potter*

Voice Techs., LLC v. *Apple Inc.*, 24 F. Supp. 3d 882, 886 (N.D. Cal. 2014) ("courts have emphasized the importance of pleading the defendant's knowledge of the patent-in-suit"); *Inv. Tech. Grp., Inc.* v. *Liquidnet Holdings, Inc.*, 759 F. Supp. 2d 387, 410 (S.D.N.Y. 2010). Several of the cases cited by Appthority cite the *State Industries* language that a patent must exist for the principle that knowledge of a patent *application* cannot establish willful infringement — this is not such a case. *See, e.g.*, *Va. Innovation Scis., Inc.* v. *Samsung Elecs. Co.*, 983 F. Supp. 2d 700, 709 (E.D. Va. 2013) ("it is insufficient to allege knowledge of a patent application without further alleging knowledge of the patent"); *Pandora Jewelry, LLC* v. *Cappola Capital Corp.*, No. 8:06-cv-845-T-24 MSS, 2009 WL 2029964, at *1 (M.D. Fla. July 9, 2009) (notice of a patent "is certainly relevant to the issue of willfulness," but notice of the patent application is not enough to show willfulness); *Anascape, Ltd.* v. *Microsoft Corp.*, Civ. Action NO. 9:06-CV-158, 2008 WL 7182476, at *3 (E.D. Tex. Apr. 25, 2008).

> Others emphasize not that specific knowledge of the patent is required, but rather that the defendant must have had some awareness *prior to the litigation* to state a claim for willful infringement. *See, e.g.*, *Rembrandt Social Media, LP* v. *Facebook, Inc.*, 950 F. Supp. 2d 876, 884 (E.D. Va. 2013) ("Federal Circuit authority makes clear that an allegation of willful infringement must depend upon pre-suit knowledge of the patent in issue."); *Brandywine Commc'ns Techs., LLC* v. *Casio Comput. Co.*, 912 F. Supp. 2d 1338, 1352 (M.D. Fla. 2012).

> Still others do not cite *Seagate* for the willful infringement standard when it clearly governs. *See, e.g.*, *Milo & Gabby, LLC* v. *Amazon.com, Inc.*, 12 F. Supp. 3d 1341, 1353 (W.D. Wash. 2014). In any event, these district court decisions are not binding on me.

[32] Specifically, the Federal Circuit defined willful infringement as "when the infringer was aware of the asserted patent, but nonetheless 'acted despite an objectively high likelihood that its actions constituted infringement of a valid patent,' " and then stated that "[a]fter satisfying this objective prong, the patentee must also show that the infringer knew or should have known of this objectively high risk." *i4i Ltd. P'ship* v. *Microsoft Corp.*, 598 F.3d 831, 860 (Fed. Cir. 2010), *aff'd* 131 S. Ct. 2238 (2011) (quoting *In re Seagate Tech., LLC,* 497 F.3d 1360, 1371 (Fed. Cir. 2007)).

[33] I note that this finding is not inconsistent with my conclusion on enhanced damages, *infra* Section IV.B, that the jury could have found differently on some of Appthority's invalidity defenses, because that conclusion is specifically limited to Appthority's defenses on the '609 Patent.

[34] The assertion that the claimed invention of the '609 Patent was patent-ineligible, in contrast, was a close call, but that defense is not relevant to a determination of willfulness as to infringement of the '924 Patent.

[35] I note, however, that the Federal Circuit has made clear that defenses raised during summary judgment but not presented to the jury, including claim construction arguments, "may be objectionably reasonable," and therefore may defeat a claim of objective willfulness. *See Carnegie Mellon Univ.* v. *Marvell Tech. Grp., Ltd.*, No. 2014-1492, 2015 WL 4639309, at *15 (Fed. Cir. Aug. 4, 2015).

[36] I am not persuaded by Appthority's argument that because the '924 Patent was held by Rovi and licensed to Veracode, it could not have been located with reasonable diligence.

[37] After the jury verdict, Appthority's counsel stated to the press that Appthority had confidence in its post-trial motions and felt that "the lawsuit represents the kind of groundless patent intimidation that stifles innovation for start-ups like Appthority."

[38] Remittitur is appropriate if the damages award granted by the jury "exceeds any rational appraisal or estimate of the damages that could be based upon the evidence before it." *Wortley* v. *Camplin*, 333 F.3d 284, 297 (1st Cir. 2003) (internal quotation marks and citations omitted); *see Astro-Med, Inc.* v. *Nihon Kohden Am., Inc.*, 591 F.3d 1, 13 (1st Cir. 2009) (jury's verdict on damages will be upheld unless award was "grossly excessive, inordinate, shocking to the conscience of the court, or so high that it would be a denial of justice to permit it to stand"). I may direct a remittitur that reduces the damages award only as low as the "highest reasonable total of damages for which there is adequate evidentiary support." *Marchant* v. *Dayton Tire & Rubber Co.*, 836 F.2d 695, 704 (1st Cir. 1988).

[39] For this reason, Appthority's reliance on *WBIP, LLC* v. *Kohler Co.*, No. 11-10374-NMG, 2014 WL 585854, at *1-2 (D. Mass. Feb. 12, 2014), is not particularly helpful, as that case involved special questions to the jury asking for the sales upon which the royalty was based and the royalty rate applied, only one of which was not supported by substantial evidence. [40] Alternatively, the jury could have adjusted the proposed entry fee upward and maintained a 3% royalty rate or a 1-3% royalty range. If it took this approach, approximately $23,493 of the damages award would be attributable to ongoing royalties (at a 3% royalty rate), and the entry fee would amount to $758,364. I am not persuaded by Appthority's argument that the jury applied a 59.85% royalty rate because it would have subtracted out $350,000 of Appthority's revenues that are attributable to projects that used only dynamic analysis and therefore did not infringe the '924 Patent. Even if this calculation were supported by the evidence, the jury reasonably could have considered the entire Platform as the royalty base –for reasons discussed below – and adopted a 33% royalty rate. On review, of course, I resolve any doubts about the calculation in favor of the patentee. *See Lam, Inc.* v. *Johns-Manville Corp.*, 718 F.2d 1056, 1065 (Fed. Cir. 1983).

41   Veracode asserts that Appthority should not be permitted to argue that the award is grossly excessive in relation to its revenues, because it announced publicly following the trial that "there is no scenario where the outcome in this case ... in any way disrupts or impairs Appthority's business prospects, and the verdict amount is "not at a sufficient level to negatively impact Appthority's business viability." Because I conclude that the award was a reasonable one, I need not address this issue further.

42   Of course, these cases speak in terms of *profits*, whereas the award here approximates Appthority's *revenues*. The cases Appthority cites for support, however, do not state that a damages award cannot exceed or approximate an infringer's revenues. Although such an award might be unreasonable if it were based solely on a royalty rate, here, it was reasonable to include an upfront entry fee as part of the award. Accordingly, as a percentage of Appthority's revenues, the royalty rate does not even come close to representing 100% of revenues.

43   Mr. Martinez testified as follows:
      Q: And when does that hypothetical negotiation take place? ....
      A: The hypothetical negotiation is to take place at the date of first infringement.
      Q: And did you choose a date for the hypothetical negotiation in doing your analysis here?
      A: I did, yes.
      Q: What date did you choose? ....
      A: I chose March of 2012, one, because that's the date that the lawsuit was filed. I looked for any evidence of when first infringement might have taken place, and typically what we use as, damages experts, we look for the first sale of a product that incorporates the patent. Well, as of March 2012, Appthority had not yet sold any product, and so, typically, that's our default. We go back to the date that the suit was filed as a timing for the hypothetical negotiation."
      Mr. Martinez acknowledged that Dr. Abramson had chosen October 2011 as the hypothetical negotiation date but did not know why he chose it. Mr. Martinez further testified that he did not think the difference of five to six months was relevant, because "Appthority was in essentially the same position in October of 2011 as they were in March of 2012," that is, an unfunded startup that had not offered a product yet, and they were also in the same position in relation to Veracode, in perceiving each other as competitors as early as June 2011.

44   Specifically, I instructed the jury that "[a]lthough the relevant date for the hypothetical license negotiation is just before the infringement began, you may consider any actual profits made by Appthority due to its infringement or the infringing products after that date. You may only consider this information, however, if those sales and profits were foreseeable just before the infringement began; that is, if they informed the judgment about what the negotiation was going to be, what they anticipated."

45   The *VirnetX* Court further concluded that this error was not harmless, because the plaintiff's expert had relied on the entire value of what he identified as the "smallest salable units" in calculating a reasonable royalty. *See VirnetX, Inc.* v. *Cisco Sys., Inc.*, 767 F.3d 1308, 1328 (Fed. Cir. 2014). The VPN On Demand and FaceTime features of Defendant Apple's products had been found to infringe the plaintiff's patents; the expert relied on the entire value of the iOS devices on which these features appear, including a range of devices from the iPodTouch, with a value of $199, to the iPhone 4S, with a value of $649, as a royalty base. *Id.* The Federal Circuit concluded that the expert "could have apportioned a smaller per unit figure for FaceTime" by using the cost of the software upgrade, for example, rather than using the full iOS devices, which "contain[ ] significant unpatented features." *Id.* at 1329. Identifying the iOS devices as "a patent-practicing unit ... with a close relation to the patented feature" was unreasonable. *Id.*

46   Although Veracode argues that the evidence also demonstrates that the patented feature "substantially create[s] the value of the component parts," *Uniloc USA, Inc.* v. *Microsoft Corp.*, 632 F.3d 1292, 1318 (Fed. Cir. 2011), I did not instruct the jury on this basis for the application of the entire market value rule. To the extent that this approach overlaps with a focus on consumer demand or with an assessment of whether the infringing and non-infringing features constitute a single unit, however, I have considered Veracode's arguments on this point.

47   The Federal Circuit has declined to resolve whether the duration factor considers conduct starting from the date of direct notice of infringement, or from the date of a judicial finding of infringement, observing only that this factor, like others, is "informed by the totality of the circumstances." *Funai Elec. Co.* v. *Daewoo Elecs. Corp.*, 616 F.3d 1357, 1376 (Fed. Cir. 2010) (quoting *Odetics, Inc.* v. *Storage Tech. Corp.*, 185 F.3d 1259, 1274 (Fed. Cir. 1999)).

48   The Federal Circuit has recognized that the presumption of irreparable harm supporting the issuance of a permanent injunction that was recognized by courts prior to *eBay* no longer applies. *See Robert Bosch LLC* v. *Pylon Mfg. Corp.*, 659 F.3d 1142, 1148-49 (Fed. Cir. 2011).

49   The parties in *Riverbed* were companies operating in the "Wide Area Network ("WAN") optimization market" that "utilize hardware and virtual appliances to minimize the application performance problems caused by bandwidth constraints." *Riverbed Tech., Inc.* v. *Silver Peak Sys., Inc.*, Civ. No. 11-484-RGA, 2014 WL 4695765, at *1 (D. Del. Sept. 12, 2014).

50   I am not persuaded by Veracode's claims of lost partnership opportunities with MDM vendors, or by the relevance of the upfront investment Veracode made in obtaining a license to the patent and conducting the freedom to operate search to the adequacy of remedies inquiry.

51   It is also significant that the remaining time on the patent was far greater in *Innogenetics* than it is here.

52   It is important to emphasize that any supplemental damages Veracode receives may account for the time period only up to the date on which an injunction becomes effective (the date of entry or the effective date following a stay). Under this arrangement, Veracode is compensated for the harm caused by Appthority's infringement up to the point at which Appthority is enjoined from continuing its infringement, and does not get to "double dip" its relief. *Cf. Finjan, Inc.* v. *Secure Computing Corp.*, 626 F.3d 1197, 1213 (Fed. Cir. 2010) ("district court should have awarded compensation for any infringement prior to the injunction").

53   Without acknowledging its own contradictions, Appthority represents to the court that it would be destroyed by a permanent injunction of the scope sought by Veracode, yet it has represented to the public that its business will not be harmed by the verdict.

54   In making this proposal, Appthority reserves its rights of appeal, including as to non-infringement and injunctive relief, and again asserts its arguments that the detection of these application behaviors does not infringe the '924 Patent.

55   I recognize there is some precedent supporting Veracode's general proposition. In *ePlus, Inc.* v. *Lawson Software, Inc.*, 700 F.3d 509, 522 (Fed. Cir. 2012), the Federal Circuit upheld an injunction prohibiting the defendant "from servicing and maintaining products sold before the injunction issued," because the defendant was not "authorized to sell products that infringe [the plaintiff's] patent" at the time of the sales. *Id.* (distinguishing *Odetics,* 185 F.3d 1259, and *Fonar Corp.* v. *Gen. Elec. Co.*, 107 F.3d 1543 (Fed. Cir. 1997)).
Here, the database was made during the term of the patent using infringing technology that, while not part of the database, was necessary for the database's creation. *Cf. Johns Hopkins Univ.* v. *CellPro, Inc.*, 152 F.3d 1342, 1366 (Fed. Cir. 1998) (injunction requiring return of machine was "beyond the scope of Section 283 and hence an abuse of discretion" because machine "was never made, used, or sold during the term of the patent in the United States").

56   Veracode suggests that a finding of willful infringement alone is enough to warrant a finding of exceptionality. In support of this assertion, it points to two district court opinions following *Octane Fitness* in which attorneys' fees were awarded as part of default judgments. *See Ceiva Logic Inc.* v. *Frame Media Inc.*, No. SACV 08-00636-JVS, 2014 WL 7338840, at *4 (C.D. Cal. Dec. 19, 2014); *Rubbermaid Comm. Prods., LLC* v. *Trust Comm. Prods.*, No. 13-cv-2144, 2014 WL 4987878, at *6 (D. Nev. Aug. 22, 2014), *r.& r. adopted*, 2014 WL 4987881 (D. Nev. Oct. 6, 2014). The majority of the case law after *Octane Fitness*, cited throughout the discussion in this section, makes clear that a totality test still governs, and that willfulness is a relevant but not dispositive consideration. This coincidentally is consistent with the legal standard for enhanced damages. *See Seagate*, 497 F.3d at 1368.

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