United States Court of Appeals for the Federal Circuit

APPLE INC., A CALIFORNIA CORPORATION,
Plaintiff-Cross-Appellant

v.

SAMSUNG ELECTRONICS CO., LTD., A KOREAN CORPORATION, SAMSUNG ELECTRONICS AMERICA, INC., A NEW YORK CORPORATION, SAMSUNG TELECOMMUNICATIONS AMERICA, LLC, A DELAWARE LIMITED LIABILITY COMPANY,
Defendants-Appellants

2015-1171, 2015-1195, 2015-1994

Appeals from the United States District Court for the Northern District of California in No. 5:12-cv-00630-LHK, Judge Lucy H. Koh.

Decided: February 26, 2016

WILLIAM F. LEE, Wilmer Cutler Pickering Hale and Dorr LLP, Boston MA, argued for plaintiff-cross-appellant. Also represented by DANA OLCOTT BURWELL, ANDREW J. DANFORD, MARK CHRISTOPHER FLEMING, LAUREN B. FLETCHER, SARAH R. FRAZIER, RICHARD WELLS

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Before PROST, *Chief Judge,* DYK, and REYNA, *Circuit Judges.*

DYK, *Circuit Judge.*

The current appeal results from a patent infringement suit and countersuit between Apple Inc. ("Apple") and Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC (collectively, "Samsung"). Apple alleged infringement of five U.S. patents that it owns: U.S. Patent Nos. 5,946,647 (the '647 patent), 6,847,959 (the '959 patent), 7,761,414 (the '414 patent), 8,046,721 (the '721 patent), and 8,074,172 (the '172 patent). After a jury trial, the district court entered a judgment awarding Apple $119,625,000 in damages and ongoing royalties[1] for infringement of the '647 patent, the '721 patent, and the '172 patent. The jury found that Samsung had not infringed the '959 patent and the '414 patent. The district court entered judgment accordingly.

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[1] The district court determined that Apple was entitled to ongoing royalties but did not quantify the amount.

Samsung's countersuit alleged infringement of two patents that it owns: U.S. Patent Nos. 5,579,239 (the '239 patent) and 6,226,449 (the '449 patent). The jury found Apple had infringed the '449 patent and awarded $158,400 in damages but found that Apple had not infringed the '239 patent. The district court entered judgment in accordance with the jury verdict.

Both Apple and Samsung appeal. With regard to Apple's '647 patent, we reverse the district court's denial of Samsung's motion for judgment as a matter of law (JMOL) of non-infringement and find that Apple failed to prove, as a matter of law, that the accused Samsung products use an "analyzer server" as we have previously construed that term. We also reverse the district court's denial of JMOL of invalidity of Apple's '721 and '172 patents, finding that the asserted claims of both patents would have been obvious based on the prior art. We affirm the judgment of non-infringement of Apple's '959 and '414 patents, affirm the judgment of infringement of Samsung's '449 patent, and affirm the judgment of non-infringement of Samsung's '239 patent. In light of these holdings, we need not address the other issues on this appeal. Accordingly, we affirm-in-part and reverse-in-part.

BACKGROUND

This is our third appeal in this case. In the first appeal, we reversed the district court's order granting a preliminary injunction enjoining Samsung from selling one of its smartphones in the United States based on a patent no longer at issue in this case. *Apple Inc. v. Samsung Elecs. Co.*, 695 F.3d 1370 (Fed. Cir. 2012) (*"Apple I"*). In the second appeal, we vacated a district court remedial order denying Apple's request for a permanent injunction that would have enjoined Samsung from "making, using, selling, developing, advertising, or importing into the

United States software or code capable of implementing the infringing features [of the '647, the '721, and the '172 patents] in its products." *Apple Inc. v. Samsung Elecs. Co.*, 809 F.3d 633, 638 (Fed. Cir. 2015).[2] The district court decision and our reversal addressed the appropriateness of injunctive relief for assumed infringement. That decision did not address or resolve the merits of the underlying case that is now before us. In this third appeal, we confront the core infringement and invalidity issues with respect to the asserted patents.

I

Apple filed suit against Samsung on February 8, 2012, asserting infringement of eight patents, including the five that are relevant for this appeal. Samsung answered, contesting infringement and alleging invalidity of the asserted patents. In addition, Samsung countersued Apple for infringement of eight patents that it owns, including the two relevant for the current appeal. Before trial, the parties reduced the number of asserted claims, with Apple maintaining infringement as to five patents and Samsung maintaining allegations of infringement of two patents.

The five Apple patents involved at trial and on appeal cover various aspects of the operation of smartphones. The '647 patent covers software to detect "structures," such as a phone number, in text and to turn those structures into links, thus allowing a user to "click" on the structure to take an action (such as making a phone call) rather than having to copy and paste the structure into another application. The '721 patent is directed to the

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[2] On January 18, 2016, the district court entered the requested injunction, which was automatically stayed for 30 days.

iPhone's "slide to unlock" feature, where a user can slide a moving image across the screen of the phone with his finger to unlock the phone. The '172 patent covers "auto-correct" software on the phone that automatically corrects typing errors. The '959 patent claims "Universal Search," where a user can, from a single search term, find results both from applications on the phone and from the Internet. Lastly, Apple's '414 patent covers "Background Sync" software that synchronizes information on the phone with other devices while the user is using the phone.

As to Samsung's patents, the '449 patent covers camera systems for compressing, decompressing, and organizing digital photos and videos. The '239 patent covers systems for compressing and transmitting videos.

After a 13-day trial, the jury found all asserted claims of the Apple patents not invalid and awarded Apple $119.6 million for infringement of the asserted claims of the '647, '721, and '172 patents.[3] The jury, however, found that Samsung had not infringed Apple's '414 patent or Apple's '959 patent. Additionally, the jury found that Apple had infringed the asserted claim of the '449 patent, awarding Samsung $158,400 in damages, but found Samsung's '239 patent not infringed. The district court entered judgment.

We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1). We review a district court's order granting or denying JMOL under the standard applied by the regional circuit. In the Ninth Circuit, the review is de novo, and the court views the evidence in the light most

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[3] The jury found the asserted claims of the '647 and the '721 patents infringed, and the district court had previously entered summary judgment of infringement of the asserted claim of the '172 patent.

favorable to the jury verdict. *See Amarel v. Connell,* 102 F.3d 1494, 1521 (9th Cir. 1996).

DISCUSSION

I. The Apple '647 Patent

Apple asserted infringement of claim 9 of the '647 patent. The jury found that Samsung infringed and awarded Apple $98,690,625. The district court denied JMOL of non-infringement.

Samsung argues that the district court erred in not granting its motion for JMOL of non-infringement. The '647 patent "discloses a system for recognizing certain structures (such as a telephone number) on a touchscreen and then linking certain actions (such as calling the telephone number) to the structure. For example, a user may be able to call or save a phone number it has received via text message or email simply by touching the number on the screen of its device." *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1304 (Fed. Cir. 2014) (*"Motorola").* Asserted claim 9 depends on claim 1. Claim 1 reads:

> A computer-based system for detecting structures in data and performing actions on detected structures, comprising:
>
> an input device for receiving data;
>
> an output device for presenting the data;
>
> a memory storing information including program routines including
>
> an <u>analyzer server</u> for detecting structures in the data, and for linking actions to the detected structures;

> a user interface enabling the selection of a detected structure and a linked action; and
>
> an action processor for performing the selected action linked to the selected structure; and
>
> a processing unit coupled to the input device, the output device, and the memory for controlling the execution of the program routines.

'647 patent, col. 7 ll. 9–24 (emphasis added). Claim 9 adds an additional limitation, "wherein the user interface enables selection of an action by causing the output device to display a pop-up menu of the linked actions." *Id.* at ll. 53–55.

Samsung contends that Apple failed to produce any evidence from which a reasonable jury could conclude that Samsung's allegedly infringing phones practiced the "analyzer server" limitation.[4]

Before trial, neither party sought construction of "analyzer server," agreeing that it should be given its ordinary meaning. However, on the last scheduled day of trial, we issued a decision in another case construing this term in the same claim at issue here. *See Motorola*, 757 F.3d at 1304. The district court adopted our construction and allowed each party to recall its expert witnesses to

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[4] Samsung also maintains that Apple failed to provide any evidence that the accused software in the Samsung devices practiced the "linking actions to the detected structures" limitation. In light of our holding as to the "analyzer server" limitation, we need not address this issue.

address whether the allegedly infringing devices met the limitation under our new construction. The district court then allowed the case to proceed to the jury.

In the *Motorola* case, we construed "analyzer server" to mean "a server routine separate from a client that receives data having structures from the client." *Id.* We found that the "plain meaning of 'server,' when viewed from the perspective of a person of ordinary skill in the art, entails a client-server relationship. Consistent with this perspective, the specification discloses an analyzer server that is separate from the application it serves." *Id.* We rejected Apple's proposed construction—"a *program routine(s)* that receives data, uses patterns to detect structures in the data and links actions to the detected structures"–and Apple's arguments that "the analyzer server need not be 'separate from a client.'" *Id.* We found that the proposed construction and argument "conflict[] with the claim language by ignoring the claim term 'server.'" *Id.* at 1305. In other words, Apple tried to "take[] the claim text and remove[] the 'analyzer server,' leaving the rest basically unchanged." *Id.* Our construction required that the "analyzer server" be a piece of software that runs separately, receives data from a client application, performs the "detecting" and "linking" steps, and then returns that data to the client application. *Id.* at 1304–05.

Here, Apple accused two applications on Samsung devices of infringing claim 9: the Browser application (the web browser) and the Messenger application (used for text messaging). For these applications, Apple asserted that pieces of software code stored in shared program libraries were the "analyzer server" that performed the "detecting" and the "linking" functions. A "program library is a collection of computer programs for a particular application." *Software Libraries*, Encyclopedia of Computer Science 1620 (4th ed. 2000). Libraries contain collections

of programs to perform specific operations common to many different applications. *Id.* As the name implies, a client program can go to the shared program library and "borrow" (i.e., use) code from the library to perform a specific needed task rather than having to program that functionality into the client program. In other words, the software library program runs as part of the client program. *See Program library (software library)*, Dictionary of Computing 391 (4th ed. 1996) ("Usually it is only necessary to reference the library program to cause it to be automatically *incorporated in* a user's program.") (emphasis added). In a client-server implementation, as our previous opinion recognized, *Motorola*, 757 F.3d at 1304–05, the client sends information to a separately-running independent program which then performs a task using that information and sends information back to the client program. *See Client-Server Computing*, Encyclopedia of Computer Science 215 (4th ed. 2000).

There can be no question that before the last day of trial, Apple tried its case based on the claim construction that we rejected in *Motorola*. Apple's expert explicitly testified that the claim language covered any "piece of software that performs these functions," J.A. 10896, and that the claim language did not require software that could be used across different applications. In other words, Apple's expert, prior to the last day of trial, testified that the "analyzer server" need not be a separate piece of software that runs on its own.

On the last day of trial, Apple recalled the same witness to testify that the accused devices infringed even under our new claim construction. He testified that the accused software was a separate "analyzer server" because the Samsung application (i.e., Messenger) "goes to the code where it is and uses it there, and it does that each time it accesses the code." J.A. 13037. He also testified that these shared library programs were "defi-

nitely separate from the applications" because they were stored in a different part of memory, they received data from the Messenger and Browser applications, and they were developed independently of the Browser and Messenger applications. J.A. 13035–36.

However, this testimony is not sufficient evidence to allow a jury to conclude that the Samsung software met the "analyzer server" limitation. Our previous construction required more than just showing that accused software was stored in a different part of the memory and was developed separately. We found that the "analyzer server" limitation is a separate structural limitation and must be a "server routine," consistent with the "plain meaning of 'server'." *Motorola*, 757 F.3d at 1304. That is, it must run separately from the program it serves.[5] *See*

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[5] Specifically, we found that the "analyzer server" had to involve a "client-server relationship." *Motorola*, 757 F.3d at 1304. "Client-server computing is a distributed computing model in which client applications request services from server processes." *Client-Server Computing*, Encyclopedia of Computer Science 215 (4th ed. 2000). The "client application is a process or program that sends messages to a server . . . . Those messages request the server to perform a specific task . . . ." *Id.* "The server process or program listens for client requests that are transmitted . . . . Servers receive those requests and perform actions such as database queries and reading files." *Id.* In other words, a server process provides services, and the client receives those services. A client/server relationship assumes a "clean separation of functions"—both the client and the server are independently operating programs, each performing separate functions. *See, e.g.*, Stephen L. Montgomery, Object-Oriented Information Engineering: Analysis, Design, and

id. At oral argument, Apple "agree[d] . . . that [the analyzer server] has to be run separately from the client." Oral Argument at 29:28; *see generally id.* 27:16–29:40.

Multiple Samsung experts testified that the Samsung software library programs "do[] not run on [their] own. [They run] as *part of the application* that is using" them. *See, e.g.*, J.A. 11591. Another Samsung expert testified that the client program "go[es] to the library" and "integrate[s]" the library program code into the application, at which point "the library code is no different than any other code in the application." J.A. 11792.

Apple could point to no testimony where its expert stated that the library programs run separately. When asked at oral argument to point to testimony that shows that the Samsung software runs separately, Apple continually pointed to its expert's testimony on the last day of trial that the Samsung software "has access to the code and it goes to the code where it is and *uses* it there." J.A. 13037 (emphasis added). This testimony, though, shows the opposite of what Apple contends. It shows that the client application borrows or *uses* the library program code, not that the library program code runs separately. This is consistent with other testimony by the same Apple expert, admitting that the Samsung programs were not "standalone program[s]." J.A. 13054. As he testified, shared library code, like the Samsung software, "needs to be *exercised by* a particular application. It's not written

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Implementation 265 (1994); U.S. Patent No. 5,546,583, col. 1 ll. 24–25 ("Client/server interaction provides a clean separation of functions between processes . . . .") (filed in 1994); s*ee also Parallel Networks, LLC v. Abercrombie & Fitch Co.*, 704 F.3d 958, 969 (Fed. Cir. 2013) (finding that the term "generated by the server" could not cover a situation where the function was "finalized at the client").

as a standalone program, even though it is distinct and separate from the application." *Apple Inc. v. Samsung Elecs. Co.*, No. 5:12-cv630, ECF No. 1928 (Trial Transcript of Apr. 28, 2014), at 3052:3–6 (emphasis added). Thus, both the Samsung and Apple expert testimony showed that the shared library code is "used" by the Messenger and Browser applications, and not run separately.[6]

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[6] Further undermining Apple's arguments that a shared library program can be a separately running server is testimony from one of the inventors of the '647 patent taken during deposition and referenced during examination of the experts. The inventor understood that a shared library program and a server were two different ways of implementing the function described in the '647 patent, testifying that a shared library implementation was a "different kind of implementation" than a client-server implementation. *Apple Inc. v. Samsung Elecs. Co.*, No. 5:12-cv630, ECF No. 1928 (Trial Transcript of Apr. 28, 2014), at 3045–46; *Id.*, ECF No. 1624 (Trial Transcript of April 7, 2014), at 897–99.

According to the referenced testimony, the inventor considered using a shared library to implement the functions described but opted for a server implementation instead. *Id.* Although inventor testimony "cannot be relied on to change the meaning of the claims," *Howmedica Osteonics Corp. v. Wright Medical Technology, Inc.*, 540 F.3d 1337, 1346 (Fed. Cir. 2008) (citing *Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 983 (Fed. Cir. 1995) (en banc)), "[t]he testimony of an inventor, of course, may be pertinent as a form of expert testimony, for example, as to understanding the established meaning of particular terms in the relevant art," *Howmedica*, 540 F.3d at 1352 n.5 (citing *Phillips v. AWH Corp.,* 415 F.3d 1303, 1318 (Fed. Cir. 2005) (en banc)).

Apple emphasizes conflicting testimony between the experts for each side as to whether the Samsung software is "copied" from the library before it is run. Samsung's expert testified that "[w]hen an application, like Messenger, uses [a shared library program], it gets [its] own copy." J.A. 13094. Apple's expert disagreed, stating that each application does not have its own copy of the shared library. J.A. 13036. This testimony is, indeed, conflicting and confusing.[7] But this conflicting testimony is not relevant to whether the software on the Samsung devices runs separately or is run by the client application. Regardless of whether the code is copied, the expert testimony from both sides shows that the Samsung software library programs are not "standalone" programs that run separately.

In short, Apple provided no evidence that the accused software library programs in the Samsung phones run separately from the Browser and Messenger applications. No reasonable jury could have concluded that the accused devices had "an analyzer server for detecting structures in the data, and for linking actions to the detected structures." We reverse the district court's denial of JMOL of non-infringement by the Samsung devices of claim 9 of the '647 patent.

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[7] It is unclear to what extent the experts are talking about copying the code into "Random Access Memory" (RAM) for execution, *see, e.g.*, '647 patent, col. 3 ll. 44–46 (describing how software can be copied from disk storage to RAM prior to execution), or whether the experts are talking about making a copy from one part of disk storage to another part of disk storage. The testimony might not, in fact, be inconsistent if the experts are referring to different types of copying.

II. The Apple '721 and '172 Patents

Apple asserted claim 8 of the '721 patent and claim 18 of the '172 patent. Before trial, the district court granted Apple summary judgment of infringement of the '172 patent. The jury found both patents not invalid and found the asserted claim of the '721 patent infringed, awarding $2,990,625 for infringement of the '721 patent by three Samsung products and $17,943,750 for infringement of the '172 patent by seven Samsung products. Additionally, the jury found that Samsung had willfully infringed the '721 patent, which Apple argued supported an award of enhanced damages. The district court denied Samsung's motions for JMOL of invalidity and non-infringement, but granted JMOL that Samsung did not willfully infringe the '721 patent. On appeal, Samsung challenges the determination as to invalidity, and Apple challenges the JMOL as to willfulness.

We first consider the questions of patent invalidity. Samsung argues on appeal that the district court erred in not granting its motion for JMOL that the '721 and '172 patents would have been obvious in light of the various prior art references.

A patent is invalid for obviousness "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." 35 U.S.C. § 103(a) (pre-America Invents Act); *see also KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007). Obviousness is a question of law based on underlying findings of fact. *In re Kubin,* 561 F.3d 1351, 1355 (Fed. Cir. 2009). Secondary considerations, such as commercial success, long felt but unsolved needs, and the failure of others, must be considered. *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule*

Patent Litig., 676 F.3d 1063, 1075 (Fed. Cir. 2012). For such evidence to be probative of nonobviousness, a patentee must demonstrate a nexus between the patented features and the particular evidence of secondary considerations. *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.,* 776 F.2d 281, 305 n.42 (Fed. Cir. 1985).

A. The Apple '721 Patent

Samsung contends that the district court should have granted its motion for JMOL that the '721 patent would have been obvious. We agree.

The '721 patent is directed to the "slide to unlock" feature of the iPhone. As described in the specification, one problem with a portable device with a touchscreen is the accidental activation of features. When a user puts the portable device in a pocket, features may be activated by unintentional contact with the screen, and, for example, a phone call might be made. Thus, cell phone manufacturers had long used "well-known" procedures to prevent this, by locking the phone (i.e., not recognizing any touch inputs) until the user has "press[ed] a predefined set of buttons . . . or enter[ed] a code or password" to "unlock" the device. '721 patent, col. 1 ll. 47–50. The '721 patent claims a particular method of unlocking. The user touches one particular place on the screen where an image appears and, while continuously touching the screen, moves his finger to move the image to another part of the screen.

Asserted claim 8 depends on claim 7. Claim 7 reads:

A portable electronic device, comprising:

a touch-sensitive display;

memory;

one or more processors; and

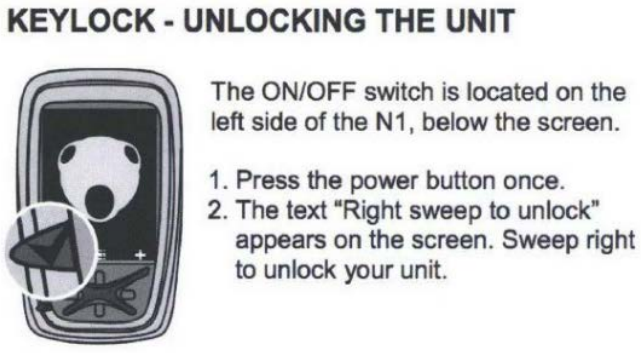
> one or more modules stored in the memory and configured for execution by the one or more processors, the one or more modules including instructions:
>
> > to detect a contact with the touch sensitive display at a first predefined location corresponding to an unlock image;
> >
> > to continuously move the unlock image on the touch-sensitive display in accordance with the movement of the detected contact while continuous contact with the touch-sensitive display is maintained, wherein the unlock image is a graphical, interactive user-interface object with which a user interacts in order to unlock the device; and
> >
> > to unlock the hand-held electronic device if the unlock image is moved from the first predefined location on the touch screen to a predefined unlock region on the touch-sensitive display.

'721 patent, col. 19 l. 50–col. 20 l. 9. Claim 8 additionally requires "instructions to display visual cues to communicate a direction of movement of the unlock image required to unlock the device." *Id.* at col. 19 ll. 10–12.

At trial, Samsung presented two prior art references, the NeoNode N1 Quickstart Guide ("Neonode") from 2004 and a video and paper by Plaisant that were presented at a computer-human-interactivity conference in 1992. The parties treat the Plaisant video and paper as a single

reference, and we do the same. Both NeoNode and Plaisant are prior art. Samsung argues that these two references together disclose every limitation of claim 8 of the '721 patent and that it would be a trivial matter for one of skill in the art to combine the teachings of these two references. Thus, it asserts that claim 8 would have been obvious because it is simply "the combination of familiar elements according to known methods." *KSR*, 550 U.S. at 416.

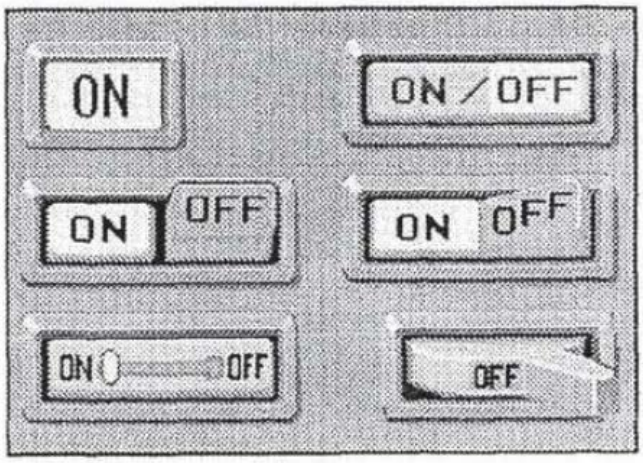
The Neonode reference describes an unlocking mechanism for a touchscreen phone where a user can, through movement of a finger continuously touching the screen of the device, unlock the phone. The reference also describes text on the device indicating how the user is to unlock the phone, specifically that the user is to "Right sweep to unlock."



J.A. 20725. Samsung contends, and Apple does not dispute, that Neonode discloses all of the limitations of claim 8 except for limitations concerning an "unlock image" or the visual depiction of its movement. The claim requires using a "predefined location corresponding to an unlock image," "continuous[] move[ment]" of the unlock image, and unlocking the device if the unlock image is moved from "one location to another." In other words, Neonode discloses using a touch gesture on the screen to

unlock a phone but does not have a moving image associated with the gesture.

The Plaisant paper, Samsung argues, supplies the missing element. The Plaisant paper "compares six different touchscreen-based toggle switches to be used by novice or occasional users to control two state (on/off) devices in a touchscreen environment." J.A. 20742. In one of these toggles, the "slider toggle," "a sliding/dragging movement is required to change the position of the yellow pointer from one side of the toggle to the other. . . . Users can [] grab the pointer and slide it to the other side." J.A. 20743. The "lever toggle" has the same functionality with a different appearance. These six methods are pictured below, with the "slider toggle" on the bottom left and the "lever toggle" bottom right:



J.A. 20742. As demonstrated on the video of the conference presentation, the user will place his finger at one end of the slider (the first predefined location) and will continuously move his finger to the other end of the slider (the second predefined location). While the user is moving his finger, the screen display will move the image.

On appeal, Apple does not dispute that Plaisant, when combined with Neonode, discloses all of the claimed features of the '721 patent. Rather, Apple argues that the jury could have reasonably found that (1) Plaisant teaches away from using the "slider toggle" and (2) a skilled artisan would not have had the motivation to combine Neonode and Plaisant because Plaisant describes wall-mounted devices rather than portable mobile phones.

First, Apple argues that Plaisant teaches away because the reference, in describing the results of human testing of the various slider designs, indicated that sliders were less intuitive than some other designs used. Specifically, the Plaisant paper states that "[t]he toggles that are pushed seemed to be preferred over toggles that slide. A possible explanation is that sliding is a more complex task than simply touching, but we also noticed that sliders are more difficult to implement than buttons!" J.A. 20743.

Our cases have recognized the "mere disclosure of more than one alternative" does not amount to teaching away from one of the alternatives where the reference does not "criticize, discredit, or otherwise discourage the" solution presented by the disclosure. *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1320 (Fed. Cir. 2015) (internal quotation marks omitted) (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)); *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 963–64 (Fed. Cir. 2014). Moreover, a motivation to use the teachings of a particular prior art reference need not be supported by a finding that that feature be the "preferred, or the most desirable." *Fulton*, 391 F.3d at 1200. Indeed, we have found a reference to not teach away when, for example, it described a particular composition "as somewhat inferior to some other product for the same use." *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994).

The fact that the Plaisant paper here notes that users did not prefer the particular design of the slider toggles is not evidence of teaching away. The reference simply discloses that users were able to figure out the push-button-type toggles more intuitively than the slider toggle. Only a single sentence in the reference suggests that sliding toggles might be less preferable to push-button-type toggles because "sliding is a more complex task than simply touching" and is "more difficult to implement." J.A. 20743. This was so primarily because of the design of Plaisant's sliding toggle. The Plaisant paper notes that a simple alteration of the design could solve this problem, noting that "the slider pointer should be larger, and the lever or pointer should highlight when touched to signify that the user has control over it." *Id*. The authors also discuss positive results, noting that "[e]ven if sliders were not preferred, the fact that users used them correctly is encouraging." *Id*. The reference also lists many benefits of sliding toggles, noting that "many other controls can be designed using sliding motions. Another advantage of the sliding movement is that it is less likely to be done inadvertently therefore making the toggle very secure. . . . This advantage can be pushed further and controls can be designed to be very secure." *Id.* There was no criticism of sliding toggles that would lead one of skill in the art to be "discouraged from following the path" that was taken. *Gurley*, 27 F.3d at 553. Further, the reference extolls the virtues of sliding toggles as a possible solution to particular problems in computer-human-interaction design. Under our authority, a reasonable jury could not have found that Plaisant teaches away from using sliding toggles.

Apple also argues that the jury could have found that a skilled artisan would not have been motivated to combine Plaisant with Neonode because Plaisant is not relevant prior art. Whether a reference in the prior art is

"analogous" is a fact question. *In re Clay*, 966 F.2d 656, 658 (Fed. Cir. 1992). A reference qualifies as analogous prior art if it is "from the same field of endeavor, regardless of the problem addressed" or "if the reference is not within the field of the inventor's endeavor, . . . the reference still is reasonably pertinent to the particular problem with which the inventor is involved." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1237 (Fed. Cir. 2010) (quoting *Comaper Corp. v. Antec, Inc.,* 596 F.3d 1343, 1351 (Fed. Cir. 2010)). We conclude that no reasonable jury could find that the Plaisant reference is not analogous art in the same field of endeavor as the '721 patent. The field of endeavor is determined "by reference to explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004); *see also In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986) (finding that if a prior art reference discloses essentially the same structure and function as the invention, it is likely in the same field of endeavor).

Samsung presented expert testimony that a person of skill in the art "would be highly interested" in both Neonode and Plaisant when faced with the inadvertent activation problem because "they both deal with touch base[d] systems, they both deal with user interfaces. They both talk about changing state. . . . [A] person looking at this would just think it natural to combine these two." J.A. 11982. Notably, Apple did not offer any expert testimony that Plaisant was not relevant to the subject matter of the '721 patent but instead simply asserts that "Plaisant describes a wall-mounted device to control home appliances like air-conditioning units and heaters, which a skilled artisan would not naturally turn to for solving the 'pocket dialing' problem." Br. for Resp'ts 26–27.

Neither the Plaisant reference nor the '721 patent so strictly defines the field of endeavor. As is described in the patent itself, the invention of the '721 patent "relate[s] generally to user interfaces that employ touch-sensitive displays, and more particularly, to the unlocking of user interfaces on portable electronic devices." '721 patent, col. 1 ll. 18–21. The purpose of the invention is to allow "more efficient, user-friendly procedures for transitioning such devices, touch screens, and/or applications between user interface states (e.g., from a user interface state for a first application to a user interface state for a second application, between user interface states in the same application, or between locked and unlocked states)." *Id.* at col. 1 ll. 58–67. Accordingly, the patentee included as potentially relevant many prior art references relating generally to human-interface design, including the Plaisant reference.[8] *See* File Wrapper for '721 patent, Information Disclosure Statement filed May 13, 2011. The specification clearly describes the field of the invention as being related to "transitioning" touch screen devices between interface states. '721 patent, col. 1 ll. 58–64. The Plaisant paper describes exactly this same function—it describes "toggle switches[9] to be used by novice or occasional users to control two state (on/off) devices in a

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[8] We have held that submission of an information disclosure statement to the USPTO does not constitute an admission that the reference listed is material prior art. *Abbott Labs. v. Baxter Pharm. Prods., Inc.*, 334 F.3d 1274, 1279 (Fed. Cir. 2003) (finding that of listing a prior sale in an IDS was not a disclaimer of claim scope). However, the nature of the prior art listed in an information disclosure statement can be informative as to the field of endeavor.

[9] Toggle switches in Plaisant include the "sliding toggles" that are pertinent here.

touchscreen environment." J.A. 20742 (footnote not in original). Though the authors of Plaisant describe one "practical orientation" of their work as being related to integrated control systems for entertainment, security, and climate controls, the goal of the study "was to select a usability-tested/error-free toggle and to better understand some of the problems and issues involved in the design of controls for a touchscreen environment" more broadly. *Id.*

Both the '721 patent and the Plaisant reference also disclose essentially the same structure—a touchscreen device with software that allows the user to slide his finger across the screen to change interface states. Certainly, the problem faced by both the inventors of the '721 patent and the authors of Plaisant was similar—how to create intuitive, easy to understand interfaces for changing states on touchscreen devices. A skilled artisan would naturally turn to references like Plaisant to find solutions. *See Bigio*, 381 F.3d at 1327 (a toothbrush was relevant prior art for a hairbrush because of the similarity in structure between the two devices); *Automatic Arc Welding Co. v. A.O. Smith Corp.*, 60 F.2d 740, 743–44, 745 (7th Cir. 1932) (an electric arc lamp was analogous art to a patent on an electric arc welder because "the problem of the electrical engineer in the other fields was so similar, and necessarily so, that one trained as an electrical engineer must be chargeable with knowledge common to those who labored in those fields"). A reasonable jury could not conclude otherwise.

Apple argues that even if Samsung established a prima facie case of obviousness, the evidence of secondary considerations demonstrates nonobviousness. Certainly secondary considerations "must be considered in evaluating the obviousness of a claimed invention." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1305 (Fed. Cir. 2010). But "weak secondary considerations generally do not overcome

a strong prima facie case of obviousness." *W. Union Co. v. MoneyGram Payment Sys., Inc.*, 626 F.3d 1361, 1373 (Fed. Cir. 2010) (citations omitted); *see also Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1371 (Fed. Cir. 2011) ("A strong case of *prima facie* obviousness . . . cannot be overcome by a far weaker showing of objective indicia of nonobviousness."); *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (finding that even "substantial evidence of commercial success, praise, and long felt need" was "inadequate" to overcome a strong prima facie showing of obviousness). This is particularly true when an invention involves nothing more than "the predictable use of prior art elements according to their established functions." *Wyers*, 616 F.3d at 1246 (quoting *KSR*, 550 U.S. at 417); *see also Ohio Willow Wood Co. v. Alps South, LLC*, 735 F.3d 1333, 1344 (Fed. Cir. 2013) ("[W]here a claimed invention represents no more than the predictable use of prior art elements according to established functions, . . . evidence of secondary indicia are frequently deemed inadequate to establish non-obviousness.").

Here, the prima facie case of obviousness was strong. Apple's evidence of secondary considerations was weak and did not support a conclusion that the '721 patent was nonobvious.

Apple contends that there was evidence showing (1) a long-felt but unresolved need, (2) industry praise, (3) copying, and (4) commercial success.

For long-felt but unresolved need, Apple argues that "[b]efore Apple's invention, phone designers tried for years to solve the accidental activation problem and only came up with 'frustrating' methods." Br. for Resp'ts 28. For this, it points to testimony by one of its expert witnesses describing the problem that the '721 patent was meant to solve. After describing the "pocket dial" problem

(i.e., the accidental activation of features on touch screen phones), the expert described an example of how another manufacturer had solved the problem—the unlocking mechanism of a Nokia device. J.A. 10638–39. The expert testified that the Nokia device "shows *an example* that *I* have been very frustrated with" because "[w]hat was required to unlock, it was entirely unintuitive." J.A. 10638 (emphasis added). What that device lacked, apparently, was a more intuitive unlocking mechanism.

We have held that evidence of a long-existing need in the industry for the solution to a recognized and persistent problem may lend support to a conclusion that an invention was nonobvious. *See, e.g.*, *Ecolochem, Inc. v. S. California Edison Co.*, 227 F.3d 1361, 1376 (Fed. Cir. 2000). The idea behind this secondary consideration is that if a particular problem is identified by an industry but left unsolved, the failure to solve the problem (despite the incentive to do so) supports a conclusion of nonobviouness. *See, e.g.*, Natalie A. Thomas, *Secondary Considerations in Nonobviousness Analysis: The Use of Objective Indicia Following* KSR v. Teleflex, 86 N.Y.U. L. Rev. 2070, 2078 (2011). Thus, to demonstrate long felt need, the patentee must point to an "*articulated identified* problem and evidence of efforts to solve that problem" which were, before the invention, unsuccessful. *Tex. Instruments v. Int'l Trade Comm'n*, 988 F.2d 1165, 1178 (Fed. Cir. 1993) (emphasis added). But "[w]here the differences between the prior art and the claimed invention are . . . minimal . . . it cannot be said that any long-felt need was unsolved." *Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l, LLC*, 618 F.3d 1294, 1304 (Fed. Cir. 2010).

Apple appears to identify the unsolved problem as the lack of an "intuitive" method of unlocking a touch-screen portable device. But Apple provided no evidence showing that this problem was recognized in the industry. No

reasonable jury could find testimony by a single expert about his personal experience with one device as evidence of an industry-wide long-felt need. Apple's contention here is nothing more than an unsupported assertion that Apple's method is better and more "intuitive" than previous methods. This is not sufficient to demonstrate the existence of a long-felt but unmet need. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1332–33 (Fed. Cir. 2009) (finding that patentee failed to demonstrate, as a matter of law, a long-felt but unmet need with bare assertions that the patent provided "improved efficiency").

As evidence of industry praise, Apple presented expert testimony that the attendees at an Apple event manifested approval when Steve Jobs first presented and unlocked the iPhone. We have held that "[a]ppreciation by contemporaries skilled in the field of the invention is a useful indicator of whether the invention would have been obvious to such persons at the time it was made." *Vulcan Eng'g Co., Inc. v. Fata Aluminium, Inc.*, 278 F.3d 1366, 1373 (Fed. Cir. 2002) (citing *Stratoflex, Inc., v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983)). For example, expression of disbelief by experts and then later acquiescence to the invention may be strong evidence of nonobviousness. *See, e.g.*, *United States v. Adams*, 383 U.S. 39, 52 (1966); *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 697–98 (Fed. Cir. 1983). Similarly, industry recognition of the achievement of the invention, such as awards, may suggest nonobviousness provided that the praise is tied to the invention claimed by the patent. *See Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1327 (Fed. Cir. 2008). Evidence of approval by Apple fans—who may or may not have been skilled in the

art—during the presentation of the iPhone is not legally sufficient.[10]

As to copying, Apple also argues that internal Samsung documents show that a feature of the Samsung unlock mechanism was copied from the iPhone. These documents show that Samsung engineers recommended modifying Samsung software to "clarify the unlocking standard by sliding" to make it the "[s]ame as [the] iPhone." J.A. 51289. What was copied was not the iPhone unlock mechanism in its entirety, but only using a fixed starting and ending point for the slide, a feature shown in the Plaisant prior art.

We have found, "[i]n some cases, evidence that a competitor has copied a product embodying a patented invention can be an indication of nonobviousness." *W.M. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012). Evidence of copying of a feature in a patent owner's commercial product is "not sufficient to demonstrate nonobviousness of the claimed invention" where, as here, there is a "substantial question of validity raised by the prior art references" cited by the accused infringer. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1366 (Fed. Cir. 2001). Thus Apple's evidence showing that Samsung copied one aspect

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[10] Apple also relies on statements from Samsung documents that it contends demonstrates a competitor's praise. We have sometimes recognized that, a competitor's public statements, such as in advertising, touting the benefits of the technology claimed by a patent may be "inconsistent" with a position that the claimed invention is obvious. *Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010). These internal Samsung documents are not such public statements.

of the Apple unlocking mechanism is entitled to little weight on the question of obviousness.

Lastly, Apple points to the commercial success of the iPhone as evidence of nonobviousness. Apple argues that the success of the iPhone is tied to the patented feature of claim 8 of the '721 patent. To make this connection, Apple cites to a study where users were asked to assess their willingness to purchase a product with and without the slide-to-unlock feature. But this study only asked about tablet devices with a screen size larger than seven inches, not phones. Further, evidence that customers prefer to purchase a device "with" a slide-to-unlock capacity does not show a nexus when the evidence does not show what alternative device consumers were comparing that device to. For example, it is not clear whether the alternative device had any unlocking feature. A reasonable jury could therefore not find a nexus between the patented feature and the commercial success of the iPhone.

In short, Apple's evidence of secondary considerations is "insufficient as a matter of law to overcome our conclusion that the evidence *only* supports a legal conclusion that [the asserted claim] would have been obvious." *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1371 (Fed. Cir. 2006). We reverse the judgment of infringement and no invalidity because the asserted claim of the '721 patent would have been obvious in light of Neonode and Plaisant.

B. The Apple '172 Patent

Samsung also contends that the district court erred in denying its motion for JMOL that asserted claim 18 of the '172 patent was obvious. Again, we agree.

The '172 patent covers the iPhone's "autocorrect" feature. As is described in the patent specification, the small

size of a physical or virtual keyboard on portable devices leads to more "typing mistakes and thus more backtracking to correct the mistakes. This makes the process of inputting text on the devices inefficient and reduces user satisfaction with such portable devices." '172 patent, col. 1 ll. 31–35. The '172 patent seeks to solve this problem by providing methods of automatically correcting typographical errors as the user is typing. Apple asserted claim 18 of the '172 patent, which reads:

> A graphical user interface on a portable electronic device with a keyboard and a touch screen display, comprising:
>
> a first area of the touch screen display that displays a current character string being input by a user with the keyboard; and
>
> a second area of the touch screen display separate from the first area that displays the current character string or a portion thereof and a suggested replacement character string for the current character string;
>
> wherein;
>
> the current character string in the first area is replaced with the suggested replacement character string if the user activates a key on the keyboard associated with a delimiter;
>
> the current character string in the first area is replaced with the suggested replacement character string if the user performs a gesture on the suggested replacement character string in the second area; and

> the current character string in the first area is kept if the user performs a gesture in the second area on the current character string or the portion thereof displayed in the second area.

'172 patent, col. 12 l. 49–col. 13 l. 4. In essence the claim requires that current text be displayed in a first area, that the current word as typed and suggested corrections be displayed in a second area, and that the correction be automatically entered if a certain key, such as the space bar, is pressed or if the user touches the suggested replacement. Additionally, the user can choose to use the current word (as typed) if he touches that option in the second area. Figure 4D from the '172 patent specification below demonstrates the invention:

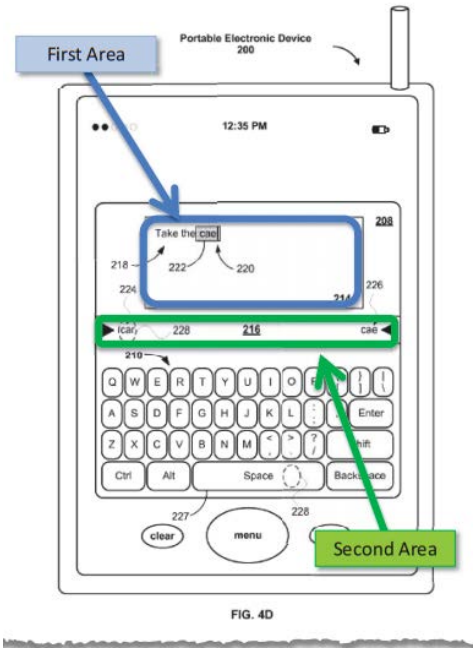


FIG. 4D

J.A. 50822 (annotations added).

There is no dispute that autocorrection features were known in the prior art. Samsung presented two pieces of

prior art that it contends together teach every limitation of the claimed invention. The first is U.S. Patent No. 7,880,730 to Robinson ("Robinson"). Robinson is directed to a "keyboard system with automatic correction" which describes a touchscreen keyboard that can automatically correct incorrectly typed text. J.A. 20885. In this invention, a pop-up window appears as a user is typing a word, displaying the current character string and a list of suggested replacements, as demonstrated in Figure 1B of the Robinson patent:

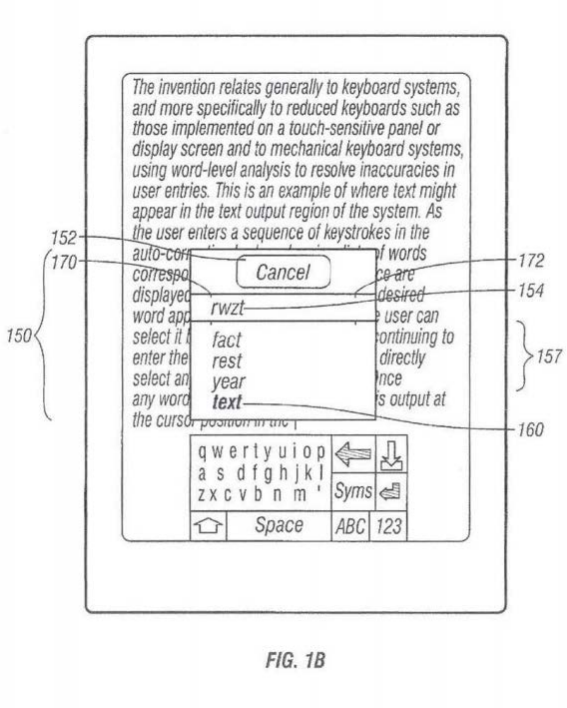


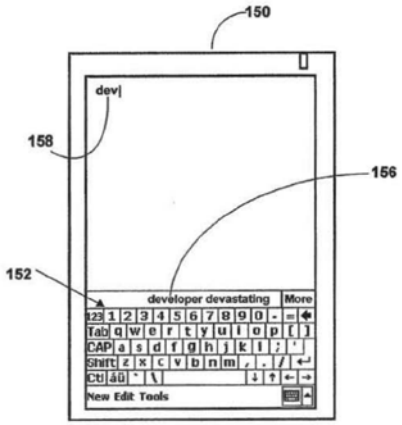
FIG. 1B

J.A. 20890.

The pop-up menu of Robinson (150) includes the word as typed (154) and suggestions, including the most commonly used suggested replacement (160), corresponding to the "second area" of claim 18 of the '172 patent. As to the other elements, Robinson states that "[t]he space key acts

to accept the default word . . . and enters the [default] word [] in the text output region at the insertion point in the text being generated where the cursor was last positioned." J.A. 20925 col. 33 ll. 12–16. In other words, in Robinson, pressing the space bar selects the most frequently used word that is a correction of the incorrectly typed text. Robinson also discloses that when a user selects a corrected word by touching it, or when a user selects the text as typed by touching it, the selected text will be inserted. As both parties agree, Robinson thus discloses every aspect of the invention except displaying and replacing an incorrectly typed word in a first area (in context).

Samsung argues that "displaying what a user is typing (i.e., the current character string) in the text entry area was a well-known behavior in computers." Pet'r's Br. 43. It points to an International Patent Application, WO 2005/008899 A1 ("Xrgomics"), which describes another text-entry system. Xrgomics discloses a "letter and word choice text input method" and describes "quick selection of choices to be implemented seamlessly for reduced keyboard systems," like those in mobile devices. J.A. 21002. As pictured below, Xrgomics teaches displaying the current character string in a first area (158) and potential completions and/or replacements in a second area (156):



J.A. 21049. The combination of Robinson and Xrgomics results in Apple's invention.

Apple argues that the jury could have found that a skilled artisan would not have been motivated to combine Xrgomics with Robinson because Xrgomics primarily discloses a text completion (rather than text correction) system and that this is a different field than an autocorrect system. But, as with the '721 patent, the specification does not so narrowly draw boundaries around the field of the invention, stating that the disclosed invention "relate[s] generally to text input on portable electronic devices." '172 patent, col. 1 ll. 15–16. Both the '172 patent and Xrgomics disclose text input systems on a mobile device, and do so with remarkably similar structures (displaying typed text in context and corrections/completions in a space below). Considering the "reality of the circumstances—in other words, common sense," a skilled artisan would have considered Xrgomics to be within the scope of the art searched. *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992). Certainly text correction and text completion are closely related problems in the "same field of endeavor" such that they would be considered analogous arts. *See, e.g.*, *Verizon Servs. Corp. v. Cox Fibernet Va., Inc.*, 602 F.3d 1325, 1338 (Fed. Cir. 2010) (finding that references relating to telephony and wireless communication were relevant to the Internet and network protocols because the "problem facing the inventors of the Network Patents was related to" the problem faced by the prior art references). There is a strong prima facie case of obviousness.

Apple also argues that a jury could have found its evidence of secondary considerations sufficient to demonstrate nonobviousness. As to the '172 patent, Apple relies only on copying and commercial success.

For copying, Apple again points to internal Samsung documents showing that one feature of the iPhone was copied. Prior to the copying, the Samsung phones automatically corrected the typed text as the user typed. *See* J.A. 51488. On the iPhone, the correction was made only after the user "accepts or hits space." *Id.* This feature is exactly what was disclosed in Robinson. When the feature that is copied is present in the prior art, that copying is not relevant to prove nonobviousness. *See Amazon.com*, 239 F.3d at 1366; *Wm. Wrigley Jr. Co.*, 683 F.3d at 1363; *see also In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) ("Where the offered secondary consideration actually results from something other than what is both claimed and *novel* in the claim, there is no nexus to the merits of the claimed invention.").

For commercial success, Apple again relies on survey evidence to link the commercial success of its iPhone to the subject matter of claim 18. Here, the survey does address consumer preferences for this feature on phones. Users were asked whether they would be more or less likely to purchase a smartphone at a particular price point with or without autocorrection. The survey evidence indicates that consumers were more likely to purchase smartphones with automatic correction than without automatic correction. However, the survey evidence does not demonstrate whether a consumer would be more or less likely to buy a device with the specific combination of features reflected in claim 18 of the '172 patent as opposed to, for example, the Robinson prior art.

To be relevant, commercial success must be linked to the "merits of the claimed inve ntion," *Wyers*, 616 F.3d at 1246 (alterations omitted), rather than features known in the prior art. *See also Ethicon Endo-Surgery, Inc. v. Covidien LP*, No. 2014-1771, 2016 WL 145576, at *9 (Fed. Cir. Jan. 13, 2016); *Pregis Corp. v. Kappos*, 700 F.3d 1348, 1356 (Fed. Cir. 2012); *Ormco Corp. v. Align Tech., Inc.*,

463 F.3d 1299, 1312 (Fed. Cir. 2006). Apple's evidence shows that phones with autocorrection may sell better than phones without autocorrection, but it does not show that phones with the specific implementation of autocorrection embodied by claim 18 sell better than phones with other methods of autocorrection disclosed by the prior art. "A nexus must be established between the merits of the claimed invention and the evidence of commercial success before that issue becomes relevant to the issue of obviousness." *Vandenberg v. Dairy Equip. Co.*, 740 F.2d 1560, 1567 (Fed. Cir. 1984). Apple presented no evidence demonstrating a nexus between the commercial success of the iPhone and the features claimed by the patent, and accordingly the claimed evidence of commercial success is entitled to no weight.

In short, we find that Samsung presented a strong case of obviousness, showing that every element of claim 18 was present in the prior art. Apple's evidence of secondary considerations was very weak. Claim 18 of the '172 patent would have been obvious to one of skill in the art as a matter of law. Therefore, we reverse the judgment of infringement and no invalidity.

Because we have found that the asserted claims of the '721 and the '172 patents would have been obvious, we need not address Apple's argument that the jury's finding of willful infringement of the '721 patent should be reinstated nor Samsung's argument that the district court erred in construing "keyboard" in the '172 patent for purposes of determining infringement.

III. The Apple '959 Patent

Next, we turn to Apple's '959 patent. The jury found the asserted claim not invalid but not infringed. After trial, both sides filed motions for JMOL, with Samsung arguing invalidity (anticipation and indefiniteness) and

Apple arguing infringement, both of which the district court denied. Both sides appeal.

We first address the issue of infringement. The '959 patent covers "universal search" on the iPhone. In short, the patent describes a method of providing "convenient access to items of information . . . by means of a unitary interface which is capable of accessing information in a variety of locations," such as information stored on the phone and information stored on the Internet. '959 patent, col. 2 ll. 16–20. A user will input a search term into the search bar, and the phone will search a plurality of locations, including the address book, the calendar, and the Internet. The phone then displays results from all of these various searches in a list. Apple asserted claim 25, which depends on claim 24. Claim 24 reads:

> A computer readable medium for locating information from a plurality of locations containing program instructions to:
>
> > receive an information identifier;
> >
> > provide said information identifier to a plurality of heuristics to locate information in the plurality of locations which include the Internet and local storage media;
> >
> > determine at least one candidate item of information based upon the plurality of heuristics; and
> >
> > display a representation of said candidate item of information.

Id. at col. 9 ll. 16–26. Claim 25 adds an additional limitation, "wherein the information identifier is applied separately to each heuristic." *Id.* at ll. 27–30.

On appeal, the only issue of contention is whether the search feature on the Samsung phones "provide[s] said information identifier to a plurality of heuristics to locate information in the plurality of locations which include the Internet and local storage media," *id.* at col. 9 ll. 20–22, specifically whether the search function on the Samsung phones "locates" information on the Internet.

The district court found that "Samsung presented sufficient rebuttal evidence to permit the jury to decide that the accused devices lack instructions to search 'a plurality of locations which include the Internet,' as claim 25 requires." J.A. 103. The district court pointed to two Samsung witnesses who testified that the Samsung search function "does not search the Internet, but rather 'blends' data previously retrieved from a Google server and a local database." J.A. 103–04. In other words, these experts testified that because the search function only searched information previously pulled from the Internet, it was not searching the Internet, as required by the claim language. As the district court found, this is substantial evidence supporting the jury verdict of non-infringement.

Apple argues that the plain meaning of the claim ought to cover searching information previously downloaded from the Internet. The district court found that this argument attempts to assert "a new claim construction position after trial, when Apple did not request additional claim construction, and plain and ordinary meaning applied to the terms that Apple now raises." J.A. 104. We agree with the district court and affirm the denial of Apple's motion for JMOL of infringement of claim 25 of the '959 patent. We thus also affirm the judgment of non-infringement.

Samsung conceded at oral argument in our court that we need not address its appeal as to invalidity of the '959 patent if we uphold the jury's non-infringement finding.

Since we sustain the jury's verdict of non-infringement, we need not address issues of invalidity.

IV. The Apple '414 Patent

We now consider Apple's '414 patent. The jury found the asserted claim of the '414 patent not invalid and not infringed. After trial, both sides challenged the jury verdict, with Samsung moving for JMOL of invalidity and Apple moving for JMOL of infringement. The district court denied both motions. Both parties appeal.

We address first the issue of infringement. The '414 patent covers "background sync" and describes systems, methods, and computer readable media for synchronizing data between multiple devices. Specifically, the patent covers simultaneous synchronization where the "synchronization tasks and non-synchronization tasks [are] executed concurrently." '414 patent, col 2 ll. 19–21. Basically, this means that a user can continue using a program that manipulates data (say the Address Book) and the system can synchronize the data being used (i.e., the contacts in the Address Book) at the same time. The invention will "synchronize" a contact created on an iPhone to another device, such as an iPad, without any user interaction. Apple asserted claim 20, which depends on claim 11. Claim 11 reads:

> A computer readable storage medium containing executable program instructions which when executed cause a data processing system to perform a method comprising:
>
> > executing at least one user-level non-synchronization processing thread, wherein the at least one user-level non-synchronization processing thread is provided by a user application which provides a user interface to allow a user to access

> and edit structured data in a first store associated with a first database; and
>
> executing at least one synchronization processing thread concurrently with the executing of the at least one user-level non-synchronization processing thread, wherein the at least one synchronization processing thread is provided by a synchronization software component which is configured to synchronize the structured data from the first database with the structured data from a second database.

Id. at col. 33 ll. 37–54. Claim 20 adds the additional limitation, "wherein the synchronization software component is configured to synchronize structured data of a first data class and other synchronization software components are configured to synchronize structured data of other corresponding data classes." *Id.* at col. 34, ll. 18–22.

Apple contends that the jury's finding of non-infringement is not supported by substantial evidence, and that the district court erred in concluding otherwise. As the district court found, "[i]t is undisputed that claim 20 requires at least three distinct 'synchronization software components . . . . The first is the claimed synchronization software component 'configured to synchronize structured data of a first data class' and the other two are the 'other synchronization software components' configured 'to synchronize structured data of other corresponding data classes.'" J.A. 99. In other words, the claim requires three pieces of software that will synchronize three different data classes, such as contacts, calendar, and email. It is also undisputed that the accused Samsung phones contain synchronization software components that meet the other limitations of the claims for two data classes (calendar and contacts). The only issue is

whether the Samsung devices contain synchronization software components "configured to synchronize" for email. The limitation in question was construed by the district court to have its plain and ordinary meaning.

The district court concluded that "substantial trial evidence permitted a reasonable jury to determine non-infringement" on the basis of Samsung expert testimony that email software was not configured to synchronize because it does not synchronize data by itself, but rather "indirectly 'cause[s]' synchronization by calling other software components." J.A. 100; *see also, e.g.*, J.A. 11573. We agree with the district court that this is substantial evidence supporting the jury verdict of non-infringement.

Apple now argues that this testimony is insufficient because the plain and ordinary meaning of "configured to synchronize" includes indirect causes of synchronization, like the Samsung email software. The Samsung expert testimony, according to Apple, does not suffice as substantial evidence because it "'import[s] additional limitations into the claims' by suggesting that . . . a sync adapter be configured to perform all synchronization or to perform synchronization in a specific way." J.A. 100. The district court rejected this argument because "Apple seeks a post-trial construction for 'configured to synchronize' . . . despite never requesting such a construction before." *Id.* at 101–02. We agree and affirm the judgment of non-infringement.

Since we conclude that substantial evidence supports the jury's finding of non-infringement, we need not address the invalidity of claim 20 of the '414 patent.

V. The Samsung '239 Patent

The jury, based on the district court's claim construction, found asserted claim 15 of the '239 patent not in-

fringed. Samsung argues that the district court erred in construing "means for transmission" in claim 15.

Samsung's '239 patent pertains to "remote video transmission" and "provide[s] a method and means for capturing full-color, full-motion audio/video signals, digitizing and compressing the signals into a digitized data file, and transmitting the signals over telephone lines, cellular, radio and other telemetric frequencies." '239 patent, col. 2 ll. 26–31. Samsung asserted claim 15, which reads:

> An apparatus for transmission of data, comprising:
>
> > a computer including a video capture module to capture and compress video in real time;
> >
> > means for transmission of said captured video over a cellular frequency.

Id. at col. 14 ll. 17–21. The district court construed "means for transmission"—a means-plus-function claim limitation—to require software "performing a software sequence of initializing one or more communications ports on said apparatus, obtaining a cellular connection, obtaining said captured video, and transmitting said captured video" disclosed in the specification, in addition to hardware. J.A. 150.

Samsung argues that "[t]he specification of the '239 patent does not require any *software* for transmission, and including such software [in addition to hardware] as necessary structure was error." Pet'r's Br. 57 (emphasis in original). But, as the district court found, "the term 'transmission' implies communication from one unit to another, and the specification explains that software is necessary to enable such communication." J.A. 144. Consistent with this, "the specification teaches that a

software sequence is necessary for transmitting a signal in the context of the invention. . . . Under the preferred embodiment, the '239 patent discloses that software is required for transmission: 'Transfer software *sequence B enables the remote unit* to communicate' and 'contains all of the instructions *necessary*' for communication." *Id.* (citing and quoting from the '239 patent, col. 8 ll. 23–30). Hardware, alone, does nothing without software instructions telling it what to do, and the patent recognizes this, stating that the "transfer software" is what "enables" the transmission. *See* '239 patent, col. 8 ll. 23–30. Thus, because "corresponding structure must include all structure that actually performs the recited function," *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 296 F.3d 1106, 1119 (Fed. Cir. 2002), the district court correctly included software as part of the corresponding structure for "means for transmission."

Samsung also argues, in the alternative, that even if software were required, the district court incorrectly required that the software initialize the communications ports, obtain a cellular connection, and obtain the captured video. But the district court was correct in this regard as well. The specification explicitly describes the initializing and obtaining aspects of the transfer software as part of the structure that enables the remote unit to transmit a video file over a cellular frequency. *See* '239 patent, col. 8 ll. 17–30 ("Transmission of a data file is accomplished by selecting the 'TRANSFER' button" which "initiates" specific software sequences (sequences B and C) described in the specification as initializing the communications port, obtaining a cellular connection, and obtaining the captured video.).

We affirm the district court's construction of "means for transmission" in claim 15 of the '239 patent and the judgment of non-infringement.

VII. The Samsung '449 Patent

Samsung asserted claim 27 of the '449 patent. The jury found that Apple had infringed and awarded $158,400 in damages. The district court denied Apple's post-trial motion for JMOL of non-infringement. Apple challenges the district court's denial of its motion for JMOL that its products do not infringe the '449 patent.

Samsung's '449 patent is directed to camera systems for compressing/decompressing and organizing digital files, such as photos and videos. Samsung asserted claim 27, which depends on claim 25. Claim 25 reads:

> A digital camera comprising:
>
> a lens,
>
> an imaging device which converts an optical image into an analog signal;
>
> an A/D converter which converts said analog signal from said imaging device to a digital signal;
>
> a compressor which compresses said digital signal outputted from said A/D converter, and generates compressed data by using a different compressing method for moving image signals and for still image signals;
>
> a recording circuit which records compressed data, said compressed data including a moving image signal, and a still image signal;
>
> a decompressor which decompresses said compressed data by using a different decompressing method according to whether

> said recorded compressed data is a moving image signal or a still image signal;
>
> a reproducing circuit which reproduces a moving image signal, a sound signal in synchronous to said moving image signal, and a still image signal; and
>
> a display which displays said moving image signals and still image signals outputted from said reproducing circuit, and a list of said moving image signal and still image signal as a search mode, and a list of classifications as a classification mode;
>
> wherein said recording circuit records each one of said plurality of image signals with classification data, and
>
> said display lists a plurality of classifications and a number of images belonging to each classification.

'449 patent, col. 18 ll. 7–35 (emphases added). Claim 27 additionally requires the classification be "able to change by a direction of a user." *Id.* at ll. 40–42.

There are three limitations at issue on appeal. First, Apple contends that no reasonable jury could have found that the Apple products met the "compressor" and "decompressor" limitations of the claim because these limitations require components that compress or decompress both still images and videos, and its products use separate and distinct components to compress and decompress still images and videos. But, as the district court found, Samsung presented testimony that "identified a single Apple design chip with the circuitry that performs both compressing methods." J.A. 118. Even though this chip may contain separate components, a jury may still have reasonably concluded that the chip (not the individual

components of that chip) performs the "compressing" and "decompressing" steps and that the chip itself meets the "compressing" and "decompressing" limitations.

Second, Apple contends that no reasonable jury could have found that the Apple products met the "search mode" limitation because the Apple products do not display a "list," as required by the claims. The Apple products contain a "Camera Roll" which displays an array of thumbnails (small previews of the image). Samsung presented expert testimony that this "Camera Roll" was a "list" under the plain and ordinary meaning of that term in the context of the '449 patent. As the district court found, a jury could have believed this testimony and concluded that this limitation was met.

Lastly, Apple argues that its products do not have a recording circuit that "records each one of said plurality of image signals with classification data." '449 patent, col. 18 ll. 32–33. Apple argues that the Camera Roll on its products includes all photos and videos taken with the device so that there is no classification of the images. But again, Samsung presented testimony that the Apple products record images with classification data. Samsung's expert testified that, for example, the Camera Roll contains "Albums" that are created automatically as well as albums that are created by the user. A jury could have reasonably believed this expert and found that Apple's products contained "classification data."

Therefore, we affirm both the district court's denial of JMOL of non-infringement by Apple of claim 27 of the '449 patent and the judgment of infringement.

VII. Remaining Issues

Because we have reversed the district court's denial of JMOL of non-infringement of the '647 patent and obviousness of the '721 and '172 patents, Samsung's remain-

ing arguments relating to ongoing royalties and the district court's evidentiary rulings related to damages are now moot.

CONCLUSION

In conclusion, we reverse the district court's judgment of infringement of the '647 patent and the judgment of no invalidity with respect to obviousness of the '721 patent and the '172 patent. Samsung was entitled to a judgment of non-infringement of the '647 patent and a judgment of invalidity as to the '721 and '172 patents. We affirm the judgment of non-infringement of Apple's '959 patent, Apple's '414 patent, and Samsung's '239 patent and affirm the judgment of infringement of Samsung's '449 patent. In light of these holdings, we find that we need not address any of the other issues on appeal.

AFFIRMED-IN-PART, REVERSED-IN-PART

COSTS

Costs to Samsung.