

UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

SHURE, INC.,
Plaintiff,
v.
CLEARONE, INC.,
Defendant.
CLEARONE, INC.,
Counter-Plaintiff
SHURE, INC., BIAMP SYSTEMS CORP.,
and QSC, LLC
Counter-Defendants.
No. 17 C 3078
Judge Edmond E. Chang

MEMORANDUM OPINION AND ORDER
(INITIAL REDACTED PUBLIC VERSION)

This litigation concerns a set of patents on audioconferencing technology. Shure, Inc., sued its competitor ClearOne (the owner of the patents), seeking a declaratory judgment of invalidity and non-infringement of U.S. patent no. 9,635,186 (the '186 patent) and a judgment of non-infringement of U.S. patent no. 9,264,553 (the '553 patent).1 R. 1, Compl. ¶ 1.2 In response, ClearOne filed a counterclaim for infringement against Shure, and also named Biamp Systems

1The Court has subject matter jurisdiction over this case under 28 U.S.C. § 1338(a).

2Citations to the record filings are "R." followed by the docket number and, when necessary, a page or paragraph number. Many exhibits have overlapping names or numbering, so exhibits will be identified by docket number throughout to avoid confusion.

Corporation and QSC Audio Products, LLC, as counter-defendants.³ R. 28, Counterclaim. Several months later, ClearOne filed a motion for preliminary injunction against Shure in an attempt to halt Shure's alleged infringement of the '186 patent.⁴ R. 81, Mot. Prelim. Inj. Shure and ClearOne engaged in extensive discovery and filed several briefs with supporting evidence. A hearing was held on the preliminary injunction motion on February 14, 2018. R. 266, Feb. 14, 2018 Minute Entry.

After hearing arguments and reviewing the parties' evidence, the Court finds that ClearOne has not met its burden of demonstrating entitlement to the extraordinary relief of a preliminary injunction. Shure has raised a substantial question of the '186 patent's validity in light of two prior art references by Dr. Walter Kellerman. This substantial question of validity blocks the issuance of a preliminary injunction, so ClearOne's motion is denied. For the sake of completeness, however, and to speed along the litigation if there is appellate review,

³Shure moved to dismiss ClearOne's First Amended Counterclaim for infringement on the grounds that it did not contain enough well-pleaded facts to state a claim upon which relief could be granted. R. 63, Shure Mot. Dismiss; *see Bell Atlantic Corp. v. Twombly*, 550 U.S. 544 (2007); *Ashcroft v. Iqbal*, 556 U.S. 662 (2009). As discussed in an earlier hearing, that motion is denied. The Counterclaim contained more than enough facts to state a claim of infringement on theories of joint, induced, contributory, and willful infringement, especially because the counterclaim incorporated by reference a number of documents supporting those theories. *See* R. 57, Counterclaim Exhibits. Shure's motion to dismiss sought too much from *Twombly* and *Iqbal*, which require only "sufficient factual matter, accepted as true, to 'state a claim to relief that is plausible on its face.'" *Iqbal*, 556 U.S. at 678 (quoting *Twombly*, 550 U.S. at 570). The shortcomings of the motion to dismiss are highlighted by the finding that ClearOne could likely prove Shure's infringement. *See* Section III.B, *below*.

⁴Biamp and QSC are not involved in the preliminary injunction litigation (except to provide some discovery). *See* R. 107, Aug. 17, 2017 Minute Entry.

the Court will still evaluate the parties' arguments on infringement and irreparable harm.

I. Background

A. The '186 Patent

For the purposes of the preliminary injunction motion, the only patent at issue is the '186 patent (though the '553 patent still plays a role in the analysis, as will become clear). The invention claimed in the '186 patent is a method of combining two well-known audio signal processing techniques: beamforming and acoustic echo cancellation. Beamforming is a technology that combines signals from multiple microphones in a microphone array to generate combined audio signals (called "beams") that pick up sounds from a particular location. Mot. Prelim. Inj. at 5; R. 83, Schonfeld Decl. ¶ 22. The advantage of a beamforming microphone is that it can focus in on the sounds that audio-conference participants want to hear (that is, people's voices), while filtering out unwanted sounds (like background noise and paper shuffling). R. 83, Schonfeld Decl. ¶ 22; R. 82, Graham Decl. ¶ 8. Beamforming microphones are also practical: one beamforming microphone can replace ten or more tabletop or ceiling microphones. R. 82, Graham Decl. ¶ 9. Meanwhile, acoustic echo cancellation (often abbreviated in the industry as "AEC") is a technology that removes far-end echo.⁵ Without acoustic echo cancellation, near-end microphones would pick up far-end speakers' voices and transmit them back to the far-end, so that the far-end speakers would be subjected to an annoying echo of their own

⁵"Far-end" and "near-end" are simply industry terms for the two separate rooms of people participating in the audio conference.

voices. *Id.*; R. 83, Schonfeld Decl. ¶ 22. Figuring out how to combine beamforming and acoustic echo cancellation in a cost-efficient way—while still preserving audio quality—has been a longstanding challenge in the audio industry. *See, e.g.*, R. 158, Kellerman Decl. Exh. 2 (“Kellerman 2001”) (“[S]traightforward combinations of the two techniques either multiply the considerable computational cost of AEC by the number of array microphones or sacrifice algorithmic performance if the beamforming is time-varying.”); R. 83, Schonfeld Decl. ¶ 23.

The illustrative claim of the ’186 patent (Claim 7) discloses an efficient method of combining a beamforming microphone with AEC. U.S. Patent No. 9,635,186 (“186 Patent”) at Col. 19:48-20:8. The claimed method reduces AEC processing costs by providing a beamformer capable of picking up a number of audio signals, which are then combined into a smaller number of “fixed” beams. *Id.* Col. 2:3-16. AEC is then performed on only the smaller number of fixed beams. *Id.* Col. 19:65-67. Performing AEC on fixed (as opposed to adjustable) beams reduces the amount of work for the acoustic echo cancellers, which would otherwise need to constantly adjust to track the changing beams. *Id.* Col. 2:3-16. After AEC is performed, a “signal selection module” selects one or more of the echo-cancelled signals to transmit to the far end. *Id.* Col. 20:1-3. The signal selection module also uses the far-end signal as information to inhibit the change of the near-end signal selection while only the far-end signal is “active.” *Id.* Col. 20:3-8.

B. Alleged Infringement

The Shure MXA910 is a ceiling-mounted beamforming microphone array. R. 157, Cerra Decl. ¶¶ 7, 13. The MXA910 [REDACTED]. R. 169, Cerra Decl. ¶ 20 (sealed). It can, however, be used in combination with a category of devices called digital signal processors (DSPs for short). *Id.* Digital signal processors perform a variety of functions, including acoustic echo cancellation and mixing or gating audio signals. *Id.* Shure produces a DSP device called the Shure P300 Intellimix. *Id.* ¶ 22. The two other companies named as counter-defendants, QSC and Biamp, also sell DSP devices. Biamp's line of DSP devices is called the Tesira/TesiraFORTÉ; QSC's is known as the Q-SYS. Mot. Prelim. Inj. at 8-9. ClearOne argues that Shure's MXA910 beamforming microphone, when paired with a digital signal processors produced by Shure, QSC, and Biamp, practices all the elements of Claim 7 of the '186 patent.

II. Preliminary Injunction Standard

The Patent Act authorizes courts to grant injunctions to prevent violations of patent rights. 35 U.S.C. § 283. To obtain a preliminary injunction, the moving party must show: (1) a reasonable likelihood of success on the merits; (2) irreparable harm if an injunction is not granted; (3) a balance of hardships tipping in its favor; and (4) the injunction's favorable impact on the public interest. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1350 (Fed. Cir. 2001). On likelihood of success, ClearOne must show that (1) it can likely prove that Shure is infringing the '186 patent and (2) that the '186 patent will likely withstand Shure's challenge to its

validity. See *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1364 (Fed. Cir. 1997). A preliminary injunction is an extraordinary remedy never awarded as of right. *Wind Tower Trade Coalition v. United States*, 741 F.3d 89, 95 (Fed. Cir. 2014) (citing *Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7, 24 (2008)).

III. Analysis

A. Claim Construction

Before digging into the arguments on infringement and invalidity, the Court must decide what invention the '186 patent actually claims. Claim construction requires that the Court determine how a person of ordinary skill in the art would understand the claim terms. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). The claim's own language is the starting point, but "[c]laims must be read in view of the specification, of which they are a part." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995). Prosecution history is also "of primary significance" in determining how a claim should be understood. *Id.* at 980. Lastly, extrinsic evidence—that is, expert testimony or any other evidence outside of the patent and prosecution history—can also be considered, but carries less weight than intrinsic evidence. *Id.* at 980-982. Extrinsic evidence is mostly useful for helping the Court to understand the relevant art and to explain how the invention works. *Phillips*, 415 F.3d at 1318-19.

At the preliminary injunction stage, the parties focus on the meaning of three terms in Claim 7: (1) "fixed beam"; (2) "select with a signal selection module"; and (3) "inhibit said signal selection module from changing the selection of the combined

echo cancelled signals while only the far end signal is active.” *See* ’186 Patent Col. 19:48-Col. 20:8. The Court will take each in turn.

1. Fixed Beams

The core insight behind the ’186 patent is that processing costs can be lowered by performing acoustic echo cancellation on a limited number of “fixed” beams, instead of performing AEC on every incoming microphone signal, or on moving beams. *See* ’186 Patent Col. 2:3-16. Shure and ClearOne disagree on the meaning of the crucial term “fixed beam.” Shure argues that a fixed beam is a “beam that has non-adjustable filter coefficients.” R. 186, Joint Claim Construction Chart. To Shure’s way of thinking, this means that a fixed beam is a beam that can *never* be adjusted.⁶ ClearOne, on the other hand, argues that “fixed beams” are “beam[s] defined by parameters determined before a conference,” or, alternatively, “beams having non-adjustable filter coefficients during use.” *Id.*; R. 195, ClearOne Reply at 3. In other words, ClearOne thinks that the claim refers to beams that are fixed while the conferencing system is in *use* (that is, when people are talking), but which might be capable of being adjusted at other times (before a conference, for example).

Viewed from the perspective of a skilled artisan, ClearOne’s construction of “fixed beam” makes more sense than Shure’s, especially in light of the purpose of the patented method. The point of using fixed beams is to reduce the workload for the echo cancellers. With adjustable beams, the echo cancellers would need to

⁶Filter coefficients are used to change the look direction of a beam. R. 174, Turner Decl. Exh. 2., Graham Dep. Tr. 103:4-20 (sealed); R. 196, Schonfeld Supp. Decl. ¶¶ 8-9.

constantly adjust to changes in the beamformer, resulting in high processing costs for the AEC devices, which in turn would limit the number of microphones in the microphone array. *See* '186 Patent, Col. 1:60-Col. 2:15; *see also* R. 158, Kellerman 2001 at 297. But echo cancellation is only needed while the audioconferencing system is in use, so adjusting the beams before or after a conference makes no difference to the AEC processing costs.

The '186 patent's specification also supports ClearOne's reading. The specification explicitly defines "fixed beam" as "a beam that is defined with pre-computed parameters rather than being adaptively steered to look in different directions in real time. The pre-computed parameters are configured *prior to use* of the beamforming microphone array *in a conference*." '186 Patent, Col. 8:50-54 (emphasis added). So the specification says outright that fixed beams are beams with parameters defined "prior to use" in conference, which implies that the beams could be adjusted *before* the conference and yet still be considered a "fixed" beam. Some of the specification's suggested embodiments confirm this reading. For example, the specification says that the beamforming microphone can be installed in different positions in the room, and that the beam pick-up pattern would be changed depending on the orientation of the conferencing apparatus. '186 Patent Co. 7:44-45. These beams would not be considered "fixed" under Shure's definition, because they could be adjusted before or after a conference, which confirms that Shure's proposed construction is wrong.

To refute the specification's definition, Shure relies heavily on prosecution history. Specifically, Shure points out that ClearOne added the "fixed beam" limitation to distinguish its invention from a prior art publication authored by Matti Kajala, U.S. Pub. No. 2004/0013033 ("Kajala").⁷ R. 193, Shure Resp. Br. 8-9. As explained during the preliminary-injunction hearing, however, Shure's prosecution history argument does not hold water. *See* R. 269, Hearing Tr. 51:15-19 (sealed). The Kajala publication actually promoted the *opposite* of a fixed beam. Kajala wrote that the "main advantage" of his invention is that "the filter coefficients of the beamformer are not fixed but adjustable.... In particular the adjustable filter coefficients enable the system to continuously and smoothly steer the look direction of the beamformer." Kajala ¶ 34. So ClearOne did not actually *disclaim* beams fixed during conference in its communications with the patent examiner; instead, ClearOne merely explained that *Kajala* contemplated beams that adjusted constantly during use, in sharp contrast to ClearOne's fixed (non-moving) beams. *See* R. 163, Turner Decl. Exh. 12 at 9.⁸ This attempt to distinguish Kajala's continuously adjusting beams thus does not foreclose ClearOne's definition of "fixed beams" as beams that have non-adjustable filter coefficients *during use*. All

⁷This so-called disclaimer was actually made during the application for the '186 patent's grandparent application, Application No. 13/493,921. ClearOne assumes, for the purposes of the preliminary injunction litigation, that a disclaimer in the prosecution history of the grandparent application is binding on the child patent. ClearOne Reply at 4 n.8.

⁸Exhibit 12 to the Turner Declaration appears to have been misfiled in CM/ECF. The link on the docket designated as Turner Exhibit 12 actually links to Turner Exhibit 10. *See* R. 163-12. The Court was able to use the paper copy of the exhibit submitted by Shure to write this opinion, but Shure should file a corrected version of this docket entry as soon as possible.

in all, ClearOne has the better of the argument on the construction of fixed beams, so the Court will use ClearOne's definition of fixed beams: beams defined by parameters determined before a conference.

2. Select with a Signal Selection Module

The next disputed part of Claim 7 is the phrase "select with a signal selection module one or more of the combined echo cancelled signals for transmission to the far end." Shure argues that both "signal selection module" and "select" are in need of construction, while ClearOne insists that the terms are clear on their face. *See* R. 186, Joint Claim Construction Chart. Here again, ClearOne has the better of the arguments.

a. Signal Selection Module

Shure asserts that the term "signal selection module" is indefinite, or, alternatively, that it is a means-plus-function claim and thus triggers 35 U.S.C. § 112(f). Section 112(f) applies when a claim limitation is stated in a way that identifies the means and function of the limitation, but does not identify "structure, material, or acts in support thereof." 35 U.S.C. § 112(f). If Section 112(f) applies, then the claim must be construed to cover the structure disclosed in the specification and equivalents. *Id.* There is a weak presumption that if a limitation does not use the word "means," then the claim is not subject to Section 112(f). *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015). The ultimate question is "whether the words of the claim are understood by persons of

ordinary skill in the art to have a sufficiently definite meaning as the name for structure.” *Id.*

In Shure’s view, the phrase “signal selection module” is an empty term. Shure points out that “module” is so generic that it is really a substitute for the word “means.” *See* Shure. Resp. Br. 10-11; *Williamson*, 792 F.3d at 1350. Some of Shure’s experts testified that the term “signal selection module” does not have defined meaning for persons of skill in the art. Dr. Wilfrid LeBlanc, for example, opined that he has never heard the term “signal selection module” used in the audio signal processing field. R. 160, LeBlanc Decl. ¶ 43. One of the inventors named on the ’186 patent even testified that he has “no idea” what a signal selection module is. R. 163, Turner Decl. Exh. 7, Thurston Dep. Tr. 29:12-15.

But even if the term “signal selection module” is unclear when viewed in isolation, it is clear enough in context to avoid a means-plus-function construction. “Structure may [] be provided by describing the claim limitation’s operation, such as its input, output, or connections,” considered in the context of the invention. *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014), *overruled on other grounds*, *Williamson*, 792 F.3d at 1349. Structure may also be provided by considering the term in the context of the specification and prosecution history. *Id.* Here, Claim 7 and the specification provide enough information about the “signal selection module” to make its structure apparent to a skilled artisan. According to the claim, the signal selection module “select[s]... one or more of the combined echo cancelled signals for transmission to the far end” and “uses the far-end signal... to

inhibit... changing the selection of the combined echo cancelled signals.” ’186 Patent, Col. 20:1-7. From this description, a skilled artisan would understand that the signal selection module must be a device that can select one or more desired signals from multiple incoming signals, and transmit the selected signals to the far end. Those devices are well known in the art. *See, e.g.*, R. 196, Schonfeld Decl. ¶ 13; R. 196, Loy Decl. ¶¶ 29-30; *see also* R. 160, LeBlanc Decl. ¶ 44 (“A multiplexer... is something a POSITA would understand and recognize.”).

The specification provides even more information about the structure of the signal selection module. In the description of one of the disclosed embodiments of the invention, the specification gives an example of a signal selection module, and says that the signal selection module is a “selector.” Specifically, a “signal selection module (*selector*) 901, *such as a multiplexer...* selects one or more of the M combined echo cancelled signals.” Col. 12:43-50 (emphasis added). The description of the module as a “selector” and the example of a “multiplexer” provide yet more direction for the skilled artisan, affirming that the signal selection module is a selector, or a category of devices that select signals, a number of which are recognized in the art. *See* R. 160, LeBlanc Decl. ¶¶ 44, 57 (describing multiplexers and automixers); *see also Apple v. Motorola*, 757 F.3d at 1300 (“The limitation need not connote a single, specific structure; rather, it may describe a class of structures.”); *Personalized Media Commc’ns, LLC v. Int’l Trade Comm’n*, 161 F.3d 696, 705 (Fed. Cir. 1998) (“Even though the term ‘detector’ does not specifically evoke a particular structure, it does convey to one knowledgeable in the art a variety of structures

known as ‘detectors.’”). The term “signal selection module” is neither indefinite nor a trigger for § 112(f).

b. Select

Shure’s next argument is labeled as a non-infringement argument, but it actually depends on the construction of the word “select” in Claim 7, so the Court will address it here. Shure argues that “selecting” signals implies choosing some signals to the *exclusion* of others, as opposed to *combining* all the signals into one blended signal. Shure Resp. Br. 24-25; R. 160, LeBlanc Decl. ¶ 57 (“Selection is, by definition, an exclusionary process.”). This argument is rejected. It is true that some devices, such as multiplexers, select signals by switching off the undesired signals and transmitting only the desired signals. R. 160, LeBlanc Decl. ¶¶ 57-58. But other devices select signals by attenuation—that is, they attenuate the undesired signals and amplify the desired signals to form one combined signal. *See* R. 160, LeBlanc Decl. ¶ 58. Selection by attenuation is an accepted method of signal selection in the audio industry, known to skilled artisans, as even Shure’s expert agrees. R. 244, Patel Decl. Exh. 18, Kellerman Dep. Tr. 131:19-132:10 (“Q: Is selection by attenuation something that a person of ordinary skill in the art at the time of the invention would have known? / A: Yes.”); *see also* R. 163, Turner Exh. 6, Schonfeld Dep. at 87:15-88:4. Even the language Shure uses to describe how its own automixer combines signals—calling unattenuated signals “gated on,” and attenuated signals “gated off”—confirms that attenuation is widely understood as a form of selection. *See* R. 157, Cerra Decl. ¶ 10. Because selection by attenuation is a

recognized method of signal selection in the art, there is no reason to narrow the construction of “select” to exclude selection by attenuation.⁹

2. Inhibit While the Far End is Active

Last up of the claim construction issues is the final step of the claimed method: the signal selection module “uses the far end signal as information to inhibit said signal selection module from changing the selection of the combined echo cancelled signals while only the far end signal is active.” ’186 Patent Col. 20:4-8. On first glance, this language is opaque. ClearOne argues that this limitation refers to “last mic on” or “last mic hold,” an old and well-known technique in the audioconferencing industry. *See* Mot. Prelim. Inj. at 13 n.10, 19; R. 169, Cerra Decl. ¶ 11. The last mic on feature leaves the last active near-end signal on while far-end speakers are talking. The goal of last mic on is to transmit some near-end background noise to the far end to reassure far-end speakers that the call has not dropped. *See* R. 157, Cerra Decl. ¶ 11.

Shure and ClearOne go back and forth over the exact nuances of the words “inhibit” and “while,” and ask the Court to interpret those terms.¹⁰ *See* Shure Resp.

⁹Shure’s expert Dr. LeBlanc argues that attenuation is “functionally distinct” from selection by exclusion, but does not explain *how* they differ in practice. R. 160, LeBlanc Decl. ¶ 58. From a technological perspective, the difference between attenuation and selection might be one of degree rather than kind. *See, e.g.*, R. 244, Patel Decl. Exh. 18, Kellerman Dep. Tr. 132:2-5 (“And if my voting stage multiplies all incoming signals by zero—which is attenuation by infinitely many dBs—and just retains one, then it’s a selector.”). At the preliminary injunction hearing, Shure’s counsel argued that accepting the idea of selection by attenuation would start a slide down a slippery slope: who is to say how much a signal must be attenuated in or amplified in order to “select” it? *See* R. 269, Hearing Tr. 121:3-25 (sealed). But the slippery slope argument cuts the other way as well: why is attenuating some signals to near-zero any different than excluding them? The non-attenuated signal is still the “selected” one, especially if whatever is receiving the signals just disregards the attenuated signal.

Br. at 14-15; ClearOne Reply at 9-10. But it is not at all clear *why* the Court must do so. The parties' differences of opinion on "inhibit" and "while" do not seem to have any impact on whether the accused devices infringe (at least as disputed at this stage of the case), or whether the '186 patent is valid. This means that the interpretation of those terms does not affect ClearOne's likelihood of success on the merits one way or the other. Indeed, when the Court expressed confusion at the hearing about the relevance of the "inhibit ... while" limitation, the parties were not able to satisfactorily explain the dispute's importance for the preliminary injunction decision.¹¹ *See* R. 269, Hearing Tr. 36:18-37:7; 60:21-62:14 (sealed). In the interest of avoiding advisory pronouncements on what these claim terms might mean, the Court declines to interpret "inhibit" or "while."

B. Infringement

With claim construction on the books, the next question is infringement. A method patent is not infringed unless every step of the patented claim is carried out. *Limelight Networks, Inc. v. Akamai Techs., Inc.*, 134 S. Ct. 2111, 2117 (2014). In order to show entitlement to a preliminary injunction, ClearOne must

¹⁰Shure also asserts again that the term "signal selection module" fails to disclose structure, but, as explained above, the Court disagrees.

¹¹Later in the hearing, Shure's counsel explained that ClearOne's construction of the word "while" could mean that the '186 patent was anticipated by Kellerman's 1997 article. R. 269, Hearing Tr. 136:17-24 (sealed). As discussed below, however, the presence or absence of the last mic on feature in the Kellerman references does not make a difference to the ultimate question of validity. The last mic on feature was so well known and widely used that it would be obvious to combine it with the kind of device proposed by Kellerman. *See* R. 157, Cerra Decl. ¶ 11 ("[E]ssentially everyone in the industry has used "Last Mic On" for many years."). So the only question is whether Kellerman disclosed the other limitations in the '186 patent. If he did, then the patent is invalid, whether or not Kellerman disclosed last mic on.

demonstrate that it will likely be able to prove that Shure is infringing the '186 patent. *Amazon.com*, 239 F.3d at 1350. Shure argues that ClearOne cannot do so because the devices ClearOne accuses of infringing the '186 patent—the MXA910 and the three accused digital signal processors—do not perform all the steps of Claim 7. ClearOne (of course) contends that they do. Shure also takes issue with ClearOne's claims of joint and induced infringement, levying different arguments against each theory.

1. Whether the Accused Devices Practice the Patented Method

a. Fixed Beams

Shure's first non-infringement argument is that its MXA910 microphone does not have "fixed" beams, and so does not infringe the '186 patent. Shure Resp. Br. at 23-24. This argument depends heavily on Shure's interpretation of "fixed" beams as beams that cannot be adjusted at any time. Unfortunately for Shure, as discussed above, the correct interpretation of the "fixed beams" is beams fixed during a conference. On that definition, the Shure device practices the limitation. Although the Shure beams are *capable* of being adjusted during conference—that is, capable of being used in a non-infringing way—it is clear that most of the time, the beams are fixed as defined by the '186 patent. Yes, the Shure microphone does have an auto-adjust feature that adjusts beam patterns during use, *see* R. 160, LeBlanc Decl. ¶ 56, but the auto-adjust feature is not enabled by default; users must enable it manually. R. 196, Schonfeld Supp. Decl. ¶ 35 (sealed). In theory, users could manually adjust the beams during conference, but Shure's Vice President of

Engineering for Conferencing and Audio Processing, David Cerra, testified that he has never seen anyone do so, even though he has observed the MXA910 in action many times. R. 199, Giza Decl. Exh. 3, Cerra Dep. at 144:17-23 (sealed). Indeed, Cerra was not even sure how users would go about adjusting the beams during conference. *Id.* at 145:13-25 (sealed). If Shure’s Vice President of Engineering is unsure how beams could be adjusted during use, then it is very unlikely that Shure’s customers are adjusting the beams. This means that, in practical terms, the beams of the Shure device usually end up being “fixed” as described in the 186 patent.

b. Signal Selection

Shure’s next argument is that the accused digital signal processor devices do not “select” signals in the way envisioned by the ’186 patent. The first version of this argument is that the accused devices have automixers (which *combine* all signals for transmission to the far end) as opposed to multiplexers (which *exclude* some signals before transmission). *See* Shure Resp. Br. at 24-25. But the Court has already rejected the argument that selection necessarily implies exclusion. *See* Section III.A.2.b, *above*. The accused devices’ automixers *do* “select” signals: they select by attenuation. *See* R. 157, Cerra Decl. ¶ 10. The argument that the accused devices do not select signals fails.

The other version of Shure’s signal selection argument is that the accused devices do not infringe because they do not select signals based on the signal’s direction of arrival. *See* Shure Resp. Br. 25-26. Claim 7, however, does not specify

that the signal selection module must use direction of arrival to select; only that it must (in some way) select signals. *See* '186 Patent, Col. 20:1-3. If Shure had prevailed on its means-plus-function claim construction argument, then it might have been able to establish that the only structures disclosed in the specification use direction of arrival to select signals. *See, e.g.,* '186 Patent at Col. 12:43-50, Col. 13:30-35. But, as it stands, there is no reason to think that Claim 7 requires the signal selection module to use direction of arrival. Indeed, the principles of claim construction point the other direction: Claim 7 does *not* mention direction of arrival, yet—in contrast—one of its dependent claims, Claim 12, does. '186 Patent, Col. 20:26-30 (“The method of claim 7 *wherein said processor is further configured to perform a direction of arrival determination... to select one of the plurality of combined echo cancelled signals.*”) (emphasis added). The explicit inclusion of a direction-of-arrival determination in one of Claim 7’s dependent claims suggests that Claim 7 itself is not limited to signal selection via direction-of-arrival determination. *See Eli Lilly and Co. v. Teva Paternal Medicines, Inc.*, 845 F.3d 1357, 1371 (Fed. Cir. 2017) (The doctrine of claim differentiation [] presumes that dependent claims are of narrower scope than the independent claims from which they depend.”) (cleaned up).¹² So the second version of the “selection” argument also does not help Shure.

¹²This opinion uses (cleaned up) to indicate that internal quotation marks, alterations, and citations have been omitted from quotations. *See, e.g., United States v. Reyes*, 866 F.3d 316, 321 (5th Cir. 2017).

c. Use of the Far-End Signal to Inhibit

Shure’s last non-infringement argument is that the accused devices do not use the far-end signal as information to inhibit changing of the signal selection. The gist of this argument seems to be that the accused digital signal processors cannot “use” the far-end signal because they do not receive it.¹³ But even if the accused devices do not *directly* receive the far-end signal, they could still *use* it as information to inhibit a change in signal selection. In fact, the accused devices *must* use the far-end signal as information to inhibit changes in signal selection. The idea of the “last mic on” feature is that when only far-end talkers are active, the near-end processor transmits only the last active near-end signal. *See* R. 157, Cerra Dec. ¶ 11. The far-end signal *has* to be used as information to make this work. If the selection module did not somehow use the far-end signal, then the near-end microphones would pick up on the far-end signal as if it were a near-end talker. This would result in the near-end mic selector sending the far-end talkers’ own signal back to them—changing the signal selection during the far-end talk period. *See* Shure Resp. Br. at 38; R. 157, Cerra Decl. ¶¶ 11, 30 (explaining that the Shure automixer gates on any signal that exceeds an assigned threshold); R. 163, *see also* Turner Decl. Exh. 2, Graham Dep. 37:22-38:9 (explaining that the echo canceller

¹³ClearOne disputes this, arguing that at least the Shure P300 receives the far-end signal. The basis for this argument is a “signal flow diagram” depicting the setup of the Shure P300 digital signal processor platform. This diagram appears to show the far-end signal going into the Shure automixer. *See* R. 204, Giza Decl. Exh. 111, LeBlanc Dep. 247:2-7 (sealed). At the hearing, Shure’s counsel disagreed that the P300 uses the far-end signal. R. 269, Hearing Tr. 124:1-2 (sealed). It is not obvious how the signal flow diagram should be read; but, as explained in the text, the Court’s conclusion on infringement of this step does not depend on the automixer directly receiving the far-end signal.

removes residual echo, which prevents other microphones from gating on during far-end activity). So, for last mic on to work properly, the selector must either be able to recognize the far-end signal as the far-end signal (to avoid treating it as a near-end talker), filter out the far-end signal to prevent it from being transmitted, or recognize that only the far-end is active and halt the signal selection process accordingly. This means that last mic on can only work if the selector *uses* the far-end signal as a reference. Both sides agree that the accused devices have the last mic on feature,¹⁴ so the accused devices practice this part of the claimed method.

2. Joint Infringement

ClearOne does not claim that any one of Shure's microphones on its own practices all steps of the claimed method. Instead, it argues that Shure's MXA910 microphone infringes when it is used in combination with the digital signal processors produced by Biamp, QSC, and Shure itself. It is worth noting that Shure controls both the MXA910 and the P300 (Shure's digital signal processor), so Shure could infringe the '186 patent even without involving Biamp or QSC. But if Shure and Biamp or Shure and QSC are jointly infringing, the scope of the infringement is much larger, which is relevant to the magnitude of harm and the reach of the potential injunction, so the Court will address the joint infringement theory of liability.

¹⁴See R. 199, Giza Decl. Exh. 3, Cerra Tr. 134:22-24 (last mic on is enabled by default in the P300 Intellimix); R. 200, Giza Decl. Exh. 31, Rosenboom Tr. 166:8-10 (last mic on is enabled by default in the Q-SYS); R. 200, Giza Decl. Exh. 32, Snook Tr. 160:9-22 (Biamp recommends using last mic on).

When more than one actor performs the steps of a patented method, the accused infringer is liable only if (1) it directs or controls the others' performance of the method steps or (2) if the actors have formed a joint enterprise. *Akamai Techs., Inc. v. Limelight Networks, Inc.*, 797 F.3d. 1020, 1022 (Fed. Cir. 2015). ClearOne does not argue that Shure directed or controlled Biamp or QSC's performance of any method steps, so the only question is whether Shure formed a joint enterprise with Biamp or QSC. In *Akamai Technologies, Inc. v. Limelight Networks, Inc.*, the Federal Circuit adopted the definition of joint enterprise set out in the Second Restatement of Torts. 797 F.3d. at 1023. A joint enterprise requires proof of four elements: (1) an agreement, express or implied, among the members of the group; (2) a common purpose to be carried out by the group; (3) a community of pecuniary interest in that purpose; and (4) an equal right to a voice in the direction of the enterprise, which gives an equal right of control. *Id.* (citing Restatement (Second) of Torts § 491 cmt.c). Under the Restatement approach, a joint enterprise need not be a formal, contractual partnership; looser arrangements can suffice. *See* Restatement (Second) of Torts § 491 cmt.b ("A joint enterprise includes a partnership, but it also includes less formal arrangements for cooperation, for a more limited period of time and a more limited purpose.").

ClearOne will likely be able to prove its joint-enterprise theory. The evidence on the record shows that Shure coordinated extensively with both Biamp and QSC to make the MXA910 more compatible with Biamp's and QSC's digital signal processors. For example, Shure worked with both Biamp and QSC to create

software and plugins that would allow the MXA910 to pair with Biamp and QSC's products. *See* R. 199, Giza Decl. Exh. 12, Wiggins Dep. 92:21-94:2 (sealed); R. 200, Giza Decl. Exh. 31, Barbour Dep. 60:2-61:22 (sealed); R. 204, Giza Decl. Exhs. 124-129 (sealed). The goal of these efforts was to make it easier for customers to use the devices together. *See, e.g.,* R. 199, Giza Decl. Exh. 12, Wiggins Dep. 94:3-95:8 (sealed); R. 200, Giza Decl. Exh. 32, Snook Dep. 210:24-211:15 (sealed); R. 204, Giza Decl. Exh. 129 (sealed). Shure also worked with both Biamp and QSC to inform customers about their products' interoperability. These efforts included press releases touting the parties' "partnership[s]" and "integrated compatibility," as well as the creation of instructional materials to inform customers about how to integrate the devices. *See* R. 200, Giza Decl. Exhs. 20-25 (sealed); R. 88, Giza Decl. Exhs. A-F, Q.

Interoperability was good for business all around. It was in QSC and Biamp's interest to make their products compatible with as many different devices as possible. Customers preferred and demanded interoperability, and meeting customer demands meant more sales. *See* R. 200, Giza Decl. Exh. 31, Barbour Dep. 53:3-54:20 (sealed); Exh. 32, Snook Dep. 244:6-16 (sealed). Shure had an equally powerful financial interest in promoting interoperability. The market for installed audioconferencing is facilitated by system integrators, who liaise between customers and companies like Shure. R. 89, Waadevig Decl. at 17-18. Most integrators use either Biamp or QSC products, but not both. R. 199, Giza Decl. Exh. 12, Wiggins Dep. 95:24-96:10 (sealed). In order to maximize sales, it was in Shure's

best interest to make the MXA910 compatible with both QSC and Biamp’s signal processing platforms. *Id.* at 95:13-96:17; R. 203, Giza Decl. Exh. 81 (sealed). Shure, Biamp, and QSC responded to these financial incentives by making their products easier to combine.

All these actions satisfy the first three elements of the joint-enterprise test. Shure had informal agreements with both Biamp and QSC to further a common purpose of increasing interoperability and marketing the products’ compatibility. Shure, Biamp, and QSC entered into these agreements because they wanted to increase sales, which establishes the pecuniary-interest element. As for the final element—equal right to control the enterprise—it is met by the fact that the parties had to work together to undertake the joint project of promoting interoperability. Contrary to Shure’s assertions, ClearOne does *not* need to establish that Shure exercised control over QSC or Biamp; it need only show that Shure and Biamp or QSC both controlled their *shared* enterprise. *See* Restatement (Second) of Torts § 491 cmt.c (“an equal right to a voice in the direction *of the enterprise*”) (emphasis added). It is clear from the communications between Shure, Biamp, and QSC that each had the ability to direct and control the joint efforts to promote product integration and marketing. Shure and QSC employees worked together on the language of a joint press release announcing their partnership. *See* R. 200, Giza Decl. Exhs. 20-25 (sealed). Emails between marketing staff show that each party was exercising control over the joint press releases, including providing feedback and edits to the draft documents. *See* R. 200, Giza Decl. Exh. 22, 24 (sealed). Each

party also had control over the decision whether to make their products compatible, and could have opted out of the compatibility efforts at any time. *See* R. 200, Giza Decl. Exh. 32, Snook Dep. 237:21-238:13 (sealed); Exh. 31, Barbour Dep. 43:19-24 (sealed). The parties' interactions made it clear that "all [had] a voice in directing the conduct of the enterprise." *See* Restatement (Second) of Torts §491 cmt.b. So, on this record, all the elements of joint enterprise have been established.¹⁵

C. Validity

Next up is the question of the '186 patent's validity. This is a crucial question, because if Shure can demonstrate a "substantial question" of the patent's validity, then the preliminary injunction cannot issue. *Amazon.com v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1350-51 (Fed. Cir. 2001). A substantial question exists if the challenger raises an invalidity defense that the patentee cannot prove lacks substantial merit. *Id.* (citing *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F.3d 1361, 1364 (Fed. Cir. 1997)). The Court will address each of Shure's major invalidity arguments.¹⁶

¹⁵ClearOne also argues that Shure (again, along with QSC or Biamp) has induced system integrators and end users to infringe. Mot. Prelim. Inj. at 17-20. It is not necessary to address this argument in light of the Court's holding on joint infringement. The harm from Shure's joint-enterprise infringement would be enough to justify issuing an injunction if all other requirements were met, *see* Section III.D, *below*, so the outcome on induced infringement would not impact the overall result.

¹⁶ClearOne argues that Shure did not disclose its invalidity theories based on the ClearOne BMA, the ClearOne XAP 800, Kellerman 2001, or Kajala in its initial invalidity contentions as required by Local Patent Rule 2.3. ClearOne Reply at 30 n.39. But Shure *did* disclose Kellerman 2001, *see* R. 205, Giza Decl. Exh. 148, Shure's 2.3 Contentions at 5-8, Exh. B at 26-50 (sealed). It makes sense that Shure's invalidity contentions would evolve as discovery progressed and Shure learned more about ClearOne's invention and legal theories. The Local Patent Rules do allow (and even expect) parties to amend and update their contentions. *See* Local Patent Rules 3.1.-3.2 Shure updated its invalidity contentions

1. The ClearOne BMA and Converge Pro

ClearOne launched its beamforming microphone, the BMA, in 2012. In combination with the ClearOne ConvergePro, a digital signal processor, the BMA practices the patented method. *See* Mot. Prelim. Inj. 8-9; R. 56, First Am. Counterclaim ¶¶ 34-35. The '186 patent application was not filed until 2016. Shure argues that ClearOne's early sales of the patented technology render the '186 patent invalid. *See* 35 U.S.C. § 102(a) (no entitlement to a patent if the invention was "in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention"); Shure Resp. Br. at 29-30. ClearOne responds that the elements of the '186 patent were disclosed in earlier-filed patent applications in the same family of patents, so the pre-2016 sales do not invalidate the '186 patent. ClearOne Reply at 30-31.

The Patent Act gives a patent the benefit of an earlier-filed application if, among other things,¹⁷ the earlier-filed application disclosed the invention. *See* 35 U.S.C. § 120. In this case, at least one of the prior applications identified by ClearOne discloses the claimed invention. Specifically, all elements of Claim 7 of the '186 patent were described in provisional patent application number 61/495,968 (the '968 application). *See* R. 194, Loy Decl. ¶ 38. Shure concedes that the '968 application discloses most of the elements of the invention, but argues that it lacks the "last mic on" limitation (requiring the signal selection module to limit change of

accordingly, *see* R. 244, Patel Decl. Exh. 4, Shure's Amended 2.3 Contentions at 4-6, so there is no reason to exclude these theories for noncompliance with the Local Patent Rules.

¹⁷There are other requirements for priority, but none are relevant here because Shure does not dispute that they are met. *See* 35 U.S.C. § 120.

selection while the far end is active). But that is wrong: the '968 application states that “The ‘RX ONLY’ state is used as the activity of the far-end audio. To further improve the direction-of-arrival activity, the SRP-PHAT is calculated and the DOA is updated only if the local activity is present at least a few frames of audio at a stretch; otherwise the old value of the DOA is used for processing.” ’968 Application, App’x at 13. Stripped of the technical jargon, this means that, when the far-end audio is active, signal selection occurs only if there is significant near-end activity; otherwise the old signal is transmitted to the far end. *See* R. 194, Loy Decl. ¶ 44. In even simpler terms, it discloses inhibiting a change of signal selection while only the far end is active. So Shure’s priority argument fails, and the ’186 patent is not invalid based on ClearOne’s prior sales.

2. The ClearOne XAP 800

Under 35 U.S.C. § 103, patents should not be granted if the claimed invention would have been obvious before the filing date to a person of ordinary skill in the art. The framework for evaluating obviousness was set forth by the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966), and *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Factors to be considered include the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the art; as well as secondary considerations like commercial success, long-felt need, and the failure of others to arrive at the invention. *Graham*, 383 U.S. at 17-18.

Shure argues that another of ClearOne's own microphones, the XAP 800, renders the method of the '186 patent obvious. The XAP 800 is a digital signal processor. This processor has the last mic on feature, performs echo cancellation on individual audio signals, and has a signal selection device (a gating automixer). *See* R. 160, LeBlanc Decl. Exh. 7, XAP 800 Installation & Operation Manual at 1, 45; R. 174, Turner Decl. Exh. 2, Graham Dep. Tr. 50:5-14 (sealed). Shure argues that the claimed invention was a predictable variation in light of the XAP 800, because all the invention does is add a beamformer to the XAP 800. *See* Shure Resp. Br. 31-33.

This argument misses the mark. The XAP 800 had eight individual microphones, and one acoustic echo canceller for each microphone signal. R. 163, Turner Decl. Exh. 7, Thurston Dep. Tr. 84:4-15. The key insight of the '186 patent, on the other hand, is to combine the microphone signals from the beamformer into a smaller number of fixed beams, and then perform AEC on the fixed beams. *See* '186 Patent Col. 19:58-67. The point is to save on AEC processing costs while still allowing for a large number of microphones. *See* '186 Patent Col. 1:60-Col 2:9. The XAP 800, on the other hand, suffered from the limitations of the pre-'186 art: echo cancellation had to be performed on each microphone signal, so the number of microphones was limited. So the XAP 800 does not itself render the '186 patent obvious.

3. Kellerman 2001

Shure's most serious invalidity argument is that the '186 patent is obvious in light of a 2001 book chapter published by Dr. Walter Kellerman, entitled "Acoustic

Echo Cancellation for Beamforming Microphone Arrays.” (To avoid this mouthful of a title, call it “Kellerman 2001”). *See* R. 158, Kellerman Decl. Exh. 2 (“Kellerman 2001”). Kellerman’s 2001 book chapter was at the heart of a recent opinion by the Patent Trial and Appeal Board, which initiated *inter partes* review of the ’553 patent (a sister patent to the ’186 patent). After considering Shure and ClearOne’s arguments on validity—which appear to have been similar to their arguments in this case—the PTAB held that there was a reasonable likelihood that Shure will prevail on its argument that the illustrative claim of the ’553 patent is obvious in light of Kellerman 2001. *See* R. 244, Patel Exh. 35, PTAB Opinion, Case No. IPR2017-01785 at 11-14. The ’553 patent’s claims are very similar to the ’186 patent’s claims,¹⁸ so the PTAB’s opinion on the ’553 patent is persuasive authority in the Court’s analysis of the ’186 patent’s validity. It is true, as ClearOne points out, that the PTAB opinion is not *binding* on this Court. But at this stage, the Court agrees that Kellerman 2001 is similar enough to the ’186 patent to raise a substantial question of the patent’s validity.

Kellerman 2001 proposes a method for combining acoustic echo cancellation and beamforming. R. 158, Kellerman 2001 at 281.¹⁹ Kellerman begins by noting the challenges of combining AEC and beamforming—the same problems the ’186 patent tries to solve—and proposes a fix: “decompose[]” the beamformer “into a time-invariant and a time-varying part in the sequel, with AEC acting only on the output of the time-invariant part.” R. 158, Kellerman 2001 at 297. Shure argues that this is

¹⁸Claim 1 of the ’553 patent has all the same elements as Claim 7 of the ’186 patent, except for the last mic on limitation.

¹⁹For ease of reference, the Court will use the textbook’s own page numbers.

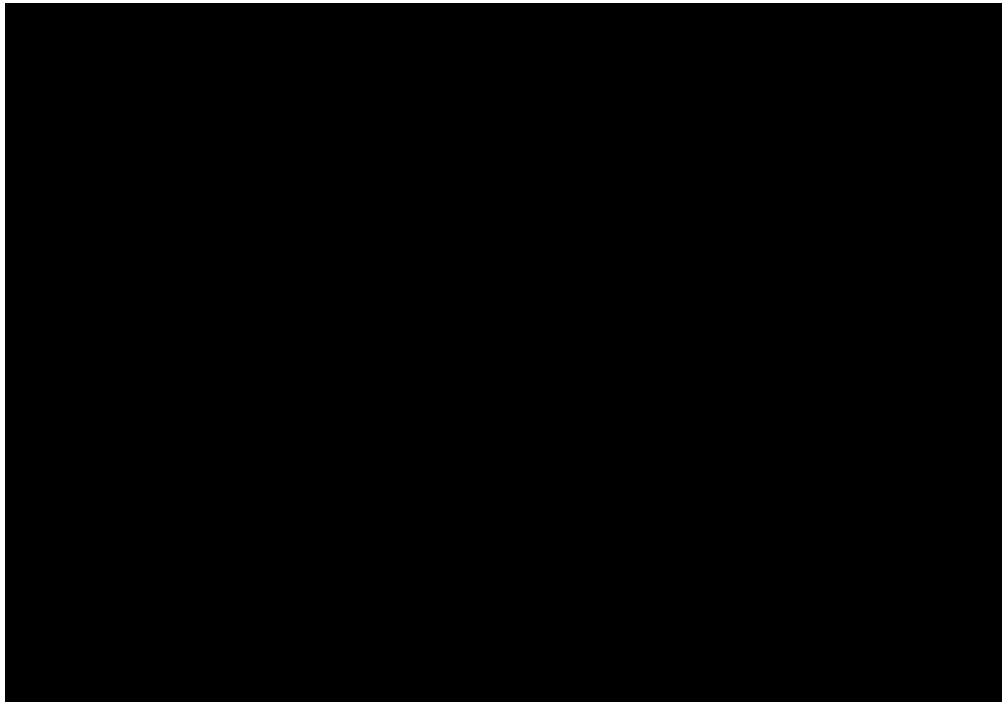
the same idea as the method outlined in the '186 patent: perform AEC only on fixed (“time-invariant”) beams and then select which beam to transmit to the far end. Like the '186 patent, Kellerman 2001 envisions that cost savings will be realized by having fewer fixed beams than microphones. R. 158, Kellerman 2001 at 299.²⁰ In other words, Kellerman saw the same problem as the '186 patent (the problem of efficiently combining AEC and beamforming) and arrived at the same solution (save on AEC costs by performing AEC on a smaller number of fixed beams).

Not surprisingly, ClearOne advances a number of arguments to try to distinguish Kellerman 2001. First, ClearOne argues that Kellerman was interested in *adaptive* beamforming, and that his book chapter taught away from fixed beams. It is true that Kellerman was interested in promoting what he called “time-varying” beamforming. R. 158, Kellerman Decl. ¶ 16; R. 158, Kellerman 2001 at 281 (describing methods for integration of AEC into time-varying beamforming). But, as Kellerman explained, his chapter describes a beamformer that is adaptive in the *system* sense. R. 204, Kellerman Sur-Reply Decl. ¶ 5. Kellerman’s “time-varying part” of the conferencing apparatus refers to the conferencing system’s ability to select desired signals for transmission to the far end (what the '186 patent calls “signal selection” and Kellerman calls “voting”), *not* the steering of the microphone beams themselves. *Id.* ¶¶ 5-7; R. 158, Kellerman 2001 at 299-300; *cf.* R. 158, Kellerman Decl. Exh. 4, “A Self-Steering Digital Microphone Array” (“First, fixed beams are formed... and second, a voting algorithm selects the beams that should

²⁰In Kellerman’s own words: “Thus, if M [the number of fixed beamforming filters] < N [the number of microphones]... AEC operates at a reduced computational cost.” R. 158-2, Kellerman Decl. Exh. 2 at 299.

contribute to the output signal.”). The Kellerman chapter does not teach away from fixed beamforming (in the sense of the ’186 patent); it envisions fixed beams as an integral part of an adaptive conferencing system. R. 204, Kellerman Sur-Reply Decl. ¶ 6; R. 158, Kellerman 2001 at 297-299.

ClearOne points to parts of the Kellerman chapter that appear to suggest that Kellerman’s so-called “time-invariant” beams might actually be updated during conference. In particular, Figure 13.8 of the Kellerman chapter shows a box labeled “Beam design and Control” providing input to the fixed beamformer. R. 158, Kellerman 2001 at 299; *see* R. 265, Loy Sur-Reply Decl. ¶¶ 17-19. Here it is:



ClearOne admits that it is not exactly clear what the box labeled “Beam design and Control” does, but argues that it must be conveying information in real time, presumably to update the so-called fixed beams. R. 265, Loy Sur-Reply Decl. ¶ 19;

but see R. 240, Kellerman Sur-Reply Decl. ¶ 9 (“[S]imply allowing a fixed beamformer to receive data does not convert it into an adaptive beamformer.”). Other parts of the Kellerman chapter also seem to suggest that Kellerman’s time-invariant beams could be updated during a conference, which would render them not “fixed” in the sense of the ’186 patent. For example, Kellerman suggests that in some situations, the beams would adjust during a “training phase” at the beginning of a conference, or even update continuously. R. 158, Kellerman 2001 at 300;²¹ *see also* R. 217, Morrow Decl. Exh. C, Kellerman Dep. 93:22-94:6.²²

Beams that are adjusted during conference are not, of course, “fixed beams” under the Court’s interpretation of the ’186 patent. Adjusting the beams during conference would lead to higher AEC processing costs, which is what the ’186 patent tries to avoid. But the fact that Kellerman discloses the *option* of updating the fixed beams during conference does not change the fact that his book chapter *first* disclosed the basic idea of holding the beams fixed. Indeed, Kellerman seems to envision that beam updating would only need to happen in more complex conferencing scenarios, such as situations where there are “several desired sources or moving desired sources.” R.158, Kellerman Decl. Exh. 2 at 299-300. A skilled artisan would recognize that the best way to limit AEC processing costs would be to

²¹ “[L]earning of optimum beamformers for deciding upon [the fixed beams] can be carried out during an initial training phase only, or continuously.” R. 158, Kellerman 2001 at 300.

²² “Q: The adaptive beamformer also updates the coefficients for the fixed beamformer, and you said, for example, on a level of seconds. / A: For example. Or even less. So for example, in this room, we would initially run an adaptive beamformer which pick our two voices mainly, right, and learns the background noise statistics. And then we would use it as a fixed beamformer for the rest of the session.” R. 217, Kellerman Dep. 93:22-94:6.

not update the fixed beams during use. For a conference with seated participants, the beams might not be updated at all. *See* R. 240, Kellerman Sur-Reply Decl. ¶ 8; *see also* R. 158, Kellerman Decl. Exh. 5 (“Kellerman 1997”) at 222 (“Assuming seated participants, the [beamforming] filters must be updated very infrequently.”). The idea proposed in the Kellerman chapter is close enough to the crucial steps of the ’186 patent—perform AEC only on a small number of fixed beams, then select from those beams for transmission to the far end—that the method of the ’186 patent would likely have been obvious to a person of skill in the art in light of Kellerman.

The fact that Kellerman 2001 did not describe “last mic on” does not change this conclusion. Last mic on was a well-known industry feature for decades before the publication of the Kellerman chapter or the issuance of the ’186 patent. *See* R. 157, Cerra Decl. ¶ 11 (“[E]ssentially everyone in the industry has used ‘Last Mic On’ for many years.”); ClearOne Reply at 2 n.3 & R. 198, Giza Decl. Exh. 109 (noting that Bell Labs invented last mic on in 1973). ClearOne’s own devices have long made use of last mic on. *See* R. 163, Turner Decl. Exh. 7, Thurston Dep. 66:3-9; R. 160-7, LeBlanc Decl. Exh. 7, XAP 800 Installation & Operation Manual at 45; R. 163, Turner Decl. Exh. 2, Graham Dep. 28:22-29:17. The benefits of last mic on are obvious: last mic on prevents the impression of a dropped call, and so improves the user experience. *See* R. 82, Graham Decl. ¶¶ 13-14; R. 157, Cerra Decl. ¶¶ 11-12. It would not tax the imagination of a skilled artisan to recognize that last mic on

would improve a conferencing apparatus that practiced the method described by Kellerman.

ClearOne next points to the secondary considerations of the obviousness inquiry, which include commercial success, long-felt but unsolved need, and the failure of others to arrive at the invention. *KSR*, 550 U.S. at 399. It is true that the secondary considerations do cut in ClearOne's favor. ClearOne received industry awards for innovation for its beamforming microphone. *See* R. 87, Hakimoglu Decl. ¶ 10. The ClearOne beamforming microphone has been commercially successful, generating ██████████ in revenue for ClearOne and arguably leading to a rise in ClearOne's market share. *Id*; *see also* R. 191, Waadevig Decl. ¶¶ 8-9 (sealed). What's more, the Kellerman book chapter was hardly hidden away in the archives; according to Kellerman himself, the textbook containing Kellerman 2001 is "the single most cited text in the entire field of microphone array technology." R. 240, Kellerman Supp. Decl. ¶ 4. Yet it apparently took over ten years for anyone in the industry to arrive at the method of the '186 patent. *See* R. 87, Hakimoglu Decl. ¶ 10; R. 157, Cerra Decl. ¶ 4. This delay would be surprising if Kellerman rendered the patented method obvious, because Shure's own market research shows that there was a long-felt need for a ceiling-mounted microphone that still preserved audio quality. *See* R. 200, Giza Decl. Exh. 30, "2006 U.S. Corporate Boardroom Research" (sealed). All of these considerations do cut against a conclusion of obviousness, and secondary considerations can be powerful evidence of non-obviousness. *See Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983). But

secondary-consideration evidence can be overcome if other facts point strongly in the other direction. *See, e.g., ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1222-23; *Ohio Willow Wood Co. v. Alps South, LLC*, 735 F.3d 1333, 1344 (Fed. Cir. 2013). In this case, Shure’s obviousness argument is strong. Kellerman discloses all the steps in Claim 7 of the ’186 patent, except utilizing last mic on, which is an obvious and predictable improvement given the ubiquity of that feature. *See KSR*, 550 U.S. at 401. So, although secondary considerations do cut the other way, they are not persuasive enough to overcome the strong evidence of obviousness.

ClearOne also argues that the Kellerman chapter cannot render the patent invalid because it is not enabling. But this argument fails because the basic technologies described by the Kellerman chapter existed long before the invention date of the ’186 patent. Beamforming and acoustic echo cancellation are both old technologies, and have long been used in the audio industry. *See, e.g., R. 158*, Kellerman Decl. Exh. 5 (“Kellerman 1997”) at 221 (noting in 1997 that adaptive beamforming and AEC are both “intensively researched areas”); *R. 163*, Turner Decl. Exh. 7, Thurston Dep. 28:4-15 (“Q: And how long as AEC been around in the trades? / A. Before my day. So some of it was in the 1950s and earlier.”), 175:20-25 (noting that beamforming products had been on the conferencing and audio market since at least the early 2000s); *R. 169*, Cerra Decl. ¶ 4 (noting that Shure began work on a ceiling-mounted beamforming microphone in 2001). What Kellerman brought to the table was an idea for combining well-known existing technologies. Based on the Kellerman 2001 chapter, a skilled artisan would have been able to

practice the method described by the '186 patent.²³ See R. 217, Morrow Decl. Exh. C, Kellerman Dep. at 95:3-7, 96:3-20. Enablement is not an obstacle to Shure's reliance on Kellerman 2001.

A preliminary injunction cannot issue unless the moving party can show, "in light of the presumptions and burdens that will inhere at trial on the merits" that it will likely withstand challenges to the patent's validity. *Amazon, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1350 (Fed. Cir. 2001). The Court cannot say at this point that it is *likely* that ClearOne will be able to withstand Shure's validity challenge, even taking into account Shure's enhanced burden at trial. But this is a close call. It might be that, at the summary judgment stage or at trial, after more discovery (and when Shure bears the burden), Shure will be the one to fall short. But for now, ClearOne has not established that it is likely to succeed on the merits, and so the injunction cannot issue.

3. Kellerman 1997

For the sake of completeness, the Court will also address Shure's final obviousness argument. Shure argues that Kellerman's 1997 article, "Strategies for Combining Acoustic Echo Cancellation and Adaptive Beamforming Microphone Arrays" (Kellerman 1997 for short), either anticipates the claimed method or renders it obvious. The analysis here is almost the same as the analysis above. Kellerman 1997 discloses the same idea as Kellerman 2001—reducing processing

²³Whether the artisan would have been able to do so in a marketable or cost-effective way is another matter; but that does not matter for enablement (though it might explain why it took ten years to get the ClearOne BMA to market even if Kellerman rendered the invention obvious).

costs by decomposing beamforming into “time-invariant” (fixed) and “time-variant” parts, and performing AEC only on the time-invariant part. R. 158-5, Kellerman Decl. Exh. 5 (“Kellerman 1997”) at 219.²⁴ So the outcome here is the same as for Kellerman 2001: Kellerman 1997 renders the patented method obvious.

The only difference in the analysis between Kellerman 1997 and Kellerman 2001 is that Shure argues that Kellerman 1997 actually anticipates the ’186 patent instead of just rendering it obvious. To anticipate Claim 7, Kellerman 1997 would have to disclose the last mic on feature. Shure argues that it does, at least on one possible version of the claim construction. Kellerman 1997 suggests that “[w]hen entering a far-end talk period we propose to start out with the weights for the most recently active local talker and gradually change weights to arrive at a beamforming averaging over all [] talker beams.” R. 158, Kellerman 1997 at 221. In other words, Kellerman suggests *gradually* changing local signal selection during far-end talk periods. On its face, this looks quite different from last mic on, which is supposed to *prevent* signal selection from changing at all during far-end talk. But Shure argues that the language of Claim 7, which requires “inhibit[ing]... changing the selection... while only the far end signal is active” is actually broad enough to cover the gradual change of signal selection suggested by Kellerman.²⁵ Shure’s argument only works if “inhibit” means something like “slow down” or “lessen” rather than “prevent.” This reading of the word “inhibit” is certainly possible, although it does not make much sense if the point of Claim 7’s final limitation is to

²⁴The Court uses the article’s own page numbering.

²⁵Notably, Kellerman himself does not think that his article disclosed this limitation. See R. 217, Morrow. Decl. Exh. C, Kellerman Dep. at 140:6-19.

disclose last mic on. And possible or not, the posture of the argument is odd: Shure has argued at length that “inhibit” means “prevent,” not “lessen,” *see* Shure Resp. Br. at 14, Shure Reply at 10-11, so Shure’s argument that K-97 discloses last mic on actually depends on Shure *losing* to ClearOne on the construction of “inhibit” (which the Court has already found to be unnecessary). Shure’s argument that Kellerman 1997 is anticipatory is a fallback argument now rendered unnecessary by the opinion on claim construction.

But the Court need not get too far into this problem, because it does not make a difference to the outcome of the preliminary injunction. As discussed above, it would be obvious to combine last mic on with Kellerman’s idea for fixed beams. Because last mic on is an obvious addition, Kellerman 1997 at the very least renders the claimed method obvious. Obviousness and anticipation would both render the patent invalid, and the issue at the preliminary injunction is whether Shure has raised a substantial question of validity. It has, regardless of the construction of “inhibit... while only the far end signal is active.”

D. Irreparable Harm

Although the injunction will not issue because of substantial questions about the ’186 patent’s validity, it is worth discussing the other requirements for a preliminary injunction in case the Court is mistaken on the validity issue (this will provide the most complete and efficient opportunity for appellate review, as well as to inform the parties in evaluating settlement positions in the here and now). When a party seeks the extraordinary remedy of a preliminary injunction, it “must make a

clear showing that it is at risk of irreparable harm, which entails showing a likelihood of substantial and immediate irreparable injury.” *Apple, Inc. v. Samsung Electronics Co. Ltd.*, 678 F.3d 1314, 1325 (Fed. Cir. 2012) (“*Apple I*”) (cleaned up). For the harm inquiry, the Court considers factors like the nature of competition between the patentee and the infringer, the willingness of a patentee to license, and any lost sales the patentee has proven. *Presidio Components, Inc. v. American Technical Ceramics Corp.*, 875 F.3d 1369, 1383 (Fed. Cir. 2017). In addition to harm, the patentee must show that there is a “sufficiently strong causal nexus” between the harm and the infringement. *Apple Inc. v. Samsung Electronics Co., Ltd.*, 695 F.3d 1370, 1374 (Fed. Cir. 2012) (“*Apple II*”). ClearOne has met its burden of showing both harm and causal nexus.

1. Harm

ClearOne has established that it is suffering harm from Shure’s alleged infringement. The record is replete with examples of customers switching their loyalty from the ClearOne beamformer to the Shure MXA910. *See, e.g.*, R. 191, Waadevig Supp. Decl. at ¶¶ 17-18 (sealed). For example, Shure and ClearOne competed to install their microphones in ██████ new Plano headquarters. R. 87, Hakimoglu Decl. ¶¶ 23-24. Shure ultimately won the job,²⁶ and was able to grow an initial installation of 19 or 20 units into a sale of over 200 MXA910s. *See* R. 94,

²⁶It is not crystal clear whether ClearOne won the initial bid and then lost it, or whether Shure was chosen from the start. *Compare* Mot. Prelim. Inj. at 22 (“█████... had initially selected ClearOne’s BMA Solutions...” *with* R. 94, Hakimoglu Decl. ¶ 26 (noting that an integrator on the project “attempted to install 20 units of the Shure MXA910 ceiling array”) and ¶ 30 (“But for the fact that another integrator [] offered ██████ the option to install Shure/Biamp products in these conference rooms, ClearOne and its customer ██████ would have sold and installed... ClearOne products... at ██████.”).

Hakimoglu Decl. ¶ 30 (sealed); R. 201, Giza Decl. Exh. 52 (sealed). A sale of this magnitude would have been hugely important to ClearOne, which sells around a couple thousand BMA units each year.²⁷ See R. 96, Waadevig Decl. at 29-30 (sealed). ClearOne also lost out to Shure in a battle to install audioconferencing equipment for ██████████ ██████████ records show that ██████████ planned to install either Shure or ClearOne ceiling arrays in its conference rooms. See R. 202, Giza Decl. Exh. 60 at 13, 19, 20 (sealed); Exh. 61 (sealed). In the end, ██████████ went with Shure. See R. 202, Giza Decl. Exh. 63. In addition to lost bids, Shure has also started switching customers who were formerly loyal to ClearOne to Shure microphones. For example, ██████████ and ██████████—both established ClearOne customers—have changed their loyalties to Shure. See R. 181, Turner Decl. Exh. 40 (sealed) (emails from ██████████'s integrator) (sealed); R. 93, DiCampello Decl. ¶¶ 14-17 (discussing lost business at ██████████ (sealed)).

It appears that Shure and ClearOne are the only suppliers of this type and quality of installed audioconferencing system, so any sales to Shure are likely losses to ClearOne.²⁸ R. 96, Waadevig Decl. at 4, 16-17 (“ClearOne and Shure are the two Installed Audio Conferencing Market participants that offer beamforming

²⁷Shure argues that ClearOne *did* end up selling 20 units to ██████████ Shure Resp. Br. 38-39. It is not clear that this actually happened, see R. 94, Hakimoglu Decl. ¶¶ 27-30, but it does not much matter. Shure eventually sold over 200 units to ██████████—sales which probably would have gone to ClearOne had Shure not been in the picture.

²⁸Shure points to a microphone by Sennheiser as comparable, but the Sennheiser's price is several times higher than the price of the MXA910 or the ClearOne BMA, making it an unlikely substitute product. In fact, Shure's own marketing executive, Chad Wiggins, testified that he does not consider the Sennheiser to be a direct competitor because of its much higher price point. See R. 199, Giza Decl. Exh. 12, Wiggins Dep. at 287:14-288:8 (sealed).

microphone array technology with comparable marketing factors (price, target market, target use case.)” (sealed); *see also* R. 199, Giza Decl. Exh. 12, Wiggins Dep. 285:23-291:22 (admitting that Shure considers the ClearOne BMA the primary direct competitor to the Shure MXA910) (sealed); R. 86, DiCampello Decl. ¶ 8 (“Shure is ClearOne’s *only* competitor as a provider of beamforming microphones in the installed audio conferencing market in the United States today.”) (emphasis added). The pattern of ClearOne’s lost sales tends to confirm that the BMA and the MXA910 are the only two options for many customers in their target market. ClearOne’s losses often happened in head-to-head quality tests where Shure and ClearOne were the only competitors, making it clear that the sales to Shure were direct losses to ClearOne. ClearOne’s lost sale to [REDACTED] followed this pattern, for example, as did its lost sales to [REDACTED] and [REDACTED]. *See* R. 181, Turner Decl. Exh. 40 (sealed) ([REDACTED]); R. 94, Hakimoglu Decl. ¶ 24 (stating that [REDACTED] requested a “shoot-out” between the Shure and ClearOne microphones); R. 202, Giza Decl. Exhs. 60-63 ([REDACTED]). The evidence shows that customers are usually choosing between the Shure and ClearOne beamformers for their audioconferencing needs, so sales to Shure tend to be direct losses to ClearOne. *See Robert Bosch LLC v. Pylon Mfg. Corp.*, 659 F.3d 1142, 1151 (Fed. Cir. 2011) (“[T]he existence of a two-player market may well serve as a substantial ground for granting an injunction—e.g., because it creates an inference that an infringing sale amounts to a lost sale for the patentee.”) (emphasis deleted); *Presidio Components, Inc. v. American Technical Ceramics Corp.*, 702 F.3d 1351, 1363 (Fed. Cir. 2012)

(evidence of “direct and substantial competition between the parties” weighed in favor of irreparable harm).

The characteristics of the installed audioconferencing market make these lost sales particularly devastating to ClearOne. End users often prefer to use the same brand of installed audioconferencing equipment for *all* their rooms and facilities, because using the same supplier makes maintenance easier for the user. R. 94, Hakimoglu Decl. ¶ 13 (sealed). Consultants and integrators also prefer to stick with one brand, allowing them to develop expertise in designing and installing that brand. R. 96, Waadevig Decl. at 18-19; R. 94, Hakimoglu Decl. ¶ 14 (sealed). Sales can be infrequent and unpredictable due to the long life span of the equipment and the uncertain needs of end-users. R. 94, Hakimoglu Decl. ¶ 15; R. 96, Waadevig Decl. 20-21. These factors can magnify the impact of even small lost sales. An example of this phenomenon is Shure’s sale to ██████ Shure internal communications noted that it might grow the initial installation into far more sales: “This 1 job could become much bigger—world standard for ██████ buildings.” R. 200, Giza Decl. Exh. 52 (sealed). In the audioconferencing market, individual lost sales can balloon into substantial downstream lost business.

In addition to tangible harms like lost sales, ClearOne also argues that it is suffering intangible harms, such as loss of customer goodwill and reputation. ClearOne used to be able to market itself as the *sole* purveyor of a beamforming microphone with the patented technological features. *See* R. 86, DiCampello Decl. ¶ 6; R. 84, Sanderson Decl. ¶ 4. Now that Shure offers a competing device, ClearOne

can no longer sell itself as the only source of this technology. R. 86, DiCampello Decl. ¶ 7; R. 84, Sanderson Decl. ¶¶ 6-7. The fact that there are now *two* sources of this technology makes the ClearOne product appear less innovative, which in turn damages ClearOne’s reputation for innovation. *See* R. 87, Hakimoglu Decl. ¶¶ 8, 10; R. 84, Sanderson Decl. ¶ 6; R. 86, DiCampello Decl. ¶ 7. Erosion of reputation and brand distinction are yet more evidence of irreparable harm. *See Douglas Dynamics, LLC v. Buyers Prods. Co.*, 717 F.3d 1336, 1344-45 (Fed. Cir. 2013) (“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.”).

ClearOne’s refusal to license its technology also helps to establish its irreparable injury. ClearOne’s CEO, Zee Hakimoglu, has testified that ClearOne has no plans to license the ’186 patent because “this patented technology goes to the core of [ClearOne’s] business.” R. 87, Hakimoglu Decl. ¶ 9. As the Federal Circuit has often held, unwillingness to license weighs in favor of a finding of irreparable harm. *See Douglas*, 717 F.3d at 1345; *Presidio*, 702 F.2d at 1363. All these factors—lost sales and business, reputational harm, and refusal to license—show that ClearOne will likely be able to show that it is suffering harm, and that it will continue to suffer harm if Shure continues to sell its competing devices.²⁹

²⁹Shure argues that ClearOne unreasonably delayed asserting its patent rights. Delay would undermine ClearOne’s argument that it was being irreparably harmed. But the record shows that ClearOne asserted its patent rights even before the litigation began. *See* R. 88, Giza Decl. Exhs. J-M. And any delay by ClearOne in requesting a preliminary injunction is not long enough to raise suspicion given the complexity of this case. The Court

2. Nexus

ClearOne has also established that its injuries are caused by Shure's alleged infringement.³⁰ It is worth clarifying at the outset that ClearOne does not need to show that the patented features of its product are the only or even the main reason for consumer demand for the product. *See Genband US LLC v. Metaswitch Networks Corp.*, 861 F.3d 1378, 1382-84 (Fed. Cir. 2017) (explaining that the patented feature need only be “a driver” rather than “the driver” of demand). Instead, ClearOne need only show “some connection between the patented feature and demand” for its products. *Apple, Inc. v. Samsung Electronics Co., Ltd.*, 735 F.3d 1352, 1364 (Fed. Cir. 2013) (“*Apple III*”). This can be done in a number of ways, including by showing that the patented features are one of many factors in consumers' purchasing decision, or by showing that the presence of the patented features makes the product significantly more desirable. *Id*; *see also Apple, Inc. v. Samsung Electronics Co., Ltd.*, 809 F.3d 633, 644 (Fed. Cir. 2015) (“*Apple IV*”) (holding that causal nexus was established by showing that the features at issue “were important to customers when they were examining their phone choices”).

With these standards in mind, it is clear that there is a causal nexus between the accused devices' use of the patented features and harm to ClearOne. It is obvious that audio quality is important to customers buying audio conferencing

will not penalize ClearOne for not rushing headlong into litigation, especially when the relief of a preliminary injunction is extraordinary in nature.

³⁰Of course, an invalid patent cannot be infringed. *See Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1929 (2015). But it is not yet clear whether Shure will be able to prove that the '186 patent is invalid, so the Court will address the harm from the alleged infringement under the assumption that the patent is valid.

products, and the evidence on the record bears this out. For example, the integrator who described the head-to-head test of Shure and ClearOne’s products at [REDACTED] [REDACTED] emphasized sound quality above all, and noted that the end users at the bank were also comparing the sound quality of the microphones. R. 181, Turner Decl. Exh. 40 (“One person thought gen 2 [BMA] and Shure sounded about equal in quality... The other person liked the sound of Shure a bit more.”; “Noise cancelling on the new DSP was great.”). Although the integrator mentioned other features of the devices, like the software interface, sound quality was clearly the main metric on which the devices were being judged. *See id.* [REDACTED] internal communications also demonstrate that sound quality is end users’ major concern. R. 202, Giza Decl. Exh. 63 (“The Shure produced cleaner dialogue, less room noise, and an overall more refined sound.” “I found the difference in audio quality to be pretty significant... I recommend that everyone listen to the difference in as many different ways as possible.”) (sealed). ClearOne’s current sales efforts focus on promoting their products’ audio quality as superior to Shure’s—a strategy that makes no sense unless audio quality is a major driver of consumer demand. *See* R. 86, DiCampello Decl. ¶ 7. Shure’s own market research confirms that “[i]n this market, audio quality is king.” *See* R. 96, Waadevig Decl. at 37 (sealed); R. 200, Giza Decl. Exh. 30, “2006 U.S. Corporate Boardroom Research” (“sound quality and clarity ultimately trump aesthetic concerns”; “Although end-users do want to ‘get mics off the tables,’ they do not want to do so if it means lower audio quality.”

“Integrators perceive ceiling mounted microphones as a ‘last resort’ primarily due to concerns over audio quality.”).

It is also clear that the patented features improve the sound quality of the accused audioconferencing systems. As ClearOne’s marketing expert testified, beamforming technology is considered to be far superior to non-beamforming technology for audioconferencing applications. R. 96, Waadevig Decl. at 5 (sealed); *see also* R. 158, Kellerman 2001 at 292 (noting that beamforming is “undisputed for its effectiveness in suppressing local noise and reverberance of local desired sources”). The parties also agree that acoustic echo cancellation and last mic on (the two other key features claimed in the patent) are important to users’ audio quality experience. Acoustic echo cancellation saves users from being subjected to distracting echoes of their own voices, and last mic on prevents the disturbing impression of a dropped call. *See* R. 82, Graham Decl. ¶¶ 9, 13-14; R. 157, Cerra Decl. ¶¶ 8, 11. Without this combination of features—a beamforming microphone array, acoustic echo cancellation, and last mic on, combined in the efficient manner suggested by the ’186 patent—the Shure microphone would not be competing with the ClearOne microphone in the first place.

Shure argues that the MXA910’s popularity is due to other features, especially its adaptive steering, which allows it to adjust to different room setups. *See* R. 171, Wiggins Decl. ¶¶ 67 (sealed); R. 270, Sealed Hearing Tr. 5:23-10:7 (sealed). It is probably true that *some* users prefer the Shure microphone because of its adaptability, but that does not undermine ClearOne’s showing of a nexus

between the patented features and demand for the device. Again, the patented features need not be the *only* driver of consumer demand; it is enough that they make the product significantly more desirable. *Apple III*, 735 F.3d at 1364. That is exactly the situation here: the patented features make the MXA910 attractive to consumers; the fact that the MXA910 has other, non-infringing features that make it *more* attractive does not change the fact that Shure’s purported infringement is driving sales. ClearOne has shown what it needs to show in order to establish a nexus between its harm and Shure’s alleged infringement.

E. Inadequate Remedy at Law

The question of adequate remedy at law “inevitably overlaps” with the irreparable harm inquiry. *MercExchange, L.L.C. v. eBay, Inc.*, 500 F.Supp.2d 556, 582 (E.D. Va. 2007). As explained above, ClearOne has shown that it is losing many sales to Shure, and is likely to lose more. The structure of the market makes it hard to measure the impact of these sales. A single lost sale could mean a loss of yet more business down the road, because integrators and users prefer to stick with the audio technology they know. From this evidence, it is clear that money damages would be difficult to quantify, which is evidence that remedies at law are inadequate to compensate the harm. *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 703-04 (Fed. Cir. 2008); *i4i Ltd. Partnership v. Microsoft Corp.*, 598 F.3d 831, 862 (Fed. Cir. 2010); *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1368 (Fed. Cir. 2017). ClearOne has also pointed to evidence of other hard-to-measure harms, such as the loss of its reputation as a market-leading innovator. ClearOne affirms that it

has no plans to license the patented technology because it benefits so much from exclusivity. R. 87, Hakimoglu Decl. ¶ 9. This loss of exclusivity cannot easily be made whole by money damages. *See Douglas*, 7171 F.3d at 1345 (holding that remedies at law were inadequate to compensate patentee's reputation loss from infringement); *i4i*, 598 F.3d at 862. An injunction is the right remedy for these harms (if there was no substantial question on validity).

F. Balance of Harms and the Public Interest

The last two preliminary-injunction factors ask the Court to weigh the relative costs and benefits of an injunction to ClearOne and Shure, and to examine whether an injunction is in the public interest. *Metalcraft*, 848 F.3d at 1369, *citing Luminara Worldwide, LLC v. Liown Elecs. Co. Ltd.*, 814 F.3d 1352 (Fed. Cir. 2016).

Every injunction has costs, and here the costs to Shure would be significant. Shure would have to stop selling its products to comply with an injunction, or modify them to comply with the scope of the injunction. ClearOne says that the modifications would not be costly—Shure could avoid infringement simply by telling their customers to disable last mic on, *see* Mot. Prelim. Inj. at 30—but Shure argues persuasively that having to do that could harm Shure's reputation and relationships with customers. *See* Shure Resp. Br. at 43-44. But even though Shure would be harmed by the injunction, the balance of harms would still favor ClearOne (again, if ClearOne had refuted the substantial question on validity). As has been discussed at length, if an injunction was granted, ClearOne would benefit enormously from the prevention of those harms and the restoration of its monopoly on the technology.

These benefits would outweigh the reputational costs to Shure, especially if the injunction was narrowly tailored.

In addition to its effect on Shure, an injunction would impose costs on the public. Having more than one supplier of any product increases competition, which can drive down prices and promote innovation. The Shure product is innovative in some respects and highly useful. As Shure has argued, its adjustable beams make it highly adaptable to consumer needs. R. 171, Wiggins Decl. ¶¶ 67 (sealed); R. 176, Sanderson Dep. 25:20-21 (sealed) (“[G]enerally, the perception was that [Shure] did have a better product.”), R. 270, Sealed Hearing Tr. 5:23-10:7 (sealed). But, assuming ClearOne had a valid patent, any harms from loss of competition would be offset by the benefits of the injunction to the public. The point of granting a period of exclusivity over patented technology is to reward innovation and investment in research. The public benefits when this system works, and suffers when patents are infringed, so it is in the public interest—in the long run—to protect valid patents. *See Douglas*, 717 F.3d at 1345 (“While the general public certainly enjoys lower prices, cheap copies of patented inventions have the effect of inhibiting innovation and incentive.”); *Broadcom*, 543 F.3d at 704 (agreeing that “it is generally in the public interest to uphold patent rights”). And even with an injunction in place, the public would still have access to the technology through the rightful supplier, ClearOne. *See Metalcraft*, 848 F.3d at 1369. Of course, because there are substantial questions about the patent’s validity, the public interest does not weigh in favor of enforcement. *See Abbott Labs. v. Sandoz, Inc.*, 500 F.Supp.2d

846, 855 (N.D. Ill. 2007) (“The public interest is not served by the enforcement of allegedly invalid patents or the extension of monopoly pricing by means of invalid patents.”).

IV. Conclusion

Substantial questions about the '186 patent's validity in light of the Kellerman prior art references prevent the issuance of a preliminary injunction. But it is worth noting that ClearOne had the better of the arguments on claim construction, infringement, and harm. If not for the validity problem, then the preliminary injunction would have issued. As it is, ClearOne's motion is denied.

The Court does encourage the parties to evaluate their litigation and settlement positions as promptly as possible. To that end, it would make sense (1) to adopt the parties' initial schedule on the '806 patent (Local Patent Rules 2.1-2.5), R. 277 at 3, so the parties shall follow those agreed deadlines; and (2) postpone the status hearing of March 19, 2018 to April 3, 2018 at 1:30 p.m., to consider the impact on the '186 schedule. The parties shall file another joint status report on March 28, 2018. The other reason to postpone the status hearing is that the parties also must quickly file a position paper explaining why the sentences preceding the citations to the (sealed) exhibits or transcripts must remain under seal. The Court believes that most, and perhaps all, of the sentences were written at a high enough level of generality that sealing is unnecessary. The position paper detailing what, if any, part of the Opinion should remain sealed (and why) is due by March 21, 2018.

In the meantime, to give the public as much information as possible, the Court will issue an initial redacted version of the Opinion.

ENTERED:

s/Edmond E. Chang
Honorable Edmond E. Chang
United States District Judge

DATE: March 16, 2018