IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

RESONANT SYSTEMS, INC. d//b/a RevelHMI,	§	
	§	
Plaintiff,	§	
	§	
v.	§	NO. 2:22-CV-00424-JRG
	§	
SONY GROUP CORP. and SONY INTERACTIVE ENTERTAINMENT INC.,	§	
	§	
Defendants.	§	

CLAIM CONSTRUCTION ORDER

Resonant Systems, Inc., asserts patent infringement by Sony Group Corp. and Sony Interactive Entertainment Inc. (together, "Sony") of claims from U.S. Patents 8,860,337, 9,369,081, and 9,941,830. The patents, which are from the same family and share a common specification,[1] relate to "vibration modules" used in electromechanical devices such as pagers, electric toothbrushes, and game controllers. *See* '337 Patent at 1:16–21, 1: 26–29.

The parties present eight disputes about claim scope. Having considered the parties' briefing and arguments of counsel during a July 3, 2024 hearing, the Court resolves the disputes as follows.

I. BACKGROUND

The patents purport to teach a better way of producing vibrations than by using

[1] *See* '830 Patent at [63] (identifying the '337 Patent and '081 Patent as related).

Samsung et al. v. Resonant Sys.
IPR2023-00993 - Exhibit 1054

intentionally unbalanced electric motors. Prior-art methods rotate a shaft to which a weight is asymmetrically mounted, which causes the end of the shaft to move elliptically. The amount of vibration varies with the speed of rotation. *See generally* ’337 Patent at 1:23–2:10.

The patent describes two main problems with this approach. First, this method “produces destructive, unbalanced forces within the motor that contribute to rapid deterioration of motor parts.” ’337 Patent at 2:11–19. Second, this method is “relatively inefficient.” *See id.* at 2:31–39, 2:58–62 (noting “[t]he bulk of energy consumed by an unbalanced electric motor is used to spin the shaft and unbalanced weight and to overcome frictional and inertial forces within the motor,” so “[o]nly a relatively small portion of the consumed energy is translated into desired vibrational forces”). In addition, many applications are better suited for linear oscillation rather than the elliptical oscillation of the prior art. *Id.* at 2:39–45.

To address these deficiencies, the patents teach a vibration module that uses linear oscillation of a mass rather than elliptical oscillation of a shaft and weight. As shown in Figures 4A–4G (below), which illustrate an embodiment of a vibration module in various states, a cylindrical housing (402) defines a chamber (406) in which a cylindrical magnetic weight (404) can move linearly. The chamber has a magnetic disk (414, 416) on each end. Each disk has the same polarity as the closest end of the weight. A coil (420) encircles the housing, and applying an electric current (422, 430) to the coil creates a corresponding magnetic force (424, 432) that accelerates the weight one way or the other. When the weight reaches one side, a repulsive magnetic force due to the closest disk and the weight having the same polarity decelerates the weight and reverses its direction. The module then applies current to the coil in the opposite direction, which helps move the weight to the other end of the chamber, and the process repeats. Thus, a rapidly reversing polarity of the magnetic field, combined with the repulsive forces between the weight and the disks, causes

the weight to linearly oscillate between the ends of the chamber. *See generally* ’337 Patent at 4:44–5:34.

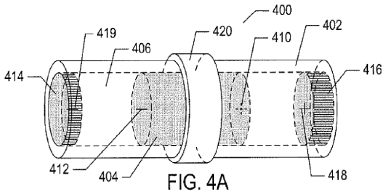


FIG. 4A

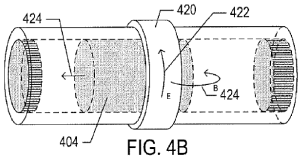


FIG. 4B

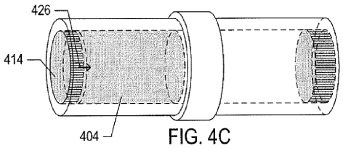


FIG. 4C

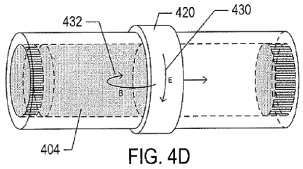


FIG. 4D

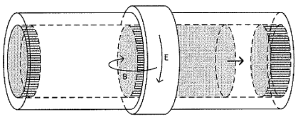


FIG. 4E

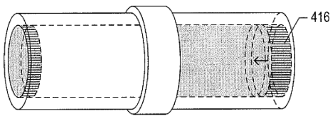


FIG. 4F

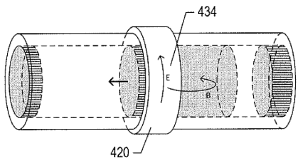


FIG. 4G

The independent claims of the three patents are very similar. For example, as shown in Table 1 (below), Claims 1 and 20 of the ’830 Patent, Claim 1 of the ’081 Patent, and Claim 2 of the ’337 Patent are each directed to a “vibration module” with a housing, a moveable component,

user-input features, a driving component, and a control component:

TABLE 1			
’830 Patent, Claim 1	**’830 Patent, Claim 20**	**’081 Patent, Claim 1**	**’337 Patent, Claim 2**
A vibration module comprising:		A linear vibration module comprising:	
a housing;			
a moveable component;			
a power supply;			
user-input features;			
a driving component that drives the moveable component to oscillate within the housing; and		a driving component that drives the moveable component in each of two opposite directions within the housing; and	
a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values[,]		a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by user input received from the user-input features[,]	
	wherein the control component drives simultaneous oscilla-tion of the moveable component at two or more frequencies to generate complex vi-bration modes.		wherein the control component drives simultaneous oscilla-tion of the moveable component at two or more frequencies to generate complex vi-bration modes.

The parties’ main dispute centers on whether the applicants, during prosecution, disclaimed any embodiments in which the “control component” is outside of the “vibration module.” In addi-tion, the parties dispute the meaning of four terms from dependent claims, and whether an error in two dependent claims can be judicially corrected.

II. GENERAL LEGAL STANDARDS

A. Generally

"[T]he claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). As such, if the parties dispute the scope of the claims, the court must determine their meaning. *See, e.g.*, *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1317 (Fed. Cir. 2007) (Gajarsa, J., concurring in part); *see also Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996), *aff'g*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc).

Claim construction, however, "is not an obligatory exercise in redundancy." *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997). Rather, "[c]laim construction is a matter of [resolving] disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims . . . ." *Id.* A court need not "repeat or restate every claim term in order to comply with the ruling that claim construction is for the court." *Id.*

When construing claims, "[t]here is a heavy presumption that claim terms are to be given their ordinary and customary meaning." *Aventis Pharm. Inc. v. Amino Chems. Ltd.*, 715 F.3d 1363, 1373 (Fed. Cir. 2013) (citing *Phillips*, 415 F.3d at 1312–13). Courts must therefore "look to the words of the claims themselves . . . to define the scope of the patented invention." *Id.* (citations omitted). The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1313. This "person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Intrinsic evidence is the primary resource for claim construction. *See Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1348 (Fed. Cir. 2010) (citing *Phillips*, 415 F.3d at 1312). For certain claim terms, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips*, 415 F.3d at 1314; *see also Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history."). But for claim terms with less-apparent meanings, courts consider "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean . . . [including] the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips*, 415 F.3d at 1314.

B. Indefiniteness

"[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc*., 572 U.S. 898, 901 (2014). The claims "must be precise enough to afford clear notice of what is claimed" while recognizing that "some modicum of uncertainty" is inherent due to the limitations of language. *Id.* at 908. "Indefiniteness must be proven by clear and convincing evidence." *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017).

III. THE LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is the skill level of a hypothetical person who is

presumed to have known the relevant art at the time of the invention. *In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In resolving the appropriate level of ordinary skill, courts consider the types of and solutions to problems encountered in the art, the speed of innovation, the sophistication of the technology, and the education of workers active in the field. *Id.* Importantly, "[a] person of ordinary skill in the art is also a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Here, Resonant contends a skilled artisan at the time of invention "would have had *at least* a bachelor's degree or equivalent in mechanical or electrical engineering, including course work in electro-mechanical control systems and two years of industry experience." Dkt. No. 62 at 2 (citing Baker Decl., Dkt. No. 62-5 ¶ 19; emphasis added). Sony doesn't offer a competing characterization. Although Resonant's use of "at least" is problematic because it leaves the level of skill unbounded, the Court adopts the crux of Resonant's characterization of a skilled artisan. Specifically, the Court finds a skilled artisan at the time of the invention would have had a bachelor's degree or equivalent in mechanical or electrical engineering, including coursework in electro-mechanical control systems, and two years of industry experience.

IV. THE DISPUTED TERMS

A. Preamble of '337 Patent, Claim 2

Resonant's Construction	Sony's Construction
The preamble is not limiting.	The preamble is limiting.

Claim 2 starts "[a] linear vibration module comprising." '337 Patent at 16:1. According to Sony, the preamble recites essential structure because the claim would otherwise encompass prior art. Dkt. No. 65 at 2. For support, Sony points to the file histories of the patents and Resonant's agreement that preambles from the other two patents are limiting. *Id.* at 2–3. With respect to the

former, Sony cites Resonant's statements distinguishing the claims of the '830 Patent over U.S. Publication No. 2011/0248817 (Houston) because the "control component" in that reference is separate from the disclosed vibrating device. *Id.* at 4.

Resonant, however, argues any disclaimer from the related patents doesn't apply to the '337 Patent because it had already issued at the time of the alleged disclaimer. Dkt. No. 62 at 4. Moreover, says Resonant, nothing about the preamble recites any necessary structure for the claim. *Id.* at 3.

The Court agrees with Resonant. Notably, Sony doesn't identify the alleged "essential structure" of a "vibration module" that is missing from the body of the claims. With its disclaimer argument, Sony seems to suggest that essential structure relates to the location of the "control component," *see* Dkt. No. 65 at 4 (emphasizing the arguments distinguishing Houston), but that is a different matter. *See* Part IV.C. *infra*. But as for this term, Sony has not shown that "vibration module" includes essential structure that warrants holding the preamble limiting.

B. "vibration module ('337 Patent, Claims 2–3; '081 Patent, Claims 1–8, 17; '830 Patent, Claims 1–8, 17)

Resonant's Construction	Sony's Construction
Plain and ordinary meaning	"vibrating device"

Sony purports to seek "a more understandable articulation of the meaning of 'vibration module' as understood and used by the inventors." Dkt. No. 65 at 7. To that end, Sony points to the specification's explanation that "[t]he current application is related to vibration-generating *devices*." *Id.* at 6 (quoting '081 Patent at 1:15–16 (emphasis added)). Sony also points to statements by Resonant during prosecution distinguishing the claims over Houston. *Id.* at 6–7. Resonant, however, says "[t]his is a simple, two-word phrase" that does not require construction. Dkt. No.

62 at 4.

The Court rejects Sony's construction because it fails to present a dispute over scope the Court can resolve. In fact, neither party offers a supposed "ordinary and customary meaning" of the term for the Court to consider. Moreover, even if, as Sony alleges, "device" is *more* understandable by a jury than "module," that does not mean "module" is not *sufficiently* understandable. Accordingly, the Court rejects Sony's position and will give this term a "plain and ordinary meaning" construction.

C. "a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by [user input received from the user-input features] / [one or more stored values]" ('337 Patent, Claim 2; '081 Patent, Claim 1; '830 Patent, Claims 1, 20)

Resonant's Construction	Sony's Construction
Subject to 35 U.S.C. § 112 ¶ 6. **Function:** controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by [user input received from the user-input features / one or more stored values]	
Structures: oscillator circuit; microcontroller with internal or external memory; processor; CPU; microprocessor; and equivalents thereof **If an algorithm is required:** Where the corresponding structure is a processor, CPU, or microprocessor, the processor / CPU / microprocessor is programmed with an algorithm comprising the following steps: (a) set the mode and strength to [default values or] values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output	**Structures:** an oscillator circuit, a microcontroller with internal or external memory, a processor, a CPU, or a microprocessor contained within the vibrating device where the microcontroller, processor, CPU, or microprocessor are programmed with an algorithm comprising the following steps: (a) set the mode and strength to [default values or] values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component and equivalents thereof

The parties agree this is a means-plus-function term and on the recited function. But they disagree about the corresponding structure. More specifically, they disagree about (1) whether the disclosed "microcontroller" embodiment requires an algorithm in accordance with *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015), and (2) whether the corresponding structure should be limited as to its location.

1. Whether the "microcontroller" embodiment requires an algorithm

For § 112 ¶ 6 limitations implemented by a programmed general-purpose computer or microprocessor, the corresponding structure described in the specification must usually include an algorithm for performing the function. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). In that case, the corresponding structure is not a general-purpose computer but rather the special-purpose computer programmed to perform the disclosed algorithm. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

Here, Resonant argues the microcontroller "is not a general-purpose computer but instead provides more specific functionality sufficient to perform the claimed function without additional special programming." Dkt. No. 62 at 7. "Functionality," however, is not the question—structure is—and Resonant fails to explain how a skilled artisan would understand the disclosed microcontroller as providing sufficient structure without an algorithm. Resonant points very generally to three columns from the patent, but fails to provide any reasoning to support its ultimate conclusion. *Id.* (citing '081 Patent at 10:53–13:51). It also cites its expert's declaration, which is conclusory, refers to the same three columns, and fares no better. *Id.* (citing Baker Decl., Dkt. No. 62-5 ¶ 32). In short, because nothing on which Resonant relies undercuts the "algorithm" requirement of *WMS Gaming Inc.*, the Court holds an algorithm is required even for the microcontroller embodiment.

2. Whether the location of the "control component" must be "within the device"

The parties generally agree on the proper § 112 ¶ 6 corresponding structure. The only dispute concerns whether that structure must be within the recited "module."

According to Sony, "the intrinsic record expressly supports [that] requirement." Dkt. No. 65 at 12 (stressing the specification only describes that structure as located in the device). Moreover, says Sony, Resonant disclaimed any potential embodiments in which the "control component" is located other than "within the device." *Id.* at 13.

Specifically, Sony points to the applicants' remarks in response to an office action rejecting the claims of U.S. Application 15/181,249[2] in light of U.S. Publication No. 2011/0144426 (Blenk) and Houston. At the time, Claim 1 of the '249 Application read as it does now:

> 1. A vibration module comprising:
>
> a housing;
>
> a moveable component;
>
> a power supply;
>
> user-input features;
>
> a driving component that drives the moveable component to oscillate within the housing; and
>
> a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values.

See generally '830 Patent File Wrapper, Dkt. No. 65-6 (showing the claims were not amended during the pendency of the application). The Office rejected Claim 1 based on the combination of Blenk and Houston, asserting Blenk discloses all six claim limitations, except for the "stored

[2] The '830 Patent issued from the '249 Application.

values" recited at the end of the claim. *Id.* at 37. But Houston, said the examiner, "discloses stored values with[in] [the] controller . . . . It would have been obvious to one of ordinary skill in the art to combine the vibration module of Blenk . . . with stored values of Houston . . . for improved control." *Id.*

In response, Resonant focused on the location of the "stored values" in Houston. Specifically, Resonant argued:

> the controller of Houston resides in a computer, and is separate from the vibrating device . . . . Thus, the stored values of Houston are not in the same module as the vibrating device. In other words, the sensations felt by a user 626 are sent by a system controller 622 to a haptic interface 624.
>
> These are separate units and not contained in a vibration module and thus is in contrast to the language of Applicants' claim 1, which recites that the "vibration module [comprises] . . . [the] control component . . . to cause the moveable component to oscillate at a frequency and amplitude specified by one or more stored values".

Id. at 25–26. Sony characterizes this as "expressly and unambiguously distinguish[ing] its invention from a system in which the control component is not contained within the vibration module." Dkt. No. 65 at 13. And because the claims of the '081 Patent and '337 Patent include similar language, Sony says the disclaimer should also apply to those claims. *Id.* at 14.

Resonant's briefing doesn't really address Sony's disclaimer argument, but instead treats this as construction of a means-plus-function term. For example, it says Sony's "additional language is unwarranted under § 112 ¶ 6," which limits the structure rather than its location. Dkt. No. 62; *see also* Dkt. No. 67 at 5 (distinguishing cases).

The Court agrees with Sony, and apparently Resonant, at least so far as the '830 Patent is concerned. *See* Hr'g Tr., Dkt. No. 89 at 9:10–15 (Resonant acknowledging disclaimer for the '830 Patent). In its remarks, the applicant clearly and unmistakably characterized the "system

controller" and "haptic interface" of Houston as "separate units and not contained in a vibration module." '830 Patent File Wrapper, Dkt. No. 65-6 at 25–26. A skilled artisan would understand from those arguments that the claimed vibration module requires a control component that is *not* separate and *is* contained within the module, and that understanding is consistent with the specification's description of the control component's location. Accordingly, the Court adopts Sony's requirement that the "control component" must be within the module for the '830 Patent's claims.

The question, then, is whether the Court should hold that same disclaimer also applies to the other patents at issue. Pointing to *Oyster Optics, LLC v. Ciena Corp.*, No. 4:17-CV-05920-JSW, 2020 WL 13891311 (N.D. Cal. Aug. 10, 2020), Resonant says any disclaimer should *not* apply to the '337 Patent and '081 Patent. At the hearing, Resonant stressed the *Oyster Optics* court did not find a case applying disclaimer made during prosecution of a child application to claims of a parent application. Hr'g Tr., Dkt. No. 89 at 10:9–11:3 (citing *Oyster Optics,* 2020 WL 13891311, at *8).

In *Oyster Optics*, a case about fiberoptic communications, the parties agreed the ordinary meaning of "receiver" was not limited to receivers without demodulators, but that "receiver" in one of the three patents at issue *was* limited in that way based on an amendment made during prosecution. *Oyster Optics*, 2020 WL 13891311, at *7. Specifically, the claims originally recited "a receiver having a demodulator," but in response to an "enablement" rejection the applicant amended the claim to remove "having a demodulator." *Id.* Citing an earlier *Oyster Optics* decision from this Court, the California court noted:

> [T]he parties have not cited—and the Court has not found—any case where disclaimer made during prosecution of a child application applied retroactively to claims derived from a parent application. The Texas court similarly found "no authority which permits a disclaimer to be imputed from a *progeny to ancestor* when

> it is not, as *Microsoft* requires, a 'representation of [the patentee's] own understanding of the inventions disclosed in all [related] patents.'"

Oyster Optics, 2020 WL 13891311, at *8 (citing *Oyster Optics, LLC v. Coriant Am. Inc.*, No. 2:16-CV-1302-JRG, 2017 WL 6026729, at *4 (E.D. Tex. Dec. 5, 2017); brackets in original). Ultimately, the court considered the prosecution-history statements "relevant" to the construction of "receiver" in the other patents, but opted not to apply disclaimer. *Id.* at *9.

As the California court noted, this Court considered the same issue in *Oyster Optics, LLC v. Coriant Am., Inc.*, No. 2:16-CV-1302-JRG, 2017 WL 6026729 (E.D. Tex. Dec. 5, 2017). As in the California case, the Court considered whether disclaimer from the applicant's deletion of "having a demodulator" should apply to claims from the earlier-issued patents. *Oyster Optics*, No. 2:16-CV-1302-JRG, at *18–19. The Court concluded "the enablement rejection and the responsive amendments were specific to the claims" of only the one patent, and declined to apply disclaimer to the others. *Id.* at *19. The Court did, however, recognize *Microsoft Corp. v. Multi-Tech Sys.*, 357 F.3d 1340 (Fed. Cir. 2004), for the proposition that "[a]ny statement of the patentee in the prosecution of a related application as to the scope of the invention would be relevant to claim construction," and that relevance can be "enhanced" if made in an official proceeding. *Id.* at *19 (quoting *Microsoft*, 357 F.3d at 1350).

In response, Sony points to *Microsoft.* There, the appellate court considered whether the claimed inventions were limited to communication over a telephone line, despite that some of the asserted claims did not recite that requirement. *Microsoft*, 357 F.3d at 1347 (noting only one claim of the three asserted patents explicitly recited transmission of data packets over a telephone line). During prosecution, the applicants described their system generally as

> operat[ing] over a standard telephone line. Such a telephone line is commonly referred to in the art as a "plain old telephone service" (POTS) line and establishes a

> point-to-point connection between telephone equipment on each end of the line. Applicants' invention . . . transmits the packets across a POTS line to a remote site . . . .

Id. at 1349. The court concluded "[t]hat statement, which expressly related to the specification shared by all three patents and the communications system disclosed in all three patents, makes clear that [the applicant] viewed the local and remote sites of its inventions as communicating directly over a telephone line." *Id.*; *see also id.* at 1350 (noting the statement "was a representation of its own understanding of the inventions disclosed in all three patents").

The present record is closer to *Microsoft* than *Oyster Optics*. For one, although not dispositive on the issue, the prosecution-history arguments here do not stem from amendments to the claims and related arguments. Rather, the applicant characterized the invention as a whole by referencing not just the "control component" limitation, but also the preamble and the transitional word "comprising." '830 Patent File Wrapper, Dkt. No. 65-6 at 25–26. And notably, very similar language—including very similar preambles—occurs in all claims for which this term is at issue. *See* Table 1 *supra*. Given that similarity, the Court is hard-pressed to see how the applicants' characterization of "module comprising" vis-à-vis Houston would not apply to the other claims. That is, a skilled artisan *would* consider the applicants' arguments as characterizing the invention as a whole, and *would not* read the various claims as having such fundamentally different scope.

In sum, for each of the claims at issue, the Court holds the "control component" limitation is subject to 35 U.S. C. § 112 ¶ 6, and that the agreed recited function is "controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by [user input received from the user-input features / one or more stored values]," as agreed to by the parties. Furthermore, the Court adopts Sony's proposed corresponding structure, which accounts for the disclaimer:

an oscillator circuit, a microcontroller with internal or external memory, a processor, a CPU, or a microprocessor contained within the vibrating module where the microcontroller, processor, CPU, or microprocessor are programmed with an algorithm comprising the following steps: (a) set the mode and strength to [default values or] values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component and equivalents thereof.

D. "a primary oscillation frequency modulated by a modulating oscillation frequency" ('337 Patent, Claim 3; '081 Patent, Claim 16; '830 Patent, Claim 16)

Resonant's Construction	Sony's Construction
No construction necessary; plain and ordinary meaning	"a primary oscillation frequency modulated by a modulating oscillation frequency to produce low frequency pulses of high-frequency vibration such as depicted in Fig. 22B"

The claims at issue require the "control component" to "drive[] simultaneous oscillation of the moveable component at two or more frequencies to generate complex vibration modes." '337 Patent at 16:14–16; *see also* '830 Patent at 17:30–33; '081 Patent at 17:9–12. They then require the "complex vibration modes" to include "a primary oscillation frequency modulated by a modulating oscillation frequency; a beat frequency; and an aperiodic oscillation waveform." *See, e.g.*, '337 Patent at 16:17–22. This dispute concerns only the first of these three modes.

Sony's construction attempts to limit the phrase to include a specific result of choosing the "primary oscillation frequency" mode. It supports that requirement with the specification's explanation that "[d]riving the linear vibration module by both a primary and modulating frequency produces low-frequency pulses of high-frequency vibration." Dkt. No. 65 at 15 (quoting '337 Patent at 13:23–28). Its concern comes, at least in part, from Resonant's statement that "primary oscillation frequency modulated by a modulating oscillation frequency" may be "any number of complex vibrational patterns and modes." *Id.* at 16 (citing '337 Patent at 13:36–41). Resonant,

however, accuses Sony of attempting to improperly limit the scope of the phrase to disclosed embodiments. Dkt. No. at 62 at 8–9.

The Court agrees with Resonant. Sony does not suggest the ordinary meaning of the phrase limits the characteristics of the output pulses. Nonetheless, it fails to assert any basis for disclaimer or lexicography. Instead, it cites "informative descriptions" from the specification and notes "[c]laims must always be read in light of the specification." Dkt. No. 65 at 15 (quoting *Phillips*, 415 F.3d at 1303 (Fed. Cir. 2005)). But courts must "look to the words of the claims themselves . . . to define the scope of the patented invention." *Id.* (citations omitted); *see also Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1361 (Fed. Cir. 2013) ("If the claim term has a plain and ordinary meaning, our inquiry ends."). Here, the Court need not choose between alternative possible "ordinary meanings" based on the specification and decide which "ordinary meaning" is more appropriate. After all, that meaning is not in dispute, which is evident from Sony's construction that mostly tracks the claim language. Moreover, Sony's construction would potentially inject more uncertainty into the claim by using terms of degree like "low" and "high." For these reasons, the Court rejects Sony's position and will give this term a "plain and ordinary meaning" construction.

E. "a beat frequency" ('337 Patent, Claim 3; '081 Patent, Claim 16, '830 Patent, Claim 16)

Resonant's Construction	Sony's Construction
No construction necessary; plain and ordinary meaning	"two driving frequencies combine to produce a lower frequency beat waveform such as depicted in Fig. 23"

This is the second of three disputes about "complex vibration modes." Sony points to Figure 23, which the specification describes as "two driving frequencies combin[ing] to produce a lower frequency beat-wave form." Dkt. No. 65 at 15 (quoting '337 Patent at 13:29–33). Resonant,

however, says the term's scope "would be readily understood by a POSITA and jury" and "does not require construction." Dkt. No. 62 at 11. But Resonant's briefing does not tell the Court that meaning, nor does the specification use the term outside of the claims.

At the hearing, the Court tentatively construed this term as "two driving frequencies combine to produce a lower frequency beat waveform." Although Resonant generally did not dispute that construction, it expressed concern a jury might be confused about the meaning of "lower"—for example, "lower" relative to what? To answer that question, Resonant suggested modifying the construction to require producing "a waveform with a component having a lower frequency than the highest frequency component of the waveform." Dkt. No. 89 at 16:10–12; *see also id.* at 18:3–8 ("what we want to convey is that the 'lower' in the Court's construction is lower relative to this higher frequency component"). Sony responded that such a construction would lose the concept of a beat waveform, Hr'g Tr., Dkt. No. 89 at 18:16–19:2, although Resonant denied that was its intent, *see id.* at 20:4–6 ("We would be fine with including the word 'beat' there.").

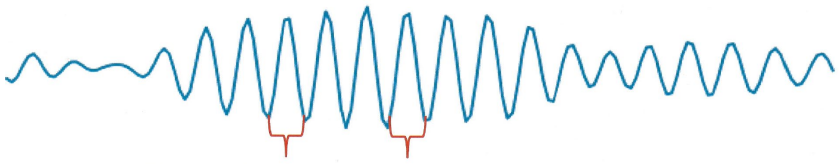
Ultimately, the parties agreed that "lower" in the preliminary construction should mean lower than the highest of the two driving frequencies. *See* Hr'g Tr., Dkt. No. 89 at 15:1–16:1, 19:8–14, 19:19–22. The Court recognizes that agreement and will hold the parties to it, but nonetheless opts to keep its tentative construction. Accordingly, the Court construes "a beat frequency" as "two driving frequencies combine to produce a lower frequency beat waveform."

F. "an aperiodic oscillation waveform" ('337 Patent, Claim 3; '081 Patent, Claim 16; '830 Patent, Claim 16)

Resonant's Construction	Sony's Construction
No construction necessary; plain and ordinary meaning	"a vibration waveform that does not repeat in time"

In this final dispute about "complex vibration modes," Sony's briefing accuses Resonant of alleging "that a random waveform that repeats every two seconds qualifies as 'aperiodic.'" Dkt. No. 65 at 16 (quoting Dkt. No. 62 at 12). Resonant, however, suggests the ordinary meaning of the term is "a waveform that is irregular," but distinguishes between what it calls a "fully" aperiodic mode that never repeats in time and an aperiodic wave form that maybe be sampled and repeated. Dkt. No. 62 at 12.

The parties' dispute became better crystallized at the hearing. The Court proposed a tentative construction of "an oscillation waveform that does not repeat in time," which Resonant generally did not dispute. But Resonant seemed concerned Sony might point to a "component" that appears more than once in a waveform and then characterize the waveform as *periodic*. For example, Resonant showed the following 20-second waveform and noted a shape that appears twice, but argues the "overall waveform would not be considered a . . . 'periodic waveform' just because there happens to be some small subcomponent that does repeat." Hr'g Tr., Dkt. No. 89 at 16–21.



To make that concept clear, Resonant suggested adding "fully" to the Court's preliminary construction, after which it would read "an oscillation waveform that does not *fully* repeat in time." *Id.* at 24:15–18.

The Court agrees with Resonant that a waveform is not "periodic" merely because a component of that waveform appears more than once. Clearly periodicity requires reference to some timeframe of observance—or as Resonant calls it, the "overall waveform." That said, adding "fully" to the construction is confusing, because the Court sees no credible basis for distinguishing

between an "aperiodic" and a "fully aperiodic" waveform. Generally, an "aperiodic" waveform is simply one in which no part of the waveform is repeated at regular intervals. The Court's preliminary construction of "an oscillation waveform that does not repeat in time" sufficiently encapsulates that scope.

G. Indefiniteness of '081 Patent, Claim 4, and '830 Patent, Claim 4

Claim Term	Resonant's Construction	Sony's Construction
"claim 1" ('081 Patent, Claim 4; and '830 Patents, Claim 4)	"claim 3"; not indefinite	Plain and ordinary meaning
"the one or more operational control outputs" ('081 Patent, Claim 4; '830 Patents, Claim 4)	Plain and ordinary meaning; not indefinite	Indefinite

This dispute implicates each of Claims 1, 3, and 4 of each patent. Claim 1 of the '081 Patent recites:

> 1. A linear vibration module comprising:
>
> . . .
>
> a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by user input received from the user-input features.

'081 Patent at 15:62–67. *see also* '830 Patent at 15:56–67 (similar). Claim 3 recites:

> 3. The linear vibration module of claim 1 wherein the control component *receives output signals from sensors within the linear vibration module* during operation of the linear vibration module and adjusts one or more *operational control outputs* of the control component according to the received output signals from the sensors.

'081 Patent at 15:36–48; *see also* '830 Patent at 16:14–19 (similar). Finally, Claim 4 of each patents recites:

> 4. The linear vibration module of claim 1 wherein the control component adjusts *the one or more operational control outputs of the control component according to the received output signals from the sensors* in order that subsequent operation of the linear vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.

'081 Patent at 16:1–7 (emphasis added); *see also* '830 Patent at 16:21–27 (similar). Although neither Claim 1 refers to "one or more operational control outputs," Claim 3 of each patent does. The parties agree each Claim 4 has an error, either by introducing "operational control outputs" with "the" (rather than "a") or by reciting dependence from Claim 1 rather than Claim 3.

Sony says there are two equally plausible corrections for that error:

> <u>Correction 1</u>
>
> 4. The [linear] vibration module of claim 1 wherein the control component adjusts ~~the~~ one or more operational control outputs of the control component according to ~~the~~ received output signals from ~~the~~ sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.
>
> <u>Correction 2</u>
>
> 4. The [linear] vibration module of claim ~~1~~ **[3]** wherein the control component adjusts the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.

Dkt. No. 65 at 19. The scope differs between these two corrections because "Correction 2" requires the sensors to be within the vibration module, whereas "Correction 1" does not. And because these are equally plausible corrections that differ in scope, says Sony, Claim 4 of each patent must be held indefinite. *Id.* at 20.

Focusing on the dependency, Resonant seeks correction of what it calls "a one-character typographical error" relating to the dependency of each Claim 4. Dkt. No. 62 at 15. In its view, the correction is not subject to reasonable debate after considering the claim language and the specification. *Id.*

The Court agrees with Resonant. Definiteness is always considered from the perspective of a skilled artisan. *See Howmedica Osteonics Corp. v. Tranquil Prospects, Ltd.*, 401 F.3d 1367, 1371 (Fed. Cir. 2005) ("The perspective of a person of ordinary skill in the art at the time of the patent application governs the definiteness analysis."). Here, such a person would not think Claim 4 refers back to Claim 1. Most persuasively, Claim 4 references "the" control outputs, received output signals, and sensors, all of which are recited in Claim 3 but absent from Claim 1.

Moreover, the nature of the narrowing from each patent's Claim 1 to Claim 4 bolsters Resonant's position. Specifically, Claim 1 expressly recites the structure of the invention, Claim 3 recites how the "control component" of Claim 1 controls the supply of power to the driving component—by adjusting operational control outputs according to received output signals from sensors in the module. Claim 4 then recites the *result* of that "adjusting"—to "produce desired outputs from the one or more sensors." In other words, Claim 4 articulates the result of Claim 3, which, in turn, characterizes the operation of Claim 1's structure. Thus, reading these claims together, the Court concludes a skilled artisan would understand Claim 4 as limiting Claim 3 rather than Claim 1, and corrects each Claim 4 to depend from its respective Claim 3.

H. "a strength of vibration produced by the linear oscillation of the moveable component" ('081 Patent, Claim 5; '830 Patent, Claim 5)

Resonant's Construction	Sony's Construction
No construction necessary; plain and ordinary meaning	"a value the corresponds to the amount of current applied to the driving component"

This dispute concerns the nature of "operational control parameters," which is recited before the disputed phrase in each claim. *See, e.g.*, '081 Patent at 16:9; '830 Patent at 16:26. Claim 1 of each patent requires a "control component" that causes a "movable component" to oscillate at a frequency and amplitude specified by received user input. '081 Patent at 14:44–48; '830 Patent at 15:64–67. Claim 4 of each patent requires the "control component" of Claim 1 to adjust operational control outputs to "produce[] desired outputs from the one or more sensors corresponding to one or more operational control parameters." '081 Patent at 16:1–7; '830 Patent at 16:21–27. Claim 5, which depends from Claim 4, then requires that "the one or more parameters is a strength of vibration produced by the linear oscillation of [a] movable component." '081 Patent at 16:9–11; '830 Patent at 16:29–30.

Sony relies on "implicit lexicography" to interject the notion of electrical current into this limitation. Specifically, Sony points to the specification's explanation that current applied to the driving component drives the linear oscillation of the movable component, which in turn produces the vibration. Dkt. No. 65 at 21 (citing '081 Patent at 4:44–5:45). Resonant, however, disputes any lexicography and argues the specification teaches embodiments where generated signals correspond to the vibration strength. Dkt. No. 62 at 16–17 (citing '337 Patent at 6:21–43).

The Court agrees with Resonant for two reasons. First, the phrase limits the nature of the previously recited "operational control parameters," which are just aspects of operation the user can control. Other "operational control parameters" include the frequency of vibration and the operational mode. *See* '081 Patent at 16:32–38. Nothing about a user setting inherently limits *how* a device effects that setting. Second, the passages on which Sony relies do not rise to the level of implicit lexicography, which, like express lexicography, must be supported by a clear and unambiguous intent to define the term. *See Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362,

1368 (Fed. Cir. 2012) (explaining "'implied' redefinition must be so clear that it equates to an explicit one," so "a person of ordinary skill in the art would have to read the specification and conclude that the applicant . . . has acted as its own lexicographer"). Rather, those passages are descriptions of specific embodiments. The Court will therefore give this term a "plain and ordinary meaning" construction.

V. CONCLUSION

Disputed Term	The Court's Construction
Preamble of '337 Patent, Claim 2	Not limiting
"vibration module" ('081 and 830 Patents, Claims 1–8, 17)	Plain and ordinary meaning
"a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by [user input received from the user-input features]/[one or more stored values]" ('337 Patent Claim 2; '081 Patent, Claim 1; '830 Patent, Claims 1, 20)	Subject to 35 U.S.C. 112 ¶ 6. **Function:** controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by [user input received from the user-input features / one or more stored values] **Structures:** an oscillator circuit, a microcontroller with internal or external memory, a processor, a CPU, or a microprocessor contained within the vibrating module where the microcontroller, processor, CPU, or microprocessor are programmed with an algorithm comprising the following steps: (a) set the mode and strength to [default values or] values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component and equivalents thereof

Disputed Term	The Court's Construction
"a primary oscillation frequency modulated by a modulating oscillation frequency" ('337 Patent, Claim 3; '830 Patent, Claim 16)	Plain and ordinary meaning
"a beat frequency" ('337 Patent, Claim 3; '830 Patent, Claim 16)	"two driving frequencies combine to produce a lower frequency beat waveform"
"an aperiodic oscillation waveform" ('337 Patent, Claim 3; '830 Patent, Claim 16)	"an oscillation waveform that does not repeat in time"
Typographical Error in Claim 4 ('081 Patent, Claim 4; '830 Patent, Claim 4)	Claim 4 of each patent depends from Claim 3 rather than Claim 1
"a strength of vibration produced by the linear oscillation of the moveable component" ('081 Patent, Claim 5; '830 Patent, Claim 5)	Plain and ordinary meaning

The Court **ORDERS** each party not to refer, directly or indirectly, to its own or any other party's claim-construction positions in the presence of the jury. Likewise, the Court **ORDERS** the parties to refrain from mentioning any part of this opinion, other than the actual positions adopted by the Court, in the presence of the jury. Neither party may take a position before the jury that contradicts the Court's reasoning in this opinion. Any reference to claim construction proceedings is limited to informing the jury of the positions adopted by the Court.

SIGNED this 27th day of August, 2024.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE