IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
MIDLAND/ODESSA DIVISION

RESONANT SYSTEMS, INC., d/b/a RevelHMI, *Plaintiff,*	§	
	§	**MO:23-CV-00077-ADA**
v.	§	
APPLE, INC., *Defendant.*	§	

COURT'S CLAIM CONSTRUCTION ORDER

Before the Court are the parties' claim construction briefings in the above captioned matter. ECF Nos. 75, 79, 82, and 84. Pursuant to this Court's Order Governing Proceedings, the parties were given the Court's preliminary constructions via email on May 30, 2024. The patents-in-suit are U.S. Patent Nos. 8,093,767, 8,860,337, 9,941,830, and 11,15,882. This order memorializes the Court's final constructions of the disputed terms in this case. The Court will issue memorandum opinion on these rulings in due course.

FINAL CONSTRUCTIONS

A. The parties' agreed constructions

Term	Court's Construction
Preambles: "linear resonant vibration module"; "linear vibration module"; "vibration module"; "oscillating resonant module[s]" U.S. Patent No. 8,093,767, Claim 1; U.S. Patent No. 9,941,830, Claims 1 & 19; U.S. Patent No. 11,152,882, Claims 1 & 10	Preamble is limiting
"a driving component that drives the moveable component in each of two opposite directions"	Subject to 35 U.S.C. § 112(f) **Function**: driving the moveable component in each of

U.S. Patent No. 8,093,767, Claim 1	two opposite directions **Structures**: coils 420, 514, 626, 1202, 1204, 1302, 1304, 1412, 1414, 1510 (also shown in Figs. 16–17); electromagnets shown in Figs. 10–11; and equivalents thereof
"a driving component that drives the moveable component in each of two opposite directions within the housing" U.S. Patent No. 8,860,337, Claim 2	Subject to 35 U.S.C. § 112(f) **Function**: driving the moveable component in each of two opposite directions within the housing **Structures**: coils 420, 514, 626, 1202, 1204, 1302, 1304, 1412, 1414, 1510 (also shown in Figs. 16–17); stator coils of Figs. 24A, 24B, 25; electromagnets shown in Figs. 10–11; and equivalents thereof
"a driving component that drives the moveable component to oscillate within the housing" U.S. Patent No. 9,941,830, Claims 1, 19, & 20	Subject to 35 U.S.C. § 112(f) **Function**: driving the moveable component to oscillate within the housing **Structures**: coils 420, 514, 626, 1202, 1204, 1302, 1304, 1412, 1414, 1510 (also shown in Figs. 16–17); stator coils of Figs. 24A, 24B, 25; electromagnets shown in Figs. 10–11; and equivalents thereof

B. Preambles

Term	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"linear vibration module" U.S. Patent No. 8,860,337, Claim 2 Proposed by Apple	Preamble is not limiting; no construction necessary; plain and ordinary meaning	Limiting	Limiting
"vibration module"	Preamble is not limiting; no construction	Limiting	Limiting

U.S. Patent No. 9,941,830, Claim 20 Proposed by Apple	necessary; plain and ordinary meaning		

C. "Control Component …"

Claim Language	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"a control component that includes a microprocessor and that controls supply of power from the power supply to the driving component to cause the moveable component to linearly oscillate, the control component including, in addition to the microprocessor, a control program, stored in one of a separated electronic memory or within the processor, that is executed by the microprocessor to control operation of the linear resonant vibration module, and a switch that receives a directional signal d from the processor and that	(1) Plain and ordinary meaning; not subject to 35 U.S.C. § 112 ¶ 6 (2) If subject to 35 U.S.C. § 112 ¶ 6, then:	Subject to 35 U.S.C. § 112(f)	Plain and ordinary meaning, not subject to means-plus-function treatment
	<u>Agreed Function</u>: controlling supply of power from the power supply to the driving component to cause the movable component to linearly oscillate; controlling operation of the linear resonant vibration module; receiving output signals from sensors within the linear resonant vibration module during operation of the linear resonant vibration module; and adjusting 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 linear resonant vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters		

selects a corresponding direction of the two opposite directions in which the driving component drives the moveable component, the control component receiving output signals from sensors within the linear resonant vibration module during operation of the linear resonant vibration module and adjusting 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 linear resonant vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters" U.S. Patent No. 8,093,767, Claim 1 Proposed by Apple	**<u>Structure</u>**: a microprocessor; a switch; electronic memory; a control program that, if an algorithm is required, performs an algorithm comprising the following steps: (a) receive the value of an output signal; (b) compare that value to a different value, which could be a previous value; and/ (c) adjust one or more operational control outputs based on that comparison; and equivalents thereof *See, e.g.*, '767 patent at 5:15-48, 6:14-8:3, Figs. 5A-6, 7A-7C	**<u>Structure</u>**: a microprocessor; a switch that receives a directional signal d from the processor and that selects a corresponding direction of the two opposite directions in which the driving component drives the moveable component; a control program, stored in one of a separated electronic memory or within the processor, that is executed by the microprocessor wherein the control program performs the algorithm shown in Figs. 7A–C and described at 6:15–8:3; and equivalents thereof	

Term	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"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 oscillation of the moveable component at two or more frequencies to generate complex vibration modes." U.S. Patent No. 8,860,337, Claim 2 Proposed by Apple	**No Dispute:** Subject to 35 U.S.C. § 112(f) **<u>Agreed Function</u>**: 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; driving simultaneous oscillation of the movable component at two or more frequencies to generate complex vibration modes.		Subject to 35 U.S.C. § 112(f) **<u>Function</u>**: 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; driving simultaneous oscillation of the movable component at two or more frequencies to generate complex vibration modes. **<u>Structure</u>**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to the steps shown in Figures 7B and 7C, <u>or</u> the algorithm described in the corresponding text, *See, e.g.* 7:10–7:24, 7:32–8:30 and/or equivalents thereof.
	<u>Structure</u>: 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 values representing selections made by user input to the user input features; (b) provide a corresponding output to the power supply so that the power	**<u>Structure</u>:** the switches shown in Figures 5A–6 and described at 5:45–65, 6:2–8 with the processor/microprocessor/microcontroller/CPU that performs the algorithm shown in Figures 7A–C and described at 6:43–8:30 and 13:3-41; and equivalents thereof	

	supply provides a corresponding output to the driving component; and (c) drive simultaneous oscillation of the moveable component at two or more frequencies. *See, e.g.*, '337 patent at 5:43-6:10, 6:43-8:30, 11:43-12:5; Figs. 5A-6, 7A-7C, 13, 22A-23		
Term	**Resonant's Proposed Construction**	**Apple's Proposed Construction**	**Court's Construction**
"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" U.S. Patent No. 9,941,830, Claims 1 & 19 Proposed by Apple	**No Dispute:** Subject to 35 U.S.C. § 112(f) **Agreed Function**: controlling supply of power from the power supply to the driving component to cause the movable component to oscillate at a frequency and an amplitude specified by one or more stored values		Subject to 35 U.S.C. § 112(f) **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 specified by one or more stored values **Structure**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to all steps shown in Figure 7B other than Step 734 and
	Structure: oscillator circuit; (except as to claim 20); microcontroller with internal or external memory; processor; CPU; microprocessor; and equivalents thereof Where the corresponding structure is a processor, CPU, or microprocessor, the processor / CPU / microprocessor is programmed with an	**Structure:** the switches shown in Figures 5A–6 and described at 5:52–6:5, 6:9–16 and the processor/microprocessor/microcontroller/CPU that performs the algorithm shown in Figures 7A–C and described at 6:52–8:40; and equivalents thereof	

	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. *See, e.g.*, '830 patent at 5:50-6:18, 6:52-8:40, 11:57-12:19; Figs. 5A-6, 7A-7C		all steps shown in Figure 7C, <u>or</u> the algorithm described in the corresponding text, *See, e.g.,* 7:20–7:34, 7:42–7:52, 7:60–8:40, and equivalents thereof.
Term	**Resonant's Proposed Construction**	**Apple's Proposed Construction**	**Court's Construction**
	No Dispute: Subject to 35 U.S.C. § 112(f)		

"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, wherein the control component drives simultaneous oscillation of the moveable component at two or more frequencies to generate complex vibration modes." U.S. Patent No. 9,941,830, Claim 20 Proposed by Apple	**Function**: controlling supply of power from the power supply to the driving component to cause the movable component to oscillate at a frequency and an amplitude specified by one or more stored values **Structure**: microcontroller with internal or external memory; processor; CPU; microprocessor; and equivalents thereof 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	**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 one or more stored values; and driving simultaneous oscillation of the moveable component at two or more frequencies to generate complex vibration modes **Structure:** the switches shown in Figures 5A–6 and described at 5:52–6:5, 6:9–16 and the processor/microprocessor/microcontroller/CPU that performs the algorithm shown in Figures 7A–C and described at 6:52–8:40 and 13:20–59; and equivalents thereof	Subject to 35 U.S.C. § 112(f) **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 one or more stored values; and driving simultaneous oscillation of the moveable component at two or more frequencies to generate complex vibration modes **Structure**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to the steps shown in Figures 7B and 7C, or the algorithm described in the corresponding text, *See, e.g.* 7:20–7:34, 7:42–8:40 and/or equivalents thereof.

	to the driving component. For claim 20, the algorithm comprises the following additional step: (c) drive simultaneous oscillation of the moveable component at two or more frequencies. *See, e.g.*, '830 patent at 5:50-6:18, 6:52-8:40, 11:57-12:19; Figs. 5A-6, 7A-7C		

Term	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"a control component that receives control signals input to the oscillating resonant module, receives outputs from the one or more sensors, and controls oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate." U.S. Patent No. 11,152,882, Claim 1 Proposed by Apple	**No Dispute:** Subject to 35 U.S.C. § 112(f) **Agreed Function**: receiving control signals input to the oscillating resonant module; receiving outputs from the one or more sensors; controlling oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate.		Subject to 35 U.S.C. § 112(f) **Function**: receiving control signals input to the oscillating resonant module; receiving outputs from the one or more sensors; controlling oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate. **Structure**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Figure 45 or the algorithm described in the corresponding text, *See, e.g.* 31:19–32:13, and equivalents thereof.
	Structure: oscillator circuit; microcontroller with internal or external memory; processor; CPU; microprocessor; and equivalents thereof Where the corresponding structure is a processor, CPU, or microprocessor, the processor / CPU / microprocessor is programmed with an algorithm comprising the following steps: (a) receive a target frequency; (b) receive sensor outputs indicating (1) position of the mass, or (2) position and velocity of the mass; and (c)	**Structure**: the processor/logic circuitry that performs the algorithm shown in Fig. 45 and described at 31:19–32:13; and equivalents thereof	

	generate control outputs based on the target frequency and the current position and velocity of the mass *See, e.g.*, '882 patent at 31:19-32:23, Fig. 45		
Term	**Resonant's Proposed Construction**	**Apple's Proposed Construction**	**Court's Construction**
"a control component that receives control signals input to the oscillating resonant module by the controller, receives outputs from the one or more sensors, and controls oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate." U.S. Patent No. 11,152,882, Claim 10 Proposed by Apple	**No Dispute:** Subject to 35 U.S.C. § 112(f) **<u>Agreed Function</u>**: receiving control signals input to the oscillating resonant module; receiving outputs from the one or more sensors; controlling oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate.		Subject to 35 U.S.C. § 112(f) **<u>Function</u>**: receiving control signals input to the oscillating resonant module; receiving outputs from the one or more sensors; controlling oscillation of the mass to produce a vibration response according to the received control signals by generating, using one or more of the received sensor outputs, control outputs to an actuator that drives the mass to oscillate. **<u>Structure</u>**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Figure 45 or the algorithm described in
	<u>Structure</u>: oscillator circuit; microcontroller with internal or external memory; processor; CPU; microprocessor; and equivalents thereof Where the corresponding structure is a processor, CPU, or microprocessor, the processor / CPU / microprocessor is programmed with an algorithm comprising the following steps: (a)	**<u>Structure</u>**: the processor/logic circuitry that performs the algorithm shown in Fig. 45 and described at 31:19–32:13; and equivalents thereof	

	receive a target frequency; (b) receive sensor outputs indicating (1) position of the mass, or (2) position and velocity of the mass; and (c) generate control outputs based on the target frequency and the current position and velocity of the mass *See, e.g.*, '882 patent at 31:19-32:23, Fig. 45		the corresponding text, *See, e.g.,* 31:19–32:13, and equivalents thereof.

D. Indefiniteness

Term	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"the one or more sensors" U.S. Patent No. 8,093,767, Claim 1; U.S. Patent No. 9,941,830, Claim 4 Proposed by Apple	No construction necessary; plain and ordinary meaning Alternatively, to the extent a construction is deemed necessary, "the sensors"	Indefinite	Plain and ordinary meaning
"desired outputs" U.S. Patent No. 8,093,767, Claim 1; U.S. Patent No. 9,941,830, Claim 4 Proposed by Apple	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning
"the one or more operational control outputs"	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning

U.S. Patent No. 9,941,830, Claim 4 Proposed by Apple			
"the received output signals" U.S. Patent No. 9,941,830, Claim 4 Proposed by Apple	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning
Term	**Resonant's Proposed Construction**	**Apple's Proposed Construction**	**Court's Construction**
"the sensors" U.S. Patent No. 9,941,830, Claim 4 Proposed by Apple	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning
"the mass" U.S. Patent No. 11,152,882, Claims 1, 3–6, 10 Proposed by Apple	Plain and ordinary meaning, in which all recitations of "a mass" and "the mass" refer to the same mass	Indefinite	Plain and ordinary meaning, where all recitations of "a mass" and "the mass" refer to the same mass
"the oscillating resonant module[s]" / "the one or more oscillating resonant module[s]" U.S. Patent No. 11,152,882, Claims 10, 17, 19, 20 Proposed by Apple	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning
"the physical device" U.S. Patent No. 11,152,882, Claim 17 Proposed by Apple	No construction necessary; plain and ordinary meaning	Indefinite	Plain and ordinary meaning

E. Resonant Proposed Constructions

Term	Resonant's Proposed Construction	Apple's Proposed Construction	Court's Construction
"claim 1" U.S. Patent No. 9,941,830, Claim 4	"claim 3"	Plain and ordinary meaning	"claim 3"
"claim 1" U.S. Patent No. 11,152,882, Claim 17	"claim 10"	Plain and ordinary meaning	"claim 10"

It is so **ORDERED.**

SIGNED this 3rd day of June, 2024.

ALAN D ALBRIGHT
UNITED STATES DISTRICT JUDGE