

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN ROBOTIC FLOOR
CLEANING DEVICES AND
COMPONENTS THEREOF**

Investigation No. 337-TA-1252

COMMISSION OPINION

Table of Contents

I.	INTRODUCTION.....	3
II.	BACKGROUND	4
	A. Procedural Background	4
	B. The Accused Products	7
	C. The Domestic Industry Products.....	8
III.	COMMISSION REVIEW OF THE FID.....	8
IV.	ANALYSIS	9
	A. The '511 Patent	10
	B. The '423 Patent	10
	1. Technical Description of the Patent and Relevant Claims.....	11
	2. Asserted Claim 9	17
	3. Asserted Claim 12	22
	4. Asserted Claim 23	33
	C. The '517 Patent	42
	1. Technical Description of the Patent and Relevant Claims.....	43
	2. Claim Construction.....	47
	3. Infringement/Technical Prong (“Receiving System”).....	54
	4. Technical Prong (“Autonomously Identify”)	57
	5. Economic Prong	62
	6. Anticipation by Kawakami	62

PUBLIC VERSION

V. REMEDY, PUBLIC INTEREST, AND BONDING..... 71

A. Remedy..... 71

1. Limited Exclusion Order..... 71

2. Cease and Desist Order 73

B. The Public Interest..... 75

1. Public Health and Welfare..... 75

**2. Competitive Conditions in the United States Economy and the
 Production of Like or Directly Competitive Products in the United
 States 76**

3. U.S. Consumers 76

4. Public Interest Conclusion 82

C. Bonding..... 82

VI. CONCLUSION 85

PUBLIC VERSION

I. INTRODUCTION

On January 4, 2023, the Commission determined to review in part the final initial determination (“FID”) issued by the presiding Administrative Law Judge (“ALJ”) on October 7, 2022. *See* 88 Fed. Reg. 1405-07 (Jan. 10, 2023). On review, the Commission has determined that there has been a violation of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 (“section 337”), based on the infringement of claims 1 and 9 of U.S. Patent No. 10,813,517 (“the ’517 patent”) by respondents SharkNinja Operating LLC, SharkNinja Management LLC, SharkNinja Management Co., SharkNinja Sales Co., and EP Midco LLC, all of Needham, Massachusetts, and SharkNinja Hong Kong Co. Ltd. of Hong Kong (collectively, “Respondents” or “SharkNinja”). The Commission has also determined that the asserted claims of the ’517 patent are not invalid and that Complainant iRobot Corporation (“iRobot” or “Complainant”) of Bedford, Massachusetts, satisfied the domestic industry requirement with respect to the ’517 patent. Accordingly, the Commission has determined to: (1) issue a limited exclusion order (“LEO”) against Respondents’ infringing products and a cease and desist order (“CDO”) against each Respondent; and (2) set a bond during the period of Presidential review in an amount of twenty (20) percent of the entered value of the infringing products.

The Commission finds no violation of section 337 based on U.S. Patent Nos. 9,884,423 (“the ’423 patent”); 7,571,511 (“the ’511 patent”); and 10,835,096 (“the ’096 patent”). The Commission takes no position as to the FID’s findings on the economic prong of the domestic industry requirement with respect to the ’423, ’511, and ’096 patents.

This opinion sets forth the Commission’s reasoning in support of its determinations. The Commission affirms all findings in the FID that are not inconsistent with this opinion.

PUBLIC VERSION

II. BACKGROUND

A. Procedural Background

The Commission instituted this investigation on March 2, 2021, based on a complaint filed on behalf of Complainant iRobot. *See* 86 Fed. Reg. 12206-07 (Mar. 2, 2021). The complaint alleged violations of section 337 based upon the importation into the United States, the sale for importation, and the sale within the United States after importation of certain robotic floor cleaning devices and components thereof based on the infringement of certain claims of the '423, '511, '517, and '096 patents.¹ The Commission's notice of investigation identified the SharkNinja entities as respondents in the investigation. The Office of Unfair Import Investigations is not participating in the investigation.

On December 30, 2021, the ALJ issued a *Markman* Order (Order No. 37) construing the claim terms in dispute for all asserted patents. On October 7, 2022, the ALJ issued the FID finding a violation of section 337 based on infringement of claims 9 and 12 of the '423 patent and claims 1 and 9 of the '517 patent. The FID found no violation of section 337 based on claim 23 of the '423 patent, claims 17 and 26 of the '096 patent, and claims 12 and 23 of the '511 patent. The FID further found that iRobot has satisfied the domestic industry requirement with respect to the '423, '511, and '517 patents, and that SharkNinja failed to prove, by clear and convincing evidence, that claims 9, 12, and 23 of the '423 patent and claims 1 and 9 of the '517 patent are invalid under 35 U.S.C. §§ 101, 102, or 103. As to the '096 patent, the FID found

¹ U.S. Patent No. 10,296,007 ("the '007 patent") was also asserted in the investigation but was terminated based on the withdrawal of the complaint as to that patent. *See* Order No. 23 (Sept. 13, 2021), *unreviewed by* Comm'n Notice (Oct. 5, 2021); Order No. 38 (Jan. 4, 2022), *unreviewed by* Comm'n Notice (Jan. 25, 2022). Claims 9, 12, and 23 of the '423 patent; claims 12 and 23 of the '511 patent; claims 1 and 9 of the '517 patent; and claims 17 and 26 of the '096 patent remain asserted in this investigation.

PUBLIC VERSION

that iRobot failed to satisfy the technical prong of the domestic industry requirement, but that the economic prong would be satisfied. The FID included a recommended determination (“RD”) on remedy and bonding, recommending that the Commission issue an LEO directed to SharkNinja’s infringing products and a CDO directed to each SharkNinja entity, should the Commission find a violation of section 337. The RD also recommended that the Commission set a bond in an amount of twenty percent (20%) of the entered value of the infringing products during the period of Presidential review.

On October 24, 2022, SharkNinja and iRobot each petitioned for review of certain aspects of the FID.² On November 1, 2022, SharkNinja and iRobot each filed a response in opposition to each other’s petition for review.³

The Commission received no public interest comments from the public in response to the Commission’s *Federal Register* notice seeking comments on the public interest. *See* 87 Fed. Reg. 62451-52 (Oct. 14, 2022). iRobot submitted public interest comments pursuant to Commission Rule 210.50(a)(4) (19 C.F.R. § 210.50(a)(4)) on November 9, 2022.⁴

On November 16, 2022, SharkNinja filed a motion to submit a notice that the Patent Trial and Appeal Board (“PTAB”) issued a Final Written Decision (“FWD”) finding, *inter alia*, asserted claims 12 and 23 of the ’423 patent unpatentable. On December 1, 2022, SharkNinja filed a motion to submit information regarding iRobot’s failure to appeal a PTAB FWD

² *See* Complainant’s Petition for Review of the Final Initial Determination and Recommended Determination (Oct. 24, 2022) (“Complainant’s Pet.”); Respondents’ Petition for Review of the Initial Determination (Oct. 24, 2022) (“Respondents’ Pet.”).

³ *See* Respondents’ Response to Complainant’s Petition for Review of the Final Initial Determination and Recommended Determination (Nov. 1, 2022) (“Respondents’ Pet. Reply”); Complainant’s Response to Respondents’ Petition for Review of the Initial Determination (Nov. 1, 2022) (“Complainant’s Pet. Reply”).

⁴ *See* Complainant’s Statement on the Public Interest (Nov. 9, 2022) (“Complainant’s PI Br.”).

PUBLIC VERSION

rendering the asserted claims of the '511 patent unpatentable. On January 4, 2023, the Commission determined to grant both motions.

On January 4, 2023, the Commission determined to review certain aspects of the FID, namely:

- For the '511 patent, the FID's finding that estoppel applies to the Trilobite prior art device and that no violation of section 337 occurred with respect to the asserted claims of the '511 patent based on the PTAB's finding that the claims are unpatentable;
- For the '423 patent, the FID's findings that: (i) claim 9 is practiced by the DI products; (ii) SharkNinja's accused robots with forward-docking, *i.e.*, the IQ, AI, and AI-WD products, do not infringe claim 23; (iii) the prior art Dottie⁵ robot does not anticipate claim 23; (iv) the prior art combination of Dottie and Everett⁶ and the prior art combination of Dottie and Kim⁷ do not render claims 12 or 23, respectively, obvious under 35 U.S.C. § 103; (v) Complainant iRobot presented insufficient evidence of secondary considerations of non-obviousness with respect to claim 23; and (vi) claim 23 is directed to patent-eligible subject matter under 35 U.S.C. § 101;
- For the '517 patent, the ALJ's construction and finding that (i) the "receiving system" for claims 1 and 9 is not means-plus-function; (ii) claims 1 and 9 are infringed by SharkNinja's accused products; (iii) claims 1 and 9 are practiced by iRobot's DI products; and (iv) claims 1 and 9 are not anticipated by the asserted prior art (Kawakami⁸); and
- For all remaining asserted patents, *i.e.*, the '511, '423, '517, and '096 patents, the FID's finding that iRobot satisfied the economic prong of the domestic industry requirement.

See Comm'n Notice (Jan. 4, 2023), 88 Fed. Reg. 1405-07 (Jan. 10, 2023).

⁵ Dottie is an autonomous robotic vacuum cleaner system developed by Cybermotion, Inc. and Cyberclean Systems, LLC ("Cyberclean") in the 1990s. *See* RX-329C, RX-331C, RX-332C.

⁶ Everett is a book titled *Sensors for Mobile Robots, Theory and Application*, published in 1995. *See* RX-312, RX-314.

⁷ Kim refers to U.S. Patent No. 5,440,216. *See* RX-292.

⁸ Kawakami refers to JP Patent Publication No. H07-281752. *See* CX-660.

PUBLIC VERSION

The Commission notes that iRobot did not petition for review of, and therefore waived any argument with respect to, the FID’s finding of no violation as to the ’096 patent. The Commission did not review any of the FID’s findings as to that patent, except for the economic prong of the domestic industry requirement as to which we take no position on review.

In connection with its review, the Commission requested briefing on certain issues under review. Furthermore, the Commission requested written submissions from the parties, interested government agencies, and other interested persons on the issues of remedy, the public interest, and bonding. *Id.* On January 18, 2023, iRobot and SharkNinja each filed a brief on the requested issues under review, remedy, the public interest, and bonding.⁹ On January 25, 2023, the parties filed reply briefs.¹⁰ The Commission received no other submissions.

B. The Accused Products

The notice of investigation defines the accused products as “robotic vacuums and wet/dry mops, their docking stations, and associated parts and components (including software).” *See* 86 Fed. Reg. at 12207. The table below presents the SharkNinja robot product lines that iRobot accused of infringement for each asserted patent or claim.

⁹ *See* Complainant’s Response to the Commission’s Notice and Request for Written Submissions (Jan. 18, 2023) (“Complainant’s Not. Resp.”); Respondents’ Brief to the Commission on Issues Under Review and on Remedy, Bonding, and the Public Interest (Jan. 18, 2023) (“Respondents’ Not. Resp.”).

¹⁰ Complainant’s Reply to SharkNinja’s Submission on Remedy, Bond, and the Public Interest (Jan. 25, 2023) (“Complainant’s Not. Reply”); Reply Brief on the Issues of Remedy and Bonding (Jan. 25, 2023) (“Respondents’ Not. Reply”).

PUBLIC VERSION

Asserted Patent	DI Product(s)
'511 patent	ION, IQ, AI
'423 patent (claims 9 and 12)	ION, IQ
'423 patent (claim 23)	IQ, IQ-AE, AI, AI-WD, Lidar 360
'517 patent	AI-WD
'096 patent	AI-WD

See FID at xvi.

C. The Domestic Industry Products

The table below presents the DI products that are alleged to practice the asserted patents.

Asserted Patent	Accused Product(s)
'511 patent	600 Series, 800 Series, 900 Series, e Series, i Series
'423 patent (claims 9 and 12)	600 Series, 800 Series, 900 Series, e Series, i Series, s Series
'423 patent (claim 23)	600 Series, 800 Series, 900 Series, e Series, i Series, s Series, Braava m6
'517 patent	Roomba s9, Braava m6
'096 patent	Roomba i7(+), Roomba s9(+), Braava m6

See FID at xvi.

III. COMMISSION REVIEW OF THE FID

When the Commission reviews an initial determination, in whole or in part, it reviews the determination *de novo*. *Certain Soft-Edged Trampolines and Components Thereof*, Inv. No.

PUBLIC VERSION

337-TA-908, Comm'n Op. at 4 (May 1, 2015). Upon review, the "Commission has 'all the powers which it would have in making the initial determination,' except where the issues are limited on notice or by rule." *Certain Flash Memory Circuits & Prods. Containing Same*, Inv. No. 337-TA-382, USITC Pub. No. 3046, Comm'n Op. at 9-10 (July 1997) (quoting *Certain Acid-Washed Denim Garments & Accessories*, Inv. No. 337-TA-324, Comm'n Op. at 5 (Nov. 1992)). This is "consistent with the Administrative Procedure Act which provides that once an initial agency decision is taken up for review, 'the agency has all the powers which it would have in making the initial decision except as it may limit the issues on notice or by rule.'" *Certain Polyethylene Terephthalate Yarn & Prods. Containing Same*, Inv. No. 337-TA-457, Comm'n Op. at 9, 2002 WL 1349938 (June 18, 2002) (citing 5 U.S.C. § 557(b)).

With respect to the issues under review, "the Commission may affirm, reverse, modify, set aside or remand for further proceedings, in whole or in part, the initial determination of the administrative law judge." 19 C.F.R. § 210.45(c). The Commission also "may take no position on specific issues or portions of the initial determination," and "may make any finding or conclusions that in its judgment are proper based on the record in the proceeding." *Id.*; see also *Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984).

IV. ANALYSIS

For the reasons set forth below, the Commission has determined that the FID's findings with respect to the '511 patent are moot and vacates those findings, including those that the Commission determined not to review. In addition, the Commission has determined to affirm with modifications the FID's finding of a violation of section 337 with respect to the '517 patent, and to reverse the FID's finding of a violation of section 337 with respect to the '423 patent.

PUBLIC VERSION

A. The '511 Patent

The FID found no violation of section 337 with respect to the '511 patent, and iRobot petitioned for review of that determination. During the period of review, the PTAB issued an FWD on September 6, 2022, finding all asserted claims of the '511 patent, *i.e.*, claims 12 and 23, unpatentable. iRobot did not file an appeal from the PTAB's determination within the allowed appeal period. *See* Respondents' Motion to Submit Information regarding Final Invalidity of the Asserted Claims of U.S. Patent No. 7,571,511 (Dec. 1, 2022). Thus, the Commission finds that all issues relating to the '511 patent are moot and vacates the FID's findings with respect to that patent. *See United States v. Munsingwear*, 340 U.S. 36, 39-40 (1950); *U.S. Bancorp Mortg. Co. v. Bonner Mall P'ship*, 513 U.S. 18, 25 (1994); *LSI Corp. v. U.S. Int'l Trade Comm'n*, 604 F. App'x 924, 930 (Fed. Cir. 2015) ("The Commission is entitled to its own choice, as long as that choice is reasonable, about whether to set aside ALJ determinations that the Commission cannot review because of intervening expiration of the patent.").

The Commission notes that the certificate of cancellation, which is the formal action taken by the U.S. Patent and Trademark Office ("PTO") to cancel claims that were found unpatentable after all appeals are exhausted, has yet to issue for the '511 patent. The Federal Circuit, however, has held that the PTO's certificate of cancellation is merely a "non-discretionary formality," and it is "irrelevant" to the finality of the FWD. *See Security People, Inc. v. Iancu*, 971 F.3d 1355, 1361 (Fed. Cir. 2020). Accordingly, any relief would be illusory and the issues relating to the '511 patent are moot.

B. The '423 Patent

The Commission has determined to reverse the FID's finding that iRobot established the technical prong of the domestic industry requirement with respect to claim 9 of the '423 patent,

PUBLIC VERSION

i.e., the finding that the DI products practice that claim.¹¹ There is no dispute that the DI products practice the other asserted claims of the '423 patent, *i.e.*, claims 12 and 23, upon which iRobot also relies to establish the technical prong of the domestic industry requirement. The Commission, however, finds that claims 12 and 23 are invalid.¹² Thus, the Commission finds no violation of section 337 with respect to the '423 patent because iRobot failed to satisfy the technical prong of the domestic industry requirement based on a valid claim.

1. Technical Description of the Patent and Relevant Claims

The '423 patent (JX-1), entitled “Autonomous Robot Auto-Docking and Energy Management Systems and Methods,” issued on February 6, 2018, and has twenty-six (26) claims, of which claims 9, 12, and 23 are asserted against SharkNinja’s accused products and are relied upon for establishing the domestic industry requirement. *See* ID at 49, 51; JX-1, '423 patent at cover, 20:20-24, 31-36, 22:15-18. The earliest effective filing date for the '423 patent is January 21, 2004, and therefore the patent is subject to the pre-AIA¹³ patentability provisions of the Patent Act (effective March 16, 2013). *See* JX-1, '423 patent at cover.

The '423 patent is directed to a method for energy management in a robotic device that includes providing a base station for mating with the robotic device, determining a quantity of energy stored in an energy storage unit of the robotic device, and performing a predetermined task based at least in part on the quantity of energy stored. JX-1, '423 patent at Abstract. The

¹¹ iRobot asserted that the DI products practice claims 9, 12, and 23 of the '423 patent. *See* FID at 84; Complainant’s Initial Post-Hearing Br. (“CIB”) at 50 (Jan. 21, 2022).

¹² During the period of review, the PTAB issued an FWD on November 14, 2022, finding unpatentable claims 1, 12, 21, and 23 of the '423 patent, among others, but not claim 9. *See* Ex. A, Respondents’ Motion to Submit Notice of Issuance of Final Written Decision of the Patent Trial and Appeal Board in IPR2021-0054 Relating to U.S. Patent No. 9,884,423. Both iRobot and SharkNinja filed an appeal from the PTAB’s determination.

¹³ AIA refers to the Leahy-Smith America Invents Act (Sept. 16, 2011).

PUBLIC VERSION

method also includes emitting avoidance signals (*e.g.*, infrared signals from the base station) to prevent inadvertent contact between the robotic device and the base station, which can damage either device. *Id.* The '423 patent further discloses systems for emitting homing signals (*e.g.*, infrared signals from the base station) to allow the robotic device to accurately dock with the base station. *Id.* As illustrated in the embodiments of Figures 1, 2A, 5, and 7 (below), the inventive method and system includes a base station **10** having a top signal emitter **18** and a front signal emitter **20**. *Id.* at Figs. 1, 2A, 5:33-39, 6:14-22.

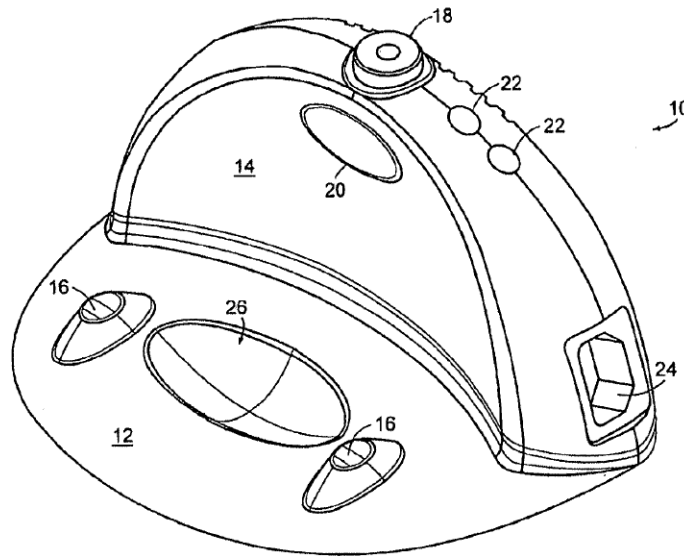


FIG. 1

The claimed invention also includes a robotic device **40**, adapted to dock with base station **10**, having signal detectors **50**, **52**. *Id.* at Figs. 2A-2B (reproduced below), 6:45-47, 7:24-25.

PUBLIC VERSION

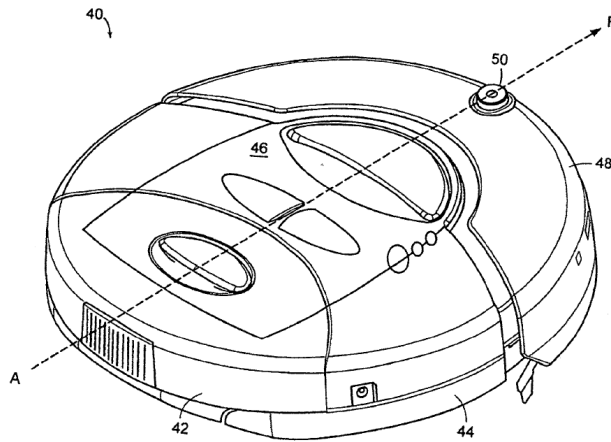


FIG. 2A

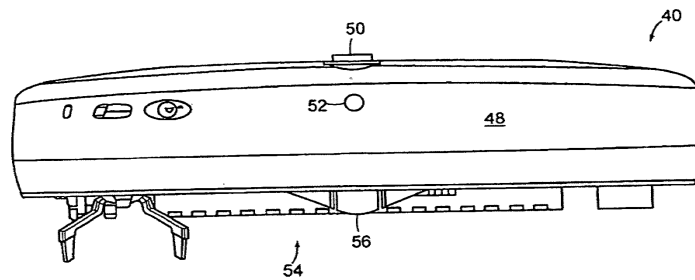
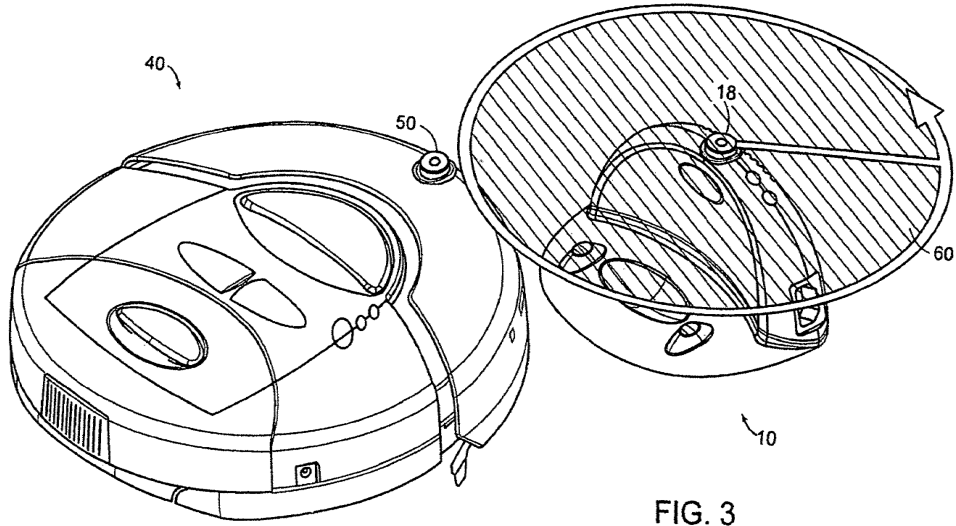


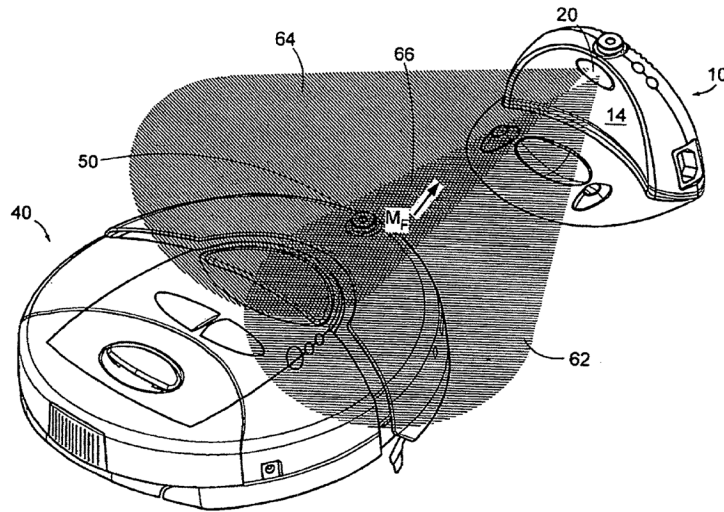
FIG. 2B

The robotic device, via the signal detectors, detects and receives an avoidance signal **60** from the top signal emitter **18** to avoid inadvertent contact with the base station during regular operation (e.g., cleaning or vacuuming of a room) when its battery charge is above a predetermined level. *Id.* at Figs. 3, 7, 11:62-12:3.

PUBLIC VERSION



The robotic device uses homing signals **62**, **64** to locate and dock with the base station for recharging when its battery charge is below a predetermined level or when its cleaning has been completed. *Id.* at Figs. 4A-4C, 13:65-14:2.



The inventive method and system further includes: (1) having the robotic device perform cleaning operations at a first speed, but dock with the base station at a reduced second speed to avoid damage during contact with the base station (*id.* at 15:5-12); and (2) having the

PUBLIC VERSION

robotic device go back out after recharging at the base station to complete cleaning when it detects that cleaning was not finished prior to recharging (*id.* at 18:63-19:5).

As noted, claims 9, 12, and 23 of the '423 patent are asserted for infringement and the domestic industry requirement. Claims 9 and 12 depend from independent claim 1, and claim 23 depends from independent claim 21. Independent claims 1 and 21 recite (with the relevant disputed limitations in ***bolded italics***):

1. A method of docking a robotic cleaning device with a base station that includes a plurality of signal emitters including a right signal emitter and a left signal emitter, the method comprising:

directing the robotic cleaning device about a room at a first velocity;

detecting, by a sensor mounted on the robotic cleaning device, a right signal transmitted by the right signal emitter of the base station and a left signal transmitted by the left signal emitter of the base station;

controlling forward movement of the robotic cleaning device toward the base station at a second velocity less than the first velocity while orienting the robotic cleaning device in relation to the right signal and the left signal;¹⁴

detecting contact with charging terminals on the base station;

stopping the forward movement of the robotic cleaning device in response to detecting contact with the charging terminals on the base station; and

charging a battery of the robotic cleaning device.

* * *

21. An autonomous cleaning robot, comprising:

an undercarriage;

a motive system configured to propel the undercarriage;

¹⁴ The recited clause “controlling forward movement . . . toward the base station at a second velocity less than the first velocity while orienting” is referred to herein as the “reduced second velocity” limitation.

PUBLIC VERSION

an energy storage [unit] supported by the undercarriage and configured to be charged while the cleaning robot is positioned at a base charging station; and

a navigational control system configured to autonomously:

control the motive system to direct the cleaning robot about a room at a first velocity;

control forward movement of the cleaning robot toward the base charging station at a second velocity less than the first velocity in response to detecting a need to charge the energy storage unit;

stop the forward movement of the cleaning robot to dock the cleaning robot to the base charging station;¹⁵ and

charge the energy storage with the cleaning robot docked at the base charging station.

JX-1, '423 patent (claims 1 and 21).

Dependent claims 9, 12, and 23 of the '423 patent, which are asserted for both infringement and domestic industry, and which depend from claims 1 or 21 (provided above), recite (with the relevant disputed limitations in ***bolded italics***):

9. The method of claim 1, further comprising ***avoiding, by the robotic cleaning device, the right signal and the left signal*** while an energy level of the battery of the robotic cleaning device remains above a predetermined energy level.¹⁶

* * *

12. The method of claim 1, ***wherein controlling the forward movement of the robotic cleaning device toward the base station at the reduced second velocity comprises initiating the forward movement at the second velocity in response to detecting the right signal or the left signal.***¹⁷

¹⁵ The recited clause “stop the forward movement . . . to dock the cleaning robot” is referred to herein as the “stop the forward movement” limitation or the 21[g] limitation.

¹⁶ The recited clause “avoiding, by the robotic cleaning device, . . .” is referred to herein as the “avoidance” limitation.

¹⁷ The recited clause “wherein controlling the forward movement . . . in response to detecting the right signal or left signal” is referred to herein as the “detecting and reducing second velocity” limitation.

PUBLIC VERSION

* * *

23. The autonomous cleaning robot of claim 21, *wherein the navigational control system is configured to direct the cleaning robot to a portion of the room still requiring cleaning following charging the energy storage unit.*¹⁸

JX-1, '423 patent (claims 9, 12, and 23).

2. Asserted Claim 9

The FID determined that there is a violation of section 337 based on claim 9 of the '423 patent, finding that the claim is infringed and not invalid. *See* FID at 61-65, 121-27, 216. The FID also found that iRobot's DI products practice claims 9, 12, and 23 of the '423 patent. *Id.* at 85-89, 216. SharkNinja does not dispute the FID's infringement and validity findings as to claim 9. SharkNinja, however, petitioned for review of the FID's finding that iRobot's DI products practice claim 9 of the '423 patent, and more specifically, the "avoidance" limitation recited in that claim. SharkNinja's Pet. at 51-55. As explained below, the Commission has determined to reverse the FID's finding that iRobot's DI products practice claim 9 of the '423 patent. Because the Commission has also determined below that claims 12 and 23 are invalid, the Commission finds no violation of section 337 because iRobot failed to satisfy the technical prong of the domestic industry requirement based on practice of a valid claim.¹⁹

Claim 9 recites the "method of claim 1, further comprising *avoiding, by the robotic cleaning device, the right signal and the left signal* while an energy level of the battery of the robotic cleaning device remains above a predetermined energy level." *See* JX-1, '423 patent

¹⁸ The recited clause "wherein the navigational control system . . . direct the cleaning robot to a portion of the room still requiring cleaning" is referred to herein as the "recharge and resume" limitation.

¹⁹ iRobot only asserted that the DI products practice claims 9, 12, and 23 of the '423 patent. *See* FID at 84; CIB at 50. Accordingly, any argument that the DI products practice other claims of the '423 patent has been forfeited under the Commission's rules. *See* 19 C.F.R. § 210.43(b)-(c).

PUBLIC VERSION

(claim 9). The FID found that in the DI products, “the [right and left] buoy signals create an overlapping area that can be described as a ‘halo’ effect that a robot can move through and still avoid the dock.” *See* FID at 90. Thus, the FID concluded that “the DI Product robot is still reacting to the buoy signals.” *See id.*

In its petition, SharkNinja argues that “[i]t is undisputed that the DI products avoid a *different signal*—the halo signal,” not the right and left signals as required by claim 9. *See* Respondents’ Pet. at 53 (emphasis in original) (citing Hr’g Tr. at 330:4-20 (Halloran²⁰)); JX-1, ’423 patent at claim 9 (stating that the claimed method “compris[es] avoiding by the robotic cleaning device the right signal and the left signal while an energy level of the battery of the robotic cleaning device remains above a predetermined energy level”). SharkNinja contends that the FID “ignored this difference, stating instead that the robot will ‘still avoid the dock.’” Respondents’ Pet. at 53 (citing FID at 90). SharkNinja further states that “contrary to the ID’s finding that the ‘robot is still reacting to the buoy signals,’ . . . iRobot’s witness and SharkNinja’s expert agreed that the DI products only ever react to the halo signal, not the right and left signals (buoys), in its avoidance behavior.” *Id.* (citing Hr’g Tr. at 330:4-20 (Halloran); Hr’g Tr. at 1205:15-22, 1206:7-13 (Bystrom²¹); Hr’g Tr. at 1234:24-1235:23 (Messner²²)). Indeed, SharkNinja continues, “iRobot’s witness was clear that iRobot itself refers to the halo as the ‘dock-avoid signal.’” *Id.* (citing Hr’g Tr. at 329:15-330:3 (Halloran)).

iRobot responds that “avoiding the right and left signal does not require actively detecting and avoiding both signals simultaneously.” Complainant’s Pet. Reply at 23 (citing

²⁰ Michael Halloran is iRobot’s Senior Vice President of Systems and Architecture.

²¹ Dr. Maja Bystrom is one of SharkNinja’s expert witnesses (source code).

²² Dr. William Messner is one of SharkNinja’s expert witnesses.

PUBLIC VERSION

Hr’g Tr. at 515:17-22, 523:22-524:6 (Reinholtz²³). Moreover, iRobot argues that SharkNinja’s interpretation “reads out the ‘halo signal’ embodiment specifically disclosed in the specification and illustrated in Figure 3.” *Id.*

The Commission finds that iRobot failed to satisfy its burden to establish that the DI products practice claim 9. The DI products avoid the “halo” or “dock-avoid” signal (shown in yellow below), but iRobot presented no evidence that the products avoid the right signal and left signal (shown in red and green below) as required by claim 9. As explained by SharkNinja, “the DI products include ‘IR LED emitters’ on the dock that emit right and left IR signals (or beams), shown in green and red, which iRobot calls ‘buoys.’” Respondents’ Pet. at 52 (citing Hr’g Tr. at 247:14-22, 326:2-6 (Halloran)); *see also* RDX-14; CDX-13 (reproduced below). “The robot follows the right and left signals when docking” to the dock or base station. Respondents’ Pet. at 52 (citing Hr’g Tr. at 248:24-249:8 (Halloran)). Dr. Halloran explained that the Omni receiver on the robot looks “[

]” *See* Hr’g Tr. at 249:1-8 (Halloran);

id. (“[]”).

²³ Dr. Charles Reinholtz is iRobot’s expert witness with respect to the ’511 and ’423 patents.

PUBLIC VERSION

[

]

RDX-14; CDX-13.

In addition, the dock also includes an omni-directional or circular signal, shown above in yellow, which emits a “halo,” “force field,” or “dock-avoid signal.” Respondents’ Pet. at 52 (citing Hr’g Tr. at 326:11-4, 329:15-330:3 (Halloran)); RDX-14; CDX-13. “The purpose of iRobot’s halo is not for docking, but instead for the robot to avoid the dock during normal cleaning,” to prevent inadvertent damage to the dock or base station or to the robot.

Respondents’ Pet. at 52 (citing Hr’g Tr. at 330:4-17 (Halloran)). That signal is different from the homing (or buoy signals) that the robot uses to dock. *See* Hr’g Tr. at 250:22-24 (Halloran). If, during normal operation, the robot encounters the halo or force field, it will avoid the dock and turn and move away. *See id.* at 250:25-251:1-4, 254:1-6. When the robot’s battery is low and it encounters the halo force field, it will follow the force field around until it encounters the right and left buoy signals and it will use them to dock. *Id.* at 250:5-9, 253:13-25.

The Commission finds that the DI devices do not avoid the right signal or left signal, but rather they avoid the halo signal, which is a different signal. The halo signal keeps the robot from encountering the docking station during normal cleaning, but the robot may still pass

PUBLIC VERSION

through the right and left buoy signals because they extend beyond the halo. RDX-14; CDX-13. SharkNinja argues (and iRobot does not dispute) that “[

]” See Respondents’ Pet. at 52 (citing Hr’g Tr. at 1205:15-22, 1206:7-13 (Bystrom); RX-788C.8; CX-3119C.4; RX-798C.1; RX-800C.1; CX-3107C.1). SharkNinja’s expert persuasively testified that the DI products are [

]. See Hr’g Tr. at 1205:15-22, 1206:7-13 (Bystrom).

iRobot’s arguments fail to satisfy its burden on this issue. It is true that the DI products avoid the dock during regular operation, as the FID found, but that by itself is insufficient to establish the claimed requirement of “avoiding, by the robotic cleaning device, *the right signal and the left signal.*” See JX-1, ’423 patent (claim 9) (emphasis added). As discussed above, the DI products avoid the halo signal, which is a different signal. By comparison, the FID found that SharkNinja’s accused products avoid the right and left signals because they maneuver to avoid the base station when they observe a D signal (the dock-avoid signal) *and* when they encounter left and right signals (*e.g.*, A, B, C, and C’) which the robot treats as a D signal. See FID at 63-64 (citing CIB at 37-39; Hr’g Tr. at 511:13-518:5 (Reinholtz); CX-368C.44, 73; CDX-4C.132-38; Hr’g Tr. at 774:14-778:19 (Lee²⁴)). There is no evidence that the DI products avoid anything other than the halo signal.

iRobot argues that “‘avoiding the right and left signal’ does not require actively detecting and avoiding both signals ‘simultaneously.’” Complainant’s Pet. Reply at 23. Nor does it require, according to iRobot, “absolute avoidance.” *Id.* at 24. iRobot, however, failed to establish that the DI devices avoid the right signal and the left signal at all, whether

²⁴ Mr. Damian Lee is SharkNinja’s Senior Vice President of Engineering.

PUBLIC VERSION

simultaneously, absolutely, or not. iRobot further points to Figure 3 of the '423 patent which, like the DI products, discloses an omni-directional signal (the halo signal) as the avoidance signal. Claim 9, however, refers to another embodiment in the specification where the robotic cleaning device avoids the right signal and the left signal. *See* JX-1, '423 patent, 12:12-15, claim 9. Indeed, the specification, consistent with the scope of claim 9, contemplates other embodiments for the avoidance signal, including “a plurality of single stationary beams or signals.” *See id.* at 12:12-15. Moreover, the scope of claim 9 “need not encompass all disclosed embodiments” of the '423 patent as iRobot suggests. *See TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008).

Thus, the Commission finds that the right and left buoy signals are distinct from the halo or force field avoidance signal in the DI products, and that iRobot failed to establish the DI products satisfy the “avoidance” limitation. Accordingly, the Commission has determined to reverse the FID’s finding that iRobot’s DI products practice claim 9 of the '423 patent. Because, as discussed below, the Commission also finds that claims 12 and 23 are invalid, the Commission finds no violation of section 337 based on the '423 patent because iRobot failed to satisfy the technical prong of the domestic industry requirement with respect to practice of a valid claim.

3. Asserted Claim 12

The FID determined that there is a violation of section 337 based on claim 12 of the '423 patent, finding that the claim is infringed and not invalid. *See* FID at 65-67, 121-27, 216. The FID also found that iRobot’s DI products practice claim 12 of the '423 patent. *Id.* at 85-89, 216. SharkNinja does not dispute the FID’s finding of infringement as to claim 12, but petitioned for review of the FID’s finding that iRobot’s DI products practice claim 12 of the '423 patent and

PUBLIC VERSION

the FID’s finding that claim 12 is not obvious under 35 U.S.C. § 103 over Dottie in view of Everett. SharkNinja’s Pet. at 55-63. The Commission determined to review the FID’s non-obviousness (but not the technical prong) findings with respect to claim 12.

The Commission has determined to reverse the FID’s finding that claim 12 is not obvious over Dottie in view of Everett.²⁵ Claim 1, upon which claim 12 depends, recites “[a] method of docking a robotic cleaning device with a base station comprising . . . controlling forward movement of the robotic cleaning device toward the base station at a second velocity less than the first velocity while orienting the robotic cleaning device in relation to the right signal and the left signal.” JX-1, ’423 patent (claim 1). Claim 12 further recites “[t]he method of claim 1 wherein controlling the forward movement of the robotic cleaning device toward the base station at the reduced second velocity comprises initiating the forward movement at the second velocity in response to detecting the right signal or the left signal.” *Id.* (claim 12). Dottie discloses a robotic vacuum cleaner system using a sonar system for docking, while Everett discloses using infrared right and left docking signals as required in claim 12.

While the FID agreed with SharkNinja that the combination of Dottie and Everett teaches or suggests the limitation recited in claim 12, the FID found “no evidence to document a reduced second velocity” as recited in claim 1, but rather, the FID continued, “the Docking Beacon Manual²⁶ describes an increased velocity.” *See* FID at 125. Thus, the FID found that “[i]n the context of the differences explained above about speeding up rather than slowing down upon docking and having a simple navigation system that worked using sonar, there is no clear and

²⁵ For the reasons set forth, *infra*, n.28, Commissioner Stayin does not join the Commission’s determination finding claim 12 obvious over Dottie in view of Everett.

²⁶ The Docking Beacon Manual describes a Cybermotion infrared docking beacon system, the DB-02 system, which is also discussed in Everett. *See* CX-3857; FID at 123.

PUBLIC VERSION

convincing evidence to provide the motivation to combine the teachings of Dottie and Everett to arrive at the invention as cited in claim 1.” *Id.* at 125-26.

SharkNinja argues that “Dottie already reduced its velocity when docking.” Respondents’ Pet. at 60. Indeed, SharkNinja explains, “the slow-moving docking process is evident from the demonstration of Dottie.” *Id.* at 61 (citing RX-324 at 12:25-14:30 (docking speed), 3:15-3:25 (cleaning speed)). Thus, SharkNinja contends, “there was no dispute that Dottie had a reduced second velocity when docking.” *Id.* SharkNinja further notes that Mr. Ward²⁷ testified regarding the benefits of Dottie’s slow approach to the docking station’s charging prong:

Q. Mr. Ward, can you describe what Dottie would do once it located the dock?

A. Dottie was programmed to be very deliberate, very methodical, very cautious as it approached the prong for two reasons. One is to make sure that the alignment remained true and, secondly, because of the size and weight and mass of Dottie, that she didn't move so fast that it would crush the prong.

Q. Was Dottie a heavy machine?

A. She was. She weighed 700 pounds.

Q. What would happen if Dottie didn't slow down when it hit that small prong?

A. It would damage the prong, probably crush the prong.

Id. (citing Hr’g Tr. at 975:22-976:10 (Ward)). SharkNinja further states that its “expert explained that there would have been no reason to remove that feature from Dottie.” *Id.* (citing Hr’g Tr. at 1269:1-11 (Messner) (“So we have already seen that Dottie moves more slowly as it approached the docking station. . . . And that behavior would not change if there were an infrared docking system . . . clearly, you’d want to move slowly toward the dock for exactly the same

²⁷ Mr. Charles Ward is the CEO of Cyberclean.

PUBLIC VERSION

reasons, at least, described by Mr. Ward, that is, maintaining alignment and making sure you didn't crush the charging prongs.”)).

SharkNinja argues that “[i]t was clearly erroneous for the ID to rely on an entirely separate reference [(the Docking Beacon Manual)] in rejecting SharkNinja’s obviousness argument related to Everett,” and finding that the combination of Dottie and Everett lacks the “reduced second velocity” limitation. *Id.* at 62. SharkNinja contends that “[i]n requiring that SharkNinja incorporate the entirety of the docking manual relied on by iRobot, the ID again improperly relied on bodily incorporation.” *Id.* at 62-63 (citing *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (“It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”); *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference, but rather whether a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.”)).

iRobot responds that “neither reference (alone or combined) taught a robot that traveled at a reduced velocity while orienting.” *See* Complainant’s Pet. Reply at 28. iRobot also argues that Dottie “had no ‘right signal’ or ‘left signal’ to use for orienting and instead relied on sonar to mate with its docking station.” *Id.* (citing RX-324 at 12:34-13:00; Hr’g Tr. at 975:5-19, 1003:16-19 (Ward)).

PUBLIC VERSION

The Commission finds that there is clear and convincing evidence that claim 12 is obvious over Dottie in view of Everett.²⁸ We first find that SharkNinja established that Dottie (*see* RDX-4C.63, reproduced below) discloses a robot that travels at a reduced speed while docking although Dottie uses a single sonar signal to locate the dock. *See* Respondents' Not. Resp. at 3, 4 (citing RX-324; RX-327; RDX-4.68; Hr'g Tr. at 975:5-19 (Ward); Hr'g Tr. at 1263:14-17 (Messner)); Respondents' Not. Reply at 2 (citing Hr'g Tr. at 975:15-976:10, 987:7-9 (Ward) ("Q. Did Dottie dock at a slower speed than its cleaning speed. A. Absolutely.")).

²⁸ Commissioner Stayin does not join the Commission's finding that claim 12 is obvious over Dottie in view of Everett. Admittedly, much of iRobot's testimony and argument regarding the combination is misplaced. For example, the question the Commission must answer is not whether Dottie "worked fine" to clean the office environment in which it operated, *see* Complainant's Not. Resp. at 7, but rather whether "a [robotic] designer of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to upgrading [Dottie]" with an infrared docking system like that in Everett. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 424 (2007). Likewise, iRobot's emphasis on the difficulties of bodily incorporating the Everett system into Dottie misses the mark. Nonetheless, iRobot presented expert testimony that infrared docking systems would have disadvantages (Hr'g Tr. 1524:3-1525:14 (Reinholtz)), corroborated by the testimony of the developers of Dottie that they "had the option of using infrared" signals, but nonetheless "chose sonar because of its simplicity." Hr'g Tr. 975:5-19 (Ward). The ALJ credited this testimony in finding no motivation to combine Dottie and Everett. FID at 124. Commissioner Stayin sees no reason to disturb the ALJ's weighing of the evidence and credibility determinations on this issue, particularly in light of the "clear and convincing evidence" standard SharkNinja must satisfy, and thus would affirm the FID.

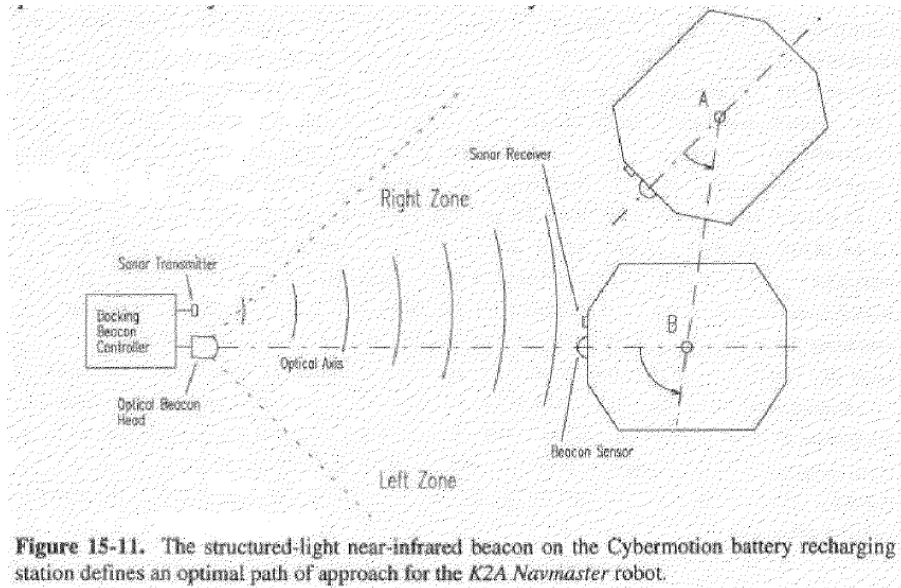
PUBLIC VERSION



RDX-4C.63.

The Commission also finds that SharkNinja established that Everett discloses the missing limitation from Dottie, *i.e.*, orienting the robotic cleaning device in relation to a right signal and a left signal, though it uses infrared signals. SharkNinja explained that Everett discloses “a docking beacon system including left and right infrared signals and ultrasonic beacons emitted from the base station.” *See* Respondents’ Pet. at 59 (citing RX-314.68-70, Fig. 15-11; Hr’g Tr. at 1263:14-1267:19 (Messner)); *see also* Respondents’ Not. Resp. at 3 (“Everett discloses autonomous robots, including a Cybermotion system, in which a mobile robot detects, orients with, and follows left and right infrared signals emitted by a base charging station to dock.”) (citing RX-314.68-70; Hr’g Tr. at 1264:15-1265:18 (Messner); RDX-4.69).

PUBLIC VERSION



RX-314.69.

The Commission further finds that SharkNinja established a motivation to combine Dottie and Everett. SharkNinja's expert explained that "it would have been obvious to use Everett's infrared docking system in place of Dottie's ultrasonic beams because infrared was a well-known alternative, infrared was already known to be an option when Cyberclean created Dottie, and infrared was known to have benefits such as improved reliability and accuracy." Respondents' Pet. at 60 (citing Hr'g Tr. at 1263:22-1264:14, 1266:7-1267:19 (Messner); Hr'g Tr. at 975:3-19 (Ward)); Respondents' Not. Resp. at 4-5 (citing RX-314.69; Hr'g Tr. at 1267:11-19 (Messner)). For instance, SharkNinja's expert testified that "infrared beams are detectable at larger distances than sonar" and that Everett's infrared signal system would allow for a "a larger range and a greater variety of approach angles" and when cleaning "wide open spaces," the robot would be able "to approach more directly than what is shown in the Dottie" video. Hr'g Tr. at 1267:6-19 (Messner).

SharkNinja demonstrated that "both sonar (ultrasound) and infrared were well known alternatives to achieve robot docking." Respondents' Not. Resp. at 5. As SharkNinja

PUBLIC VERSION

explained, even “the background section of the ’423 patent, which indicates what was known before the ’423 patent, states that ‘the types of charging stations and methods used by robots in finding or docking with them, radio signals, dead reckoning, ultrasonic beams, infrared beams, coupled with radio signals, vary greatly in both effectiveness and application.’” *Id.* (citing Hr’g Tr. at 1541:19-1542:25 (Reinholtz); JX-1, ’423 patent at 1:60-66). In view of this evidence, the Commission agrees with SharkNinja that “[o]ne of skill in the art would thus have understood the known interchangeability of sonar and infrared docking signals, would have understood that infrared docking signals would have improved Dottie in open environments, and would have been motivated to implement Everett’s infrared signals in Dottie for such applications.” *Id.* at 6 (citing Hr’g Tr. at 1266:10-1267:19 (Messner); *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007) (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person’s skill.”); *Unwired Planet, LLC v. Google*, 841 F.3d 995, 1003 (Fed. Cir. 2016) (“For the technique’s use to be obvious, the skilled artisan need only be able to recognize, based on her background knowledge, its potential to improve the device and be able to apply the technique.”)). Moreover, because Everett’s infrared docking system is one of “a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *See KSR*, 550 U.S. at 421. While Dottie’s sonar may be simpler than Everett’s infrared docking system, SharkNinja established that design incentives would motivate a person of ordinary skill in the art to include Everett’s system into Dottie, including improved range, accuracy, and reliability of the docking operation. *See e.g.*, Hr’g Tr. at 1263:22-1264:14 (Messner) (“[D]epending on the application, one would use one method, sonar in one instance

PUBLIC VERSION

and infrared in another instance, depending on what's required by the application"), 1266:7-1267:19 (Messner) (testifying that "the infrared beacon system would have improved the reliability, accuracy, and precision of docking in certain applications" and that "it was known that infrared beams are detectable at larger distances than sonar").

Like the FID, iRobot relies on the Docking Beacon Manual, which is not part of the asserted prior art combination, to argue against motivation to combine Dottie and Everett. iRobot states that Everett does not disclose that its robot reduces velocity when approaching the dock and the Docking Beacon Manual actually shows that a robot will speed up towards the docking station. *See* Complainant's Not. Resp. at 5-6 (citing CX-3857.1, 9-10). The Commission notes, however, that the reduced velocity feature already existed in Dottie and, as SharkNinja's expert explained, there would have been no reason to remove that feature from Dottie. *See* Respondents' Pet. at 61 (citing Hr'g Tr. at 1269:1-11 (Messner) ("So we have already seen that Dottie moves more slowly as it approached the docking station. . . . And that behavior would not change if there were an infrared docking system . . . clearly, you'd want to move slowly toward the dock for exactly the same reasons, at least, described by Mr. Ward, that is, maintaining alignment and making sure you didn't crush the charging prongs."), 1270:5-9 (Messner) ("The detection of the optical axis by detecting the right signal and left signal, that's how the optical axis is detected. And then the robot moves towards the docking station by making sure that it stays in between those two docking signals.")). By requiring the asserted combination to include the increased acceleration feature of the Docking Beacon Manual, the FID "bodily incorporated [that feature] into the structure of the primary reference." *See Allied Erecting*, 825 F.3d at 1381. In addition, the Commission notes that while the Docking Beacon Manual robot is accelerating when docking, that does not mean that its second (docking) velocity

PUBLIC VERSION

is greater than the first (normal cleaning) velocity since the robot begins docking from a complete stop. *See* Respondents’ Pet. at 63 (citing CX-3857.9-10; Hr’g Tr. at 1624:2-9 (Messner)).

Additionally, the Commission finds that there is a reasonable expectation of success because the prior art combination “simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement.” *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1366-67 (Fed. Cir. 2008) (quotation omitted); *see also KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”); *Hitachi Metals, Ltd. v. Alliance of Rare-Earth Permanent Magnet Indus.*, 699 F. App’x 929, 938-39 (Fed. Cir. 2017) (finding a reasonable expectation of success in combining references where the references disclose well-known techniques and the results would have been predictable). In this case, SharkNinja established that a person of ordinary skill in the art would have understood that the combination of Dottie and Everett would yield the predictable and desirable results of improving the range, accuracy, and reliability of the docking operation. *See* Respondents’ Post-Hearing Br. (“RIB”) at 63 (citing Hr’g Tr. at 1272:2-24, 1623:20-1624:1 (Messner); RX-314.69-70; RDX-4.78).

The Commission also finds that the secondary considerations do not support a finding of non-obviousness with respect to claim 12. As to nexus, iRobot argues that “claim 12’s limitations—reducing speed when left or right signals from the dock are detected, and using those signals to orient during docking—are important enabling features of ‘recharge and resume [of claim 23], because they help ensure that the robot successfully mates with its dock to

PUBLIC VERSION

recharge.”” *See* Complainant’s Not. Resp. at 7-8.²⁹ iRobot also argues, in connection with commercial success, that “consistently return[ing] to the dock to recharge [is] a feature that consumers have come to expect when purchasing a robotic cleaning vacuum.” *Id.* at 9 (citing Hr’g Tr. at 241:24-242:15, 245:15-21, 248:5-251:12 (Halloran); Hr’g Tr. at 381:19-383:10 (Archibald³⁰)). Lastly, iRobot argues that SharkNinja “copied its technology, including the specific requirement that its robots reduce their speed when the docking signals are observed.” *Id.* at 10.

SharkNinja argues against finding a nexus, stating that “iRobot’s arguments related to secondary considerations for claim 12 focus on ‘recharge and resume,’ a feature not even recited in claim 12 (or its independent claim).” *See* Respondents’ Not. Reply at 5. SharkNinja further states that the claimed infrared docking features are in no way “tethered to recharge and resume” because “iRobot accused many of SharkNinja’s products of infringing claim 23 but not claim 12.” *Id.* Similarly, SharkNinja argues that iRobot’s evidence of commercial success and copying is “untethered to the actual features of claim 12.” *See id.* at 7-8.

The Commission finds that, at best, iRobot established copying since SharkNinja was found to infringe claim 12 and there is evidence that SharkNinja “took inspiration from iRobot’s innovations, including the Roomba 980’s ‘dock finding abilities.’” *See* Complainant’s Not. Resp. at 10 (citing CX-1080C.1; CX-1397C; Hr’g Tr. at 381:19-383:10 (Archibald)). iRobot’s evidence of nexus and commercial success, however, is insufficiently related to the features recited in claim 12. Nor is that evidence limited to products actually covered by claim 12. The

²⁹ In connection with claim 23, the FID found that “iRobot presented insufficient evidence of nexus between public commentary and the recharge and resume feature of claim 23 of the ’423 patent.” *See* FID at 128.

³⁰ Ms. Lori Archibald is SharkNinja’s Senior Director of Product Development.

PUBLIC VERSION

evidence relating to the “recharge and resume” feature of claim 23 does not establish a nexus with respect to claim 12. *See* Complainant’s Not. Resp. at 9-10; Respondents’ Not. Reply at 7. Thus, the Commission finds that iRobot failed to establish that commercial success weighs in favor of non-obviousness.

On balance, the Commission finds that the secondary consideration factors do not outweigh a strong *prima facie* case of obviousness as established here over Dottie in view of Everett. *See Sundance*, 550 F.3d at 1368 (“Secondary considerations of nonobviousness . . . simply cannot overcome this strong *prima facie* case of obviousness.”); *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (finding substantial evidence of commercial success, industry praise, and long-felt need insufficient to overcome strong evidence of *prima facie* obviousness).

Thus, the Commission finds that SharkNinja established by clear and convincing evidence that claim 12 of the ’423 patent is obvious over Dottie in view of Everett. Accordingly, the Commission has determined to reverse the FID’s non-obviousness finding as to claim 12 and finds that there is no violation of section 337 as to that claim.

4. Asserted Claim 23

The FID found no violation of section 337 based on claim 23 of the ’423 patent, finding that the claim is not invalid but not infringed. *See* FID at 67-77, 119-21, 216. Both iRobot and SharkNinja petitioned for review of the FID. iRobot petitioned for Commission review of the FID’s non-infringement finding with respect to SharkNinja’s forward-docking AI and IQ robots. *See* Complainant’s Pet. at 6-9. SharkNinja petitioned for review of the FID’s findings that: (1) claim 23 is not anticipated by Dottie under 35 U.S.C. § 102; (2) claim 23 is not obvious over Dottie in view of Kim under 35 U.S.C. § 103; and (3) claim 23 is directed to patentable subject

PUBLIC VERSION

matter under 35 U.S.C. § 101. *See* Respondents' Pet. at 35-50. The Commission determined to review the issues raised by both parties.

a. Infringement

Before the ALJ, iRobot accused the following products of infringing claim 23 of the '423 patent: SharkNinja's IQ, IQ-AE, AI, AI-WD, and Lidar 360 robot products. *See* iRobot's Pet. at 6-7. The IQ and IQ-AE are part of SharkNinja's IQ family of robots and the AI, AI-WD, and Lidar 360 are part of SharkNinja's AI family of robots. *Id.* Claim 21 (from which asserted claim 23 depends) expressly recites, as part of the cleaning robot's docking procedure, "control forward movement of the cleaning robot toward the base charging station" at the reduced second velocity in preparation for docking and then recites the "stop the forward movement" limitation (21[g]), *i.e.*, "stop the forward movement . . . to dock." JX-1, '423 patent at 22:1-6 (claim 21). The FID found that the SharkNinja's accused products do not satisfy the "forward movement" limitation of claim 21[g]. *See* FID at 73-76.

It is undisputed that the IQ-AE and Lidar 360 products "reverse dock," while the other three accused products, the IQ, AI, and AI-WD products, perform "forward-docking." *Id.* at 75; Complainant's Pet. at 8-9. The FID went through the separate evidence for the forward-docking and reverse-docking robots and then correctly indicated that the accused forward-docking robots meet limitation 21[g], but the accused reverse-docking robots do not. FID at 74-75. Despite these findings, the FID then made a blanket statement with a heading that the "SharkNinja IQ and AI Products Do Not Infringe Claims 23." *Id.* at 77. A statement below this heading, however, indicates that this non-infringement determination only applies to the accused reverse-docking IQ-AE and Lidar 360 robots, based solely on that fact that these products do not meet the 21[g] limitation as all other claim limitations are met. *Id.* Despite this clarification of the

PUBLIC VERSION

heading, the FID did not find infringement of claim 23 with respect to the accused forward-docking robots, *i.e.*, the IQ, AI, and AI-WD products.

iRobot petitions for review regarding this error, and SharkNinja does not dispute iRobot's claim that the IQ, AI, and AI-WD robots with forward-docking, satisfy the limitation claim 21[g] and infringe claim 23 of the '423 patent. *See* Complainant's Pet. at 6-9; Respondents' Pet. Reply at 26. Accordingly, upon review of the record and the absence of dispute between the parties, the Commission finds that SharkNinja's IQ, AI, and AI-WD robots meet the 21[g] limitation (*i.e.*, "stop the forward movement . . . to dock") and infringe claim 23 of the '423 patent. However, as discussed *infra*, section IV.B.4.c, the Commission also finds that claim 23 is obvious over Dottie in view of Kim, and therefore the Commission affirms with modifications the FID's ultimate finding that there is no violation of section 337 with respect to claim 23 of the '423 patent.

b. Anticipation

The FID determined that claim 23 of the '423 patent is not anticipated by Dottie. In view of the finding that claim 23 is obvious over Dottie in view of Kim, *see infra*, section IV.B.4.c, the Commission has determined to take no position with respect to the FID's finding that claim 23 is not anticipated by Dottie. *See Beloit*, 742 F.2d at 1423.

c. Obviousness

The FID determined that claim 23 of the '423 patent is not obvious over Dottie in view of Kim. Claim 23 recites "[t]he autonomous cleaning robot of claim 21 wherein the navigational control system is configured to direct the cleaning robot to a portion of the room still requiring cleaning following charging the energy storage unit." JX-1, '423 patent (claim 23).

PUBLIC VERSION

The FID recognized that “Kim discloses a ‘self-moving’ cleaning robot that ‘autonomously navigates by mapping the room and monitoring its location, senses a low battery level during a cleaning operation, moves to an automatic charging station to charge its battery, and resumes cleaning from the interrupted position in the cleaning path.’” *See* FID at 119 (citing RX-292 (Kim) at Abstract, 1:5-13, 9:51-10:14, 10:19-11:65, 11:62-65, 12:12-15, 14:26-15:16, Fig. 15). The FID further noted that “iRobot did not dispute that Kim teaches the limitation of claim 23.” *Id.* The FID, however, found no motivation to combine Dottie with Kim because they “solve different technical problems.” *See id.* at 120. The FID reasoned that “Dottie navigates large commercial spaces on a pre-programmed path created using ‘PathCAD,’” while “Kim teaches an ultrasonic wave sensor 116 and optical sensor 118 to identify a location.” *Id.* (citing Hr’g Tr. at 1514:14-1515:15, 1530:8-9 (Reinholtz); RX-292 (Kim) at 14:3-15:2).

SharkNinja argues that “[o]ne of skill would have been motivated to modify Dottie with Kim’s teachings regarding returning to the last location the robot cleaned before it charged, to the extent not already disclosed in Dottie” because “[b]oth Dottie and Kim are autonomous cleaning robots that monitor their locations, both could face the problem of running low on battery during a cleaning operation, and both return to charge due to low battery level.” Respondents’ Pet. at 40 (citing Hr’g Tr. at 973:17-974:1 (Ward); Hr’g Tr. at 1261:8-1262:22 (Messner)); RX-292 at Abstract, 8:44-62). In addition, SharkNinja continues, “[b]oth Dottie and Kim return to their jobs after charging.” *Id.* (citing RX-292 at 14:63-15:2; RX-325.2). Furthermore, SharkNinja argues, “it would have been obvious to modify Dottie to do so based on the teaching of Kim, as it would fulfill Dottie’s purpose of completely cleaning an assigned area and yield more efficient and more complete cleaning.” *Id.* (citing Hr’g Tr. at 1261:24-1262:10 (Messner); RDX-4.65-66; RX-325.2).

PUBLIC VERSION

SharkNinja further argues that the FID incorrectly required bodily incorporation of Kim's docking beacon into Dottie. *Id.* at 41-42. SharkNinja explains that "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference, . . . but rather whether a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention." *Id.* at 41 (citing *Allied Erecting*, 825 F.3d at 1381). SharkNinja contends that it "never argued that one would use Kim's docking beacon in Dottie" but "[t]he sole aspect of Kim relied upon by SharkNinja was Kim's teaching regarding resuming cleaning at the 'position at which the cleaning operation is interrupted' before charging." *Id.* at 41-42 (citing RX-292 at 14:63-15:2). According to SharkNinja, "Dottie's system, which it was undisputed would return to charge if it was low on battery, would benefit from resuming cleaning where it left off, as in Kim." *Id.* at 42 (citing Hr'g Tr. at 1261:24-1263:1 (Messner)).

iRobot responds that "the FID correctly found no motivation to combine, agreeing that 'Kim and Dottie solve different technical problems' and that modifying Dottie based on Kim would 'change the principle of operation' of Dottie." Complainant's Pet. Reply at 19. For example, iRobot explains, "Dottie 'navigates large commercial spaces on a pre-programmed path' using 'specific points and paths,' whereas Kim 'teaches an ultrasonic wave sensor 116 and optical sensor 118 to identify a location.'" *Id.* (citing Hr'g Tr. at 1514:14-1515:15, 1530:8-9 (Reinholtz); RX-292 (Kim at 14:3-15:2)). Thus, iRobot continues, "Dottie and Kim have different principles of operation in how they determine and transmit location." *Id.* (citing Hr'g Tr. at 1530:20-1531:21 (Reinholtz)).

The Commission finds that there is clear and convincing evidence that claim 23 is obvious over Dottie in view of Kim. There is no dispute that Kim discloses the limitation

PUBLIC VERSION

recited in claim 23 (*i.e.*, a navigational control system is configured to direct the cleaning robot to a portion of the room still requiring cleaning following charging the energy storage unit), which is the only limitation that is arguably missing from Dottie. Kim discloses that “when its battery voltage ‘is decreased to below the predetermined level,’ the cleaning operation is interrupted and the robot cleaner returns to the charging station,” and “after the robot finishes charging, ‘the robot cleaner 1 moves to the position at which the cleaning operation is interrupted (particularly, the position at which the charging voltage of the battery 26 is decreased to below the predetermined level) and then again carries out the cleaning operation at the position.’” *See* Respondents’ Pet. at 39-40 (citing RX-292 at 8:44-62, 14:63-15:2, Fig. 14; Hr’g Tr. at 1261:8-23 (Messner); RDX-4.66).

The Commission also finds that SharkNinja established a motivation to combine Dottie and Kim and a reasonable expectation of success. As SharkNinja explains, “it would have been obvious to modify Dottie to do so based on the teaching of Kim, as it would fulfill Dottie’s purpose of completely cleaning an assigned area and yield more efficient and more complete cleaning.” *Id.* at 41 (citing Hr’g Tr. at 1261:24-1262:10 (Messner); RDX-4.65-66; RX-325.2). Thus, SharkNinja established that design incentives would motivate a person of ordinary skill in the art to include Kim’s “recharge and resume cleaning” feature into Dottie. *See KSR*, 550 U.S. at 401 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person’s skill.”); *Unwired Planet*, 841 F.3d at 1003 (“For the technique’s use to be obvious, the skilled artisan need only be able to recognize, based on her background knowledge, its potential to improve the device and be able to apply the technique.”)). Furthermore, there is a reasonable expectation of success

PUBLIC VERSION

because the prior art combination “simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement.” *See Sundance*, 550 F.3d at 1366-67 (quotation omitted); *see also* RIB at 51; Hr’g Tr. at 1262:16-22 (Messner).

That Dottie and Kim have different principles of operation does not preclude a finding of obviousness or motivation to combine. *See Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1371-72 (Fed. Cir. 2011) (“It would have been obvious to one of ordinary skill and creativity to adapt the safety mechanisms of the prior art . . . , even if it required some variation in the selection or arrangement of particular components.”). iRobot’s argument that “Dottie was a large commercial robot that used . . . bigger batteries to ensure the robot could complete its mission before returning to its dock” (*see* Complainant’s Pet. Reply at 18 (citing Hr’g Tr. at 1514:14-1515:15, 1530:20-1532:3 (Reinholtz); Hr’g Tr. at 973:17-974:1 (Ward), 1002:1-8; RX-332C.3), is not persuasive because Dottie itself included the ability to recharge and “return[] to its job,” even if it is not established clearly and convincingly that Dottie discloses directing the cleaning robot to a portion of the room still requiring cleaning as required in claim 23. *See* Respondent’s Pet. at 42 (citing Hr’g Tr. at 983:6-984:3 (Ward)); *see also* RX-325.2 (“Once the proper power has been restored the robot returns to its job.”). Nor are we persuaded by iRobot’s argument that Dottie and Kim have different principles of operation, because SharkNinja’s expert did not suggest incorporating Kim’s docking beacon into Dottie. As SharkNinja explains, “Dottie was capable of navigating on its own . . . , monitoring its location, returning to its charging station and docking when it was low on battery, and returning to its job after charging.” Respondents’ Pet. at 35 (citing Hr’g Tr. at 969:7-977:10 (Ward); RX-324; RX-325). And “[t]he sole aspect of Kim relied upon by SharkNinja was Kim’s teaching regarding

PUBLIC VERSION

resuming cleaning at the ‘position at which the cleaning operation is interrupted’ before charging.” *Id.* at 41-42 (citing RX-292 at 14:63-15:2; Hr’g Tr. at 1261:24-1263:1 (Messner)). Thus, we agree that the FID effectively required bodily incorporation of Kim’s docking beacon into Dottie instead of considering “whether a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.” *See Allied Erecting*, 825 F.3d at 1381.

As to secondary considerations, the FID found that “iRobot presented insufficient evidence of nexus between public commentary and the recharge and resume feature of claim 23 of the ’423 patent.” *See* FID at 128. iRobot argues that “the FID found that numerous iRobot Roomba products (and Shark’s robots) practice the asserted claims of the ’423 patent,” but failed to “analyze[] whether a presumption of nexus applies.” Complainant’s Pet. at 10. iRobot also argues that “[t]he overwhelming evidence demonstrates that the success of both iRobot’s and Shark’s products is tied to their ability to successfully find and dock with their charging stations and resume cleaning after charging.” *Id.* at 11. iRobot further argues that “[it] has received industry-wide praise for the Roomba’s ability to dock properly, and [SharkNinja] knowingly implemented the ’423 patent technology in its products.” *Id.* at 12.

SharkNinja responds that “iRobot cannot have a presumed nexus, when, by its own admission, its products are covered by dozens of patents directed to different features.” Respondents’ Pet. Reply at 15. SharkNinja further contends that “iRobot’s arguments in support of commercial success for the ’423 patent consisted of nothing more than identifying its revenue and R&D expenditures” and that “iRobot did not even attempt to link any of those commercial revenues to the claimed features.” *Id.* at 16. For example, SharkNinja explains, “iRobot itself ranked various items in terms of ‘category of desire’ for its products and highest

PUBLIC VERSION

among those were items related to iRobot’s brand (*i.e.*, marketing)” and “[n]ear the bottom of the list is a mention of recharge and resume, which iRobot itself categorizes as a ‘LOW Category Driver of Desire.’” *Id.* at 18 (citing CX-768.20). As to copying, SharkNinja argues that “[its] product rel[ies] solely on a 60-minute timer [for its recharge and resume feature], where the robot will return to charge after a 60-minute timer elapses, regardless of battery level, and resume after charging.” *Id.* at 20-21 (citing Hr’g Tr. at 1226:11-25 (Messner)).

SharkNinja further argues that iRobot’s evidence of industry praise is insufficiently related to the claimed feature but relates to other features including “smart sensors, edge-sweeping brush, dual brushes, and dirt detect,” as well as “Cleaning under furniture,” “Going over each spot multiple times,” “Working independently,” “Going into corners and along walls,” “Scheduling ahead of time,” and “Carefully navigating your home.” *Id.* at 21-22 (citing CX-1245C.12; CX-1246C.36; CX-768.20). SharkNinja contends that “where these materials even mention recharge and resume, they identify it as an unimportant feature.” *Id.* at 22-25.

The Commission finds that, at best, iRobot established copying since SharkNinja was found to infringe claim 23 and there is evidence that SharkNinja was inspired by iRobot’s product features. *See* Hr’g Tr. at 384:14-385:7 (Archibald) (agreeing that “iRobot’s dock-finding abilities were amazing and awe inspiring in 2018”); Complainant’s Not. Resp. at 10 (citing CX-1080C.1; CX-1397C; Hr’g Tr. at 381:19-383:10 (Archibald)). Even if the Commission were to presume a nexus between the secondary considerations and the claimed invention, however, the presumption is rebutted in view of the substantial evidence that other unclaimed features may be responsible in full or in part for the commercial success and industry praise. *See* Respondents’ Pet. Reply at 21-22 (citing CX-1245C.12; CX-1246C.36; CX-768.20; CX-1968 at 1-2; CX-1978; CX-1547.6, 9; CX-1971 at 3).

PUBLIC VERSION

On balance, the Commission finds that the secondary consideration factors do not outweigh a strong *prima facie* case of obviousness as established here over Dottie in view of Kim. *See Sundance*, 550 F.3d at 1368 (“Secondary considerations of nonobviousness . . . simply cannot overcome this strong *prima facie* case of obviousness.”); *Leapfrog*, 485 F.3d at 1162 (finding substantial evidence of commercial success, industry praise, and long-felt need insufficient to overcome strong evidence of *prima facie* obviousness).

Thus, the Commission finds that SharkNinja established by clear and convincing evidence that claim 23 of the ’423 patent is obvious over Dottie in view of Kim. Accordingly, the Commission has determined to reverse the FID’s non-obviousness finding as to claim 23 and finds that there is no violation of section 337 as to that claim.

d. Patent Eligibility

The FID determined that claim 23 of the ’423 patent is patent-eligible under 35 U.S.C. § 101. *See* FID at 128-132 (citing *Alice Corp. Pty. v. CLS Bank Int’l*, 573 U.S. 208, 217-18 (2014)). In view of the finding that claim 23 is obvious over Dottie in view of Kim, *see supra*, section IV.B.4.c, the Commission has determined to take no position with respect to the FID’s finding that claim 23 is patent-eligible under 35 U.S.C. § 101. *See Beloit*, 742 F.2d at 1423.

C. The ’517 Patent

The Commission determined to review the ALJ’s claim construction for the term “receiving system” as well as the FID’s infringement, technical prong, and anticipation findings.

As discussed below, the Commission has determined to affirm with modifications and to supplement the ALJ’s construction of the term “receiving system.” The Commission has also determined to affirm with modifications and to supplement the FID’s infringement and technical prong determinations. The Commission has further determined to affirm the FID’s finding that

PUBLIC VERSION

Kawakami does not anticipate the asserted claims of the '517 patent. Accordingly, the Commission affirms the FID's ultimate finding of a violation of section 337 with respect to asserted claims 1 and 9 of the '517 patent.

1. Technical Description of the Patent and Relevant Claims

The '517 patent (JX-3), entitled "Navigational Control System for a Robotic Device," issued on October 27, 2020, and has twenty-two (22) claims, of which claims 1 and 9 are asserted against SharkNinja's accused products. *See* FID at 133; JX-3, '517 patent at cover, 34:37-57, 35:16-38, 56-62. The '517 patent claims priority to a provisional application filed on September 13, 2002, and therefore it is subject to the pre-AIA patentability provisions of the Patent Act (effective March 16, 2013). *See* JX-3 at cover.

The '517 patent is directed to an autonomous cleaning apparatus, *i.e.*, a robotic device that can be integrated with a navigational control system and that includes a chassis, a drive system disposed on the chassis and operable to enable movement of the cleaning apparatus, and a controller in communication with the drive system. JX-3, '517 patent at Abstract. The controller includes a processor operable to control the drive system to steer movement of the cleaning apparatus, and the apparatus includes a cleaning head system disposed on the chassis and a sensor system (including debris, bump, and obstacle sensors) in communication with the controller. *Id.* The processor executes a prioritized program to identify and implement one or more dominant behavioral modes (*e.g.*, cleaning, escape, and safety behavioral modes) based upon at least one signal received from the sensor system. *Id.*

Figure 1 (reproduced below) and Figure 2 of the '517 patent illustrate the inventive robotic device **100**.

PUBLIC VERSION

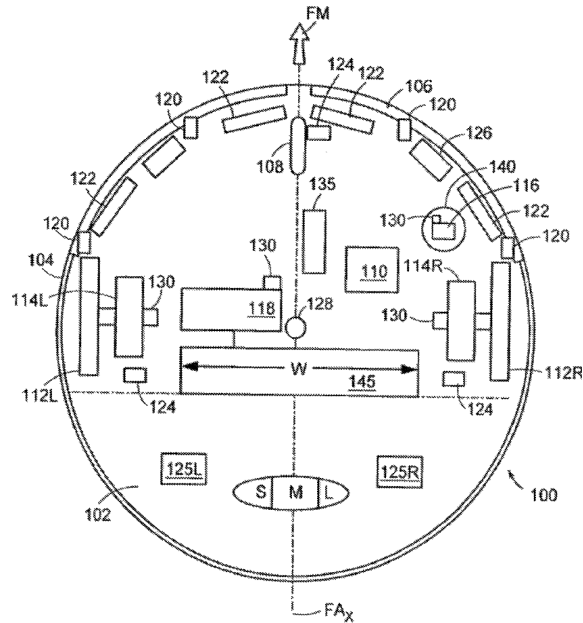


FIG. 1

The specification explains that the hardware of the robotic device **100** includes “a power system, a motive power system, a sensor system, a control module, a side brush assembly or a self-adjusting cleaning head system, respectively, all of which are integrated in combination with the housing infrastructure.” JX-3, '517 patent at 8:14-23.

Additionally, Figure 9 (reproduced below) illustrates the inventive navigational control system **10**, for use in combination with the robotic device **100**, to provide motion programming, or control signals, to enhance the cleaning efficiency of the robot. *See id.* at 21:34-50. The navigational control system **10** includes a transmitting subsystem **12** and a receiving subsystem **20** that communicates with a receiving unit **16** (or detector **128**) of the robotic device to provide the control signals. *See id.* at 21:34-50, 23:48-64.

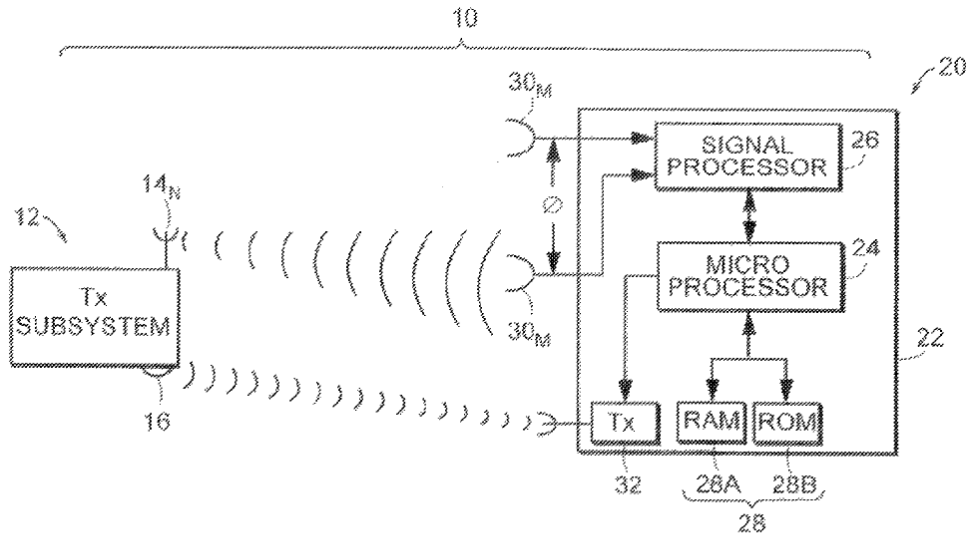


FIG. 9

The navigational control system, including the receiving subsystem (or system), allows the device to store a map of the environment based upon the robot's previous exploration, including the identification of a hot spot or zone. *Id.* at 22:31-40, 23:7-18, 27:3-12, 27:61-28:11. During a cleaning mission, the robot is capable of determining its position in the environment and, when the robot is located in the hot spot or zone that it previously identified, initiating a particular behavior or conduct in that location. *Id.* at 27:61-28:11. This allows the robot to apply useful cleaning behaviors (*e.g.*, increased vacuuming power, edge following, escape behavior, turning, increasing/decreasing speed, mopping, etc.) to particular areas based on what the robot had observed about those areas. *Id.* at 12:15-32. The inventive apparatus includes further features, *e.g.*, a dual-stage brush assembly, that optimizes cleaning, especially for carpets. *Id.* at Fig. 3, 11:19-47.

The specification also describes the receiving subsystem 20 as including "a processing unit 22 that includes a microprocessor 24, a signal processing unit 26, a memory module 28, and a set of detection units 30M." *Id.* at 27:4-8. "Additionally, the receiving subsystem 20 can also include a transmitting unit 32 for those preferred embodiments of the navigational control system

PUBLIC VERSION

10 wherein the receiving subsystem **20** is operated or functions as the base station for the navigational control system **10**.” *Id.* at 27:8-12. Furthermore, “[f]or those embodiments of the navigational control system **10** according to the present invention wherein the receiving unit **20** is integrated in combination with the robotic device **10**, the transmitting unit **32** is not required.” *Id.* at 32-13-17. Still further, the specification contemplates that “[t]he receiving subsystem **20** for the navigational control system **10**’ preferably comprises a single omnidirectional detection unit **30**.” *Id.* at 33:56-58.

iRobot asserts claims 1 and 9 of the ’517 patent for both infringement and for the technical prong of the domestic industry requirement. Independent claim 1 of the ’517 patent recites (with the relevant disputed limitations in ***bolded italics***):

1. An autonomous cleaning apparatus comprising:
 - a cleaning head;
 - a drive system operable to move the cleaning apparatus along a surface of a working environment while the cleaning head cleans the surface; and
 - a receiving system configured to prior to initiation of a cleaning mission of the cleaning apparatus, store a map of at least a portion of the working environment based on previously determined positions of the cleaning apparatus and autonomously identify a hot spot in the map based on the previously determined positions of the cleaning apparatus,***
 - determine, during the cleaning mission, a position of the cleaning apparatus in the working environment, and***
 - cause the cleaning apparatus, during the cleaning mission, to initiate a spot coverage cleaning behavior of the cleaning apparatus in response to the determined position of the cleaning apparatus corresponding to the hot spot in the stored map.***³¹

JX-3, ’517 patent at 34:37-57.

³¹ The recited clause “a receiving system configured to prior to initiation of a cleaning mission of the cleaning apparatus . . .” as the “receiving system” limitation.

PUBLIC VERSION

Claim 9 of the '517 patent depends from independent claim 4, both of which recite as follows (with the relevant disputed limitations in *bolded italics*):

4. An autonomous cleaning apparatus comprising:

a cleaning head;

a drive system operable to move the cleaning apparatus along a surface of a working environment while the cleaning head cleans the surface; and

a receiving system configured to prior to initiation of a cleaning mission of the cleaning apparatus, store a map of at least a portion of the working environment based on previously determined positions of the cleaning apparatus and autonomously identify a predefined zone in the map based on the previously determined positions of the cleaning apparatus,

determine, during the cleaning mission, a position of the cleaning apparatus in the working environment, and

cause the cleaning apparatus, during the cleaning mission, to initiate a prescribed conduct to alter a movement activity of the cleaning apparatus in response to the determined position of the cleaning apparatus being within the predefined zone in the working environment and indicated on the stored map.

* * *

9. The cleaning apparatus of claim 4, wherein configurations of the receiving system to cause the cleaning apparatus to initiate the prescribed conduct comprises configurations of the receiving system to initiate a behavior selected from the group consisting of a spot coverage behavior, an edge-following behavior, an escape behavior, a turn behavior, and a room coverage behavior.

Id. at 35:16-38, 56-62.

2. Claim Construction

The ALJ construed the term “receiving system” in accordance with its plain and ordinary meaning and not as a means-plus-function term under 35 U.S.C. § 112, ¶ 6. *See* Order No. 37 at 24-29. The ALJ explained that “claims 1 and 4 do not contain the words ‘means for,’” and therefore, “there is a rebuttable presumption that § 112, ¶ 6 does not apply.” *Id.* at 25 (citing

PUBLIC VERSION

Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (*en banc*); *Samsung Elecs. Am., Inc. v. Priusa Eng'g Corp.*, 948 F.3d 1342, 1353 (Fed. Cir. 2020)).

The ALJ reasoned that “the intrinsic record discloses sufficiently definite structure” and that the term “receiving system” is recited in the claims as one of three “structural components.” *Id.* at 26. In addition, the ALJ explained that “the specification depicts a ‘receiving subsystem’ as a structural component of a navigational control system” and it “includes well-known structures, including ‘a microprocessor **24**,’ ‘signal processing unit **26**,’ ‘RAM [random-access memory] **28A**,’ ‘ROM [read-only memory] **28B**,’ and ‘detection units **30M**.” *Id.* (citing JX-3, ’517 patent at Fig. 9, 7:6-8, 21:34-50; 27:4-14, 29:27-35).

The ALJ further explained that dependent claim 14, which further requires that “the receiving system comprise[] an omnidirectional detection unit,” also “‘suggest[s] that § 112, ¶ 6 does not govern’ because it ‘add[s] [a] limitation[] that ... describe[s] [a] particular structural feature[]’ of a ‘receiving system.’” *Id.* at 27 (citing *TEK Glob., S.R.L. v. Sealant Sys. Int’l, Inc.*, 920 F.3d 777, 786 (Fed. Cir. 2019); *Diebold Nixdorf, Inc. v. Int’l Trade Comm’n*, 899 F.3d 1291, 1298 (Fed. Cir. 2018)). The ALJ also rejected SharkNinja’s attempt to limit the term “receiving system” to “a system that includes an omnidirectional detection unit that can detect unique operating frequencies of distributed transmitting units to determine the position of the cleaning apparatus in the working environment.” *See id.* at 28. The ALJ noted that “[c]laim 14 which is narrower than claim 4, adds ‘an omnidirectional detection unit,’ indicating that broader claim 4 is not so limited.” *Id.*

SharkNinja argues that “[t]he term ‘receiving system’ has no established meaning in the art,” and should be construed as a means-plus-function term. *See* Respondents’ Pet. at 68-69. SharkNinja also argues that the ALJ erred in relying on the specification rather than the claims to

PUBLIC VERSION

determine whether the term “receiving system” connotes sufficient structure. *See id.* at 70. As to the corresponding structure, SharkNinja argues that “there is only a single embodiment in which the receiving system is located on the cleaning apparatus, as recited in the claims, and “[t]his alternative embodiment is identified as navigation system **10**’, as opposed to navigation system **10**.” *Id.* at 72 (citing JX-3, ’517 patent at 33:31-34:19, Fig. 13). In that embodiment, SharkNinja continues, “the structure disclosed for the receiving system is as follows: ‘The receiving subsystem **20** for the navigational control system **10**’ preferably comprises a single omnidirectional detection unit **30** [and] ‘[t]he omnidirectional detection unit **30** is configured and operative to scan through the unique operating frequencies utilized by the distributed transmitting units **141**, **142**, **143**.’” *Id.* (citing JX-3, ’517 patent at 33:56-65); *see also* Respondents’ Not. Resp. at 10.

iRobot responds that SharkNinja failed to rebut the presumption that § 112, ¶ 6 does not apply. *See* Complainant’s Pet. Reply at 34. According to iRobot, “[t]he intrinsic record for the ’517 patent makes plain that the claimed ‘receiving system’ connotes a sufficiently definite structure” and “it is wholly proper, and in fact required, to consider the specification of a patent when considering whether or not § 112, ¶ 6 applies to a term.” *Id.* at 35-37 (citing *TEK Glob.*, 920 F.3d at 785). iRobot also argues that the claim language shows that the claimed “receiving system” is one of three structural components for the claimed autonomous cleaning apparatus. *Id.* at 35. In addition, iRobot continues, “[t]he specification also depicts a ‘receiving subsystem’ as a structural component of a navigational control system . . . includ[ing] several well-known structures, including ‘a microprocessor 24,’ ‘signal processing unit 26,’ ‘RAM [random-access memory] 28A,’ ‘ROM [read-only memory] 28B,’ and ‘detection units 30M.’” *Id.* (citing JX-3, ’517 patent at 7:6-8, 21:34-50; 27:4-14, 29:27-35, Fig. 9).

PUBLIC VERSION

iRobot further contends that it “should come as no surprise” that “a structure responsible for detecting external signals is named a ‘receiving system.’” *Id.* at 36 (citing JX-3, ’517 patent at 24:22-43 (describing reception of “radio frequency” beams by a “receiving subsystem”)). iRobot explains that “[m]any devices take their names from the functions they perform.” *Id.* (citing *Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003, 1008 (Fed. Cir. 2018); *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996)). According to iRobot, “skilled artisans ‘could reasonably discern from the claim language’ and specification that the ‘receiving system’ here is ‘used not as [a] generic term[] or black box recitation[] of structure or abstractions, but rather as [a] specific reference[] to conventional’ technologies.” *Id.* (citing *Zeroclick*, 792 F.3d at 1008).

If section 112, ¶ 6 does apply, iRobot identifies the corresponding structure as “the receiving subsystem **20** of the navigational control system **10** according to the present invention [that] comprises a processing unit **22** that includes a microprocessor **24**, a signal processing unit **26**, a memory module **28**, and a set of detection units **30M**.” *Id.* at 41-42 (citing JX-3 at 27:4-8); *see also* Complainant’s Not. Resp. at 8. iRobot further argues that SharkNinja’s “alternative structure improperly ‘import[s] into the claim features that are unnecessary to perform the claimed function’” and “impermissibly import[s] into the claim limitation specific [elements] of a preferred embodiment that are unnecessary to perform the claimed function.” Complainant’s Pet. Reply at 43-44 (citing *Northrop Grumman Corp. v. Intel Corp.*, 325 F.3d 1346, 1352 (Fed. Cir. 2003); *Acromed Corp. v. Sofamor Danek Grp.*, 253 F.3d 1371, 1382 (Fed. Cir. 2001)); *see also* Complainant’s Not. Resp. at 6-8.

Ultimately, the dispute comes down to whether the receiving system requires an omnidirectional detection unit, and the Commission finds that it does not, regardless of whether

PUBLIC VERSION

the term is construed as means-plus-function or not. As an initial matter, the Commission agrees with the ALJ's construction of the term "receiving system" in accordance with the plain and ordinary meaning and not as a means-plus-function term. The Commission agrees that the term "receiving system" itself (as recited in the claims and described in the specification) connotes sufficient structure. The claims recite "receiving system" as one of three claimed structural components of the autonomous cleaning apparatus, and the specification is consistent with the claim language. *See* Complainant's Pet. Reply at 35 ("[E]ach claim organizes the required elements into three principal—and structural—components: 'a cleaning head,' 'a drive system,' and 'a receiving system.'"). As noted by iRobot, the specification also describes the structure of a "receiving system" using well-known constituent structures. *Id.* ("[T]he specification also depicts a 'receiving subsystem' as a structural component of a navigational control system . . . includ[ing] several well-known structures, including 'a microprocessor **24**,' 'signal processing unit **26**,' 'RAM [random-access memory] **28A**,' 'ROM [read-only memory] **28B**,' and 'detection units **30M**.'" (citing JX-3, '517 patent at 7:6-8, 21:34-50; 27:4-14, 29:27-35, Fig. 9).

As iRobot explains, the claimed "receiving system" connotes sufficient structure because it is "a structure responsible for detecting external signals." *See* Complainant's Pet. Reply at 36 (citing JX-3, '517 patent at 24:22-43 (describing reception of "radio frequency" beams by a "receiving subsystem"); Complainant's Claim Construction Br. at 51 (citing CXM-14 (The Free Dictionary) (defining "receiving system" as a "set that receives radio or tv signals")); *see also* *EnOcean GmbH v. Face Int'l. Corp.*, 742 F.3d 955, 959 (Fed. Cir. 2014) (vacating the PTAB's finding that the term "receiver" is a means-plus-function term); JX-3, '517 patent at 25:18-28, 26:17-27, 34:10-16 (referring interchangeably to a *receiver* subsystem **20** and a receiving

PUBLIC VERSION

subsystem **20**). The Commission finds that the term receiving system is not merely a “black box that performs a recited function” but connotes sufficiently definite structure to those of ordinary skill in the art. *See EnOcean*, 742 F.3d at 959. And although the Commission recognizes that the receiving system of the ’517 patent may have additional functionality compared to a typical receiver, that does not transform the term “receiving system” into a means-plus-function term for purposes of the ’517 patent.

Alternatively, even if the Commission construes the term “receiving system” as a means-plus-function term, the Commission agrees that the claimed function is performed by iRobot’s proposed corresponding structure. Specifically, the parties agree that the claimed functions of the “receiving system” are those recited in the claims, *i.e.*, “store a map,” “autonomously identify a [hot spot or predefined zone],” “determine . . . a position,” and “initiate a [spot cleaning behavior or prescribed conduct].” *See* Complainant’s Not. Resp. at 11; Respondents’ Not. Resp. at 9; JX-3, ’517 patent at claims 1 and 4. These claimed functions are performed by the corresponding structure identified by iRobot, *i.e.*, “the receiving subsystem **20** of the navigational control system **10** according to the present invention [that] comprises a processing unit **22** that includes a microprocessor **24**, a signal processing unit **26**, a memory module **28**, and a set of detection units **30M**.” Complainant’s Pet. Reply at 41-42 (citing JX-3 at 27:4-8); Complainant’s Not. Resp. at 10-11; *see also* Order No. 37 at 24.³² This is the same portion of the specification upon which the Commission relies above to show that the term “receiving system” connotes sufficient structure. Accordingly, the relevant issue with respect to structure

³² SharkNinja was aware of iRobot’s proposed corresponding structure since the claim construction stage of the investigation and cannot claim surprise or prejudice from the Commission’s adoption of that structure. *See* Order No. 37 at 24.

PUBLIC VERSION

is not whether this term is means-plus-function, but whether the “receiving system” must contain “a single omnidirectional detection unit,” as SharkNinja argues.

The Commission finds that SharkNinja’s proposed corresponding structure for performing the claimed functions is unduly narrow and is inconsistent with the intrinsic record. Specifically, SharkNinja argues that the corresponding structure should limit the receiving subsystem to “a single omnidirectional detection unit.” *See* Respondent’s Not. Resp. at 10-11. SharkNinja’s argument as to the corresponding structure is based on the incorrect assumption that the claimed embodiment corresponds only to the structure disclosed in connection with navigation system **10’** (where the receiving system is on the robot), but not navigation system **10** (which is described more generally). *See* Respondents’ Pet. at 72; Respondents’ Not. Resp. at 10. Indeed, the specification refers to navigation system **10’** as an “exemplary embodiment,” and it would not be proper to limit the corresponding structure to that embodiment, particularly where the specification also discloses a navigation system **10** where the receiving system **20** can be integrated in combination with the robotic device. *See* JX-3, ’517 patent at 32:13-21; *see also* *Budde v. Harley-Davidson, Inc.*, 250 F.3d 1369, 1379 (Fed. Cir. 2001) (“The specification must be read as a whole to determine the structure capable of performing the claimed function.”).

Indeed, the specification provides that “the receiving subsystem **20** can also include a transmitting unit **32** for those preferred embodiments of the navigational control system **10** wherein the receiving subsystem **20** is operated or functions as the base station for the navigational control system **10**” and “[f]or those embodiments of the navigational control system **10** according to the present invention wherein the receiving unit **20** is integrated in combination with the robotic device **10**, the transmitting unit **32** is not required.” *See* JX-3, ’517 patent at 27:8-12, 32:13-17, Fig. 9. Thus, the specification expressly contemplates that navigational

PUBLIC VERSION

control system **10** (not just **10'**) can include a receiving system that is integrated in combination with the robotic device. Additionally, claim 14, which depends from claim 4, further recites a “receiving system compris[ing] an omnidirectional detection unit,” demonstrating that independent claim 4 (from which claim 9 depends) is broader and not limited to “a single omnidirectional detection unit,” as SharkNinja contends. *See* Respondents’ Pet. at 72-73; Respondents’ Not. Resp. at 10-11; Complainant’s Not. Reply at 8-9 (citing *Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001) (“Claim differentiation, while often argued to be controlling when it does not apply, is clearly applicable when there is a dispute over whether a limitation found in a dependent claim should be read into an independent claim, and that limitation is the only meaningful difference between the two claims.”)).

Accordingly, the Commission finds that the ALJ correctly construed the term “receiving system” in accordance with the plain and ordinary meaning and not as a means-plus-function term. Even if the Commission were to construe “receiving system” as a means-plus-function term, the Commission agrees with iRobot’s proposed corresponding structure, namely, “the receiving subsystem **20** of the navigational control system **10** according to the present invention [that] comprises a processing unit **22** that includes a microprocessor **24**, a signal processing unit **26**, a memory module **28**, and a set of detection units **30M**.” *See* Complainant’s Pet. Reply at 41-42 (citing JX-3 at 27:4-8); *see also* Complainant’s Not. Resp. at 8. Under either construction, as discussed below, the Commission finds that SharkNinja’s accused products infringe the asserted claims of the ’517 patent.

3. Infringement/Technical Prong (“Receiving System”)

SharkNinja does not dispute infringement or technical prong under the ALJ’s plain meaning construction of the term “receiving system.” In its petition, SharkNinja argued that, as

PUBLIC VERSION

properly construed, *i.e.*, under SharkNinja’s proposed means-plus-function construction, the accused and DI products do not infringe or practice the asserted claims because they “undisputedly do not include an omnidirectional detection unit (or anything like it).” *See* Respondent’s Pet. at 73-74. As properly construed, however, the asserted claims 1 and 9 of the ’517 patent do not require an omnidirectional detection unit.

Nor does SharkNinja adequately dispute infringement or the technical prong under a means-plus-function construction and iRobot’s proposed corresponding structure for the term “receiving system.” Instead, SharkNinja argues in response to the Commission’s briefing question that the accused and DI products do not perform the recited functions. *See* Respondents’ Not. Resp. at 14-16. SharkNinja’s arguments as to the recited functions are waived and/or incorrect. SharkNinja petitioned for Commission review of the FID’s technical prong findings arguing that “iRobot’s alleged DI products also do not ‘autonomously identify’ the alleged hot spot and predefined zone ‘in the map’ such that the robot’s cleaning behavior is changed as required by the claims.” *See* Respondent’s Pet. at 75-81. SharkNinja’s technical prong argument is discussed *infra* in section IV.C.4. As to the accused products, however, SharkNinja did not challenge the FID’s infringement findings as to the claimed functions in its petition for review, despite having known about those claimed functions throughout the investigation. *See* JX-3, ’517 patent at claims 1 and 4; FID at 135-45, 146-54. Thus, to the extent SharkNinja did not raise or dispute the recited functions in its petition for review, SharkNinja’s arguments are waived. *See* 19 C.F.R. § 210.43(b)(2).

SharkNinja nowhere argued in its petition that the accused products do not satisfy any of the recited functions and the Commission rejects SharkNinja’s attempt to expand its petition with newly-raised arguments. For instance, SharkNinja did not challenge the FID’s finding that “the

PUBLIC VERSION

identification of the carpet during this run, [*i.e.*, a hot spot or predefined zone,] where [the robot] thinks the carpet is, is done entirely by the robot” and “[a] person doesn’t do anything.” *See* FID at 142 (citing Hr’g Tr. at 421:6-9 (Archibald)). More specifically, the FID found (and SharkNinja did not dispute in its petition) that “[

].” *Id.* (citing CX-266C.32, 60; Hr’g Tr. at 636:21-637:13 (Janét³³)).

Nor does SharkNinja adequately rebut iRobot’s argument that the “autonomously identify” function of the “receiving system” is performed by the structure identified by iRobot in the context of SharkNinja’s accused AI-WD product. In particular, iRobot explained that “[

].” *See* Complainant’s Not. Resp. at 18-19 (citing CX-354C.8; RX-0931C.36, 60; Hr’g Tr. at 415:17-19, 418:6-419:11 (Archibald)). Instead of rebutting iRobot’s identification of hardware in the AI-WD products, SharkNinja argues that “iRobot relied on evidence from [

].” *See* Respondent’s Not. Reply at 14.

SharkNinja’s argument is both waived and incorrect. As the FID found, “[t]he term ‘autonomously identify’ was construed to mean ‘identify without human input.’” FID at 141 (citing Order No. 37 at 17-18). SharkNinja’s argument, however, “is not based on the adopted construction of the term ‘autonomously identify,’ but instead improperly expands the word ‘identify’ to encompass the storage or approval of a hot spot or a predefined zone after it has

³³ Dr. Jason Janét was one of iRobot’s technical experts in the investigation.

PUBLIC VERSION

been identified by the robot.” *See id.* at 141-42 (citing Hr’g Tr. at 1146:4-14 (Singhose³⁴); Hr’g Tr. at 638:21-639:8 (Janét)); *see also infra*, section IV.C.4.

Accordingly, the Commission finds that SharkNinja’s infringement and technical prong arguments fail under either construction of the term “receiving system” and that iRobot has met its burden to establish infringement and the technical prong of the domestic industry requirement.

4. Technical Prong (“Autonomously Identify”)

The FID found that iRobot’s “DI Products accomplish the function of identifying zones when used as intended with the iRobot App.” FID at 152. The FID explained that “nothing in the patent or the asserted claims requires that all processing done by the ‘receiving system’ to accomplish the recited functions must be fully integrated on the robot, such that it cannot use computer processing resources in the cloud to accomplish those functions or interact with any components outside of the physical robot.” *Id.* (citing JX-3, ’517 patent (claims 1 and 4); Hr’g Tr. at 698:20-699:8 (Janét) (“The robot can outsource, offload some of its processing, is certainly a reasonable expectation.”)). The FID distinguished “a receiving system integrated with a cleaning apparatus” as recited in claim 15. *Id.* (citing JX-3, ’517 patent (claim 15)).

SharkNinja makes two main arguments. First, SharkNinja argues that “iRobot’s alleged DI products also do not ‘autonomously identify’ the alleged hot spot and predefined zone ‘in the map’ such that the robot’s cleaning behavior is changed as required by the claims.” *See* Respondent’s Pet. at 75. SharkNinja contends that “Mr. Halloran . . . testified that the robot merely [] to identify and send recommended hot spots to the user on the user’s phone with the iRobot app.” *Id.* at 76 (Hr’g Tr.

³⁴ Dr. William Singhose was one of SharkNinja’s technical experts in the investigation.

PUBLIC VERSION

at 338:8-22 (Halloran)). SharkNinja further states that “[t]here is zero evidence in the record that any of the required identification is performed on the alleged receiving system of the alleged DI products.” *Id.* at 78. Second, SharkNinja asserts that “iRobot’s alleged domestic industry products [] do not ‘autonomously identify’ a hot spot or predefined zones because clean zone suggestions require ‘user input,’ contrary to the adopted construction” of “autonomously identify” which means “identify without human input.” *Id.* at 79-80 (citing Order No. 37 (Markman Order) at 17-18).

iRobot explains that “the [DI] products use machine learning to automatically detect and proactively suggest Clean Zones around specific objects, like couches, tables and kitchen counters, which ‘allows for targeted cleaning in specific areas or around objects that attract the most common messes.’” Complainant’s Pet. Reply at 49 (citing CX-1185C.1 (iRobot Website); CX-0872C.2 (describing smart navigation which “allows the robot to automatically detect objects in your home . . . and make a recommendation to place a Clean Zone”); CX-1555C.1 (iRobot document explaining “[a]s your robot learns your space, you may also receive suggestions for clean zones based on high traffic areas”); Hr’g Tr. at 651:14-652:1 (Janét)). iRobot also argues that “[o]nce the product identifies a clean zone, the user would get a notification through the iRobot App stating: ‘You have a new Clean Zone suggestion. Review and save for targeted cleaning in that area.’” Complainant’s Pet. Reply at 49 (citing Hr’g Tr. at 652:8-9, 657:1-6 (Janét); CX-2868.207).

iRobot further states that “the asserted claims only require autonomous identification of zones, not the autonomous approval or saving of those zones: the robot identifies a clean zone based upon previous locations of the robot, asks the user to confirm they want that clean zone added to their map, and then when the robot is in that clean zone it performs some different

PUBLIC VERSION

cleaning behavior.” *Id.* According to iRobot, “[t]he initial identification of the zone and the later alteration of cleaning behavior are performed autonomously, *i.e.*, without human input” but as to the intermediate storage of the map, “whether user approval for that step is sought or not is [] irrelevant.” *Id.*

The Commission finds that iRobot’s DI products satisfy the “autonomously identify” limitation for the reasons stated by iRobot and as discussed below. The asserted claims require “a receiving system *configured to* . . . autonomously identify” a hot spot or a predefined zone. The Federal Circuit held that “configured to” could mean “designed to” but “it can also be used in a broader sense to mean ‘capable of’ or ‘suitable for.’” *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1349 (Fed. Cir. 2012).

As the FID found, the DI products use machine learning to automatically detect and proactively suggest Clean Zones around specific objects, like couches, tables and kitchen counters, which “allows for targeted cleaning in specific areas or around objects that attract the most common messes.” FID at 153 (citing CX-1185C.1 (iRobot Website); CX-872C.2 (describing smart navigation which “allows the robot to automatically detect objects in your home . . . and make a recommendation to place a Clean Zone”); CX-1555C.1 (iRobot document explaining “[a]s your robot learns your space, you may also receive suggestions for clean zones based on high traffic areas”); Hr’g Tr. at 651:14-652:1 (Janét)). In addition, “[o]nce the product identifies a clean zone, the user would get a notification through the iRobot App stating: ‘You have a new Clean Zone suggestion. Review and save for targeted cleaning in that area.’” *Id.* (citing Hr’g Tr. at 652:8-9, 657:1-6 (Janét); CX-2868.207 (image of a notification for a recommended clean zone in the iRobot App)). For example, Mr. Halloran testified that when the Roomba s9 identifies an area rug as a Clean Zone, “it’s fully autonomous” and “uses some

PUBLIC VERSION

information from our mouse sensor, our cliff sensors, and beam brush to be able to determine whether it's on a carpet or hard floor.” See CIB at 76-77 (citing Hr’g Tr. at 263:3-22 (Halloran)); *id.* at 77 (“The Roomba s9 also has the ability to detect what’s called Carpet Clean Zones where it will detect a rug, for example.”) (citing Hr’g Tr. at 652:17-653:9 (Janét); CX-2868.208 (image of iRobot App suggesting a carpet clean zone)); *id.* (“Carpet detection is a beta feature for the Roomba s9.”) (citing CX-2868.247; CX-980C).

Moreover, the Commission agrees with the FID that the receiving system need not be fully integrated onto the cleaning apparatus itself. See *Paragon Solutions, LLC v. Timex Corp.*, 566 F.3d 1075, 1085-86 (Fed. Cir. 2009) (holding that the “term ‘data acquisition unit’ ... may comprise multiple physically separate structures” in view of the intrinsic record). The intrinsic record, including the claims, support this interpretation. The receiving system of claim 15 is “integrated with a cleaning apparatus,” which suggests that the receiving system of claim 1 and 4 is broader and need not be fully integrated with a cleaning apparatus. See JX-3, ’517 patent (claims 1, 4, and 15). SharkNinja recognizes that the robot collects and sends sensor data [] to send recommended hot spots to the user on the user’s phone with the iRobot app. See Respondent’s Pet. at 76 (Hr’g Tr. at 338:8-22 (Halloran)). The Commission finds that some processing may be handled [] without taking the DI products outside the scope of the claims. See also Hr’g Tr. at 698:20-699:8 (Janét) (“The robot can outsource, offload some of its processing, is certainly a reasonable expectation.”).

The Commission also disagrees with SharkNinja’s argument that user approval of the clean zone suggestions means that the receiving system does not “autonomously identify.” See Respondent’s Pet. at 80. The term “autonomously identify” was construed to mean “identify

PUBLIC VERSION

without human input.” *See* Order No. 37 at 17-18. Neither party petitioned for review of that construction. As the FID found, “the asserted claims only require autonomous identification of zones, not the autonomous approval or saving of those zones.” FID at 153-54 (citing Hr’g Tr. at 694:5-9 (Janét) (explaining that the “approval process” is required “before the Clean Zone can be added to the map”)); JX-3, ’517 patent (claims 1 and 4). Nor does the rest of the claim language require autonomous approval of the identified hot spots or predefined zones. *See* JX-3, ’517 patent (claims 1 and 4) (“cause the cleaning apparatus, during the cleaning mission, to initiate [a spot coverage cleaning behavior or a prescribed conduct to alter a movement activity] of the cleaning apparatus in response to the determined position of the cleaning apparatus”).

Lastly, the Commission agrees with iRobot that the DI products satisfy this limitation even under an alternative “means-plus-function” construction. As iRobot explains, the “autonomously identify” function is performed by the structure identified by iRobot in the context of the DI products. *See* Complainant’s Not. Resp. at 23. Specifically, “[t]he s9 and m6 use vSLAM cameras, cliff sensors, and beam brush (detection units) to identify clean zones such as kitchen counters and rugs” and “[t]hat information is collected by the robot and used both on the robot and in the cloud to run a combination of algorithms that identify clean zones.” *Id.* (citing Hr’g Tr. at 257:17-25, 263:6-22, 337:17-338:3 (Halloran)).

Thus, the Commission has determined to affirm, with modifications and supplementation, the FID’s finding that iRobot’s DI products satisfy the technical prong of the domestic industry requirement.

PUBLIC VERSION

5. Economic Prong

The Commission has determined to affirm the FID's finding that Complainant satisfies the economic prong of the domestic industry requirement with respect to the '517 patent.³⁵ See FID at 196-206.

6. Anticipation by Kawakami

The FID determined that the asserted claims of the '517 patent are not anticipated by Kawakami. The FID noted that “[c]laims 1 and 9 of the '517 patent recite a ‘[map]’ that has certain features and is capable of certain things, including being stored prior to the initiation of a cleaning mission, being based on previously determined positions of the cleaning apparatus, having a hot spot or a predefined zone autonomously identified in it, and having a hot spot or a

³⁵ Commissioner Kearns affirms, with modified reasoning, the FID's finding that the economic prong is satisfied for the '517 patent under Section 337(a)(3)(B) and notes that he does so regardless of whether calculations (for allocating expenses and assessing significance) are performed using U.S. sales or global sales. (There was some dispute before the ALJ regarding whether it was more appropriate to use iRobot's U.S. sales or global sales figures in the economic prong analysis.) He notes that it remains an open question to him whether the significance of U.S. investments under Sections 337(a)(3)(A) and (B) should be evaluated in light of all employment of plant and equipment and labor and capital relating to the domestic industry products, including for manufacturing (both foreign and domestic), rather than being limited to a single category like research and development (“R&D”). See *Certain Movable Barrier Operator Systems and Components Thereof*, Inv. No. 337-TA-1118, Separate Views of Chair Kearns Regarding Economic Prong Issues (Jan. 12, 2021).

Here, given the ratio of allocated R&D investments to sales, the importance of R&D to the inventions at issue, the share of R&D occurring in the United States, and the lack of a petition for review of the FID's finding that the economic prong is satisfied, it is unlikely that information on other types of investments would cause him to question the existence of a domestic industry here. He notes that comparison of investments to sales (U.S. or global) for significance, the only type of “value-added” calculation possible on this record, likely understates the investments' significance compared to the DI Products' cost of production as sales values include such factors as profit and distribution costs. He does not adopt the FID's reliance on a prior investigation (completed in 2018), *Certain Robotic Vacuum Cleaning Devices & Components Thereof such as Spare Parts*, Inv. No. 337-TA-1057, or its reliance, in finding significance of iRobot's investments, on the importance of the DI Products to iRobot's overall business or iRobot's share of the robotic floor cleaner market.

PUBLIC VERSION

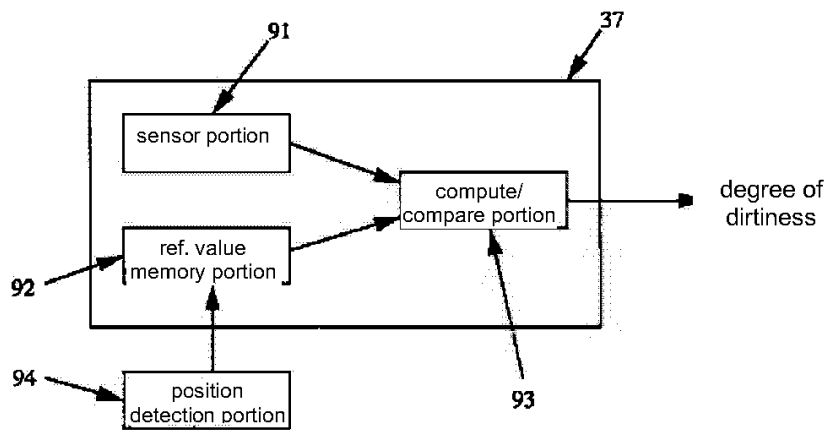
predefined zone stored in it such that spot coverage cleaning behavior or prescribed conduct can be initiated.” *See* FID at 154 (citing JX-3, ’517 patent at claims 1, 9; Hr’g Tr. at 1125:19-1126:4 (Singhose)). The FID found that “Kawakami cannot anticipate the asserted claims because it does not disclose a ‘map’ capable of meeting all of the requirements of the map in the context of claims 1 and 9.” *Id.*

The FID rejected “SharkNinja’s primary argument [] that because the translation of the Japanese-language Kawakami reference uses the word ‘map,’ the reference must satisfy all of the characteristics recited for the claimed ‘map.’” *See id.* at 155. The FID credited iRobot’s expert testimony that what is described in Kawakami is ‘a lookup table’ or ‘a data chart’ that is not capable of meeting the requirements of the map in the asserted claims. *See id.* (Hr’g Tr. at 1578:1-8 (Janét)). The FID also found “particularly problematic” Dr. Singhose’s combination of different embodiments and paragraphs to find anticipation. *See id.* at 155-56 (citing Hr’g Tr. at 1627:6-16, 1630:11-1631:17 (Singhose); CX-660 at ¶¶ 27, 34). The FID found that “Dr. Singhose did not explain how a person of ordinary skill would synthesize the different embodiments to come up with the allegedly anticipating combination.” *Id.* at 156 (citing Hr’g Tr. at 1128:25-1129:13, 1131:20-1133:23, 1134:5-1135:2, 1631:18-1633:14 (Singhose)). As to the first embodiment, the FID noted that “Dr. Singhose agrees that the embodiment in paragraph 27 does not practice the asserted claims of the ’517 patent.” *Id.* at 156-57 (citing Hr’g Tr. at 1135:21-1136:21 (Singhose)). In addition, the FID found that although the second embodiment of paragraph 34 describes “‘a map of the degree of dirtiness prior to cleaning work can be created and stored in the above-described reference value memory portion **92**,’ Figure 5 of Kawakami shows that ‘a calculation or computation’ is still required to compare the reference value memory portion **92** with the sensor portion **91**, at a particular position **94**.” *Id.* (citing CX-

PUBLIC VERSION

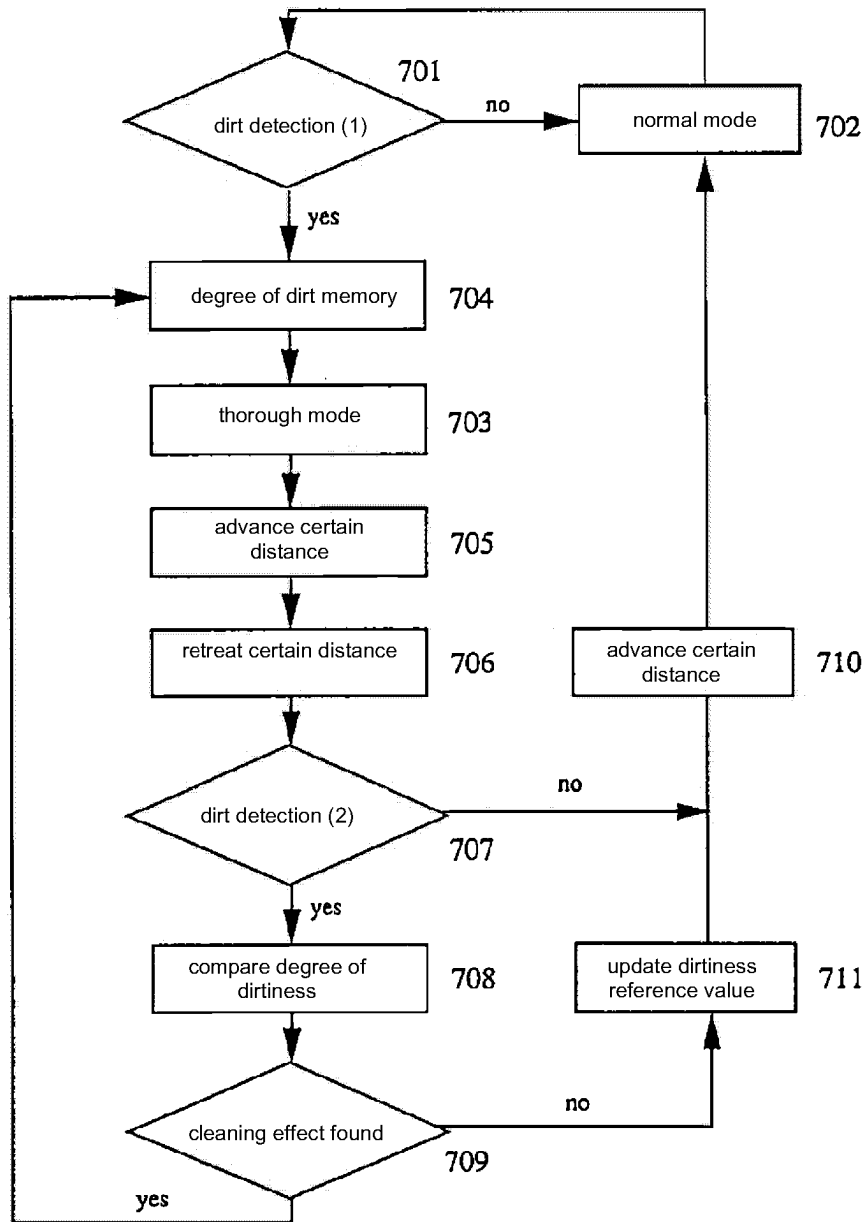
660 at Fig. 5 (reproduced below), ¶ 34; Hr’g Tr. at 1574:2-15 (“91 is the sensor reading taken from that sensor 19, and the reference value memory portion is just a calibration constant. So it knows based on, say, the location or the step that the robot is in what the offset should be from that sensor reading. They are compared, and the difference is this output called degree of dirtiness.”), 1576:8-20 (Janét)).

Fig. 5



The FID further credited Dr. Janét’s testimony that “any map that [SharkNinja] points to in the entirety of Kawakami is linked back to this memory portion 92 reference,” which is the “lookup table.” *See id.* at 157-58 (Hr’g Tr. at 1577:18-1578:18 (Janét)). The FID found that “Kawakami uses this lookup table only when it arrives at each position in the cleaning space to determine the degree of dirtiness at that location, cleans that position accordingly, then backs up to check its work using active dirt detection.” *Id.* at 158 (citing CX-660 at Fig. 7 (reproduced below); Hr’g Tr. at 1178:1-1179:3 (Singhose) (“For example, it goes forward three feet, and then it backs up three feet, and at that point backing up it might use its sensors and says, how good did I do. And if it still needs to clean some more, then it will clean some more.”)).

Fig. 7



Thus, the FID concluded, “the lookup table described in Kawakami is not capable of meeting the requirements of the claimed map, because Kawakami must pull information from the lookup table and perform a calculation prior to cleaning, whether that cleaning is based on active dirt detection or pre-stored information.” *Id.* (Hr’g Tr. at 1576:8-20, 1577:18-1578:18 (Janét)).

PUBLIC VERSION

SharkNinja argues that Kawakami discloses each limitation in claims 1 and 9 of the '517 patent. SharkNinja contends that Kawakami's "robot cleans a predetermined area and changes its cleaning behavior according to the level of dirtiness of the surface currently being cleaned, or—in an alternative embodiment actively ignored by iRobot—based on pre-stored dirtiness information." Respondent's Pet. at 82 (citing CX-660 (Kawakami) at Abstract, ¶ 46, Fig. 1). More specifically, SharkNinja states that "Kawakami explicitly discloses storing what the reference itself calls a 'map' that indicates the reflectivity and degree of dirtiness based on information the robot gathered in prior uses." *Id.* (citing CX-660 (Kawakami) at ¶¶ 27, 34, Fig. 6). SharkNinja further states that "Kawakami explains that the work mode may be switched for certain spots based on pre-stored dirtiness information stored in that map." *Id.* (citing CX-660 (Kawakami) at ¶¶ 46-47). For example, SharkNinja continues, "when the robot reaches the dirty areas indicated in the pre-stored information, Kawakami discloses changing the speed and cleaning behavior of the robot." *Id.* (citing CX-660 (Kawakami) at ¶¶ 22-23).

SharkNinja further argues that "Kawakami explicitly discloses a storing 'a map of the degree of dirtiness prior to cleaning work' that 'can be created and stored in the above-described reference value memory portion 92.'" *Id.* at 83 (citing CX-660 (Kawakami) at ¶ 34). SharkNinja explains that "[b]eyond Kawakami's use of the word 'map,' the 'map' disclosed by Kawakami is precisely the type of 'map' claimed that identifies certain hot spots or zones that may be dirtier than other areas," and "the disclosed 'map' is used in exactly the same way as the claimed 'map.'" *Id.* SharkNinja asserts that "under the adopted [plain and ordinary meaning] construction of the claim . . . , the format of the map (whether lookup table or data chart) does not matter." *Id.* at 84. According to SharkNinja, "[e]ven if calculations are required to extract

PUBLIC VERSION

information from the lookup table . . . , that does not mean the ‘map’ described in Kawakami is not a ‘map.’” *Id.* at 84-85 (citing Hr’g Tr. at 1079:18-1080:16 (Singhose)).

SharkNinja also faults the FID for finding that “there are two different embodiments in Kawakami that cannot be combined: an active dirt detection described in paragraph 27 that does not practice the claims and using pre-stored information described in paragraph 34.” *Id.* at 85. SharkNinja contends that the FID’s “reasoning is contradicted by the explicit disclosure of Kawakami and the un rebutted testimony of SharkNinja’s expert.” *Id.* In particular, SharkNinja argues that “[p]aragraph 46 of Kawakami explicitly discloses an embodiment where, instead of using the current reading of the sensors at step #701 in Figure 7, ‘the work mode is switched based on pre-stored floor surface dirtiness information at the current position of the cleaning robot.’” *Id.* (citing CX-660 (Kawakami) at ¶ 46, Fig. 7). In addition, SharkNinja continues, “Dr. Singhose also confirmed that paragraph 46 disclosed using hot spot data stored in the map to switch to a hot spot cleaning behavior.” *Id.* (citing Hr’g Tr. at 1627:1-1628:2 (Singhose)).

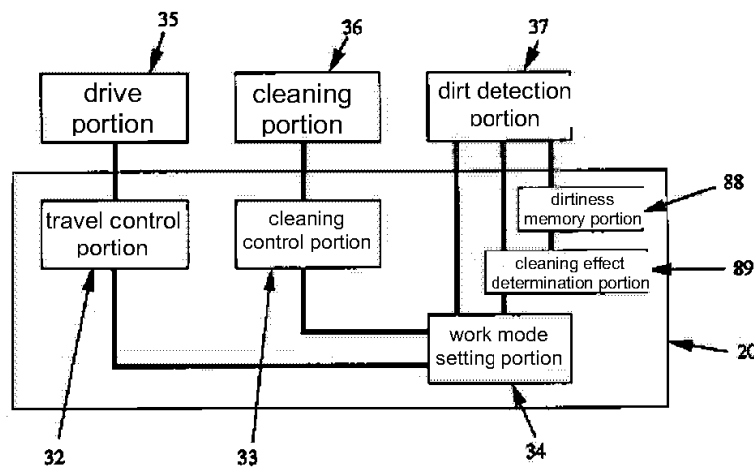
iRobot responds that the FID correctly found that Kawakami does not disclose the claimed map. iRobot notes that “the FID credited the testimony of iRobot’s expert and found that, regardless of whether Kawakami’s robot is performing active dirt detection (*e.g.*, performing cleaning based on actively reading the dirtiness of the floor) or using information stored in the lookup table, neither constitutes a map in which a hot spot or predefined zone is stored.” Complainant’s Pet. Reply at 52. iRobot explains that “[t]his is because during active dirt detection, there is no hot spot or predefined zone in the map.” *Id.* (citing Hr’g Tr. at 1135:24-1135:21 (Singhose)). In addition, iRobot continues, “though the second embodiment describes that ‘a map of the degree of dirtiness prior to cleaning work can be created and stored,’ Kawakami is not performing alternative cleaning behavior (*e.g.*, deeper cleaning) based upon the

PUBLIC VERSION

location in a map, but upon the difference between an active, real-time sensor reading and a previously stored sensor reading.” *Id.* (citing CX-660 (Kawakami) at Fig. 5, ¶ 34).

Additionally, iRobot argues that “in Figure 8, the ‘work mode setting portion’ receives two lines of input, both of which originate in the dirt detection portion 37.” *Id.* at 55 (citing CX-660 at Fig. 8 (reproduced below)).

Fig. 8



The Commission finds that the FID correctly determined that the asserted claims of the ’517 patent are not anticipated by Kawakami. The Commission agrees with the FID that Kawakami discloses a look-up table of dirtiness or reflectivity values, but there is no clear and convincing evidence that Kawakami discloses a map including hot spot or predefined zone information prior to initiation of a cleaning mission. Rather, during the cleaning mission (not before) Kawakami conducts “dirt detection” (CX-660 (Kawakami) at Fig. 7, step 701 (reproduced below)) or uses pre-stored floor surface dirtiness information at the current position of the cleaning robot (*id.* at ¶ 46). Based on that information and additional sensor readings, Kawakami determines, during the cleaning mission, whether to conduct thorough or normal cleaning. *See* CX-660 (Kawakami) at Figs. 5, 7, 8. As the FID explained, “[w]ith respect to

PUBLIC VERSION

the second embodiment described in paragraph 34, although it describes ‘a map of the degree of dirtiness prior to cleaning work can be created and stored in the above-described reference value memory portion 92,’ Figure 5 of Kawakami shows that ‘a calculation or computation’ is still required to compare the reference value memory portion 92 with the sensor portion 91, at a particular position 94.” FID at 157.

In addition, the Commission finds that the FID correctly determined that “the lookup table described in Kawakami is not capable of meeting the requirements of the claimed map, because Kawakami must pull information from the lookup table and perform a calculation prior to cleaning, whether that cleaning is based on active dirt detection or pre-stored information.” FID at 159 (citing Hr’g Tr. at 1576:8-20, 1577:18-1578:18 (Janét)). As iRobot explained, “though the second embodiment describes that ‘a map of the degree of dirtiness prior to cleaning work can be created and stored,’ Kawakami is not performing alternative cleaning behavior (*e.g.*, deeper cleaning) based upon the location in a map, but upon the difference between an active, real-time sensor reading and a previously stored sensor reading.” Complainant’s Pet. Reply at 52 (citing CX-660 (Kawakami) at Fig. 5, ¶ 34). Moreover, as Dr. Janét testified, Kawakami does not describe “cleaning the floor based only on the prior position information.” *See* Hr’g Tr. at 1579:12-16 (Janét).

Furthermore, paragraph 46 of Kawakami does not cure the deficiencies of SharkNinja’s arguments. *See* Respondents’ Pet. at 86-87 (citing Hr’g Tr. at 1627:1-1628:2 (Singhose)). That paragraph merely discloses that “instead of step 701, a method is used whereby the work mode is switched based on pre-stored floor surface dirtiness information at the current position of the cleaning robot” and such information is “measured and stored in the dirt detection portion 37.” *See* CX-660 (Kawakami) at ¶ 46. Importantly, the dirt detection portion 37 still requires a

PUBLIC VERSION

computation or comparison between the pre-stored floor surface dirtiness information, *i.e.*, reference value memory portion **92**, and the value derived from sensor portion **91**, in order to determine if a thorough mode of cleaning is required at the particular location of the robot, *i.e.*, whether that location should be considered a “hot spot.” *See id.* at Fig. 5, ¶ 34; *see also* Hr’g Tr. at 1577:18-1578:18 (Janét) (testifying that any map disclosed in Kawakami is “linked back to this memory portion **92**” and that Figure 5 of Kawakami indicates that the reference value memory portion **92** is “compared to the actual sensor reading as shown in block **91**”).

Moreover, as noted by iRobot, Figure 8 of Kawakami, which relates to the second embodiment, shows that the work mode setting portion **34** receives two lines of input from the dirt detection portion **37**, which is consistent with a comparison between the sensor portion **91** and the reference value memory portion **92**. *See* Complainant’s Pet. Reply at 55 (citing CX-660 (Kawakami) at Fig. 8); *see also* Hr’g Tr. at 1579:2-16 (Janét). At best, Kawakami is ambiguous as to whether it discloses a map including hot spot or predefined zone information prior to initiation of a cleaning mission. *See Wasica Finance GmbH v. Continental Automotive Sys., Inc.*, 853 F.3d 1272, 1284 (Fed. Cir. 2017) (“[I]t has long been understood that ambiguous references do not, as a matter of law, anticipate a claim.”).

Thus, the Commission finds that SharkNinja failed to establish by clear and convincing evidence that Kawakami discloses the claimed map that includes stored information of hot spots or predefined zones prior to initiation of a cleaning mission. Accordingly, the Commission has determined to affirm with supplementation the FID’s finding that Kawakami does not anticipate the asserted claims of the ’517 patent.

PUBLIC VERSION

V. **REMEDY, PUBLIC INTEREST, AND BONDING**

The RD recommended that the Commission issue an LEO against certain robotic floor cleaning devices and components thereof that are imported into the United States, sold for importation, or sold within the United States after importation by SharkNinja; and (2) a CDO against each SharkNinja entity. The RD also recommended that the Commission set a bond during the period of Presidential review in an amount of twenty percent (20%) of the entered value of the robotic floor cleaning devices imported by or on behalf of the Respondents. As discussed below, the Commission has determined to: (1) adopt the RD with respect to remedy and bonding, and (2) find that the public interest will not be adversely affected by the issuance of the remedial orders.

A. **Remedy**

The Commission has “broad discretion in selecting the form, scope, and extent of the remedy.” *Viscofan, S.A. v. U.S. Int’l Trade Comm’n*, 787 F.2d 544, 548 (Fed. Cir. 1986).

1. **Limited Exclusion Order**

Section 337 requires the Commission to issue an LEO against infringing products imported by or on behalf of the named respondents, subject to the public interest considerations discussed below:

If the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry into the United States

See 19 U.S.C. § 1337(d)(1); *see also Spansion, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1358 (Fed. Cir. 2010) (“[T]he Commission is required to issue an exclusion order upon the finding of a Section 337 violation absent a finding that the effects of one of the statutorily-enumerated public interest factors counsel otherwise.”).

PUBLIC VERSION

The RD recommended that the Commission issue an LEO barring the entry of SharkNinja’s infringing products and including the standard CBP certification provision and a service and repair exemption. *See* RD at 206-09. The RD also found that the service and repair exemption is warranted because “Respondents have presented evidence that the Accused Products are subject to existing service and warranty contracts.” *See id.* at 208 (citing CX-70C (Newman³⁶ Dep. Tr.) at 67:8-70:10, 73:22-74:18, 101:13-105:15; CX-435 at 13; CX-436 at 12; CX-437 at 12; CX-438 at 13 (AI-WD); CX-439 at 11; CX-249 at 13 (AI-WD); CX-137 at 12; CX-138 at 12; CX-139 at 13 (AI-WD); CX-140 at 11; CX-309 at 13 (AI-WD)). iRobot challenges the RD’s recommendation of the service and repair exemption, arguing that “[t]he limited evidence [SharkNinja] presented during trial . . . does not rise to the level of the ‘showing or argument’ necessary to justify an exemption.” Complainant’s Not. Resp. at 28.

The Commission has determined to issue an LEO including the standard CBP certification provision and a service and repair exemption (discussed *infra* in connection with the public interest).³⁷ To be clear, as the Commission previously held, “[t]he standard certification ‘does not apply to redesigns that have not been adjudicated as non-infringing.’” *See Automated Teller Machines, ATM Modules, Components Thereof, & Prods. Containing the Same*, Inv. No. 337-TA-972, Comm’n Op. at 27, 2017 WL 11198798 (June 12, 2017) (“*Automated Teller Machines*”) (quoting *Certain Marine Sonar Imaging Devices, Including Downscan & Sidescan Devices, Prods. Containing the Same, & Components Thereof*, Inv. No. 337-TA-921, Comm’n

³⁶ Ms. Alexa Newman is the Director of Consumer Excellence and Direct to Consumer Operations for SharkNinja.

³⁷ Commissioners Kearns and Karpel note that, while they grant a service and repair exemption in this investigation based on public interest considerations, in their view, the Commission can grant (and has granted) such exemptions without reliance on such considerations. *See Certain Cloud-Connected Wood-Pellet Grills and Components Thereof*, Inv. No. 337-TA-1237, Comm’n Op. at 12 n.10 (May 24, 2022).

PUBLIC VERSION

Op. at 80, 2016 WL 10987364 (Jan. 6, 2016)). Nor does the Commission need to carve out an exemption for products that were adjudicated as non-infringing because those products would not be subject to the exclusion order and can be certified to CBP as non-infringing. *See Automated Teller Machines*, Comm’n Op. at 27 n.18, 2017 WL 11198798 (“The standard provision does not allow an importer to simply certify that it is not violating the exclusion order. [CBP] only accepts a certification that the goods have previously been determined by CBP or the Commission not to violate the exclusion order.”).

Accordingly, and as discussed further *infra*, section V.B.3, the Commission has determined to issue an LEO: (1) barring entry into the United States of infringing certain robotic floor cleaning devices and components thereof imported by or on behalf of the Respondents; (2) including the standard certification provision; and (3) including an exemption for service and repair components imported for use in servicing or repairing articles, under warranty terms, that were imported prior to the effective date of the exclusion order.

2. Cease and Desist Order

Section 337 provides that in addition to, or in lieu of, the issuance of an LEO, the Commission may issue a CDO as a remedy for violation of section 337, subject to the public interest considerations discussed below. *See* 19 U.S.C. § 1337(f)(1). The Commission generally issues CDOs with respect to the imported infringing products when “respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order.” *See Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm’n Op., 2017 WL 1476193, at *3 (Feb. 1, 2017) (citations omitted).

PUBLIC VERSION

Complainant bears the burden of proving that a respondent has a commercially significant U.S. inventory in the United States. *See id.*

The RD recommended that the Commission issue a CDO against each SharkNinja entity. *See RD at 209-11.* The RD found that “[t]he evidence demonstrates that Respondents maintain a commercially significant inventory of Accused Products in the United States.” *Id.* at 210.

Specifically, the RD continued, “Complainant’s expert, Ms. Rowe,³⁸ testified that as of February 2021, [

].” *Id.* (citing Hr’g Tr. at 886:22-887:10 (Rowe); CDX-6 at 15, 18; CX-232C; CX-234C; CX-56C (Ethington³⁹ Dep. Tr.) at 57:8-12, 102:8-17).

SharkNinja does not dispute the RD’s findings discussed above. More specifically, the evidence shows that in 2021, [

],⁴⁰ [

]. *See FID at 210-11; Hr’g Tr. at 886:22-887:10 (Rowe); CDX-6C.18.* Thus, the Commission finds that the evidence supports the RD’s determination that a CDO is warranted

³⁸ Ms. Julia Rowe is iRobot’s expert witness on domestic industry, remedy, bonding, and commercial success.

³⁹ Mr. Jon Ethington is the Vice President and General Manager at SharkNinja.

⁴⁰ iRobot identified model numbers RV2000WD, RV2001WD, and RV2001WRUS as within SharkNinja’s AI-WD product family. *See Complainant’s Pre-Hearing Br. (“CHB”) at 12 (Oct. 29, 2021); see also FID at 8 n.14; JX-28C at ¶ 5.* The AI-WD product is also known as “Vacmop” []. *See CHB at xi; Respondents’ Pet. at x.*

PUBLIC VERSION

against each SharkNinja entity.^{41, 42} In addition, for the same reasons discussed, *supra* in section V.A.1, in connection with the LEO, the Commission has determined to include in the CDO an exemption for service and repair components imported for use in servicing or repairing articles, under warranty terms, that were imported prior to the effective date of the orders.

B. The Public Interest

In determining the remedy for a violation of section 337, the Commission must consider the effect of the remedy on certain public interest considerations: (1) the public health and welfare; (2) competitive conditions in the United States economy; (3) the production of like or directly competitive products in the United States; and (4) United States consumers. *See* 19 U.S.C. § 1337(d) and (f). SharkNinja did not file a public interest statement pursuant to Commission Rule 210.50(a)(4) or make any arguments regarding the public interest, but SharkNinja has requested an exemption for service and repair.

1. Public Health and Welfare

With respect to the first public interest factor (public health and welfare), the Commission finds that excluding the infringing products would not adversely affect the public health and welfare. As iRobot explains, “consumer robotic floor cleaners [] provide quality of life improvements to their users.” Complainant’s PI Br. at 3. The Commission, however, does not consider the robotic cleaning offered by the infringing product to rise to a public health and welfare issue, and SharkNinja has provided no evidence to the contrary. *See Certain Robotic*

⁴¹ While SharkNinja Hong Kong Co. Ltd. is a foreign entity, we find it appropriate to issue a CDO against it given the corporate relationship between the SharkNinja entities, and the lack of any argument to the contrary by SharkNinja.

⁴² Commissioner Schmidlein supports issuance of CDOs as to each of the SharkNinja entities regardless of whether SharkNinja’s infringing inventory is deemed commercially significant for the reasons explained in, for example, *Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944, Comm’n Op. at 56, n.20 (July 26, 2016).

PUBLIC VERSION

Vacuum Cleaning Devices & Components Thereof such as Spare Parts, Inv. No. 337-TA-1057, Comm'n Op., 2019 WL 1292948 (Feb. 1, 2019).

2. Competitive Conditions in the United States Economy and the Production of Like or Directly Competitive Products in the United States

Nor is there any evidence that excluding SharkNinja's infringing products would adversely affect the second (competitive conditions in the U.S. economy) or third (production of like or directly competitive articles) public interest factors. As iRobot explains, if SharkNinja's infringing products are excluded from importation, iRobot and other third-party market participants can meet the demand for the excluded products. *See* Complainant's PI Br. at 3. Specifically, as iRobot notes, "[t]here are numerous alternatives to [SharkNinja] available in the market, including—in addition to iRobot's suite of Roomba products—robot vacuums manufactured by Anker, RoboRock, Eufy, Neato, Samsung, Electrolus, and EcoVacs." *Id.* (citing B. Bennett, Best Robot Vacuum of 2022, CNET.com (Oct. 14, 2022), available at <https://www.cnet.com/home/kitchen-and-household/best-robot-vacuum/#jumplink1>); *see also* CX-70C (Newman Dep. Tr.) at 111:16-112:1 (testifying that customer testimonials and verbatims have compared SharkNinja products to other products including iRobot, Neato, Deebot, and Ecovac). Furthermore, there is no indication that the remedial orders would impact production of like or directly competitive articles in the United States.

3. U.S. Consumers

The Commission finds that consideration of the U.S. consumers factor does not warrant denial of remedial relief. As noted above, the record demonstrates that there are numerous alternatives to the infringing devices available to U.S. consumers, and as discussed below, the Commission is including an exemption for repair.

PUBLIC VERSION

The Commission has determined to include exemptions to the remedial orders for repair, under warranty terms, of products purchased by consumers prior to the date of the remedial orders. In deciding whether to tailor the Commission remedy in order to allow an exemption for repair and/or replacement in this investigation, the Commission considers the need for and appropriate scope of such an exemption, particularly with respect to the potential harm to U.S. consumers by virtue of the remedial orders. In so doing, the Commission considers (as it has in past investigations), among other things, evidence in the record concerning the price of the device, whether there are warranties available for the device and the terms of those warranties, and the burden the consumer would face if they have to replace the device should it fail. *See Certain Fitness Devices, Streaming Components Thereof, and Sys. Containing Same*, Inv. No. 337-TA-1265, Comm'n Op. at 89-92 (Mar. 8, 2023) ("*Fitness Devices*").

The Commission notes that, in this investigation, U.S. consumers may be harmed by the exclusion of components of infringing devices if they have already purchased such infringing devices, the devices are still under warranty, and they need parts for repair in the event their devices fail.⁴³ Relevant to the Commission's consideration is the cost of the accused products and the expectation of consumers that should their device fail, they will be able to have that device repaired. *See Fitness Devices*, Comm'n Op. at 89-92. Here, the MSRP of SharkNinja's

⁴³ Commissioner Stayin disagrees. In his view, with the remedial orders in place, SharkNinja can satisfy its warranty obligations by providing a refund. The burden on the consumer to then dispose of the device and purchase a different robotic vacuum is minimal. By contrast, (and among other differences), the burden on consumers to dispose of the products at issue in *Fitness Devices* would have been substantial, absent the exemptions provided. In the context of this investigation, Commissioner Stayin does not view the existence of warranties, the price of the products, and/or other factors discussed by the Commission sufficient to justify an exemption to the remedial orders for repair or replacement of any devices, under warranty or otherwise. Commissioner Johanson joins Commissioner Stayin's views with respect to the exemption for repair or replacement.

PUBLIC VERSION

AI-WD (VacMop) is about \$499, which is not an insignificant amount. *See* CX-198 at 14. The Commission has previously included service and repair exemptions for products in that price range to mitigate any harm to consumers. *See, e.g., Certain Movable Barrier Operator Systems & Components Thereof*, Inv. No. 337-TA-1209, Comm’n Op., 2022 WL 795701, at *44 (Mar. 11, 2022).

Additionally, “Respondents have presented evidence that the Accused Products are subject to existing service and warranty contracts.” *See* RD at 208 (citing, *inter alia*, CX-70C (Newman Dep. Tr.) at 67:8-70:10, 73:22-74:18, 101:13-105:15; CX-435 at 13; CX-438 at 13 (AI-WD); CX-249 at 13 (AI-WD); CX-139 at 13 (AI-WD); CX-309 at 13 (AI-WD)). The evidence, therefore, supports a finding that consumers expect these products to be repaired, if needed, while those products are under warranty. For instance, SharkNinja offers a one-year limited warranty for its AI-WD (VacMop) product and the warranty provides that “[th]e original unit and/or non-wearable components deemed defective, in SharkNinja's sole discretion, will be repaired or replaced up to one (1) year from the original purchase date.” *See* CX-139 at 13. However, nothing in the record suggests that consumers have an expectation that they will be able to acquire from SharkNinja components that would otherwise be subject to the orders after

PUBLIC VERSION

warranty terms expire.⁴⁴ *See Certain Cloud-Connected Wood-Pellet Grills & Components Thereof*, Inv. No. 337-TA-1237, Comm’n Op. at 17-18, 2022 WL 1732625, at *9 (May 24, 2022) (denying request for exemption for replacement parts where the evidence in the record is insufficient to support specific harm to consumers and finding that “without such facts, any alleged harm to consumers is entirely speculative”). Accordingly, the Commission includes an exemption that allows for the repair of infringing devices purchased prior to the issuance of these remedial orders, but only to the extent they are still covered by a warranty and only as permitted under that warranty.

In terms of replacement, the Commission notes that the warranty specifically states that “SharkNinja reserves the right to replace the unit with one of equal or greater value.” *See CX-139* at 13. Accordingly, the Commission finds that SharkNinja can replace the infringing device with a non-infringing device of equal or greater value without the need for an exemption for replacement. For instance, iRobot did not accuse SharkNinja’s advanced navigation/auto-empty

⁴⁴ Commissioner Karpel and Commissioner Schmidtlein concur with the majority that an exemption from the remedial orders is appropriate under the facts of this investigation to permit the Respondents to import and use component parts for repair of damaged infringing devices that are in the hands of U.S. consumers under warranty. This exemption is supported by the record and is necessary to mitigate harm to U.S. consumers. In their view, however, consumers would also be harmed from the inability to obtain component parts for repair of the infringing devices beyond the one-year warranty period. The record shows that consumers can, and do, purchase components for repair of their robotic vacuums via SharkNinja’s website or by contacting a SharkNinja customer service agent by phone. *See CX-70C* (Newman Dep. Tr.) at 101:17-105:9; *CX-440C* (Newman Dep. Exh. 8) (listing quantities of parts ordered through a SharkNinja customer service agent free of charge to customers under warranty or purchased by customers outside of warranty). Parts under warranty are shipped to customers for free whereas customers pay for parts that are not under warranty. *Id.* While consumers would not have a reasonable expectation that SharkNinja would be responsible for the cost of repair of their device outside the warranty period, given the nature and price of the device, the record is consistent with the reasonable expectation of consumers that they nonetheless could obtain parts necessary for repair rather than losing the entirety of their \$499 investment in their device that may break, for example, in the second year after purchase. Commissioner Karpel and Commissioner Schmidtlein therefore do not join the majority in limiting the exemption for repair to devices under warranty.

PUBLIC VERSION

product R1000AE/XL in connection with the '517 patent, and with a \$549 MSRP, that product has a greater value than the AI/WD product and may provide for a suitable replacement for a defective AI/WD device should it be adjudicated as non-infringing. *See* CX-198 at 14.

Accordingly, the Commission does not allow an exemption for replacement of the infringing devices with new infringing devices, whether under warranty or not.^{45, 46}

The Commission notes that the facts in this investigation differ in material respect from those in *Fitness Devices*, where the Commission allowed an exemption for repair of the fitness devices, both under warrant and not under warranty, and for replacement of the fitness devices, but only under warranty. Comm'n Op. at 89-92. The Commission notes that: (1) the devices

⁴⁵ Commissioner Schmidlein disagrees with this paragraph. She observes that Commission exclusion orders are directed to all products covered by the patent claims as to which a violation has been found rather than being limited to only those specific models found to infringe in the investigation. *See Certain Road Construction Machines and Components Thereof*, Inv. 337-TA-1088 (Modification), Comm'n Op at 11-14 (Sept. 14, 2020). There has been no adjudication of non-infringement for any products in this investigation as to the '517 patent. Commissioner Schmidlein believes that the *possibility* of SharkNinja obtaining, *in the future*, a non-infringement decision for a device not accused in the current investigation is not a persuasive rationale for declining to grant an exemption for replacement of whole devices for existing customers. Such an approach does nothing to ameliorate the current harm to existing consumers whose defective devices cannot be repaired and therefore need a replacement to make them whole. She further observes that with any exclusion order there is always the possibility of a respondent seeking a future adjudication of a non-accused product by CBP or the Commission in an ancillary proceeding. This fact has not previously prevented the Commission from granting exemptions to permit replacement of whole devices and Commissioner Schmidlein fails to see the logic of relying on this rationale now. Thus, consistent with consumer expectations, she would extend the exemption to cover the replacement of a malfunctioning device purchased prior to the effective date of the remedial orders. As discussed *infra* note 47, she would allow the exemption to cover such replacement whether covered by a warranty or not.

⁴⁶ Commissioner Kearns would allow the exemption to cover replacement of a defective unit during the warranty term. The warranty explicitly provides for repair or replacement at SharkNinja's discretion, and thus replacement is within consumers' reasonable expectations. While the majority relies on the fact that the warranty terms permit SharkNinja to replace a defective device with a non-infringing device of equal or greater value, it is not clear that non-infringing alternatives are adequate substitutes for the AI-WD products in light of their wet/dry or VacMop features.

PUBLIC VERSION

in the *Fitness Devices* investigation were more expensive than the devices here (including evidence that financing was available), (2) the warranty terms were more extensive than here, for example, ranging from 1 to 5 years, and (3) the devices would have been more difficult to remove from consumers' homes than the devices at issue here. *Id.* Given these differences, consumers may more easily replace the infringing device with a non-infringing device once the warranty ends, if they are not able to repair their device.^{47, 48}

In sum, in view of the record as discussed above, the Commission has determined to include exemptions to the remedial orders for importation of components to repair products still under warranty and purchased by consumers prior to the date of the remedial orders. With these exemptions in place, the Commission's remedy will not adversely affect United States consumers to the extent that rises to a public interest concern for the remedial orders. For those

⁴⁷ Commissioner Schmidlein does not join this paragraph as she does not agree that the factual differences in *Fitness Devices* identified by the majority are material differences from the current investigation. While it is obviously true that the devices at issue in *Fitness Devices* cost more than the infringing devices here, in her view the \$499 MSRP of SharkNinja's AI-WD (VacMop) still constitutes an expensive home product. Commissioner Schmidlein does not agree with the implication that the products at issue here are not sufficiently expensive to consumers to justify granting an exemption for a replacement. Similarly, while it is true that the length of the warranty terms in *Fitness Devices* were longer, Commissioner Schmidlein does not agree that a longer warranty period somehow justified granting an exemption for a replacement in *Fitness Devices* and does not justify granting such an exemption here. In both cases, the warranties still provide record support for an expectation of a replacement. Finally, Commissioner Schmidlein does not agree with the assumption that the devices at issue in *Fitness Devices* may have been more difficult to remove from a customer's home or that that distinction is of any consequence to whether existing customers would reasonably expect to have access to a replacement. Consistent with Commissioner Schmidlein's view in *Fitness Devices*, she would grant an exemption in the current investigation to permit existing customers to replace defective or broken whole devices outside of the warranty period.

⁴⁸ Commissioner Karpel does not join this paragraph. Commissioner Karpel did not join the majority in *Fitness Devices* in allowing an exemption for replacement of the infringing exercise devices. *See Fitness Devices*, Comm'n Op. at 89 n.51. Similar to the facts of that investigation, the availability of suitable alternatives and the absence of language in the warranty terms requiring an exact replacement for the infringing devices in the event the device fails and cannot be repaired weigh against an exemption for replacement.

PUBLIC VERSION

consumers who wish to purchase a robotic vacuum after the date of the remedial orders, as discussed in more detail above, consumers have suitable alternatives to the infringing products available from iRobot and third parties. *See, e.g., Certain Personal Data & Mobile Communications Devices & Related Software*, Inv. No. 337-TA-710, Comm'n Op. at 69, 2011 WL 12488979, at *40 (Dec. 29, 2011) (“[T]he mere constriction of choice cannot be a sufficient basis for denying the issuance of an exclusion order.”).

4. **Public Interest Conclusion**

Based on the record evidence, the Commission finds that the remedial orders would not adversely impact the public health and welfare, the competitive conditions in the United States economy, or the production of like or directly competitive products in the United States. However, the record indicates that United States consumers, who have purchased infringing products, could be adversely impacted and therefore the service and repair exemption is appropriate to mitigate those adverse impacts. The Commission has determined that the public interest factors do not preclude the issuance of the remedial orders.

C. **Bonding**

The ALJ and the Commission must also determine the amount of bond to be required of a respondent, pursuant to section 337(j)(3), during the 60-day period of Presidential review following the issuance of permanent relief, in the event that the Commission determines to order a remedy. *See* 19 U.S.C. § 1337(j)(3). The purpose of the bond is to protect the complainant from any injury. *See* 19 C.F.R. §§ 210.42(a)(1)(ii), 210.50(a)(3). Complainant has the burden of supporting any bond amount it proposes. *See Certain Rubber Antidegradants, Components Thereof, and Products Containing Same*, Inv. No. 337-TA-533, Comm'n Op. at 40 (July 21, 2006). The Commission typically sets the bond based on the price differentials between a respondent's and a complainant's products or based on a reasonable royalty rate. *See, e.g.,*

PUBLIC VERSION

Certain Graphics Systems, Components Thereof, and Consumer Products Containing Same, Inv. No. 337-TA-1044, Comm'n Op. at 71 (Sept. 18, 2018). Alternatively, the Commission has imposed a one hundred percent (100%) bond where the record establishes that the calculation of a price differential is impractical or there is insufficient evidence in the record to determine a reasonable royalty. *See, e.g., Certain Liquid Crystal Display Modules, Prods. Containing Same, & Methods Using the Same*, Inv. No. 337-TA-634, Comm'n Op. at 6-7 (Nov. 24, 2009).

The RD found that the record supports a bond of twenty percent (20%), which would be sufficient to protect Complainant from injury. *See* RD at 211-215. The RD noted that the parties do not dispute that price differential is an appropriate method to determine the bond amount. The RD explained, however, that iRobot relies on retail prices while SharkNinja contends that “the more appropriate numbers to use are the wholesale and direct sale prices from the actual sales data of the parties.” *Id.* at 213. The RD found that “it was reasonable for Complainant’s expert to rely on retail prices charged to customers by retailers since Complainant and Respondents compete based on retail pricing.” *Id.* at 214-15 (citing CX-1081C at 2-8; CX-1082C at 1; CX-198C at 2; Hr’g Tr. at 879:4-19 (Rowe)). The RD further found that “Ms. Rowe calculated the price differential between the DI Products and Accused Products across three product categories: random bounce, advanced navigation, and advanced navigation with self-empty” and “[s]he calculated that the average price differentials in those product categories ranged from about [] and thus, concluded that a bond of at least 20% is economically supportable, and a bond that is even higher is also supportable for the higher-end segments.” *Id.* at 215 (citing Hr’g Tr. at 882:18-885:17 (Rowe); CDX-6C at 9-13).

The Commission adopts the RD’s recommendation that the bond amount be set at twenty percent (20%) of the entered value of the infringing products imported by or on behalf of the

PUBLIC VERSION

Respondents. We agree with the RD that a bond based on retail values (as proposed by iRobot) is appropriate because the products compete at the retail level, and wholesale and direct sale prices (as proposed by SharkNinja) are insufficient to protect Complainant from injury.

Bonding is governed by section 337(j)(3), which states that the bond amount is “determined by the Commission to be sufficient to protect the complainant from any injury.” *See* 19 U.S.C. § 1337(j)(3). The statutory language referring to protection from “any” injury is broad and allows the parties to put forward different theories to establish an appropriate bond amount for importation and sale of unfair imports during the period of Presidential review. The Commission is not required to impose a bond amount based on the difference in wholesale prices between the domestic industry and the infringing products if that amount is insufficient to protect the complainant from injury.

Here, the Commission agrees with the RD that the [] price differential proposed by SharkNinja will not sufficiently prevent or mitigate iRobot’s injury, as the retail pricing differential varies from about []. As iRobot explained, SharkNinja undercuts iRobot’s prices in three major product categories and the degree “increases as the amount of technology incorporated in the product increases, with a [] differential for Random Bounce devices ([] for iRobot and Shark, respectively); [about] [] for Advanced Navigation devices ([]); and over [] for Advanced Navigation w/ Self-Empty ([]).” *See* RD at 212-13; CDX-6.10-13. More specifically, with respect to SharkNinja’s AI-WD (VacMop), which was found to infringe the asserted claims of the ’517 patent, its MSRP is \$499 compared to \$599 for iRobot’s Roomba j7, \$799 for Roomba j7+, and \$999 for Roomba s9+, which corresponds to a discount of about 20% to 50%. *See* CX-198 at 14.

PUBLIC VERSION

Thus, the bond amounts advocated by SharkNinja would not effectively prevent SharkNinja from undercutting the iRobot products' retail pricing, thereby causing injury to iRobot. Accordingly, the Commission has determined to set the bond during the period of Presidential review at twenty percent (20%) of the entered value of infringing products imported by or on behalf of the Respondents.

VI. CONCLUSION

For the foregoing reasons, the Commission has determined to affirm the FID in part and reverse in part. Specifically, the Commission has determined that Complainant has established a violation of section 337 based on the infringement of the '517 patent, but not the '511, '423, and '096 patents. Accordingly, the investigation is terminated with a finding of a violation of section 337. The Commission also determines that: (1) the appropriate remedy is an LEO directed against Respondents' infringing products and a CDO directed against each Respondent; (2) the public interest does not preclude this remedy; and (3) the bond during the period of Presidential review is set in an amount of twenty percent (20%) of the entered value of the infringing articles.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: April 13, 2023

CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **COMMISSION OPINION** has been served upon the following parties as indicated, on **April 13, 2023**.



Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant iRobot Corporation:

Paul F. Brinkman, Esq.
KIRKLAND & ELLIS LLP
1301 Pennsylvania Avenue, NW
Washington, DC 20004
Email: paul.brinkman@kirkland.com

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: Email Notification
of Availability for Download

**On Behalf of Respondents SharkNinja Operating LLC,
SharkNinja Management LLC, SharkNinja Management Co.,
SharkNinja Sales Co., EP Midco LLC, and SharkNinja Hong
Kong Co. Ltd.:**

Luke J. McCammon, Esq.
**FINNEGAN, HENDERSON, FARABOW, GARRETT &
DUNNER LLP**
901 New York Avenue, NW
Washington, DC 20001
Email: luke.mccammon@finnegan.com

- Via Hand Delivery
- Via Express Delivery
- Via First Class Mail
- Other: Email Notification
of Availability for Download