

Comprehensive Legal Analysis Report on U.S. Patent Litigation and Infringement Risk

Defendant-side perspective · Evidence-traceable draft

Public-record preliminary draft — no privilege asserted — subject to U.S. attorney review

Item	Content
Subject patent	US10813517B2
Product / version analyzed	SharkNinja Shark IQ Robot Self-Empty XL RV1001AE
Primary analysis as-of date	2026-07-22
Review status	Preliminary draft; not yet reviewed and issued by the responsible U.S. attorney

This document is a preliminary draft that has not been reviewed and issued by the responsible U.S. attorney. The facts, evidence, legal analysis and recommendations in this report may serve as U.S. legal advice on which the client may rely only after the responsible U.S. attorney has completed review in light of the scope of engagement and has expressly issued it.

Executive Summary and Key Defense Points

Invalidity attack conclusion: There is a basis to continue targeted development and evaluation of an invalidity attack, but not enough to recommend filing an IPR immediately. The primary path is the pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261), directed principally to claims 1 and 9; no single-reference §102 anticipation primary path meeting the issuance standard has been established. IPR decision: the existing substantive grounds are not yet petition-ready; the timing of any filing and the procedural strategy must be assessed separately in light of §315(b) service, real parties in interest / privies and §325(d). Report status: not yet reviewed and issued by the responsible U.S. attorney.

1. Summary of Defense Conclusions

Rank	Defense	Current strength	Cost	Dispositive issue / risk
1	Non-infringement defenses for the specific product and version	Not established	Not established	Not established
2	damages limitation	Not established	Not established	Not established
3	Invalidity	Not established	Not established	Not established
4	Post-grant proceedings and reexamination	Not established	Not established	Not established
5	unenforceability/equitable	Not established	Not established	Not established

2. Feasibility of the Invalidity Attack, Primary Path and Key Prior Art

Core assessment: There is a basis to continue targeted development and evaluation of an invalidity attack, but not enough to recommend filing an IPR immediately. The current primary path is the pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261), directed principally to claims 1 and 9; it is currently evaluated as showing moderate conceptual overlap but is not yet petition-ready. No single-reference §102 anticipation primary path meeting the issuance standard has been established. Whether an IPR is appropriate further depends on §315(b) service, real parties in interest / privies, §325(d) and completion of the key evidence packages.

Decision question	Current assessment	Principal basis	Limits / conditions required to reach a decision
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Whether a basis for an invalidity attack exists	There is a basis to continue targeted development and evaluation of an invalidity attack, but not enough to recommend filing an IPR immediately	The primary §103 path is the pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261).	To be decided by the responsible U.S. attorney after reviewing the key references, the element-by-element analysis and the procedural facts.
Whether an IPR can be filed immediately	A filing decision cannot be made directly on the basis of this draft	The existing substantive grounds are not yet petition-ready	The asserted claims, service date, prospective petitioner and real parties in interest / privies must first be locked down, and the §325(d) analysis completed.
Whether a single-reference §102 primary path exists	No single-reference §102 anticipation primary path meeting the issuance standard has been established	Judged by element-by-element disclosure within a single reference, date qualification and enablement.	A near-complete technical correspondence or a conditional lead must not be mischaracterized as established single-reference anticipation.
Paths / claims not yet established	1; 9	pre-AIA §103 combination ground based on Taylor in view of Samsung/Everett	These references merely add map-related disclosure and still do not supply the key transformation required by the claim: autonomously identifying a hot spot / zone from the robot's prior positions and triggering the subsequent behavior on that basis.

Prio rity	Attack path	Target claims	Current evaluation	Combination rationale / technical logic	Strongest risk	Recommended positioning
1	pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261)	1; 9	Moderate conceptual overlap, but not yet petition-ready	Applying position-indexed environmental-state data to the robot's zone behavior in order to improve cleaning efficiency in particular areas.	The combination approaches the claim only if, after reading the patent, one substitutes historical trajectory data for the dirt or user input disclosed in the references; the hindsight risk is therefore evident.	Primary path: prioritize building an expert-supported element-by-element comparison and separately assess §325(d) and procedural feasibility.
2	pre-AIA §103 combination ground based on Taylor in view of Allen	1; 9	Low to moderate strength; not yet petition-ready	The candidate combination rationale is to combine persistent map-zone control with Taylor's localized cleaning in order to achieve repeatable zone behavior.	Allen expressly relies on user annotation, the opposite of autonomous device identification; the further substitution required can be derived only from the patent and its prosecution history, so the hindsight risk is severe.	Alternative path: first complete the official text, date, family, translation and enablement evidence package.
3	pre-AIA §112 ¶ 2 indefiniteness: if "receiving system" is subject to §112 ¶ 6 and the specification discloses no adequate algorithm	1; 4; 9	The strength of this ground is reduced following the PGR denial and depends on the facts and claim construction	Not established	Not established	Supporting path: used principally to reduce disputes over analogous art, motivation to combine and chat/participant correspondence.

Reference ID	Publication No.	Role in the primary path	Operative date	Evidence status
PA-001	US20050010331A1	G1; G2; G3; G5	Not established on the current record.	Verified; usable for element-by-element comparison
PA-002	US5995884A	G2	Not established on the current record.	Verified; usable for element-by-element comparison
PA-008	US5613261A	G5	Not established on the current record.	Verified; usable for element-by-element comparison

3. Matter Scope, Key Facts and Issue Applicability

Item	Current record			
Purpose of analysis	Primary purpose: public-record patent litigation risk analysis; reliance permitted: No; legal opinion: No; privilege status: not assessed; required legend: public-record preliminary draft — not yet reviewed and issued by the responsible U.S. attorney			
Data and external-processing controls	permitted inputs: public record only; confidential client materials: No; external model upload: public materials only; raw evidence immutable: Yes; hash algorithm: sha256			
Product / version lock	Hardware: the hardware version evidenced by public materials as of 2021-01-29; Firmware: unknown, no inference permitted; Mobile app: the SharkClean app functionality evidenced by public materials as of 2021-01-29			
Analysis mode	Preliminary public-record analysis			
Issue	Applicability status	Confirmed facts / basis	Impact on conclusions	Verification or action required
Invalidity attack and PTAB paths	applicable	Claims 1 and 9 have been analyzed; structured preliminary analyses have been prepared for the principal §102/§103 and §112 paths in the current record.	The existing invalidity paths are overall of low to moderate strength; there is no high-confidence single-reference anticipation path.	Verify Taylor's provisional support and the date qualification of the key references, and strengthen the technical literature on prior-position classification.
Product-version-specific non-infringement defenses	applicable	The product is locked to the Shark IQ Robot Self-Empty XL RV1001AE; the public record does not establish the internal firmware and cloud functions.	Claim elements 1.e, 1.g, 9.b and 9.c are the principal unestablished elements; the absence of a function must not be inferred from silence in public materials.	Obtain firmware, application, cloud logs, source code or reproducible test records.
Jurisdiction, venue, service and §315(b)	applicable	Public records exist for D. Mass., ITC 337-TA-1252 and PGR2021-00065; the service date and all RPI/privy entities have not been locked down from source records.	Whether IPR is available, and its procedural cost, cannot be determined from the complaint date alone.	Verify the operative complaint, formal proof of service, prospective petitioner, RPI, privies and joinder posture.
Title, standing, license and exhaustion	Not demonstrated	The current public-record analysis does not establish a complete chain of assignment, license, settlement, covenant not to sue or authorized sale.	No definitive conclusion can yet be reached on standing, necessary parties, license defenses or the scope of remedies.	Obtain USPTO assignment records and the complete license, settlement and supply-chain contracts.
Unenforceability, equitable defenses and §273	Not demonstrated	The current record does not contain the specific facts required to assert inequitable conduct or other equitable defenses.	Ordinary prosecution disputes or evidentiary gaps must not be characterized as rendering the patent unenforceable.	Assess only after evidence of materiality, specific intent, reliance conduct or prior commercial use has been found.
Damages, injunctions, ITC and commercial exposure	applicable	The patent expired on 2024-07-24; exposure is limited to pre-expiration conduct and is subject to §286, §287, notice, apportionment and other defenses.	Prospective injunction risk and historical damages risk must be kept separate; the current public record is insufficient to quantify damages.	Lock down evidence of sales, importation, marking, actual notice, licenses and product-value apportionment.
Insurance, indemnity, preservation, e-discovery and experts	Not demonstrated	The public record contains no insurance policies, indemnity contracts, preservation notices, source-code protective orders or expert plans.	Cost allocation, discovery availability and expert-evidence readiness cannot yet be assessed.	Litigation counsel to verify policies/contracts, issue litigation holds and establish source-code and expert plans.

4. Litigation Procedure, Title, License, Indemnity Arrangements and Evidence Preservation

Matter	Current record	Legal / commercial impact	Next step
Jurisdiction, venue, transfer and service	Not established	Procedure, deadlines and cost	Litigation counsel to verify the court records

Matter	Current record	Legal / commercial impact	Next step
Title, standing, necessary parties, license and exhaustion	schema version: 1.0; matter id: demo1 irobot sharkninja 517; analysis as of: 2026-07-22; status: not established on current public record; standing: The complete chain of title to the subject patent, the substantive rights held at the time of suit, exclusive licenses and necessary parties have not been reviewed against complete assignment records and agreements; this draft reaches no definitive conclusion on standing.; license exhaustion: No potentially applicable express license, implied license, covenant not to sue, settlement agreement or authorized-sale chain has been obtained, so the license and exhaustion defenses are not established.; required evidence: complete chain of assignment and corrective records from USPTO Assignment Center; exclusive/non-exclusive licenses, settlements, covenants not to sue and related amendments; patent license terms in supplier, distributor and sales-chain agreements; the substantive rights held by the plaintiff at the time of suit and necessary-party facts; review status: Preliminary conclusion; subject to U.S. attorney review	Liability, standing and remedies	Obtain official assignment records and complete agreements
Insurance, indemnity undertakings and joint defense	Not established	Notice deadlines, costs and control	Verify policies and contracts
Litigation hold, e-discovery, source code, protective order and experts	Not established	Spoliation, disclosure, scheduling and Daubert risk	Issue a litigation hold and establish an evidence plan

5. Patent, Family, Legal Status and Claim Versions

Item	Content			
Patent No.	US10813517B2			
Application No.	Not established on the current record.			
Effective filing date	Not established on the current record.			
Current claims	Not established on the current record.			
Independent claims	Not established on the current record.			
Analysis status	Not established			
Date	Event	Claims involved	Amendment / event content	Scope impact or evidence
2018-03-09	application filed	Not established on the current record.	Not established	Not established
2018-06-06	preliminary amendment	Not established on the current record.	Not established	Not established
2020-06-22	Response to non-final rejection	Not established on the current record.	Not established	Not established
2020-08-10	RCE amendment	Not established on the current record.	Not established	Not established

Date	Event	Claims involved	Amendment / event content	Scope impact or evidence
2020-09-18	notice of allowance	Not established on the current record.	Not established	Not established
2020-10-27	Grant	Not established on the current record.	Not established	Not established
2021-02-16	certificate of correction	Not established on the current record.	Not established	Not established
2024-08-14	Post-expiration ITC rescission proceeding	Not established on the current record.	Not established	Not established

6. Applicable Statutory Regime and Effective Filing Date

Item		Conclusion	
Application-level applicable regime		pre AIA	
Whether it ever contained a claim with an EFD on or after 2013-03-16		No	
Whether it ever contained a claim with an EFD before 2013-03-16		Yes	
Filing date		Not established on the current record.	
Priority claim		Not established	
§102(b)(1) one-year grace-period critical date		Not established on the current record.	
Analysis status		Preliminary conclusion; subject to U.S. attorney review	
Claim	Effective filing date	§112(a) support basis	Uncertainties / items to verify
		To be verified element by element	

7. Claim Construction and Prosecution-History Limitations

Disputed term (original English)	Claim	Proposed construction	Intrinsic evidence	Excluded scope / dispute
prior to initiation of a cleaning mission	1; 4; 9	Refers to the period before the start of the same cleaning mission recited later in the claim; both map storage and autonomous identification must be completed before that mission.	The claim grammar separates the pre-mission storage/identification steps from the in-mission localization/response steps; the specification contemplates position history accumulated during robot operation.	Medium
autonomously identify	1; 4; 9	The recited identification is performed by the device or the receiving system rather than by a human selecting or annotating the map; this does not necessarily exclude unrelated human settings or a later selection among zones identified by the system.	The examiner interview of July 29, 2020 expressly equated autonomous performance with the absence of human input; the applicant adopted that amendment to overcome Allen's user-selected map areas and did not contest that characterization.	Hot spots or zones identified solely through user selection or map annotation fall outside the proposed construction.
based on previously determined positions of the cleaning apparatus	1; 4; 9	The previously determined robot position information is both a substantive input to the stored map and an independent substantive input to the autonomous identification of the hot spot / zone.	The same phrase modifies both map storage and autonomous identification; the position-history embodiments in the specification count/store visits and evaluate map cells.	A zone selected solely by user preference or arbitrary map geometry, without using the robot's prior positions in the identification, does not satisfy this limitation.

Disputed term (original English)	Claim	Proposed construction	Intrinsic evidence	Excluded scope / dispute
hot spot	1	A location or map area identified for localized responsive cleaning behavior, which may comprise one or more map cells and is not limited to a spiral shape.	The specification discloses map cells identified as hot spots and responsive spot coverage, and makes clear that the preferred spiral algorithm is not exclusive.	Medium
predefined zone	4; 9	A map area defined before the current cleaning mission and identified by the device from prior positions; it may include the area surrounding a stored location and need not be user-defined.	The claim language and the specification describe location A as a stored area defining an arbitrary zone; the prosecution history distinguishes user annotation from autonomous identification.	High
in response to	1; 4; 9	"In response to" requires a causal link between the determined robot position corresponding to / lying within the mapped hot spot or zone and the initiation of the recited behavior.	Based on the claim grammar and the trigger-event / control-signal examples in the specification.	Medium
spot coverage behavior	1; 9	A cleaning movement behavior directed to a limited / localized area, not limited to the preferred spiral embodiment.	The specification describes the spiral as the preferred approach while permitting other self-bounded area algorithms such as polygons.	Medium
selected from the group consisting of ...	9	The initiated behavior must be one of the five recited behaviors; an unrecited behavior alone cannot satisfy claim 9.	Based on the traditional closed Markush form and the claim language.	Low
§112(f) term (original English)	Claim	Applicable presumption	Corresponding structure / function	Indefiniteness risk
receiving system configured to [recited functions]	1; 4; 9	Not established	Receiving subsystem 20: processing unit 22, comprising microprocessor 24, signal processing unit 26, memory 28, detection unit 30M and, where required, transmitting unit 32; these components are programmed in accordance with the disclosed position-history / navigation control algorithms, including cell-visit counting and comparison, hot-spot true/false triggering, position/zone comparison, and control-signal selection and transmission, together with statutory structural equivalents.	If §112 ¶ 6 applies, each computer-implemented function must correspond to structure/algorithm adequately disclosed in the specification; expert testimony cannot supply disclosure absent from the specification. The current record supports several algorithms, but whether they cover the entire asserted scope still requires evidence from a person of ordinary skill in the art.
drive system operable to move	1; 4; 9	Not established	Not established	Not established
Type of prosecution-history limitation		Analysis		
literal_scope		The construction should exclude identification performed solely by a human through map annotation/selection; the applicant relied on precisely this distinction from Allen to obtain allowance.		
doctrine_of_equivalents		The narrowing amendment made on August 10, 2020 to obtain allowance is a significant Festo estoppel candidate as to the surrendered "manually selected zone" scope; the current public record establishes no basis for rebutting that presumption.		
no_examiner_reasons_for_allowance		Yes		
Date / round	Examiner position	Amendment / response	Scope impact	Source evidence
	Original file wrapper pending structured review			

8. §271 Liability Paths, Actors and Territoriality

Legal path	Facts that must be proven	Current assessment	Evidence	Strongest rebuttal / gap
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Legal path	Facts that must be proven	Current assessment	Evidence	Strongest rebuttal / gap
§271(a) direct infringement	Making, using, offering to sell, selling or importing; method steps must be performed by a single actor or be legally attributable	Not established	Not established	Actor, version and U.S. territorial conduct must each be proven
§271(b) induced infringement	Direct infringement exists, together with knowledge of the patent and specific intent to encourage infringement	Not established	Not established	Evidence of instructions, training, notice and infringing use
§271(c) contributory infringement	A material part of the invention, knowledge, and no substantial non-infringing use	Not established	Not established	Evidence of component use and non-infringing uses
§271(f)(g) cross-border paths	Verify statutory facts such as supply of components abroad or importation of products made by a U.S. patented process	Not established	Not established	Supply chain, place of manufacture and import records

9. Product Evidence, Element-by-Element Literal Infringement and the Doctrine of Equivalents

Scope limitation: no accused-product or conduct evidence was provided in this matter, so no infringement conclusion can be drawn.

ID	Claim element / issue	Assessment	Evidence	Pinpoint citation
	No accused-product or conduct evidence provided	Outside the scope of the current invalidity analysis		

The doctrine of equivalents must be analyzed element by element for function-way-result or insubstantial differences, the all-elements rule and vitiation, the three Festo rebuttals, prior-art ensnarement and disclosure-dedication; §112(f) statutory equivalents must not be conflated with DOE.

10. Prior Art, Non-Patent Literature and Public-Source Search Coverage

Item	Status / count
Search methodology	Controlled keywords, relational expressions, classifications, citation/family expansion and a second round of targeted searching
Search scope	U.S. patent full text, global patent discovery, China/Japan/Korea targeted discovery, EPO international patents and non-patent literature
Patent candidate records generated	18
Non-patent-literature candidate records generated	656
Use in this report	Verify the full text, dates, family and pinpoint citations of the screened key references and build an element-by-element invalidity analysis.

Search scope	Principal databases / sources	Execution status	Use in this matter
U.S. patent full text and official records	USPTO Patent Public Search, USPTO ODP	Executed	Full-text searching of U.S. patents and published applications, a second round of targeted searching, and verification of the subject patent's official record.
Global patent discovery	Google Patents, BigQuery patent publication data	Executed	Preliminary global patent discovery and candidate screening.
China, Japan and Korea targeted discovery	BigQuery standalone China / Japan / Korea search configurations	Executed	Country-by-country title-field discovery searching.
International patent bibliography, family and supplemental discovery	EPO OPS	Executed	Supplemental discovery of international patents and verification of bibliographic data, family and citation relationships.
Non-patent literature	PubMed, OpenAlex, Crossref, Semantic Scholar	Executed	Discovery of cross-disciplinary papers, publications and biomedical literature.

11. Key Prior-Art Full Text and Element-by-Element Invalidity Analysis

Item	Conclusion
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Item		Conclusion			
Overall invalidity assessment		There is a basis to continue targeted development and evaluation of an invalidity attack, but not enough to recommend filing an IPR immediately. The current primary path is the pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261), directed principally to claims 1 and 9; it is currently evaluated as showing moderate conceptual overlap but is not yet petition-ready. No single-reference §102 anticipation primary path meeting the issuance standard has been established. Whether an IPR is appropriate further depends on §315(b) service, real parties in interest / privies, §325(d) and completion of the key evidence packages.			
Primary attack path		pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261)			
Single-reference §102 path		No single-reference §102 anticipation primary path meeting the issuance standard has been established			
Review status		Preliminary conclusion; not yet reviewed and issued by the responsible U.S. attorney.			
Evidence package	Reference	Full-text status	Ground role	Date proof	Normalized hash
PA-001	US20050010331A1	Verified; usable for element-by-element comparison	G1; G2; G3; G5	date type: publication date; asserted date: 2005-01-13; verification status: official publication text verified; Date-proof source ID: PA-001-USPTO-PDF; Date-proof pinpoint citation: official publication front page	bdef48bc148ce79ab531749791ad4312bcf7bf6fd9583fe335dda c76a46f5dad
PA-002	US5995884A	Verified; usable for element-by-element comparison	G2	date type: publication date; asserted date: 1999-11-30; verification status: official publication text verified; Date-proof source ID: PA-002-USPTO-PDF; Date-proof pinpoint citation: official publication front page	50811a4f1176f72e8f70aefc411bb1a8664b6880471164c955e5fa0250ea9450
PA-008	US5613261A	Verified; usable for element-by-element comparison	G5	date type: publication date; asserted date: 1997-03-25; verification status: official publication text verified; Date-proof source ID: PA-008-USPTO-PDF; Date-proof pinpoint citation: official publication front page	1f2ae82c55da8106290bd1cb511c4430fc833a0c0e118369760f7f001092f189
Rank	Invalidity ground	Claim	Current strength	Graham/KSR analysis	Principal risk
1	pre-AIA §103 combination ground based on Taylor in view of Kawakami/Nakanishi (US5613261)	1; 9	Moderate conceptual overlap, but not yet petition-ready	Applying position-indexed environmental-state data to the robot's zone behavior in order to improve cleaning efficiency in particular areas.	The combination approaches the claim only if, after reading the patent, one substitutes historical trajectory data for the dirt or user input disclosed in the references; the hindsight risk is therefore evident.
2	pre-AIA §103 combination ground based on Taylor in view of Allen	1; 9	Low to moderate strength; not yet petition-ready	The candidate combination rationale is to combine persistent map-zone control with Taylor's localized cleaning in order to achieve repeatable zone behavior.	Allen expressly relies on user annotation, the opposite of autonomous device identification; the further substitution required can be derived only from the patent and its prosecution history, so the hindsight risk is severe.
3	pre-AIA §112 ¶ 2 indefiniteness: if “receiving system” is subject to §112 ¶ 6 and the specification discloses no adequate algorithm	1; 4; 9	The strength of this ground is reduced following the PGR denial and depends on the facts and claim construction	Not established	Not established
4	pre-AIA §102(e): single-reference anticipation by Taylor	1	Weak on the current record; not usable as a primary path	Not established	Not established

Rank	Invalidity ground	Claim	Current strength	Graham/KSR analysis	Principal risk	
5	pre-AIA §103 combination ground based on Taylor in view of Samsung/Everett	1; 9	Weak on the current element-by-element chart	Using known automatic localization and map-maintenance techniques to improve Taylor's navigation reliability and zone control.	These references merely add map-related disclosure and still do not supply the key transformation required by the claim: autonomously identifying a hot spot / zone from the robot's prior positions and triggering the subsequent behavior on that basis.	
Claim	Reference	§102 channel	Operative date	Qualification	Date proof	Exceptions / uncertainties
1	PA-001	pre-AIA 102(e), conditional	2003-03-14 may be claimed only for subject matter adequately supported by US60/454, 934; for other subject matter the operative date is 2004-03-11	Undetermined	Source ID: PA-001-USPTO-PDF; source SHA-256: 2c5b80318ff129f4ae28a4fc16966cdaef6cf4e19e5bba04d369440a4ef9b59; Pinpoint citation: official publication front page; recited publication date: 2005-01-13; Source ID: PA-001-USPTO-PDF; source SHA-256: 2c5b80318ff129f4ae28a4fc16966cdaea...	Not established
9	PA-001	pre-AIA 102(e), conditional	2003-03-14 may be claimed only for subject matter adequately supported by US60/454, 934; for other subject matter the operative date is 2004-03-11	Undetermined	Source ID: PA-001-USPTO-PDF; source SHA-256: 2c5b80318ff129f4ae28a4fc16966cdaef6cf4e19e5bba04d369440a4ef9b59; Pinpoint citation: official publication front page; recited publication date: 2005-01-13; Source ID: PA-001-USPTO-PDF; source SHA-256: 2c5b80318ff129f4ae28a4fc16966cdaea...	Not established
1	PA-002	pre-AIA 102(b)	1999-11-30	Yes	Source ID: PA-002-USPTO-PDF; source SHA-256: d483b9975e7a19f3b9995c19734d7baa44ca169b60795ea74363754be47b06a8; Pinpoint citation: official publication front page; recited publication date: 1999-11-30; Source ID: PA-002-USPTO-PDF; source SHA-256: d483b9975e7a19f3b9995c19734d7baa44...	Not established
9	PA-002	pre-AIA 102(b)	1999-11-30	Yes	Source ID: PA-002-USPTO-PDF; source SHA-256: d483b9975e7a19f3b9995c19734d7baa44ca169b60795ea74363754be47b06a8; Pinpoint citation: official publication front page; recited publication date: 1999-11-30; Source ID: PA-002-USPTO-PDF; source SHA-256: d483b9975e7a19f3b9995c19734d7baa44...	Not established

Claim	Reference	§102 channel	Operative date	Qualification	Date proof	Exceptions / uncertainties	
1	PA-008	pre-AIA 102(b)	1997-03-25	Yes	Source ID: PA-008-USPTO-PDF; source SHA-256: 196d445de89e3a831065787a520d7a033c1217edb201989660ab45f1a7787ce9; Pinpoint citation: official publication front page; recited publication date: 1997-03-25; Source ID: PA-008-USPTO-PDF; source SHA-256: 196d445de89e3a831065787a520d7a033c...	Not established	
9	PA-008	pre-AIA 102(b)	1997-03-25	Yes	Source ID: PA-008-USPTO-PDF; source SHA-256: 196d445de89e3a831065787a520d7a033c1217edb201989660ab45f1a7787ce9; Pinpoint citation: official publication front page; recited publication date: 1997-03-25; Source ID: PA-008-USPTO-PDF; source SHA-256: 196d445de89e3a831065787a520d7a033c...	Not established	
Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
1	1.a	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 surfac...	PA-001	Shown	PA-001-P20-PAR0033: pdf page: 20; paragraph: [0033]	Discloses cleaning unit 102, drive wheels/motors and a processor-controlled autonomous cleaning apparatus.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
1	1.b	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	PA-001	Not demonstrated	PA-001-P24-PAR0083: pdf page: 24; paragraph: [0083]	Discloses position tracking, map building/updating and marking of cleaned and uncleaned cells, but the cited passages do not state that this data is formed before the current cleaning mission.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
1	1.c	and autonomously identify a hot spot in the map based on the previously determined positions of the cleaning apparatus	PA-001	not shown	PA-001-P25-PAR0087: pdf page: 25; paragraph: [0087]	Discloses localized / predetermined-area cleaning and dirt or coverage information, but does not disclose autonomously identifying a hot spot from accumulated robot positions before the mission begins.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
1	1.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-001	Shown	PA-001-P22-PAR0056: pdf page: 22; paragraph: [0056]	Discloses visual localization and position tracking.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
1	1.e	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 cor...	PA-001	not shown	PA-001-P25-PAR0087: pdf page: 25; paragraph: [0087]	Localized cleaning is disclosed, but the required causal link between entering a previously autonomously learned hot spot and triggering the cleaning behavior is absent.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent

Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
1	1.a	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 surfac...	PA-002	Not demonstrated	PA-002-P40: pdf page: 40	Discloses a map interface and robotic cleaning missions.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
1	1.b	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	PA-002	not shown	PA-002-P1: pdf page: 1	Although map zones are present, the passages relied on do not establish the prior-position data relationship required by the claim.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
1	1.c	and autonomously identify a hot spot in the map based on the previously determined positions of the cleaning apparatus	PA-002	contradicted	PA-002-P55: pdf page: 55	The user annotates map attributes or designates a "clean now" area; the identification is performed by a human rather than by the device.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
1	1.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-002	Not demonstrated	PA-002-P40: pdf page: 40	The robot uses map zones or destinations to execute behaviors, but the learned-hot-spot chain required by the claim is not disclosed.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
1	1.a	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 surfac...	PA-008	Shown	PA-008-P7: pdf page: 7	Expressly discloses a self-propelled autonomous cleaner, drive wheels/motors, a cleaning unit, sensors and a controller.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
1	1.b	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	PA-008	Not demonstrated	PA-008-P8: pdf page: 8	Memory stores reflectance by floor position and the position detector indexes the map accordingly; that map records a floor-condition baseline and is not expressly generated from the robot's prior positions.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.

Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
1	1.c	and autonomously identify a hot spot in the map based on the previously determined positions of the cleaning apparatus	PA-008	not shown	PA-008-P1: pdf page: 1	The controller detects dirt and may use a pre-measured condition map, but the classification input is dirt/reflectance rather than the robot's prior positions, and detection generally occurs during cleaning.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
1	1.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-008	Shown	PA-008-P7: pdf page: 7	Wheel encoders / position detectors are used to determine the current position.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
1	1.e	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 cor...	PA-008	Not demonstrated	PA-008-P1: pdf page: 1	A fine-cleaning mode is selected by position in response to detected or stored dirt, which is functionally close; but the antecedent autonomous identification based on prior positions is still absent.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
9	9.a	An autonomous cleaning apparatus comprising a cleaning head, a drive system, and a receiving system configured to perform the inherited claim 4 functions	PA-001	Shown	PA-001-P20-PAR0033: pdf page: 20; paragraph: [0033]	Claim 9 incorporates all limitations of claim 4. Discloses cleaning unit 102, drive wheels/motors and a processor-controlled autonomous cleaning apparatus.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
9	9.b	prior to initiation of a cleaning mission, store a map based on previously determined positions of the cleaning apparatus	PA-001	Not demonstrated	PA-001-P24-PAR0083: pdf page: 24; paragraph: [0083]	Claim 9 incorporates all limitations of claim 4. Discloses position tracking, map building/updates and marking of cleaned and uncleaned cells, but the cited passages do not state that this data is formed before the current cleaning mission.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent

Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
9	9.c	and autonomously identify a predefined zone in the map based on the previously determined positions of the cleaning apparatus	PA-001	not shown	PA-001-P25-PAR0087: pdf page: 25; paragraph: [0087]	Claim 9 incorporates all limitations of claim 4. Discloses localized / predetermined-area cleaning and dirt or coverage information, but does not disclose autonomously identifying a hot spot from accumulated robot positions before the mission begins.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
9	9.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-001	Shown	PA-001-P22-PAR0056: pdf page: 22; paragraph: [0056]	Claim 9 incorporates all limitations of claim 4. Discloses visual localization and position tracking.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
9	9.e	cause the cleaning apparatus, during the cleaning mission, to initiate a prescribed conduct to alter movement in response to the determined position being within the predefined zone indicated on the ...	PA-001	not shown	PA-001-P25-PAR0087: pdf page: 25; paragraph: [0087]	Claim 9 incorporates all limitations of claim 4. Localized cleaning is disclosed, but the required causal link between entering a previously autonomously learned hot spot and triggering the cleaning behavior is absent.	Not demonstrated; limitations 1.c and 1.e are absent and have not been shown to be necessarily inherent
9	9.f	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	PA-001	Shown	PA-001-P1: pdf page: 1	Taylor expressly discloses spot / localized cleaning, one of the behaviors recited in claim 9.	Even where a recited behavior is disclosed, that does not cure the absence, in inherited claim 4, of the prior-position classifier and of the causal relationship between entering the zone and triggering the behavior.
9	9.a	An autonomous cleaning apparatus comprising a cleaning head, a drive system, and a receiving system configured to perform the inherited claim 4 functions	PA-002	Not demonstrated	PA-002-P40: pdf page: 40	Claim 9 incorporates all limitations of claim 4. Discloses a map interface and robotic cleaning missions.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
9	9.b	prior to initiation of a cleaning mission, store a map based on previously determined positions of the cleaning apparatus	PA-002	not shown	PA-002-P1: pdf page: 1	Claim 9 incorporates all limitations of claim 4. Although map zones are present, the passages relied on do not establish the prior-position data relationship required by the claim.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
9	9.c	and autonomously identify a predefined zone in the map based on the previously determined positions of the cleaning apparatus	PA-002	contradicted	PA-002-P55: pdf page: 55	Claim 9 incorporates all limitations of claim 4. The user annotates map attributes or designates a "clean now" area; the identification is performed by a human rather than by the device.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations

Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
9	9.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-002	Not demonstrated	PA-002-P40: pdf page: 40	Claim 9 incorporates all limitations of claim 4. The robot uses map zones or destinations to execute behaviors, but the learned-hot-spot chain required by the claim is not disclosed.	Not demonstrated; express user designation does not satisfy the autonomous-identification and prior-position limitations
9	9.f	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	PA-002	Not demonstrated	PA-002-P1: pdf page: 1	The preserved passages do not simultaneously establish one of the closed Markush behaviors and the inherited classifier / trigger chain.	Even where a recited behavior is disclosed, that does not cure the absence, in inherited claim 4, of the prior-position classifier and of the causal relationship between entering the zone and triggering the behavior.
9	9.a	An autonomous cleaning apparatus comprising a cleaning head, a drive system, and a receiving system configured to perform the inherited claim 4 functions	PA-008	Shown	PA-008-P7: pdf page: 7	Claim 9 incorporates all limitations of claim 4. Expressly discloses a self-propelled autonomous cleaner, drive wheels/motors, a cleaning unit, sensors and a controller.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
9	9.b	prior to initiation of a cleaning mission, store a map based on previously determined positions of the cleaning apparatus	PA-008	Not demonstrated	PA-008-P8: pdf page: 8	Claim 9 incorporates all limitations of claim 4. Memory stores reflectance by floor position and the position detector indexes the map accordingly; that map records a floor-condition baseline and is not expressly generated from the robot's prior positions.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
9	9.c	and autonomously identify a predefined zone in the map based on the previously determined positions of the cleaning apparatus	PA-008	not shown	PA-008-P1: pdf page: 1	Claim 9 incorporates all limitations of claim 4. The controller detects dirt and may use a pre-measured condition map, but the classification input is dirt/reflectance rather than the robot's prior positions, and detection generally occurs during cleaning.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.

Claim	Element	Claim language	Reference	Assessment	Full-text pinpoint citation	Technical analysis	Patentee's strongest rebuttal
9	9.d	determine, during the cleaning mission, a position of the cleaning apparatus in the working environment	PA-008	Shown	PA-008-P7: pdf page: 7	Claim 9 incorporates all limitations of claim 4. Wheel encoders / position detectors are used to determine the current position.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
9	9.e	cause the cleaning apparatus, during the cleaning mission, to initiate a prescribed conduct to alter movement in response to the determined position being within the predefined zone indicated on the ...	PA-008	Not demonstrated	PA-008-P1: pdf page: 1	Claim 9 incorporates all limitations of claim 4. A fine-cleaning mode is selected by position in response to detected or stored dirt, which is functionally close; but the antecedent autonomous identification based on prior positions is still absent.	Not anticipatory. This is currently the strongest additional reference as to the behavior limitations, but it does not disclose an autonomous classifier taking prior positions as input; the 2023 ITC decision likewise found that Kawakami does not anticipate claims 1 and 9.
9	9.f	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	PA-008	Not demonstrated	PA-008-P1: pdf page: 1	The preserved passages do not simultaneously establish one of the closed Markush behaviors and the inherited classifier / trigger chain.	Even where a recited behavior is disclosed, that does not cure the absence, in inherited claim 4, of the prior-position classifier and of the causal relationship between entering the zone and triggering the behavior.

12. Other Invalidity and Unpatentability Grounds

Ground	Current assessment	Core basis	Conclusion / next step
§101 patent eligibility	Not established	Determined from the claim as a whole and the specification	Applicability and conclusions subject to U.S. attorney review
§112(a) written description and enablement	Not established	Claim-by-claim support, scope of enablement and technical predictability	Must not be judged from the abstract alone
§112(b)/(f) definiteness and corresponding structure / algorithm	Not established	See the term-by-term §112(f) function, corresponding structure/algorithm and indefiniteness-risk table in Section 7.	Term-by-term analysis of function and corresponding structure
Priority, inventorship/derivation and obviousness-type double patenting	Not established	Not established	Verify family, common ownership and terminal disclaimer

13. Unenforceability, Equitable Defenses, License, Exhaustion and §273

Defense	Current assessment	Legal elements / facts	Next step
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Defense	Current assessment	Legal elements / facts	Next step
Inequitable conduct	The current public record does not establish but-for materiality and specific intent to deceive; inequitable conduct must not be inferred from office actions, amendments or the non-submission of a particular item alone.	Materiality and specific intent to deceive must each be proven	Where not established, no implication of merit may be made
Patent misuse, laches, waiver / equitable estoppel / unclean hands	Patent misuse, laches, waiver, equitable estoppel and unclean hands all lack the communications, conduct, reliance and prejudice facts required by their respective elements.	Verify against the independent elements of each defense	Obtain communications, conduct and timeline evidence
License, covenant not to sue and exhaustion	No potentially applicable express license, implied license, covenant not to sue, settlement agreement or authorized-sale chain has been obtained, so the license and exhaustion defenses are not established.	Verify authorized sales, the chain of transactions and contract scope	Obtain complete agreements and amendments
§273 prior commercial use	No evidence of actor, commercial-use dates, continuity, location or scope supporting §273 has been provided.	Verify commercial-use dates, continuity, actor and scope	Analyze separately from the invalidity grounds

14. PTAB, Procedural Clocks and Evolving Policy

Question	Current status	Required facts	Analysis / next step
§315(b) one-year bar	A time bar may exist, but the precise service facts have not been verified	Not established	The filing deadline must not be computed from the complaint date alone.
§315(a) civil action bar			Not established
§315(e) estoppel			Not established
§325(d) discretion as to cumulative art			Not established
PGR			Not established
Reexamination			Not established
District court path			Not established

Discretionary denial, Director Review and other evolving PTAB policies must be verified against official USPTO sources as of the primary analysis date, recording title, URL and verification date; historical policy labels must not be carried over in place of the rules in force on that date.

15. Remedies, Damages and Commercial Exposure

Issue	Current assessment	Legal / factual framework	Action
Injunctions and ITC exclusion orders	The subject patent expired on 2024-07-24 and cannot bar post-expiration conduct; ITC orders and related procedural outcomes must be interpreted according to the official record as of the analysis date.	eBay, public interest, domestic industry and importation facts	Confirm whether within the scope of engagement

Issue	Current assessment	Legal / factual framework	Action
Lost profits, reasonable royalty and apportionment	Potential monetary relief is limited to pre-expiration conduct satisfying the U.S. territoriality requirement, and lost profits, reasonable royalty and apportionment of the accused functionality relative to the value of the robot, base, application and cloud must each be analyzed separately.	Panduit, Georgia-Pacific and attributable value	Preserve sales, cost, non-infringing alternative and license evidence
Enhanced damages, attorney fees and opinions of counsel	The current record is insufficient to support a willfulness or §285 exceptional-case conclusion; this preliminary draft is not an opinion of counsel that may be relied upon, and the role of §298 must be analyzed separately in light of actual conduct and attorney communications.	The distinct roles of §284, §285 and §298	Lock down notice and subsequent conduct
Limitations period, marking and intervening rights	The §286 time window, §287 marking / actual notice for the apparatus claims, and each product version and conduct period must be verified. The current record discloses no reissue, reexamination or PTAB amendment altering claim 1 or 9, so no intervening-rights trigger has been identified.	§286, §287, §252/§307; for design patents also check §289	Calculate by claim version and product period

16. Design-Around, Settlement, Evidence Preservation and Action Plan

- Lock down the product, firmware, application and cloud versions.
- Complete claim construction, date qualification and prosecution-history review.
- Preserve evidence of service of the complaint, real parties in interest / privies, sales and importation, and marking / notice.
- The responsible U.S. attorney to complete review, decision and issuance.

17. U.S. Attorney Review, Scope of Reliance and Issuance

State the responsible U.S. attorney, the scope of review, open items, client reliance and distribution scope, and the issuance date. Internal workflow gate names are for audit purposes only and must not appear in the client-issued version.