UNITED STATES
PATENT AND TRADEMARK OFFICE

uspto®

MICROSOFT EXHIBIT 1047
Microsoft v. Dialect
IPR2025-01351

A study of unpatentability findings in *inter partes* review (IPR) final written decisions (FWDs)

November 21, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE ®

Key takeaways

- Challenged patents with findings of unpatentability in IPR FWDs have a more complex prosecution history and/or higher numbers of prior art citations than the general population
- Findings of unpatentability are overwhelmingly (93%) based on grounds citing at least one prior art reference first cited in the IPR proceeding (i.e., prior art not before the examiner during examination)
  - 47% of U.S. patent documents cited as prior art by petitioners for the first time in AIA IPR proceedings were outside an examiner's reasonable field of search (an examiner would not have been expected to find it)
- Reliance on additional information, such as expert testimony and experimental analysis/testing, enhanced the understanding of the technology and the prior art during IPR proceedings

uspto®

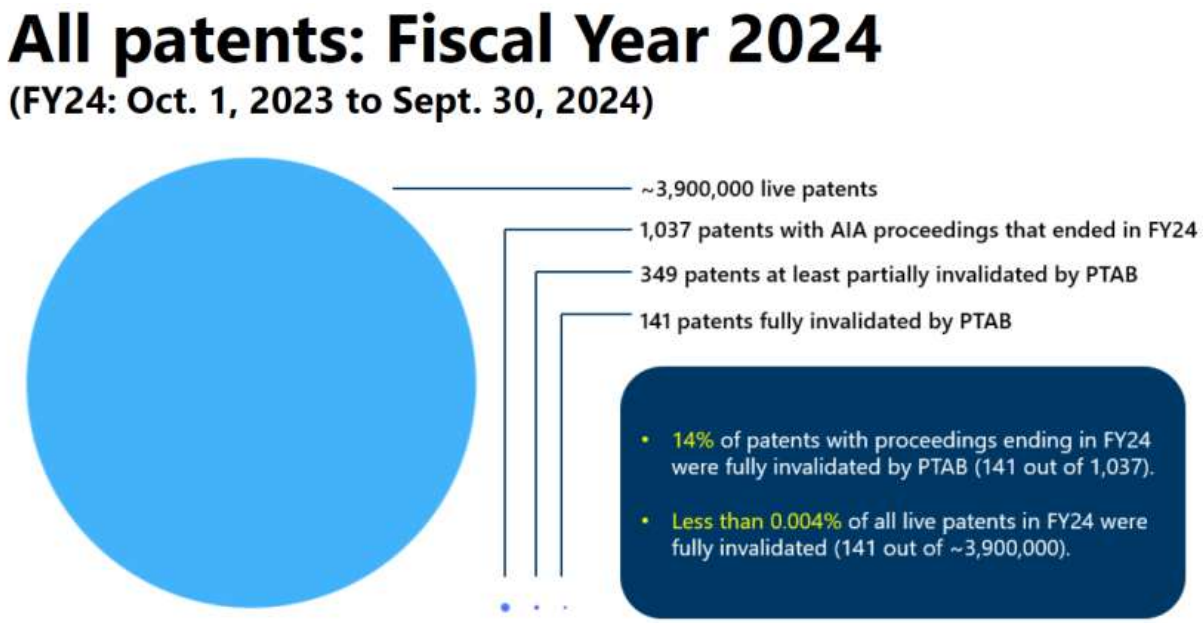
Closing the loop: PTAB and Patents information exchange

- Patents and the PTAB continue to work together to exchange information ("close the loop") to help facilitate better patent quality
- Data exchange
  - Quantified data from PTAB decisions is used to identify ways to improve search, training, and other quality initiatives
  - Post-grant outcomes - relevant information from a post-grant proceeding is distributed to all applications in the family
  - A survey on the PTAB's view of Patents' work product
- Cross-collaborative training
  - Examiners serve on details at the PTAB
  - The PTAB offers Quality Chat webinars and hearing viewings for examiners to attend
  - Legal and technical training courses for examiners are made available to the PTAB
- Co-implementing initiatives and pilot programs
- This study is part of that continued effort

uspto®

Background

- Only a **very** small percentage of issued patents are challenged in America Invents Act (AIA) IPR proceedings at the PTAB. For example:



Background (contd.)

- Moreover, only a small percentage (~20%-30%) of patents asserted in U.S. district court infringement litigation are challenged in AIA IPR proceedings
  - In other words, parties are selective about which patents they challenge in AIA proceedings
- That notwithstanding, since AIA IPR proceedings began 12 years ago, only 10% of *challenged patents* have been fully invalidated
- Nonetheless, customer confidence and satisfaction may be impacted when any issued patent claims are later determined to be unpatentable

uspto®

Study of the examination of patents addressed in IPR FWDs

- The study considered AIA IPR FWDs issued in calendar year 2021 (CY 2021) that found at least one independent claim unpatentable
  - This study did not consider:
    - Decisions on institution, including denials of institution, which occur in about one-third of all AIA decisions on institution
    - FWDs (or any other outcome) in which petitioners failed to establish that any claims were unpatentable
  - Note that FWDs only occur if the PTAB institutes an AIA trial and the case does not settle before resolution

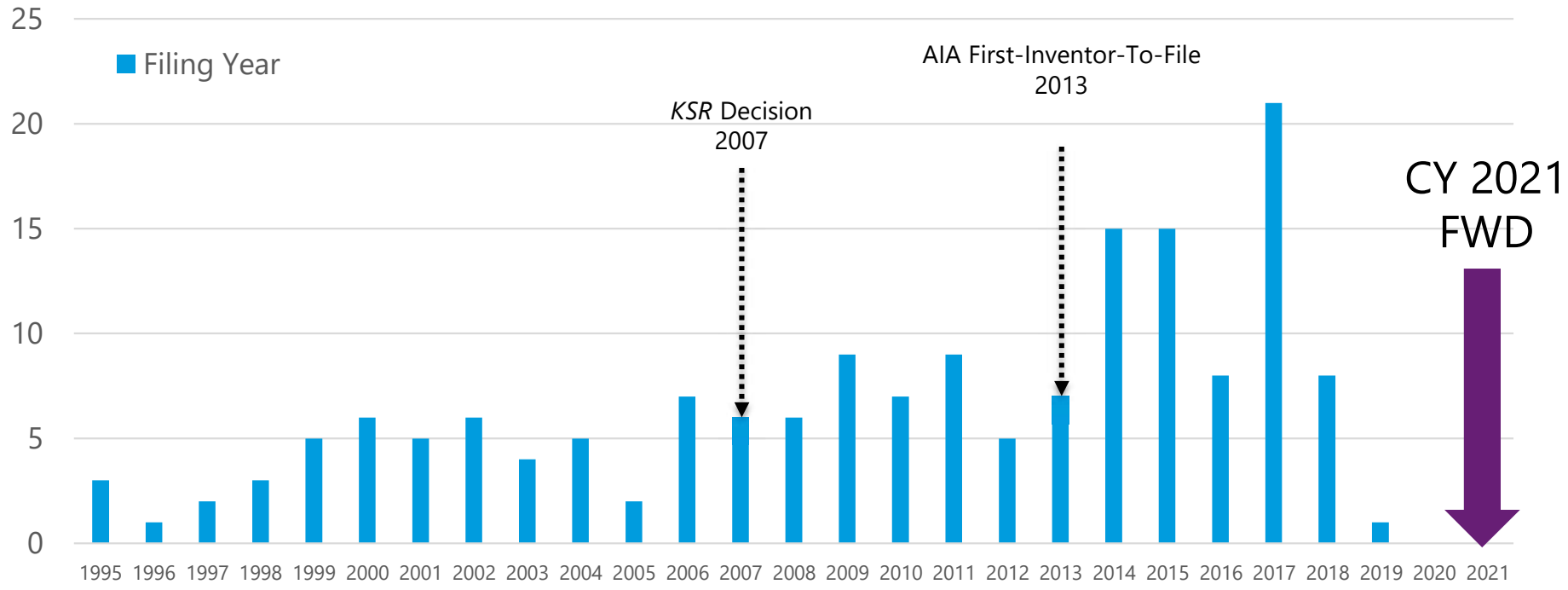
uspto®

Study sample

- AIA IPR FWDs issued in CY 2021 that found **at least one** independent claim unpatentable
  - **192** FWDs
  - **304** separate grounds of unpatentability having at least one independent claim found unpatentable
  - **166** challenged patents spanning filing dates from 1995 to 2019

uspto®

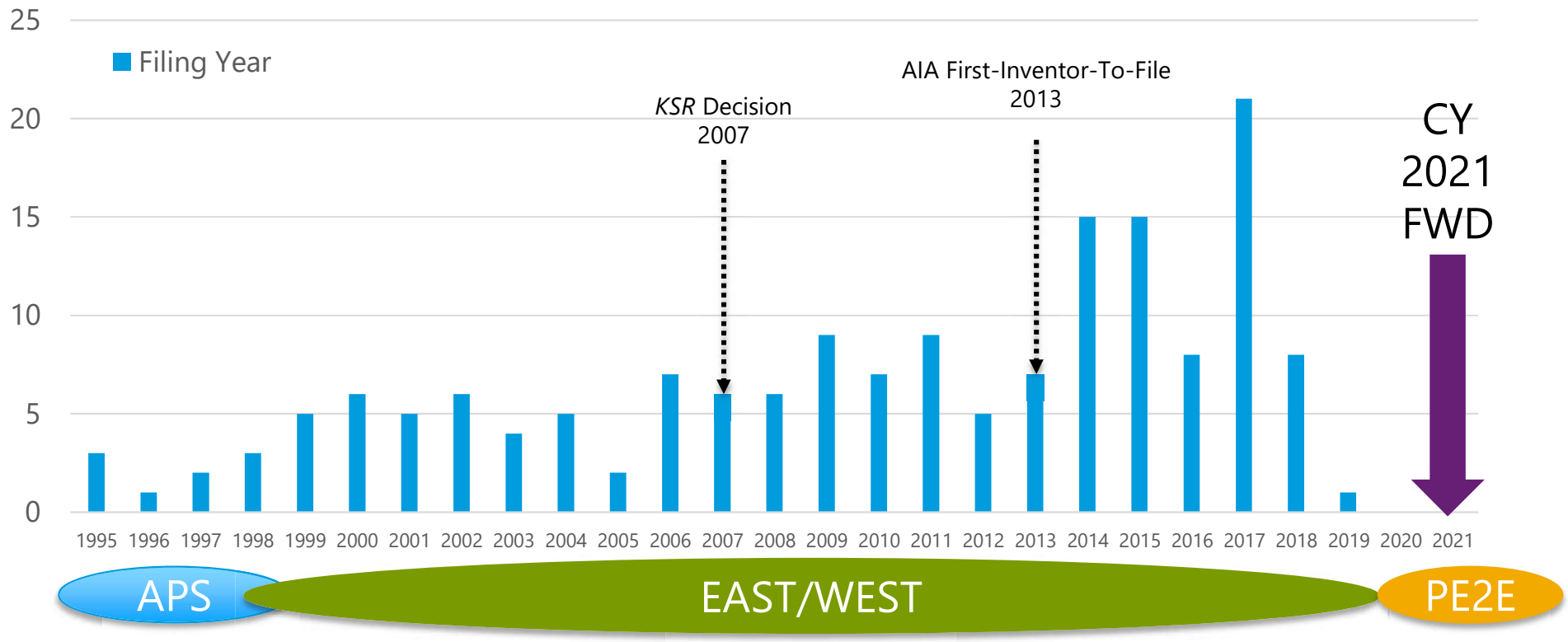
CY 2021 FWD: challenged patent filing year



Evolution of search

Time Period	CY 2012 FWD Study	Examiner Primary Search Tool	Scope of Examiner Search Tool
1995-1998	9 of 166 Challenged Patents Examined	**Automated Patent Search (APS)**	• Limited mainframe text searches and early internet • Approximately 10 million U.S. patents, foreign patent abstracts, curated library services, non-patent literature (NPL), and internet sources
1998-2021	157 of 166 Challenged Patents Examined	**EAST/WEST**	• Explosion in digital information resources, in-house datacenter image and text search system • Approximately 50 million U.S. patents, foreign patent abstracts, curated library services, NPL, and internet sources
2021-Current	Study Performed	**Patents End to End (PE2E)**	• Continued exponential growth of digital information; modern, web-based, cloud-hosted image and text based search system; and expansive digital library services • Approximately 100 million U.S. and foreign patents, full documents all in English, over 72,000 electronic journals, 400,000 eBooks, and four commercial databases, plus internet sources
		AI Capabilities	• Introduced AI capabilities such as More Like This Document and Similarity Search

CY 2021 FWD: challenged patent filing year and search



11

Prosecution vs. IPR

Examination

- Examiners spend an average of approximately 17 hours performing all examination activities (i.e., analyze application, conduct prior art search, consider prior art, prepare office action)
- Claim construction is broadest reasonable interpretation

IPR proceeding

- Diligent prior art searches conducted by petitioners can take upwards of 8-10 days, plus additional time to analyze the art
- Claim construction is ordinary and customary meaning (i.e., 37 CFR 42.100(b) (2019))

uspto®

Prosecution vs. IPR (contd.)

Examination

- Examination occurred on average approximately 12 years prior to issuance of a final written decision in CY 2021. By the time a final written decision issues, it is common to see:
  - Differences in search tools and ability to discover prior art and other relevant evidence (e.g., through AI)
  - Emerging technologies' ordinary skill, terminology, technological expertise
  - Possible changes in applicable law over time that may impact how the USPTO addresses a patentability issue

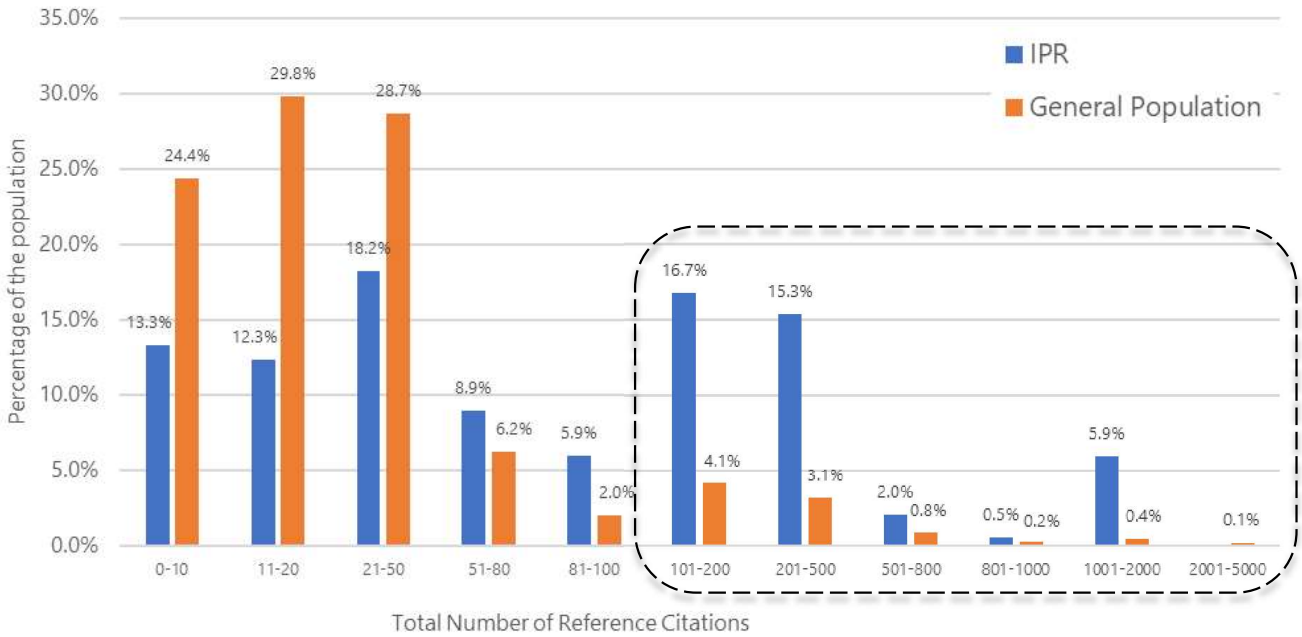
IPR proceeding

- Expert testimony and other new evidence
  - Both parties (petitioner and patent owner) often provide supplemental evidence that was not before the examiner during prosecution
  - Such evidence can provide new information regarding, for example, analysis of prior art (e.g., lab work, testing, simulations); what qualifies as prior art (e.g., priority issues); secondary considerations; etc.
- Discovery (both parties)
- Oral hearings (both parties)

Characteristics of challenged patents (vs. general population of patents)

Number of prior art references cited during prosecution of challenged patents

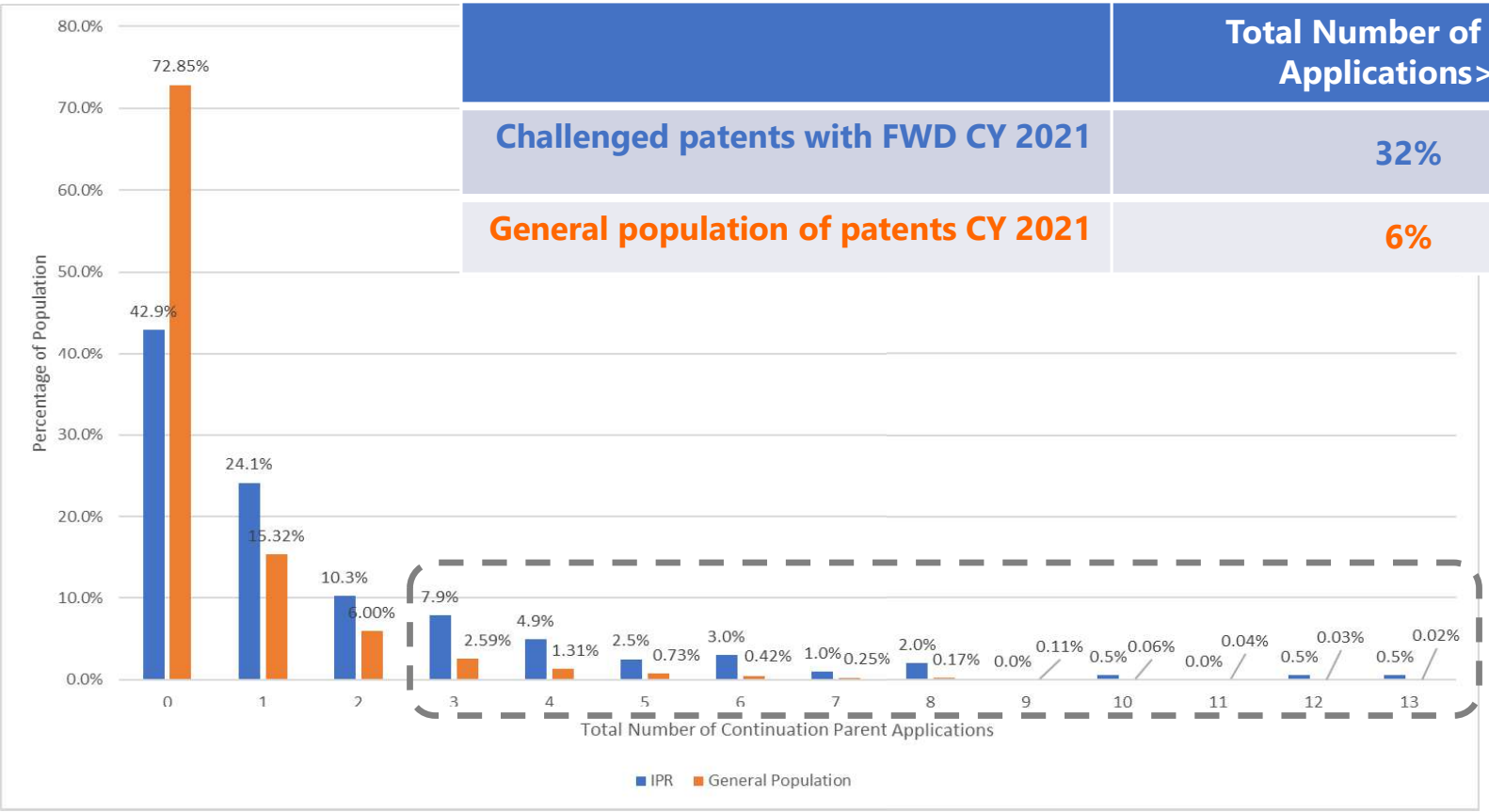
	Average # citations	>100 citations
Challenged patents with FWD CY 2021	218	43.6%
General population of patents CY 2021	55.7	8.7%



15

Number of benefit applications claimed in challenged patents

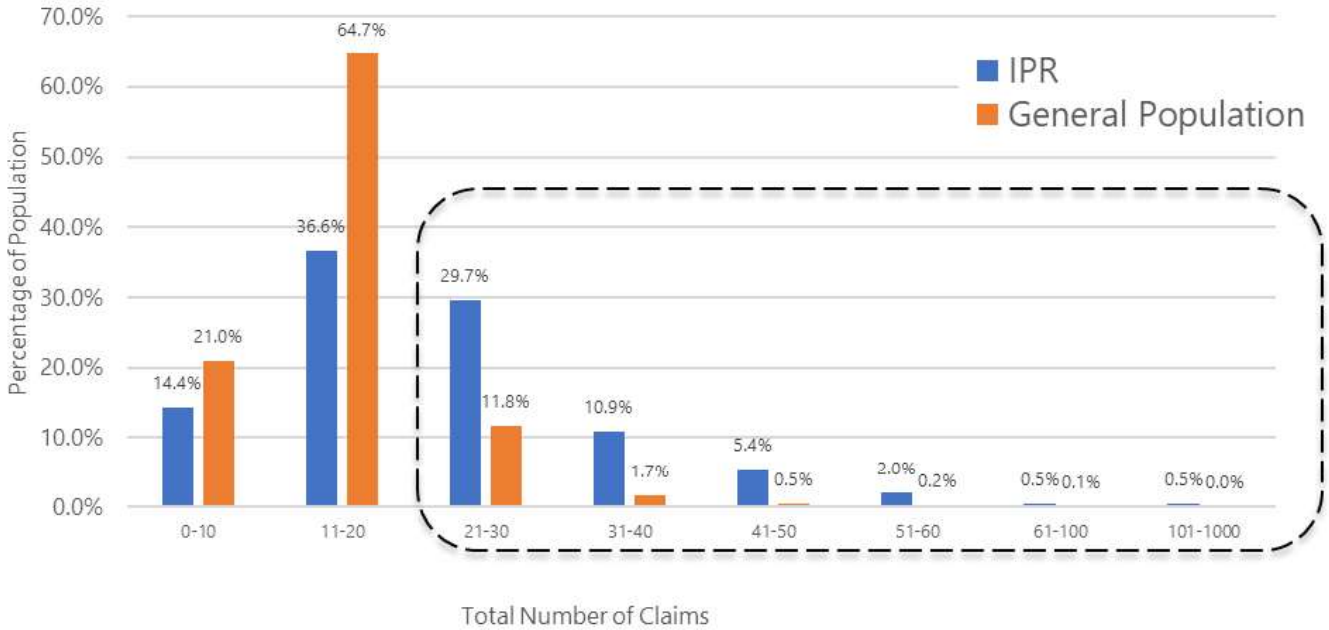
	Total Number of Parent Applications>=3
Challenged patents with FWD CY 2021	32%
General population of patents CY 2021	6%



16

Average number of claims in challenged patents

	Average # of claims	>20 claims
Challenged patent with FWD CY 2021	23	49%
General population of patents CY 2021	16.5	14.3%



Consideration of the evidence relied on in findings of unpatentability in the IPR proceedings

Evidence relied on in findings of unpatentability

304 separate grounds of unpatentability in 166 challenged patents having at least one independent claim found unpatentable

- In 7% (22 of 304 grounds), unpatentability was based **only on prior art first cited during prosecution** of the patent, either by the applicant or the examiner
- In 73% (223 of 304 grounds), unpatentability was based **only on prior art first cited during the AIA IPR proceeding**
- In 19% (59 of 304 grounds), unpatentability was based on a **mix of prior art first cited during prosecution and prior art first cited during the AIA IPR proceeding**

Evidence relied on in findings of unpatentability (contd.)

Evidence	Grounds of Unpatentability*	FWDs*	Challenged Patents*
All prior art first cited in challenged **patent prosecution**	**7% (22 of 304)**	19	17
All prior art first cited in **AIA IPR proceeding**	**74% (223 of 304)**	146	127
Mix of prior art first cited in challenge patent and first cited in AIA IPR proceeding	**19% (59 of 304)**	47	45
Total Sample	**304**	**192**	**166**

* May have more than one ground of unpatentability/AIA IPR proceeding/FWD

uspto®

All prior art first cited in challenged patent prosecution

Evidence	Grounds of Unpatentability*	FWDs*	Challenged Patents*
All prior art first cited in challenged **patent prosecution**	**7% (22 of 304)**	19	17
All prior art first cited in **AIA IPR proceeding**	**74% (223 of 304)**	146	127
Mix of prior art first cited in challenge patent and first cited in AIA IPR proceeding	**19% (59 of 304)**	47	45
Total Sample	**304**	**192**	**166**

* May have more than one ground of unpatentability/AIA IPR proceeding/FWD

uspto®

All prior art first cited during *prosecution* of the patent: challenged patent references

Grounds of Unpatentability	FWDs	Challenged Patents
7% (22 of 304)	19	17

- **77% of the challenged patents had >100 references** to be considered (13/17) during the prosecution of the patent
  - General population with >100 references to be considered is approximately 9%
- **76%** (19/25 references) of the prior art relied on in the successful grounds of unpatentability was **cited in an Information Disclosure Statement (IDS)** and considered during the prosecution of the challenged patent

uspto®

All prior art first cited during *prosecution* of the patent: claiming benefit

Grounds of Unpatentability	FWDs	Challenged Patents
7% (22 of 304)	19	17

- **47%** of challenged patents (8/17 challenged patents) claimed benefit to **three or more** parent applications
  - General population with a benefit claim of three or more applications is approximately 6%
- **8.5 years** average pendency (for 17 challenged patents) from earliest claimed benefit date

uspto®

All prior art first cited during *prosecution* of the patent: expert testimony

Grounds of Unpatentability	FWDs	Challenged Patents
7% (22 of 304)	19	17

- Expert testimony was expressly credited in **50%** of the grounds of unpatentability (11/22 grounds in 19 FWDs)
  - Analysis of prior art, rational to combine, expectation of success, PHOSITA

All prior art first cited during *prosecution* of the patent: summary

Grounds of Unpatentability	FWDs	Challenged Patents
7% (22 of 304)	19	17

- Only a small percentage (7%) of successful grounds of unpatentability in CY 2021 (22 of 304) relied entirely on prior art previously before the examiner during prosecution of the challenged patent
- Many (47%) of these 17 challenged patents claimed benefit to three or more parent applications (i.e., those challenged patents were part of large families)
- In the 22 successful grounds of unpatentability, expert testimony was expressly credited 50% of the time in the FWDs—thus, at least half the time, the AIA IPR proceeding involved arguments and explanations from an expert that were not before the examiner during prosecution

All prior art first cited in AIA IPR proceeding

Evidence	Grounds of Unpatentability*	FWDs*	Challenged Patents*
All prior art first cited in challenged **patent prosecution**	**7% (22 of 304)**	19	17
All prior art first cited in **AIA IPR proceeding**	**74% (223 of 304)**	146	127
Mix of prior art first cited in challenge patent and first cited in AIA IPR proceeding	**19% (59 of 304)**	47	45
Total Sample	**304**	**192**	**166**

* May have more than one ground of unpatentability/AIA IPR proceeding/FWD

uspto®

All prior art first cited in *AIA IPR proceeding*: independent reviewer search

Grounds of Unpatentability	FWDs	Challenged Patents
74% (223 of 304)	146	127

For each separate ground of unpatentability having a **U.S. patent document*** as the primary reference (133 of 223; 96 distinct challenged patents), an independent search was performed using current search tools/expertise

- Without the benefit of the FWD, **53%** (71 of 133 searches) of the independent searches identified the U.S. patent document (in a search result set under 500 documents)

47% of U.S. patent documents cited as prior art by petitioners for the first time in AIA IPR proceedings were **outside an examiner's reasonable field of search**

*Reference/search analysis was limited to a U.S. patent document applied as the primary reference for each ground of unpatentability

uspto®

All prior art first cited in *AIA IPR proceeding*: classification analysis

Grounds of Unpatentability	FWDs	Challenged Patents
74% (223 of 304)	146	127

CPC pictures were considered to validate the findings of the independent searches. Of the 133 U.S. patent documents,* only 110 were assigned a CPC picture.

- 68 of the 110 U.S. patent documents had at least one assigned CPC symbol that overlapped the corresponding challenged patent's CPC picture
  - All were found within the independent search without the benefit of the FWD
- 42 of the 110 U.S. patent documents had no overlapping CPC symbols with the corresponding challenged patent's CPC picture
  - 19 of 42 U.S. patent documents were found within the independent search without the benefit of the FWD

*Reference/search analysis was limited to a U.S. patent document applied as the primary reference for each ground of unpatentability

Factors contributing to AIA IPR prior art being outside of a reasonable field of search for an examiner

- Aspects of the invention emphasized in the challenged patent disclosure (e.g., explanations directed to state of the art/inventive concept, common terminology)
- Developments in the terminology and understanding of emerging technologies relevant to the time of prosecution
- Expanded resources and incentives in post-grant proceedings

Mix of prior art first cited during *prosecution* of patent and in *IPR proceeding*: grounds of unpatentability

Grounds of Unpatentability	FWDs	Challenged Patents
19% (59 of 304)	47	45

- In 19% of grounds (59 of 304 grounds in 47 FWDs, 45 patents)
- All 59 grounds were directed to obviousness
  - In 42 grounds, the primary prior art reference was first cited during prosecution, and at least one secondary prior art reference was first cited in the IPR petition
  - In 17 grounds, the primary prior art reference was first cited in the IPR petition, and at least one secondary reference was first cited during prosecution
- **Thus, for all of these 59 grounds, at least one prior art reference was cited for the first time in the IPR proceeding**

Mix of prior art first cited during *prosecution* of patent and in *IPR proceeding*: applicability of the prior art

Grounds of Unpatentability	FWDs	Challenged Patents
19% (59 of 304)	47	45

The applicability of the prior art, relied on in each of the grounds of unpatentability, was evaluated **without the benefit of the FWD** and revealed:

- In 37 (63%) of 59 grounds of unpatentability, a rejection was reasonably supported without the benefit of the FWD
- In the remaining 22, expert testimony was expressly credited in the FWD

uspto®

Summary of study

- Studied AIA IPR FWDs issued in CY 2021 that found at least one independent claim unpatentable
  - 192 FWDs: 304 grounds of unpatentability challenging 166 distinct patents
- The studied challenged patents had a significantly large number of prior art citations
  - For all patents issued in CY 2021, 8.7% included greater than 100 prior art citations, with the average being 55
  - Studied challenged patents included 43.6% having greater than 100 citations, with the average being 218
- Only a small percentage (7%) of grounds studied relied entirely on prior art previously before the examiner
- 93% of the grounds studied relied on at least one prior art reference that was not before the examiner
  - 53% of independent searches (without the benefit of the FWD) using today's search tools and techniques identified the new prior art first cited in the IPR proceeding
  - 47% of the new prior art first cited in the IPR proceeding was not within a reasonable examiner field of search (e.g., not found within reviewer search, no overlapping CPC symbols)
- During the IPR proceeding, the judges often relied on new information (e.g., expert testimony and analysis of disclosures in references, e.g., structures, experimental testing and/or data) introduced for the first time (not during prosecution)

uspto®

Potential next steps

1. Conduct a study to analyze how prior art searches are undertaken by third parties after a patent is issued
2. Develop practice tips for patent applicants and owners based on the findings of the current study
3. Continue to invest in search tools to ensure examiners have world-class tools, including enhancing AI prior art search capabilities
4. Conduct a study directed at how experts are used in IPRs to inform potential guidance/precedent in IPR proceedings
5. Continue to collaborate with the PPAC to explore additional suggestions

uspto®

APPENDIX

Study parameters

- All FWDs issued in AIA IPR proceedings in CY 2021
- Study evaluated:
  - Independent claims found unpatentable in FWDs

Study definitions

***Inter partes* review (IPR)** – an AIA proceeding that challenges the patentability of a claim(s) in an issued U.S. patent on grounds of obviousness or anticipation based on prior art patents and printed publications

Final written decision (FWD) – a decision issued by the PTAB at the end of an AIA proceeding (after institution of a trial) that may address multiple grounds of unpatentability in relation to a challenged patent

Challenged patent – a U.S. patent that is challenged in an AIA petition, such as an IPR petition; an AIA petition may result, for example, in a denial of institution, settlement, or issuance of an FWD

Ground of unpatentability – a basis alleged by a petitioner that a challenged claim is unpatentable (e.g., an obviousness ground based on prior art) in an AIA petition; there may be multiple grounds raised in an individual IPR proceeding associated with an individual issued patent

Study sample

FWDs	Grounds of Unpatentability[1]	Distinct Challenged Patents[2]	Special Status (e.g., Track One)[3]	Challenges: All References First Cited in Challenged Patent Prosecution	Challenges: All References First Cited in AIA IPR	Challenges: Mix of Prior Art First Cited in Challenged Patent Prosecution and AIA IPR
192	304	166	32	22 (7%)	223 (74%)	59 (19%)

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.
[2] It is possible for a distinct challenged patent to have multiple grounds of unpatentability, IPR proceedings, and/or FWDs.
[3] Special status applications are those that have been granted prioritized examination (e.g., Track One, PPH); the general population rate of special status applications is approximately 7%.

All prior art cited during *prosecution* of a patent: characteristics of grounds and prior art in FWDs

					Distinct References[2]		
Grounds of Unpatentability[1]	FWDs	Distinct Challenged Patents	Grounds Based on Anticipation	Grounds Based on Obviousness	U.S. Patent Documents	Foreign Patent Documents	NPL Documents
22 (7%)	19	17	5	17	24	0	1

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.
[2] A distinct reference may have been used in multiple grounds of unpatentability and/or against multiple challenged patents.

uspto®

All prior art cited during *prosecution* of a patent: prosecution of challenged patent

Challenged Patents[1]	Special Status (e.g., Track One)[2]	No Prior Art Rejection	Grounds Reference Applied in Prosecution
17	5 (29%)	6 (35%)	1

- No prior art rejection: All patent prosecutions with no prior art rejection included over 100 reference citations
- Grounds reference applied in prosecution: During the prosecution of the challenged patent, the reference was applied in a rejection under anticipation; in the AIA IPR proceeding, the reference was successfully relied on as the basis of a ground of unpatentability under obviousness relying on expert testimony directed to what a PHOSITA would have appreciated from the reference

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.
[2] Special status applications are those that have been granted prioritized examination (e.g., Track One, PPH); the general population rate of special status applications is approximately 7%.

All prior art cited during *prosecution* of a patent: expert testimony persuasive* in FWD

- Analysis of references to support claim limitations within teaching
  - Ex: Circuit analysis, flowchart analysis, lens calculations
- Improvements, benefit of modification
  - Lens case: Expert explained the ray trace diagrams, testified regarding benefits of proposed modification, testified about slight differences in results using different models, testified regarding expectation of success in physically manufacturing the lens elements
  - Fastener case: Testimony used to actually **defeat** alleged unexpected improvement in results using the claimed ranges; the examiner had asserted obviousness of the claimed range during prosecution, but that was later dropped after the applicant's argument
- Expectation of success
  - T-shirt case: Testified to the compatibility of the applied references, structural or chemical characteristic of transfer sheet and layers; further demonstrating that a PHOSITA would have known to make certain adjustments to certain layers, and that it would be straightforward
- What was well known to a PHOSITA
  - Ex: Well known to store information in any available space of storage and using tables for file management; wireless protocol requires use of a device ID that is specific to that protocol, where each protocol has different capabilities
  - A PHOSITA would have known how to adapt one structure for use with another

*"Persuasive" means that expert testimony was expressly credited in the FWD

All prior art cited during IPR proceeding: characteristics of grounds and prior art in FWDs

					Distinct References[2]		
FWDs	Grounds of Unpatentability[1]	Distinct Challenged Patents	Grounds Based on Anticipation	Grounds Based on Obviousness	# of U.S. Patent Documents	# of Foreign Patent Documents	# of NPL Documents
146	223 (74%)	127	32	191	205	50	48

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.
[2] A distinct reference may have been used in multiple grounds of unpatentability and/or against multiple challenged patents.

uspto®

All prior art cited during IPR proceeding: prosecution of a challenged patent

Challenged Patents[1]	Special Status (e.g., Track One)[2]	No Prior Art Rejection	Reference Published After Patent Allowed
127	23 (18%)	24 (19%)	1 (1%)

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.
[2] Special status applications are those that have been granted prioritized examination (e.g., Track One, PPH); the general population rate of special status applications is approximately 7%.

All prior art cited during IPR proceeding: independent searches for cited U.S. patent prior art[3]

Independent Reviewer Searches[1]			
Distinct Challenged Patents	Distinct Searches for Primary Evidence Being U.S. Patent Documents	Primary Evidence Being U.S. Patent Documents: Located by Family ID Within Search Result of Less Than 500	Primary Evidence Being U.S. Patent Documents: *Not* Located by Family ID Within Search Result of Less Than 500
96	133	71 of 133 (53%)	62 of 133 (47%)

Enhanced Reviewer Searches[2]		
# of Additional Enhanced Searches Performed Based on FWD	Primary Evidence Being U.S. Patent Documents: Located Within Search Result of Less Than 500 Documents *After Enhancing* Search Based on FWD	Primary Evidence Being U.S. Patent Documents: *Not* Located Within Search Result of Less Than 500 Documents *After Enhancing* Search Based on FWD
62 of 133	Additional 26 of 133 (20%)	36 of 133 (27%)

[1] The independent reviewer search was performed without the benefit of knowledge gained from the FWD and any associated evidence. The reviewer search is based on the knowledge available to the examiner at the time of prosecution of the challenged patent. However, the reviewer search was performed using all search tools and techniques currently available to examiners, some of which would not have been available to the examiner at the time of prosecution of the challenged patent.

[2] The enhanced reviewer search was performed when the reviewer could not locate the reference in a search result of 500 or less documents. The reviewer read the FWD and any associated evidence improving the previously performed reviewer search based on the gained knowledge.

[3] Searches were limited to grounds of unpatentability where the primary reference is a U.S. patent document. A U.S. patent document may be applied in grounds of unpatentability against more than one patent.

All prior art cited during IPR proceeding: CPC picture

Distinct Challenged Patents	# of References Distinct to Challenged Patents	Reference Shared at Least one CPC Symbol with Challenged Patent	No Shared CPC Symbols	No Shared CPC Symbols: Shared Main Group
96	110	68 (62%)	42 (38%)	(19 of 42)

"CPC" stands for the Cooperative Patent Classification system used in the assignment of symbols to a particular U.S. patent document based on its disclosure. The CPC picture refers to the group of these assigned symbols.

uspto®

All prior art cited during IPR proceeding: recreating examiner search with today's search tools

Distinct Challenged Patents	Distinct Searches for Primary Evidence Being U.S. Patent Documents	Searches for Primary Evidence Being U.S. Patent Documents: Located by Family ID Within Search Result of Less Than 500	Searches for Primary Evidence Being U.S. Patent Documents: *Not* Located by Family ID Within Search Result of Less Than 500
96	133	18 of 133 (14%)	115 of 133 (86%)

uspto®

All prior art cited during IPR proceeding: recreated examiner search vs. independent search without the benefit of the FWD

Recreated Examiner Search	Independent Search
Searches for Primary Evidence Being U.S. Patent Documents: Not Located by Family ID Within Search Result of Less Than 500	References Located by Family ID Within Search Result of Less Than 500 Without Benefit of FWD That Were Not Found by Examiner
115 out of 133	57 out of 115

uspto®

Mix of prior art first cited during *prosecution* of patent and IPR proceeding: characteristics of grounds of unpatentability and prior art in FWDs

Grounds of Unpatentability[1]	FWDs	Distinct Challenged Patents	Grounds Based on Anticipation	Grounds Based on Obviousness
59 (19%)	47	45	0	59

			Distinct References		
	Primary Reference	Distinct Challenged Patents	U.S. Patent Documents	Foreign Patent Documents	NPL Documents
First Cited in Challenged Patent	42	32	102	8	21
First Cited in IPR Proceeding	17	15	34	4	13

[1] Grounds of unpatentability analyzed for the study are limited to those in which at least one independent claim was found unpatentable.

Mix of prior art first cited during *prosecution* of patent and IPR proceeding: expert testimony supporting grounds of unpatentability

Grounds of Unpatentability	FWDs	Challenged Patents
19% (59 of 304)	47	45

Grounds of Unpatentability[1]	Claim Construction	Well Known to PHOSITA	Reference Analysis	Modification
22	5	7	19	15

[1] The 22 grounds of unpatentability listed here (i.e., a subset of the 59 grounds above, and 7% of the 304 total grounds analyzed in the study) correspond to ones where the reviewer in the study did not determine that a reasonable rejection was supported when looking at the prior art references alone (without benefit of FWD); additional evidence, e.g., expert testimony, may have impacted the analysis in the FWDs at issue.

UNITED STATES PATENT AND TRADEMARK OFFICE
DEPARTMENT OF COMMERCE