IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

UNITED STATES OF AMERICA, *et al.*, Plaintiffs, v. GOOGLE LLC, Defendant.	Case No. 1:20-cv-03010-APM HON. AMIT P. MEHTA [redacted]
STATE OF COLORADO, *et al.*, Plaintiffs, v. GOOGLE LLC, Defendant.	Case No. 1:20-cv-03715-APM HON. AMIT P. MEHTA [redacted]

PLAINTIFFS' REMEDIES PROPOSED FINDINGS OF FACT

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Remedy Trial Witness	Live/Designated	Appearance in Citations
Adkins, Heather (Google)	Live	**(H. Adkins (Google))**
Adkins, Jesse (Google)	Live	**(J. Adkins (Google))**
Allan, James (Defendant's Expert)	Live	**(Allan (Def. Expert))**
Beard, Charles (Microsoft)	Designated	**(Beard (Microsoft) Dep.)**
Boulben, Frank (Verizon)	Designated	**(Boulben (Verizon) Dep.)**
Chipty, Tasneem (Plaintiffs' Expert)	Live	**(Chipty (Pls. Expert))**
Collins, Eli (Google)	Live	**(Collins (Google))**
Cromwell, Robert	Designated	**(Cromwell (Microsoft))**
Cue, Eddy (Apple)	Live	**(Cue (Apple))**
Culnane, Chris (Defendant's Expert)	Live	**(Culnane (Def. Expert))**
Durrett, Gregory (Plaintiffs' Expert)	Live	**(Durrett (Pls. Expert))**
Epstein, Adam (adMarketplace)	Live	**(Epstein (adMarketplace))**
Evans, David (Plaintiffs' Expert)	Live	**(Evans (Pls. Expert))**
Ezell, Jeffrey (AT&T)	Designated	**(Ezell (AT&T) Dep.)**
Fitzgerald, Peter (Google)	Live	**(Fitzgerald (Google))**
Fox, Nicholas (Google)	Designated	**(Fox (Google) Dep.)**

Remedy Trial Witness	Live/Designated	Appearance in Citations
Giard, Jeffrey (T-Mobile)	Designated	**(Giard (T-Mobile) Dep.)**
Google 30(b)(6): Adkins, Jesse (30(b)(6)) Collins, Eli (30(b)(6))	Designated	 **(Google-JA 30(b)(6) Dep.)** **(Google-EC 30(b)(6) Dep.)**
Hitt, Lorin (Defendant's Expert)	Live	**(Hitt (Def. Expert))**
Hsiao, Sissie (Google)	Live	**(Hsiao (Google))**
Israel, Mark (Defendant's Expert)	Live	**(Israel (Def. Expert)**
Jerath, Kinshuk (Plaintiffs' Expert)	Live	**(Jerath (Pls. Expert))**
Kim, Jay (Samsung)	Designated	**(Kim (Samsung) Dep.)**
LaFlamme, Francois (Motorola)	Designated	**(LaFlamme (Motorola) Dep.)**
Locala, David (Plaintiffs' Expert)	Live	**(Locala (Pls. Expert))**
Luca, Michael (State Plaintiffs' Expert)	Live	**(Luca (State Pls. Expert))**
Mickens, James (Plaintiffs' Expert)	Live	**(Mickens (Pls. Expert))**
Microsoft 30(b)(6): Schechter, Michael (30(b)(6)) Cromwell, Robert (30(b)(6)) Smutny, David (30(b)(6)) Utter, Brian (30(b)(6))	Designated	 **(Microsoft-MS 30(b)(6) Dep.)** **(Microsoft-RC 30(b)(6) Dep.)** **(Microsoft-DS 30(b)(6) Dep.)** **(Microsoft-BU 30(b)(6) Dep.)**
Muhlheim, Eric (Mozilla)	Live	**(Muhlheim (Mozilla))**
Muralidharan, Omkar (Google)	Live	**(Muralidharan (Google))**
Murphy, Kevin (Defendant's Expert)	Live	**(Murphy (Def. Expert))**
Nieh, Jason (Defendant's Expert)	Live	**(Nieh (Def. Expert))**
OpenAI 30(b)(6) Turley, Nick 30(b)(6)	Designated	 **(OpenAI-NT 30(b)(6) Dep.)**
Pancholi, Neal (Google)	Designated	**(Pancholi (Google) Dep.)**
Parakh, Phiroze (Google)	Designated	**(Parakh (Google) Dep.)**
Pichai, Sundar (Google)	Live	**(Pichai (Google))**
Provost, Brian (Yahoo)	Live	**(Provost (Yahoo))**
Rangel, Antonio (Plaintiffs' Expert)	Live	**(Rangel (Pls. Expert))**
Reid, Elizabeth (Google)	Live	**(Reid (Google))**
Samat, Sameer (Google)	Live	**(Samat (Google))**
Schechter, Michael (Microsoft)	Live	**(Schechter (Microsoft))**

Remedy Trial Witness	Live/Designated	Appearance in Citations
Shevelenko, Dmitry (Perplexity)	Live	**(Shevelenko (Perplexity))**
Standal, Jan (Opera)	Designated	**(Standal (Opera) Dep.)**
Tabriz, Parisa (Google)	Live	**(Tabriz (Google))**
Turley, Nick (OpenAI)	Live	**(Turley (OpenAI))**
Vallez, Paul (Skai)	Live	**(Vallez (Skai))**
Weinberg, Gabriel (DuckDuckGo)	Live	**(Weinberg (DuckDuckGo))**
Zenner, Marc (Defendant's Expert)	Live	**(Zenner (Def. Expert))**

I. INTRODUCTION TO THIRD PARTIES[1]

A. adMarketplace

1. adMarketplace is an internet search advertising firm headquartered in New York and is a marketplace for native search advertising which occurs on an app, websites, or browsers. Rem. Tr. 1779:12–19 (Epstein (adMarketplace)).

2. adMarketplace sells search text ads. Rem. Tr. 1781:22–1782:1 (Epstein (adMarketplace)). adMarketplace offers search text ads through its AMP Results product, which returns ads on a SERP in response to a query. Rem. Tr. 1786:23–1787:21 (Epstein (adMarketplace)). adMarketplace also offers search text ads through its AMP Suggests product, which appears below a search box as a user is typing a query. Rem. Tr. 1787:22–1789:14, 1789:16–18, 1799:19–1800:10 (Epstein (adMarketplace)).

3. adMarketplace could syndicate search ads, including search text ads, to a new general search engine entrant. Rem. Tr. 1813:13–1814:9 (Epstein (adMarketplace)).

B. Apple

4. Apple Inc. is a California-based company that "designs, manufactures[,] and markets smartphones, personal computers, tablets, wearables[,] and accessories, and sells a variety of related services." Mem. Op. at 9. Apple's products all come preloaded with Apple's proprietary web browser, Safari. Mem. Op. at 9.

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[1] Abbreviations used herein have the same meaning as in Plaintiffs' Remedies Post-Trial Brief, filed contemporaneously herewith.

In addition, in finalizing these PFOF, Plaintiffs discovered a discrepancy in page/line numbering between the PDF versions and .txt file versions of the transcripts for the May 1, 2025 AM and May 7, 2025 PM sessions. Plaintiffs have cited to the PDF versions of those transcripts, as the hyperlinked version of their PFOF will link to the PDF files.

5. Apple maintains a web index of about [redacted] billion websites. Mem. Op. at 15; PXR0010* at -913. Apple continues to invest in and to build that web index today. Mem. Op. at 104 (Apple has invested [redacted] of dollars and committed [redacted] employees to Search development); Rem. Tr. 3852:7–3853:1 (Cue (Apple)) (Apple continues to make search-related investments, to work on search-related projects, and to index the web.); PXR0065* at -089 (summarizing key search capability metrics and "Strategic Focus" for FY25).

6. On Apple products, the default search access point is "the integrated search bar in the Safari browser (and to some extent, Apple's voice assistant, Siri, and on-device search, Spotlight)." Mem. Op. at 24.

7. Apple sets Google as the default search engine for Safari, both for regular and for private browsing. Rem. Tr. 3819:5–8 (Cue (Apple)) (Apple continues to set Google Search as the default search engine for Safari for both regular and private browsing.).

8. Google and Apple have entered an Internet Services Agreement (ISA) wherein Google pays Apple a share of its search ads revenue in exchange for default placement on Safari. Mem. Op. at 38–39.

9. Apple is a "crucial partner to Google." Mem. Op. at 101. In 2022, Google's revenue share payment to Apple was an estimated $20 billion, nearly double the 2020 payment that composed 17.5% of Apple's operating profit. Mem. Op. at 103.

C. AT&T

10. AT&T Mobility LLC is a Georgia-based mobile carrier that provides wireless services that connect mobile devices to cellular networks. Mem. Op. at 12. AT&T sells devices directly to consumers. Mem. Op. at 12. Roughly 30% of the smartphones that AT&T distributes are Android devices; the other 70% are Apple devices. Mem. Op. at 12.

D. DuckDuckGo

11. DuckDuckGo (DDG) is a Pennsylvania-based web services company founded in 2008. Mem. Op. at 10. DDG offers a product that is an integrated browser and general search engine. Mem. Op. at 10. DDG does not produce its own search results or search advertisements; rather it syndicates both from Microsoft. Mem. Op. at 10.

12. DDG attempts to differentiate itself from other general search engines through a focus on user privacy. Mem. Op. at 10–11. DDG uses user-side data stripped of personally identifiable information (PII). Rem. Tr. 856:22–857:2 (Weinberg (DuckDuckGo)) (The data still retains value to DDG in returning search results.); Rem. Tr. 857:15–23 (Weinberg (DuckDuckGo)) (More data might be more useful to DDG, but it is comfortable returning results with the more limited user-side data set.).

E. Microsoft

13. Microsoft Corporation is a Washington-based company whose products include the Windows operating system, the Edge web browser, and various devices, including personal computers and tablets. Mem. Op. at 10.

14. Today, Microsoft's share of the desktop search market remains at only 30%. Rem. Tr. 1015:6–13 (Schechter (Microsoft)); Rem. Tr. 1033:6–14 (Schechter (Microsoft)) ("Overall market share [for Bing] has only slightly increased, pretty much at the same rate it's been in the past, and our mobile footprint has not really increased meaningfully as well.").

15. Today, Microsoft holds only a 1% share of the mobile search market. Rem. Tr. 1015:14–19 (Schechter (Microsoft)); Rem. Tr. 1033:6–14 (Schechter (Microsoft)) ("Overall market share [for Bing] has only slightly increased, pretty much at the same rate it's been in the past, and our mobile footprint has not really increased meaningfully as well.").

16. Microsoft launched its "New Bing" in 2023, which combined Bing's existing search technology with new LLM technology. Rem. Tr. 1021:6–9, 1021:19–1022:5 (Schechter (Microsoft)).

17. Through its "Copilot Answers" search feature, Bing provides AI-generated answers to search queries on its SERP. Rem. Tr. 1024:16–1025:5, 1027:11–16 (Schechter (Microsoft)). Microsoft also recently introduced a new "Copilot Search" feature for Bing, where Bing will use an LLM to present search results in a magazine format with a combination of images, text, and links. Rem. Tr. 1025:6–22 (Schechter (Microsoft)).

18. Microsoft also offers a consumer AI application called "Copilot," which can retrieve search results from Bing when answering user prompts. Rem. Tr. 1025:23–1026:5 (Schechter (Microsoft)).

19. Microsoft licenses some AI models from OpenAI for Bing and Copilot, which Microsoft further improves and fine-tunes as necessary. Rem. Tr. 1038:17–1039:2 (Schechter (Microsoft)) (responding to Court and explaining that Bing and Copilot use some OpenAI models, but still view ChatGPT as a competitor in the consumer AI application market); Rem. Tr. 1081:9–17 (Schechter (Microsoft)) (explaining that Microsoft further fine-tunes OpenAI's models when needed for Bing and Copilot).

20. Microsoft also uses AI models beyond those licensed from OpenAI for its GenAI products and features. Rem. Tr. 1044:1–9 (Schechter (Microsoft)) (Microsoft does not exclusively use OpenAI models.).

F. Motorola

21. Motorola Mobility LLC is an Illinois-based OEM of smartphones that run on the Android platform. Mem. Op. at 12. Of the devices Motorola manufactures, [redacted]% are activated in the United States. Des. Rem. Tr. 187:16–19 (Laflamme (Motorola) Dep.).

22. Motorola and Samsung together manufacture the majority of Android devices in the United States. Mem. Op. at 12. Approximately 8–13% of smartphones in the United States are manufactured and sold by Motorola. Des. Rem. Tr. 20:14–19 (Laflamme (Motorola) Dep.). Motorola's share of the U.S. smartphone market has been growing in recent years. Des. Rem. Tr. 37:6–9 (Laflamme (Motorola) Dep.).

23. Motorola sells smartphones to carriers and directly to consumers. Des. Rem. Tr. 21:5–11 (Laflamme (Motorola) Dep.). The smartphones Motorola sells to carriers make up approximately 85% of Motorola's smartphone sales. Des. Rem. Tr. 21:12–16 (Laflamme (Motorola) Dep.).

24. Motorola's revenue in 2024 was approximately $[redacted] with profits of roughly $[redacted]. Des. Rem. Tr. 21:17–21, 22:4–6 (Laflamme (Motorola) Dep.).

25. Motorola has its own on-device AI assistant, named Moto AI, that provides specific use cases for smartphone users. Des. Rem. Tr. 27:3–28:2 (Laflamme (Motorola) Dep.). Where a Moto AI use case requires any type of search, Moto AI relies on Google Search for those queries. Des. Rem. Tr. 28:3–14 (Laflamme (Motorola) Dep.).

G. Mozilla

26. Mozilla Corporation is a California-based company that developed an open-source web browser called Firefox for both desktop and mobile devices. Mem. Op. at 10. Firefox is the most important product in Mozilla's portfolio; it represents about 90% of Mozilla's overall revenue. Rem. Tr. 3129:13–19 (Muhlheim (Mozilla)). Mozilla's share in the desktop browser market is about 10% and negligible in the mobile market. Mem. Op. at 10.

27. Google has entered into search distribution contracts with Mozilla. Mem. Op. at 101, 115–16. Pursuant to the distribution agreement, Mozilla sets Google as the default search

engine in Firefox, and in exchange, Mozilla receives revenue share payments from Google. Rem. Tr. 3130:19–25 (Muhlheim (Mozilla)).

28. Despite Google being Mozilla's biggest browser competitor, Mozilla describes its relationship with Google regarding search and search revenue sharing as critical. Rem. Tr. 3162:2–3163:2 (Muhlheim (Mozilla)).

29. For 2024, Google's revenue share payment to Mozilla was approximately $484.5 million, composing approximately 85% of Mozilla's global revenue. Rem. Tr. 3133:21–3134:2, 3163:3–8 (Muhlheim (Mozilla)). Similarly, approximately 85% of Mozilla's U.S. revenue comes from Google. Rem. Tr. 3163:3–13 (Muhlheim (Mozilla)). Of the revenue share amounts that Google pays to Mozilla, [redacted]% comes from searches performed in the United States. Rem. Tr. 3164:1–11 (Muhlheim (Mozilla)) (referencing PXR0807).

30. The U.S. composes the biggest portion of Mozilla's revenue. Rem. Tr. 3134:3–5 (Muhlheim (Mozilla)).

31. Mozilla's revenue share agreement with Google was scheduled to expire at the end of 2025. Rem. Tr. 3165:17–20 (Muhlheim (Mozilla)). Mozilla very much wanted to be in a position to extend its revenue sharing agreement with Google to maintain the status quo of Google payments to Mozilla. Rem. Tr. 3165:17–3166:2 (Muhlheim (Mozilla)).

32. In March 2025, Mozilla extended its revenue share agreement with Google through December 2026; no other terms to the agreement changed. Rem. Tr. 3166:7–16 (Muhlheim (Mozilla)).

H. OpenAI

33. OpenAI is a GenAI company that offers both a user-facing AI application, called ChatGPT, as well as a developer API for building AI applications on top of OpenAI's AI models. Rem. Tr. 373:2–10, 374:10–375:21 (Turley (OpenAI)).

34. Today, OpenAI employs hundreds of engineers and researchers working on ChatGPT functionalities, including new "thinking" models and nascent search integration. Rem. Tr. 422:2–22 (Turley (OpenAI)); Rem. Tr. 378:12–21 (Turley (OpenAI)) (responding to Court's question and explaining OpenAI's new, experimental thinking models).

35. OpenAI currently offers three tiers of ChatGPT to consumers: a free offering, a $20 monthly subscription called ChatGPT Plus, and a $200 monthly subscription called ChatGPT Pro. Rem. Tr. 376:14–377:22 (Turley (OpenAI)) (responding to Court's question on what versions of ChatGPT are available today). OpenAI's paid subscriptions give consumers access to more sophisticated AI models. Rem. Tr. 376:14–378:21 (Turley (OpenAI)) (responding to Court's question and explaining that paid tiers receive access to new "thinking" AI models). OpenAI has considered building products with web browser capabilities similar to Chrome or Edge. Des. Rem. Tr. 15:1–16 (OpenAI-NT 30(b)(6) Dep.).

36. OpenAI first began grounding ChatGPT on third-party search results in 2023. Rem. Tr. 502:10–19 (Turley (OpenAI)) (describing ChatGPT Browse product, which was a predecessor to SearchGPT); PXR0801 (listing third-party search API partners that OpenAI has used). In 2024, OpenAI sought out a partnership with Google for access to Google's Search API for grounding, but Google declined. Rem. Tr. 413:8–23, 414:4–416:3 (Turley (OpenAI)) (discussing PXR0181, describing OpenAI's failed attempts to negotiate with Google, and explaining that OpenAI believed that Google was not incentivized to work with OpenAI as a GenAI rival); PXR0181 at -315 (seeking to revisit Google negotiations because accessing Google's search API "would enable [OpenAI] to provide a better product to users," "promote more choice in search experiences," and benefit "innovation and evolution in search"). Today, OpenAI continues to experience "significant quality issues" with non-Google search API

partners. Rem. Tr. 392:11–23 (Turley (OpenAI)) (discussing search API partners listed in PXR0801).

37. Users turn to ChatGPT for a variety of use cases ranging from creative tasks like composing texts to informational queries requiring access to search grounding. Rem. Tr. 420:11–421:14 (Turley (OpenAI)) (responding to Court's question and discussing integration of SearchGPT prototype into ChatGPT); Rem. Tr. 480:7–481:4 (Turley (OpenAI)) (describing several non-informational use cases); Rem. Tr. 482:15–483:14 (Turley (OpenAI)) (responding to Court and explaining that most but not all informational queries sent to ChatGPT trigger its search functionality, and as the quality of ChatGPT's search functionality improves, so too will the likelihood that an informational query triggers search grounding).

38. OpenAI competes primarily with AI chatbots, but also increasingly competes with new AI search features within general search engines. Rem. Tr. 469:21–470:21 (Turley (OpenAI)) (sharing competitive analysis against Perplexity and AI Overviews, where OpenAI is trailing AI Overviews by a wide margin); Rem. Tr. 504:23–25, 523:7–524:7 (Turley (OpenAI)) (OpenAI views itself as competing with AI chatbots today and potentially search engines and browsers in the future).

39. ChatGPT only serves a small fraction of the daily search queries that Google's AI Overviews serve. This fraction is even smaller when compared to all daily search queries sent to Google. Rem. Tr. 469:24–470:21, 471:7–472:2 (Turley (OpenAI)).

I. Perplexity

40. Perplexity AI is a GenAI company that provides an "answer machine" for users via mobile apps, a web app, and Perplexity's website, perplexity.ai. Perplexity is also in the process of building a browser. Rem. Tr. 694:3–695:5 (Shevelenko (Perplexity)).

41. Perplexity takes user queries, searches an index, ranks sources, and uses an LLM to select and synthesize answers to those queries. Rem. Tr. 694:3–21 (Shevelenko (Perplexity)). Perplexity relies on ranking signals from third party aggregators, who pull the raw ranked results from search engines, including Google, and expose these results to Perplexity via an API. Rem. Tr. 700:1–701:5 (Shevelenko (Perplexity)).

42. While most users are free users, Perplexity monetizes its product through a subscription and, to a very small degree, through ads placed below Perplexity's responses in a "Related" queries section. Rem. Tr. 703:5–704:18 (Shevelenko (Perplexity)). Perplexity's subscription version allows users to access more powerful features and the ability to toggle which LLM model generates responses. Rem. Tr. 704:19–705:23 (Shevelenko (Perplexity)).

J. Samsung

43. Samsung Electronics Co. Ltd. is a Korea-based original equipment manufacturer (OEM) of smartphones and other mobile devices that run on the Android platform. Mem. Op. at 12. Samsung also develops mobile applications that it preloads onto its devices, including a browser known as S Browser and an app store called the Galaxy Store. Mem. Op. at 12.

44. Today, approximately [redacted]% of Samsung's smartphone sales are U.S. sales. Des. Rem. Tr. 26:15–27:11 (Kim (Samsung) Dep.). Samsung devices "represent the primary competitor to the iPhone in key monetizing regions, such as the US[.]" Mem. Op. at 12 (citing UPX0639 at -266).

45. Samsung and Google have partnered to deliver the best of Google AI to Samsung users, with Gemini Pro and Imagen 2 models powering innovative use cases, Series 24 being the first phone in the Android ecosystem to use Gemini Nano, and Circle to Search representing a new level of collaboration. PXR0013* at -339–40.

K. Skai

46. Skai is a California-based advertising services company. Formerly known as Kenshoo, Skai operates an omnichannel marketing platform that helps the largest advertisers and agencies plan, optimize, and manage their online marketing programs across a number of channels, including search advertising generally and search text advertising in particular. Rem. Tr. 1364:1–19 (Vallez (Skai)). Skai's customer base comprises an estimated 2,000–3,000 advertisers and agencies, including large global advertisers. Rem. Tr. 1374:18–1375:5 (Vallez (Skai)).

47. Skai works with its clients to place search ads on Google or Bing, as well as other search advertising platforms. Rem. Tr. 1365:3–16 (Vallez (Skai)). One of the "value-adds" that Skai provides to its customers is to assist in determining how to allocate ad spend across various search advertising platforms, including to understand the impact of each channel on ad spend. Rem. Tr. 1366:11–22 (Vallez (Skai)).

L. T-Mobile

48. T-Mobile US, Inc. is a Washington-based mobile carrier that provides cellular services and sells mobile devices directly to consumers. Mem. Op. at 13.

49. T-Mobile is the largest MNO seller of Android devices. Des. Rem. Tr. 22:22–23:6 (Giard (T-Mobile) Dep.) (T-Mobile is consistently the largest MNO seller of Android phones.). Approximately [redacted] of the phones sold by T-Mobile run on Android, and the other [redacted] are Apple devices. Mem. Op. at 13; Des. Rem. Tr. 18:7–23 (Giard (T-Mobile) Dep.) (Android's share [redacted] vis a vis iOS over the last 5 years and today is [redacted] to [redacted]%.).

M. Verizon

50. Cellco Partnership, doing business as Verizon Wireless, is a New Jersey-based mobile carrier that provides cellular services and sells mobile devices directly to consumers. Mem. Op. at 13.

51. As of the liability trial in this matter in fall 2023, Verizon had distributed roughly twice as many Apple devices (70%) as Android devices (30%). Mem. Op. at 13 (citing Liab. Tr. at 1102:21–23 (Higgins (Verizon))). As of Q4 2024, about [redacted]% of the phones sold by Verizon run on iOS, with less than [redacted]% running on the Android operating system. Des. Rem. Tr. 23:2–24:4 (Boulben (Verizon) Dep.). Over the years, Verizon has overinvested in the Android ecosystem. Des. Rem. Tr. 25:9–27:23 (Boulben (Verizon) Dep.).

52. Google and Verizon have an agreement for Gemini and Google One. Des. Rem. Tr. 16:9–18:10 (Boulben (Verizon) Dep.). Google's GenAI app Gemini is preloaded on Verizon's Android devices. Des. Rem. Tr. 33:12–35:8 (Boulben (Verizon) Dep.). Verizon offers its customers a perk that includes Google One and Gemini Advanced at a significant discount versus what a customer would pay directly to Google, with Verizon making a margin on that perk. Des. Rem. Tr. 35:9–36:19 (Boulben (Verizon) Dep.).

N. Yahoo

53. Yahoo is a California-based provider of general search services and was an early market leader in general search. Mem. Op. at 11. Yahoo is the third largest search provider in the United States and performs a little under 10 billion queries per year. Rem. Tr. 1245:4–12 (Provost (Yahoo)). Yahoo is also one of the most popular media brands on the web today, with its ecosystem including news, mail, sports, search, finance, ad business, and commerce platform. Rem. Tr. 1239:5–9, 1258:8–10, 1258:14–16 (Provost (Yahoo)).

54. Yahoo is working to reinvigorate the search business. Rem. Tr. 1239:17–23 (Provost (Yahoo)). As part of the reinvigoration of Yahoo search, Yahoo is redesigning the search page to be less cluttered, called unshipping. Rem. Tr. 1239:24–1240:9 (Provost (Yahoo)).

55. Query understanding is most important part of delivering a search experience, as it is the first opportunity to understand the needs of the user and how to build a page to satisfy those needs. Rem. Tr. 1240:13–1241:7, 1245:23–1246:2 (Provost (Yahoo)). Better query understanding guides the Yahoo content placed on the search results page. Rem. Tr. 1246:10–19 (Provost (Yahoo)). Yahoo uses AI for better query understanding and as a component of how Yahoo builds and trains models to improve query understanding. Rem. Tr. 1241:8–17 (Provost (Yahoo)).

56. Yahoo sources search results from Microsoft Bing and has done so for 15 years. Rem. Tr. 1241:21–1242:9 (Provost (Yahoo)). Microsoft Bing results on Yahoo are generated based on the signal sent from Yahoo. Rem. Tr. 1246:3–9 (Provost (Yahoo)).

57. Yahoo differentiates from Microsoft Bing by adding Yahoo content around the search results. Rem. Tr. 1242:12–22 (Provost (Yahoo)). Yahoo sources content from many different third parties. Rem. Tr. 1242:23–1243:6 (Provost (Yahoo)). A user is served search results from Bing and the rest of the content provided is Yahoo driven. Rem. Tr. 1243:7–11 (Provost (Yahoo)). Most of the content around the search results is created by Yahoo. Rem. Tr. 1243:19–24, 1245:1–3 (Provost (Yahoo)).

58. Yahoo has considered building a web browser and is developing a prototype. Rem. Tr. 1251:4–1254:13 (Provost (Yahoo)). Yahoo's prototype web browser is partially built on Chromium. Rem. Tr. 1261:1–5 (Provost (Yahoo)). Building a web browser is still under evaluation at Yahoo. Rem. Tr. 1251:24–1252:11 (Provost (Yahoo)).

59. Yahoo has considered buying a web browser. Rem. Tr. 1251:14–15 (Provost (Yahoo)). Yahoo is still considering buying a web browser but has not reached an agreement to acquire a web browser. Rem. Tr. 1251:18–23 (Provost (Yahoo)). Yahoo does not consider Netscape or AOL Shield as web browsers. Rem. Tr. 1260:16–25 (Provost (Yahoo)).

O. Contracts With Third Parties

60. Google has contracts with a number of third parties, as set forth in Attachment A hereto.

II. ADDITIONAL INDUSTRY BACKGROUND RELEVANT FOR REMEDIES

A. GenAI

1. How GenAI Works

61. "AI is one of the most profound technologies humanity will ever work on." Rem. Tr. 2450:14–2451:3 (Pichai (Google)).

62. "GenAI" or "Generative AI" is a type of artificial intelligence that creates new content including but not limited to text, images, code, classifications, and other media using machine learning models. Rem. Tr. 4056:20–4059:21 (Hitt (Def. Expert)) (explaining that GenAI technology generates new content); Rem. Tr. 148:16–149:16 (Durrett (Pls. Expert)) (an LLM is a "type of GenAI model that typically takes text or some other kind of data as input and then generates some kind of text output"); PXR0102* at -700. GenAI tools use machine learning techniques to generate structured outputs, including text or images. Rem. Tr. 148:16–149:16 (Durrett (Pls. Expert)).

63. A GenAI Product is any application, software, service, feature, tool, functionality, or product that involves or makes use of GenAI capabilities or models. It can include GenAI Search Access Points. Des. Rem. Tr. 24:11–25:9 (Google-EC 30(b)(6) Dep.) (describing Google's use of Gemini models to build a wide variety of products and features throughout the

company, including search features); Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot integrates the Gemini model and a Google Search API to provide the response."); Des. Rem. Tr. 30:22–31:7 ([redacted] Dep.) (discussing opportunities to "link a user from [redacted] to some type of [redacted] surface or query"); Des. Rem. Tr. 23:8–13 (Microsoft-DS 30(b)(6) Dep.) (describing Copilot and GenAI Products grounded in search as "potential future search entry points").

64. Large language models ("LLMs") are a type of GenAI model that take text or other input and generate text or other outputs. Rem. Tr. 148:16–149:16 (Durrett (Pls. Expert)).

65. LLMs use language modeling, which takes as an input a sequence of tokens and predicts the next token. Rem. Tr. 153:9–25, 155:4–22 (Durrett (Pls. Expert)). A token is a small unit that can be thought of as a short word. Rem. Tr. 152:11–153:8 (Durrett (Pls. Expert)). LLMs can generate large amounts of text by repeatedly predicting the next token. Rem. Tr. 154:1–155:3 (Durrett (Pls. Expert)).

66. The most typical type of LLM is the transformer. Rem. Tr. 155:4–22 (Durrett (Pls. Expert)). Transformer models are neural networks that are mediated by parameters. Rem. Tr. 155:4–22 (Durrett (Pls. Expert)). The parameters of a transformer are what compute the probability of the next token. Rem. Tr. 155:4–22 (Durrett (Pls. Expert)).

67. About a decade ago, Google invented transformers that are now the backbone of LLMs. These transformer-based architectures are effectively models that can be trained on vast public datasets and then generate answers back to queries, be it text, images, or videos. The fact that they can generate answers back has led to the phrase "generative AI." Users may perceive GenAI as the consumer apps they use, such as ChatGPT, Gemini, or Claude. But it is all part of the progress in AI. Rem. Tr. 2447:5–2448:13 (Pichai (Google)).

68. Pretraining an LLM is a process by which the parameters of a model are set. Rem. Tr. 154:1–155:3, 156:17–157:7 (Durrett (Pls. Expert)) (responding to Court's question and explaining the training process for LLMs).

69. LLMs are pretrained by exposing a model to large amounts of data, which encode knowledge in the parameters of a model. Rem. Tr. 156:17–157:7 (Durrett (Pls. Expert)) (responding to Court's question and explaining the LLM training process); Des. Rem. Tr. 60:14–19, 171:24–172:11 (Parakh (Google) Dep.) (explaining how Google pre-trains the Gemini model powering AI Overviews on [redacted] of user queries—even after Google DeepMind pre-trains the base Gemini model); PXR0123* at -182–236 (Gemini v3 Pre-Training Data Card listing extensive datasets Google uses to pre-train its Gemini models).

70. Data for pretraining LLMs is typically gathered from the web. Rem. Tr. 155:23–156:16 (Durrett (Pls. Expert)); PXR0123* at -182–236 (Gemini v3 Pre-Training Data Card listing extensive datasets Google uses to pre-train its Gemini models, including data from the Google Common Corpus, DocJoins, and third-party web sources). For example, Google trains its Gemini base models on data derived from Google's Common Corpus, a large scrape of the web. Rem. Tr. 183:25–185:6 (Durrett (Pls. Expert)). Google's Common Corpus also contains other search metadata and search signals attached to the scraped webpages. Rem. Tr. 186:20–187:3 (Durrett (Pls. Expert)).

71. Google also uses user-side data to pretrain its Gemini base models. Rem. Tr. 3342:6–18, 3343:1–25 (Collins (Google)) (describing the use of "Search augmented QA" data prepared from "Aquarium" data in pretraining); Rem. Tr. 188:3–189:4 (Durrett (Pls. Expert)) (citing Des. Rem. Tr. 144:16–20,144:25–145:8 (Parakh (Google) Dep.) (describing how

Google uses the Aquarium dataset in Gemini pretraining)); PXR0123* at -189 (listing "Search augmented QA" in the Gemini v3 Pre-Training Data Card).

72. Post-training an LLM is the process by which models are exposed to example data to impart the different capabilities desired in the LLM. Rem. Tr. 158:24–161:4 (Durrett (Pls. Expert)); Des. Rem. Tr. 114:12–115:6 (Parakh (Google) Dep.) (describing how Google post-trains and fine-tunes Gemini models used for AI Overviews).

73. LLMs are post-trained on a large number of datasets encompassing a broad collection of data. Rem. Tr. 158:24–161:4 (Durrett (Pls. Expert)); Des. Rem. Tr. 105:16–106:11 (Parakh (Google) Dep.) (Google post-trains Search-specific Gemini models on user queries.); Rem. Tr. 4090:1–9 (Hitt (Def. Expert)) (It is important to have more useful data to train foundation models.).

74. The capabilities of LLMs are limited by the data that they are trained on, and the ability of LLMs to respond accurately to queries is similarly circumscribed by the data that they are trained on. If knowledge is not in LLMs training data, they do not know the answer. Rem. Tr. 158:24–162:6 (Durrett (Pls. Expert)). Similarly, LLMs are capable of providing reasonably factual responses for frequently seen data but struggle for lesser-known information. Rem. Tr. 161:5–162:6 (Durrett (Pls. Expert)). LLMs even have difficulty answering questions regarding data they have seen as it is difficult to store information in a "lossless way." Rem. Tr. 171:13–172:21 (Durrett (Pls. Expert)). LLMs particularly struggle to incorporate fresh data, given pre-training takes weeks or months. Rem. Tr. 167:6–168:11 (Durrett (Pls. Expert)).

75. The quality of training data significantly impacts the quality of LLM output. Rem. Tr. 161:5–162:6 (Durrett (Pls. Expert)); Des. Rem. Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that Google samples user query sessions to train the Gemini models

powering AI Overviews); Des. Rem. Tr. 173:21–174:6 (Parakh (Google) Dep.) (explaining that Google also trains the Gemini models powering AI Overviews on quality signals).

76. LLMs must be trained on high-quality data or the model may break. Rem. Tr. 162:8–163:13 (Durrett (Pls. Expert)).

77. Filtering is the process by which data that is not helpful is removed from the training data for LLMs. Rem. Tr. 163:15–164:3 (Durrett (Pls. Expert)). In the filtering process, large amounts of data are removed until only the highest quality data remains. Rem. Tr. 163:15–165:15 (Durrett (Pls. Expert)) (providing an example from DCLM's filtering down to only .14% of open source Common Crawl data).

78. Data filtering significantly impacts model performance. Rem. Tr. 165:25–167:5 (Durrett (Pls. Expert)) (explaining Hugging Face data that showed significant performance boost across 22 performance benchmarks from using datasets filtered for high-quality data).

79. Data filtering is a "common practice" for training LLMs. Rem. Tr. 163:15–165:16 (Durrett (Pls. Expert)). For example, Google employs data filtering on the Google Common Corpus, which is derived from Google's Search Index. Rem. Tr. 165:17–24 (Durrett (Pls. Expert)). Google has also considered and received approval to use its "Search signals to help Gemini pretraining[,] [which] will be very helpful for [Google] to upweight good authoritative pages and downweight the spammy, untrustable ones." Rem. Tr. 187:4–188:2 (Durrett (Pls. Expert)) (citing PXR0016* at -865).

80. The advent of AI and LLMs has not eliminated the need for Search. Rem. Tr. 3601:13–15 (Reid (Google)) (agreeing the advent of AI and LLMs has not eliminated the need for Search).

81. LLMs by themselves will not replace all of Search functionality. Rem. Tr. 3601:19–23 (Reid (Google)); PXR0100* at -287 ("Google thinks that search engines will not be replaced by chatbots.").

82. An LLM may incorporate into its responses fresh data and other data outside of its training data through the use of retrieval-augmented generation ("RAG"). Rem. Tr. 168:13–169:17 (Durrett (Pls. Expert)). An LLM employs RAG by using a retrieval technique (e.g., a "retriever" such as a search engine) to surface information and feed that information, along with the query, into the LLM to generate a response. Rem. Tr. 168:13–169:17 (Durrett (Pls. Expert)). The LLM that generates information is called the "generator." Rem. Tr. 177:6–179:11 (Durrett (Pls. Expert)).

83. Google employs RAG techniques because "[w]hile AI models are brilliant at generating content, they need a way to anchor [an AI model's] outputs in reality." Rem. Tr. 169:24–170:13 (Durrett (Pls. Expert)) (quoting PXR0040* at -178); PXR0110* at -917.

84. The use of RAG techniques can significantly improve an LLM's performance. Rem. Tr. 168:13–169:17, 170:14–171:12 (Durrett (Pls. Expert)) (demonstrating that a "closed book" model not employing RAG had an accuracy of only 38.2% on questions seeking information retrieved easily from Wikipedia).

85. Google's AI Overview feature uses a RAG system that retrieves information from Google Search and uses the MAGIT model to generate content based off of the retrieved information. Rem. Tr. 177:6–179:11 (Durrett (Pls. Expert)). The AI Overview feature retrieves from Google's Search Index by using the Fast Search system to provide lower latency results so that they can be fed into the generator and produce results relatively quickly. Rem. Tr. 180:3–19 (Durrett (Pls. Expert)) (citing PXR0048* at -177). On the generator side, the MAGIT model is

made by using a Gemini base model and fine-tuning it on user queries and results. Rem. Tr. 177:6–179:11 (Durrett (Pls. Expert)) (citing PXR0086* at -.012–.014). The data MAGIT is trained on is considered to be Search data. Rem. Tr. 179:13–180:1 (Durrett (Pls. Expert)) (citing Des. Rem. Tr. 154:13–15 (Parakh (Google) Dep.)).

86. Google's Tangram model employs signals from Glue to determine whether to show an AI Overview in response to a user query. Rem. Tr. 181:10–182:25 (Durrett (Pls. Expert)).

87. GenAI is a great technique to help give users the best Search experience possible. Rem. Tr. 3601:24–3602:5 (Reid (Google)); Rem. Tr. 3837:12–3838:15 (Cue (Apple)) ("[T]he combination of a search index and LLMs should provide . . . way better results" than search engines can currently).

88. Grounding is any method, including via API, by which foundation model output or a GenAI Product can connect, call, access, retrieve, or display links or information from a [search engine]. Rem. Tr. 640:1–641:8 (Hisao (Google)) (explaining how the Gemini App calls upon Search to ground with web content); Rem. Tr. 3511:8–25, 3634:8–14 (Reid (Google)) (explaining grounding is when an LLM mode uses some class of data, often from the web, in order to improve the accuracy of its response); Rem. Tr. 399:21–401:11 (Turley (OpenAI)) (describing how ChatGPT grounds its responses via search APIs); Rem. Tr. 1014:1–1015:5 (Schechter (Microsoft)) (describing Microsoft's search grounding APIs).

89. Chatbots answering an informational query that are grounded on the web have more of an opportunity to avoid hallucinations or catch themselves from doing so. Rem. Tr. 3634:15–25 (Reid (Google)) (explaining the grounding process, adding that conceptually one could also ground on other data sources, depending on the query); PXR0040* at -203 (grounding

enables LLMs to validate responses, fact-check, or even tailor responses to sentiment derived from the web); PXR0040* at -178 ("Search is what anchors an AI model's outputs in reality").

90. Google believes that leveraging its other products in Gemini, for example by providing up-to-date information from Google Maps and Google Flights, can differentiate Gemini from other GenAI products. PXR0027* at -735 (recommending that Google "develop[] features that leverage the strengths of Google's existing ecosystem, as users perceive this as a differentiator and benefit," including "[f]acilitating Gemini has the most up-to-date info").

91. In the context of GenAI, factuality is a measure of whether the outputs of a GenAI Product reflect ground truth or an authoritative source. Des. Rem. Tr. 20:6–15 (Parakh (Google) Dep.) (defining factuality); Des. Rem. Tr. 201:9–202:11 (Parakh (Google) Dep.) (explaining that factuality depends on the authoritativeness of a web source); PXR0019 at -814 ("The way we determine factuality today is based on deductions from authoritative sources on the web. This is something that Google was built on, and we've continued to improve it over the years.").

92. To incorporate search results into AI-generated responses, GenAI Products translate user prompts into search queries, send those queries to a search engine, then incorporate information from the retrieved search results into their AI-generated responses. Des. Rem. Tr. 108:24–109:12 (Parakh (Google) Dep.) (describing how the AI Overviews search feature incorporates retrieved search results and links into its summaries as the summaries are being generated); Rem. Tr. 399:21–401:12 (Turley (OpenAI)) (describing how ChatGPT currently incorporates search results); Rem. Tr. 1022:16–1023:8 (Schechter (Microsoft)) (explaining why the quality of Microsoft's AI chatbot relied on the quality of Bing's search results); Rem. Tr. 1025:23–1026:5, 1030:13–1031:10 (Schechter (Microsoft)) (further explaining how Microsoft's Copilot products incorporate Bing search results); Rem. Tr. 3833:23–3836:13 (Cue

(Apple)) (In the general search market, LLMs are merging with search indices through RAG, such that LLMs are grounded on the "10 [blue] links").

93. Today, GenAI Products frequently include links to web sources when responding to informational queries. They retrieve these links from search engines. Des. Rem. Tr. 99:18–100:25 (Parakh (Google) Dep.) (explaining how Google includes links to web sources in its AI Overviews search feature); Des. Rem. Tr. 212:18–214:1 (Parakh (Google) Dep.) (confirming that AI Overviews display links to drive user traffic to third-party websites); Rem. Tr. 405:8–406:18 (Turley (OpenAI)) ("We do that by allowing users to see high-quality links inside ChatGPT for areas that they may want to read more about."); Rem. Tr. 1028:1–1029:1, 1029:14–1030:4 (Schechter (Microsoft)) (detailing how Copilot Answers include links to Bing sources); Des. Rem. Tr. 35:11–13, 36:16–20 (Cromwell (Microsoft) Dep.) (Copilot calls on the Bing API for roughly [redacted]% of responses.); Des. Rem. Tr. 78:14–17 (OpenAI-NT 30(b)(6) Dep.); PXR0019 at -817 ("[Google] also aim[s] to show dates on supporting links in AI-powered overviews, so you can see when this supporting information was published to get a sense of whether it's current and up-to-date for your query."); Rem. Tr. 696:13–25, 698:15–699:7, 701:7–702:11 (Shevelenko (Perplexity)) (Perplexity's answer engine responses present users with LLM generated responses, and within those responses, Perplexity provides weblink citations, and a list of web sources.).

94. For GenAI Products, a lack of good search APIs is an "innovation killer." Des. Rem. Tr. 183:14–184:13 (Parakh (Google) Dep.) (explaining "[l]ack of good APIs is an innovation killer, full stop" while discussing PXR0025 at -481); Rem. Tr. 392:11–23 (Turley (OpenAI)) (discussing "significant quality issues" with search API partners listed in PXR0801); Rem. Tr. 1022:6–1023:8 (Schechter (Microsoft)) (GenAI Products treat search results as fact in

their response, so the quality of search results directly impacts the quality of GenAI responses.); Rem. Tr. 1039:5–20 (Schechter (Microsoft)) ("[T]he quality of the [Bing] results impact Copilot for sure . . . . [I]f there's good results from Bing, Copilot inherits that and provides good results to its users. If the quality of the Bing results are poor, then the Copilot result will be poor."); Des. Rem. Tr. 74:25–75:20 (Cromwell (Microsoft) Dep.); Rem. Tr. 4156:23–4157:5 (Hitt (Def. Expert)) (Gemini App competitors do not have access to both Google's web index and Search ranking signals.); PXR0153 at -484 (Oct. 2024 Google presentation noting the quality differences based on what the model grounds on); PXR0181 at -315 ("[OpenAI] believe[s] having multiple [search API] partners, and in particular Google's API, would enable [it] to provide a better product to users."); PXR0096* at -327 (discussing the potential improvement of Bard due to the integration of Google Search).

95. While GenAI applications can produce responses to informational queries only relying on LLMs, many GenAI products including GenAI assistant apps and chatbots still retrieve information from the web. Rem. Tr. 637:11–638:5, 640:1–641:20, 647:15–20 (Hsiao (Google)) (explaining the ways in which web content appears in the Gemini App); Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot integrates the Gemini model and a Google Search API to provide the response."); Des. Rem. Tr. 142:12–143:15 (Fox (Google) Dep.); Des. Rem. Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that the Gemini App has access to the Google Search API, including Google's FastSearch API, to retrieve search results for use in its responses to user queries); Rem. Tr. 382:5–383:17 (Turley (OpenAI)) (ChatGPT can answer user questions without web information, but it struggles with accuracy due to hallucinations and its training data knowledge cut-off.); Rem. Tr. 383:18–384:20 (Turley (OpenAI)) (describing need for ChatGPT to access a source of real-time information);

Rem. Tr. 694:3–21, 698:15–699:15 (Shevelenko (Perplexity)) (describing how Perplexity uses web sources); Rem. Tr. 1026:6–11 (Schechter (Microsoft)) (explaining that all Copilot integrations retrieve information from Bing); Des. Rem. Tr. 71:14–73:8 (Cromwell (Microsoft) Dep.); Des. Rem. Tr. 125:3–22 (Standal (Opera) Dep.) (explaining how Aria, Opera's built-in browser AI tool, retrieves information from Google Search); PXR0111 at -772–73 (Feb. 2024 Google internal comments on using a Search affordance with a Gemini integration into Apple's Siri to satisfy use cases Gemini cannot); Rem. Tr. 161:5–162:6 (Durrett (Pls. Expert)) (describing how models are less likely to generate factual outputs when only trained from a LLM).

96. GenAI assistant apps and chatbots rely upon additional web information including web indices and ranking signals, similar to Search, to satisfy user needs. Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot integrates the Gemini model and a Google Search API to provide the response."); Des. Rem. Tr. 115:15–25, 116:18–22, 117:11–118:6, 118:8–9, 118:12–13, 120:19–24, 121:1–122:1, 122:25–123:15, 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining how Google's FastSearch API provides ranked search results for use in Google's GenAI Products, including AI Overviews and the Gemini App); Rem. Tr. 694:3–21, 698:15–699:15 (Shevelenko (Perplexity)) (describing how Perplexity uses web sources); Rem. Tr. 391:16–392:10, 401:13–402:5, 409:11–410:22 (Turley (OpenAI)) (describing search indices and search signals are key components of ChatGPT); Rem. Tr. 460:6–461:1 (Turley (OpenAI)) (describing OpenAI's development of search functionality involving web indices, a search index, and ranking signals); Rem. Tr. 1014:22–1015:5 (Schechter (Microsoft)) (describing Copilot's use of a Bing search API); Des. Rem. Tr. 71:14–73:8 (Cromwell

(Microsoft) Dep.); PXR0801 (listing three search API providers upon which ChatGPT relies); PXR0802 (listing the amount of ChatGPT queries for which OpenAI uses its own search index).

97. In particular, to satisfy commercial use cases, GenAI applications must have web information retrieval capabilities. Rem. Tr. 659:16–661:13 (Hsiao (Google)) (explaining that commercial queries would likely need to be grounded in a search index or through providers to satisfy commercial queries in response to a question from the Court); Des. Rem. Tr. 74:14–75:4 (Cromwell (Microsoft) Dep.).

98. Google CEO Sundar Pichai believes the Gemini App will expand overall Search use. Rem. Tr. 2492:22–2493:1 (Pichai (Google)).

99. Today, GenAI applications are not cannibalizing general search queries. Rem. Tr. 648:2–16, 648:24–649:21, 651:1–653:2, 657:5–11 (Hsiao (Google)); Rem. Tr. 1032:18–1033:5 (Schechter (Microsoft)) (explaining that positive user experiences with Bing Chat—a Copilot predecessor—actually increased Bing searches); Des. Rem. Tr. 34:25–35:5 (Cromwell (Microsoft) Dep.); PXR0116 at -044, -053–54; PXR0112 at -136; PXR0345* at -965 (internal Google calculations for grounding Meta AI with conclusion that doing so would have a "[redacted]" overall impact on Google Search revenues due to user click-through rates to Google—"[redacted]").

100. Commercial queries are not yet common use cases in GenAI applications and do not cannibalize commercial queries. Rem. Tr. 657:5–659:15 (Hsiao (Google)); Des. Rem. Tr. 302:23–25, 303:2–9 (Fox (Google) Dep.); Rem. Tr. 3837:12–3838:15 (Cue (Apple)) (AI chatbots cannot yet answer commercial queries.); PXR0101 at -743 (Google research shows that Google's grounding agreement with Meta has likely had a "small overall" impact).

101. While commercial queries are not yet cannibalized by GenAI chatbots, commercial queries and shopping are a potential emerging use case in GenAI chatbot products. Rem. Tr. 658:13–659:15 (Hsiao (Google)) (stating the belief that chatbot providers will try to make chatbots useful for commercial queries in response to a question from the Court); Rem. Tr. 661:14–662:2 (Hsiao (Google)) (explaining that some foundational models have been trained on commercial data in response to a question from the Court).

102. These chatbots undoubtedly will become used for more commercially oriented queries. "[T]here's nothing which is fundamentally different between commercial and non-commercial queries." Rem. Tr. 2460:16–2461:11 (Pichai (Google)).

103. Google CEO Sundar Pichai expects a future where Google uses ads as part of the Gemini App experience. Rem. Tr. 2493:16–19 (Pichai (Google)); PXR0241* at -034–35 (CEO Sundar Pichai explaining during September 2024 interview that advertising is "very relevant information" when user's intent is commercial, which is a "core insight behind how [Google] monetize[s] . . . search" and "[t]hat doesn't change just because there's a new underlying technology").

104. Google plans to experiment with ads in the Gemini App in the future. Rem. Tr. 2494:2–4 (Pichai (Google)); Rem. Tr. 3625:13–15 (Reid (Google)) (agreeing Google is actively experimenting with ads in the AI Overview feature today).

105. Access to the web will be crucial for satisfying emerging commercial query use cases in GenAI products. Rem. Tr. 659:16–661:13 (Hsiao (Google)) (explaining that commercial queries would likely need to be grounded in a search index or through providers to satisfy commercial queries in response to a question from the Court); Des. Rem. Tr. 166:15–21, 166:23–167:15, 167:17–22 (Fox (Google) Dep.) (discussing that over time Search capabilities will be

within the personalized intelligent agent); Des. Rem. Tr. 79:25–80:2, 80:4–81:19 (Cromwell (Microsoft) Dep.).

106. Most of the chatbots have introduced some form of grounding, which is using aspects of search engines to build their experiences. Rem. Tr. 3630:16–3631:3 (Reid (Google)).

107. GenAI Products are fundamentally different from general search engines. Rem. Tr. 1033:15–1034:1 (Schechter (Microsoft)) ("So while the LLMs and GenAI technology is good at approximating and stimulating what a human might do, it can't possibly know what news event is coming up . . . or . . . if a restaurant is open or not[.]"); Rem. Tr. 1035:24–1036:9 (Schechter (Microsoft)) (An LLM is not a knowledge base like a search engine.); Des. Rem. Tr. 43:25–44:13 (Giard (T-Mobile) Dep.) (AI is fundamentally different than search.).

108. Without access to a search index or API, a GenAI Product cannot retrieve real-time information and may hallucinate when responding to user prompts. Rem. Tr. 382:5–383:17 (Turley (OpenAI)) (ChatGPT can answer user questions without web information, but it struggles with accuracy due to hallucinations and its training data knowledge cut-off); Rem. Tr. 383:18–384:20 (Turley (OpenAI)) (describing need for ChatGPT to access a source of real-time information); Rem. Tr. 1033:15–1034:1 (Schechter (Microsoft)) ("[An LLM] can't possibly know what news event is coming up . . . or . . . if a restaurant is open or not, . . . it can certainly make something up[.]"); Rem. Tr. 1035:24–1036:9 (Schechter (Microsoft)) (If an LLM does not have access to tools like search, it will hallucinate a response.); PXR0040* at -202 ("The true strength of combining search with LLMs is in the enhancement of the LLM's efficacy" and "without current and broad data, their responses can be outdated, limited, or even hallucinated").

109. Hallucinations are AI-generated fabrications that have no basis in reality. Rem. Tr. 1035:12–23 (Schechter (Microsoft)) ("A hallucination is essentially a statement that might

sound factual but is really just generated by the language model. . . . [T]hey are not based in actual reality.").

110. Google Search defines factuality in the sense of how accurate the information is. Rem. Tr. 3621:25–3622:4 (Reid (Google)); PXR0019 at -814 ("The way we determine factuality today is based on deductions from authoritative sources on the web. This is something that Google was built on, and we've continued to improve it over the years.").

111. In Google's vision of the "AI Era" of Search, "Search will provide the most accurate and helpful answers to any question," and "AI Overviews will be the most accurate, personal and powerful – capable of reasoning, using tools and accessing Search's trillions of data points." Rem. Tr. 3625:21–3627:7 (Reid (Google)); PXR0037 at -238.

112. There are crossovers between search and AI behavior. Rem. Tr. 3160:1–12 (Muhlheim (Mozilla)).

2. Google And GenAI: GenAI In Search And Google's Gemini App

113. Google has used AI technologies deeply for more than a decade across its most important products, including Search. Rem. Tr. 2455:13–2457:4 (Pichai (Google)); Rem. Tr. 3601:7–9 (Reid (Google)) (agreeing Google has been incorporating AI and LLM technology into Search for years); Rem. Tr. 4055:17–4058:16 (Hitt (Def. Expert)) (indicating Google has a long history of using GenAI technology in Search products).

114. Google thinks it is important to combine the superpowers of an LLM (Synthesis, Creation & Execution, and Conversation) and the superpowers of Search (Reliability and Breadth & Depth) to make the best search experience. Rem. Tr. 3631:4–3632:15 (Reid (Google)) (referencing PXR0034 at -516); PXR0034 at -516.

115. GenAI and Search overlap in different ways and GenAI cannot do all that Search does and Search cannot do all that GenAI does. Rem. Tr. 4056:20–4058:16 (Hitt (Def. Expert))

(describing the overlap of search and GenAI technologies including the ability to answer questions). Rem. Tr. 2457:5–2458:9 (Pichai (Google)) (describing use cases for which Search hasn't done well including having chatbots write large sections of code or Gemini generating a whole video).

116. The use of LLMs enhances Google Search. Rem. Tr. 3601:10–12 (Reid (Google)); PXR0118* at -690 (2023 email from S. Pichai stating, "We're already starting to experiment with Gemini in Search. . . with a [redacted]% reduction in latency . . . alongside improvements in quality."); PXR0040* at -208 (noting that GenAI models "enhance various facets of the search experience, including comprehending queries, summarizing content, and personalizing results.").

117. Quality is an important component of Google Search. Rem. Tr. 3619:10–12 (Reid (Google)).

118. Quality wins reported to Google's Board of Directors for Q2 2024 included improved answer quality, reinforced TnS protections, improved predictability, and factuality (significant gains through improvement in inputs and empowered by post-hoc evidence). PXR0037 at -229.

119. Google Search trains and fine-tunes GenAI models on Google's extensive search data corpus, including user data and data from web publishers who have opted out of AI training under the Google-Extended opt-out. Rem. Tr. 183:25–185:6 ((Durrett) (Pls. Expert)) (discussing how Google pretrains Gemini models on the Google Common Corpus, which includes Docjoins, the data structure Google uses to store URLs, page content and a number of search signals."); Des. Rem. Tr. 36:5–17, 37:16–21 (Parakh (Google) Dep.) (Google incorporates click-and-query data into Search AI models.); Des. Rem. Tr. 47:1–7 (Parakh (Google) Dep.) (explaining that

there are no privacy restrictions on using search user data in Google Search's AI models); Des. Rem. Tr. 56:23–58:14 (Parakh (Google) Dep.) (Google Search trains GenAI models designed to classify and label queries using search data); Des. Rem. Tr. 105:13–106:11 (Parakh (Google) Dep.) (Google trains Search-specific Gemini models on user search queries); Des. Rem. Tr. 173:21–174:6 (Parakh (Google) Dep.) (describing how Google trains Search-specific Gemini models on user query sessions and quality signals derived from user feedback); PXR0178* at -156 (Gemini pretrains on Search data); PXR0014* at -600 (The goal of Google Search's GenAI models is "maximizing value from Gemini for K&I which includes training on search data as one of the primary mechanisms.").

120. Even beyond Search, Google trains its Gemini models on proprietary search datasets not available to third parties. Des. Rem. Tr. 52:19–54:23 (Parakh (Google) Dep.) (describing how Google trains its base Gemini models on Aquarium (Q&A pairs derived from web documents in its index) and DocJoins); PXR0123* at -182, -188–89, -202–03 (Gemini v3 pre-training data card listing various proprietary training datasets derived from search data, like DocJoins and "Search augmented [query-answer pairs]" from Aquarium).

121. Google's proprietary DocJoins dataset is comprised of all the data Google knows about the web documents in its search index, including the content of each web document and associated ranking signals. PXR0061* at -943 (explaining history and contents of Google's DocJoins dataset).

122. Google has explored using user-side data and quality signals from Search to pre-train Gemini models used outside of Search. Des. Rem. Tr. 141:6–10, 144:16–145:20, 146:15–147:4, 148:3–17, 150:4–13 (Parakh (Google) Dep.) (discussing PXR0227, a data card exploring use of sensitive search data and signals to pre-train the Gemini v3 foundation model); PXR0227

at -983–86 (describing Google's intended use of AI Overview responses scraped from anonymized user queries, Google Search question-answer pairs, anonymized user search sessions, and search signals for training data filtering and Gemini model pre-training); PXR0184* at -113 (Gemini v2 pre-training data filtering document showing Google's use of a Google Common Corpus crawlability filter and "query based removals" for filtering); PXR0016* at -865 (Google valuing search signals and using them to help Gemini pretrain so it can upweight good, authoritative pages and downweight the "untrustable" ones).

123. Google incorporates GenAI technology in Google Search today. Des. Rem. Tr. 25:13–26:1 (Parakh (Google) Dep.) (explaining that Project Magi was Google's effort to combine "a large number of GenAI ideas" into Search, which ultimately became AI Overviews); Des. Rem. Tr. 36:5–17, 37:16–21 (Parakh (Google) Dep.) (describing how Google incorporates click-and-query data into AI models used for Search); PXR0019 at -817 ("[AI Overviews] was designed as a customized integration of generative AI into Search—specifically fine-tuned for knowledge and information journeys, and therefore built on a foundation of quality."); PXR0158* at -911 ("[AI Overviews] is a customized integration of generative AI into Search that is rooted in [Google's] core ranking and quality systems, which [Google has] been honing for decades to surface high quality information.").

124. Google considered several ways to integrate Gemini into Search to grow information and retrieval and task completion with AI, including putting Gemini suggestions into the SERP, identifying a Gemini search mode within Google Search, and including a persistent Gemini entry point within Google Search. Rem. Tr. 3650:2–3653:7 (Reid (Google)); PXR0109 at -812–13 ("Project Goal Explore integration of conversational Gemini into Search"), -817 (Objectives included best enabling Search to use GenAI and driving daily active users of the

Gemini App and Gemini advanced), -819 (Explorations included "Gemini Suggestions," a "Search Mode" where "[u]sers explicitly switch between search and a Gemini-powered conversational mode," and a "[p]ersistent Gemini entry point.").

125. Google is bringing its state-of-the-art Gemini models directly into Search. Rem. Tr. 2491:23–2492:1 (Pichai (Google)) (agreeing Google is bringing its state-of-the-art Gemini models directly into Search); Rem. Tr. 3601:3–6 (Reid (Google)) (agreeing Google is incorporating AI tech and LLM technology into Google Search); Des. Rem. Tr. 27:16–28:4 (Parakh (Google) Dep.) (describing evolution of Google Search's use of Gemini models for Search, from early KITE models built from Gemini models to more direct integration of fine-tuned models); Des. Rem. Tr. 60:9–62:12 (Parakh (Google) Dep.) (The AI models powering AI Overviews today are built atop Google's Gemini models.); PXR0032 at -208 (describing KITE program, which evolved into Google Search's current usage of Gemini models, the purposes of which were to "bring Gemini to K&I [i.e., Search]," "driv[e] K&I Gemini evolution and maximiz[e] ROI."); PXR0208* at -714–15 (describing how Gemini and Search could integrate); PXR0222* at -180 ("Gemini will be deeply integrated into Chrome in the flow of your browsing"); PXR0029* at -164–65 (describing "continued collaboration[s]" between Google Search, Gemini, and the Gemini App).

126. The Google Search Team builds its own custom large language models derived from Gemini models. Rem. Tr. 2489:9–16 (Pichai (Google)); Des. Rem. Tr. 60:9–62:12 (Parakh (Google) Dep.) (The AI models powering AI Overviews today are built atop Google's Gemini models.).

127. Google has found that its Gemini models can improve the Search experience. Rem. Tr. 2489:17–23 (Pichai (Google)); PXR0032 at -208 (describing early KITE program,

wherein Gemini models were integrated into Search to improve "personalization to drive growth," "[a]ds specialization," and "further maximize the utility of Gemini in [Search] products."); PXR0029* at -164–65 (describing "continued collaboration[s]" between Google Search, Gemini, and the Gemini App "to ensure [Search] is getting the most we can out of the latest models that Google is investing in").

128. Google recognizes that incorporating GenAI into Search expands Google's user base and queries. Des. Rem. Tr. 77:22–25, 78:1–3, 78:5–18, 81:7–8, 81:10–19, 81:21–82:4, 85:3–86:6 (Fox (Google) Dep.); PXR0032 at -208 (describing one goal of integrating Gemini models into Search as improving "personalization to drive [user] growth.").

129. In 2024, Google incorporated AI Overviews, a GenAI search feature relying on a branch of the Gemini LLM family, into the Google Search product. Des. Rem. Tr. 36:9–14, 36:17–19, 36:21–23 (Fox (Google) Dep.). AI Overviews used to be branded as Search Generative Experience ("SGE"). Rem. Tr. 3549:16–23 (Reid (Google)); Des. Rem. Tr. 109:21–110:16 (Fox (Google) Dep.); Des. Rem. Tr. 66:17–19 (Parakh (Google) Dep.) (explaining that the brand "Search Generative Experience" was used while AI Overviews was a prototype in Google Labs).

130. AI Overviews are a Search feature that provide a GenAI generated response to a user's query based on the Search results. Rem. Tr. 3550:2–3552:3 (Reid (Google)); Des. Rem. Tr. 35:8–19, 36:9–14, 36:17–19, 36:21–23 (Fox (Google) Dep.); Des. Rem. Tr. 39:1–24 (Parakh (Google) Dep.) (describing how AI Overviews both grounds on Google Search results and provides links to said results); Des. Rem. Tr. 64:6–14 (Parakh (Google) Dep.) (describing the technical architecture for AI Overviews, which integrates Google's search stack to "serve

answers at scale to billions of people"); Des. Rem. Tr. 66:25–67:9 (Parakh (Google) Dep.) (affirming that Google views AI Overviews as a Search feature).

131. AI Overviews appear on a search engine's results page. Rem. Tr. 3610:1–4 (Reid (Google)) (agreeing AI Overviews appear on a search engine's results page). AI Overview provides a user with an overview of their question and lets the user continue to explore the web based on the AI Overview. Rem. Tr. 3610:1–4 (Reid (Google)) ("You can't fill the response until you have a query").

132. The Gemini model that runs AI Overviews, which is unique to Google Search, is trained on Search signals and relies on the Google Search web index. Rem. Tr. 3613:21–3614:5 (Reid (Google)) (agreeing the Gemini model that runs AI is trained on Search signals and relies on the Google Search index).

133. AI Overviews incorporate Google's search results and ranking signals to determine relevance for any given user query. Rem. Tr. 3613:10–3614:1 (Reid (Google)) (agreeing AI Overviews incorporates Google Search quality, ranking, and search features such as the knowledge graph and explaining it uses Search signals to train Search's Gemini model); Rem. Tr. 3615:5–11 (Reid (Google)) (agreeing Google, to ensure AI Overviews are high quality, integrated its "core web rankings systems into this experience, which are fundamentally designed to surface reliable and relevant information"); Des. Rem. Tr. 79:25–80:22, 81:1–25, 82:1–5, 82:16–83:8, 83:13–84:7 (Parakh (Google) Dep.) (describing how the GenAI model powering AI Overviews automatically determines whether an AI Overview will be useful or relevant to a user query); Des. Rem. Tr. 84:18–85:16, 85:25–86:6 (Parakh (Google) Dep.) (explaining how Google uses its Tangram model and relevance signals to predict when search features like AI Overviews will be relevant to user queries—including tail queries); PXR0038 at -302 ("How AI Overviews

in Search Work"), -303 ("AI Overviews use a customized Gemini model, which works in tandem with existing Search systems – like our quality and ranking systems and the Google Knowledge Graph" and "To ensure AI Overviews are high quality, we've integrated our core web ranking systems into this experience, which are fundamentally designed to surface reliable and relevant information"); PXR0158* at -911 ("[AI Overviews] is a customized integration of generative AI into Search that is rooted in [Google's] core ranking and quality systems, which [Google has] been honing for decades to surface high quality information."); PXR0036* at -660 (Google's "Universal RankBrain (formerly RankBrain) is a relevance and user-preference prediction deep [GenAI] model" applied "across all Search results, including AI Overviews.").

134. AI Overviews incorporates Knowledge Graph to improve factuality and accuracy. Des. Rem. Tr. 205:17–206:19 (Fox (Google) Dep.).

135. As Google itself states, AI Overviews have been widely successful, reaching many of Search's users and driving Search's query volume higher. Des. Rem. Tr. 187:15–23 (Fox (Google) Dep.); PXR0025 at -478 (describing the "success of AI overviews" due to "significant improvements in [their] quality, latency, and capacity.").

136. AI Overviews (codenamed Magi) are a top priority for Google—and a primary vehicle for delivering AI advancements to Google's users at scale. Des. Rem. Tr. 44:5–13 (Parakh (Google) Dep.); Des. Rem. Tr. 64:6–14 (Parakh (Google) Dep.) (AI Overviews "serve answers at scale to billions of people."); PXR0018* at -258 (explaining one of the "keys to help land Magi" includes "embarking on the next chapter of Search."); PXR0014* at -598–600 (describing Magi as "the most important client for Search," the "top priority," and "the company priority" that "[Google executives] are all behind.").

137. Currently, AI Overviews is powered by a family of models known as MAGIT. Des. Rem. Tr. 60:9–62:12 (Parakh (Google) Dep.). The AI Overviews model is tuned for factuality. Rem. Tr. 3622:22–3623:19 (Reid (Google)).

138. As of October 2024, AI Overviews triggered on [redacted]% of total U.S. queries. Rem. Tr. 3617:22–3618:4 (Reid (Google)) (confirming that [redacted]% of searches on Google Search trigger an AI Overview response today) (citing Des. Rem. Tr. 100:5–8 (Reid (Google) Dep.)); Des. Rem. Tr. 188:23–189:7 (Fox (Google) Dep.); PXR0033 at -244.

139. As of February 2025, AI Overviews triggered on roughly [redacted]% of all U.S. queries. Des. Rem. Tr. 76:22–77:2 (Parakh (Google) Dep.) ("[I]t was above [redacted] percent, something of that—[redacted] percent, in that range.").

140. Today, 1.5 billion Search users interact with AI through AI Overviews. Rem. Tr. 2490:19–21 (Pichai (Google)) (agreeing that today 1.5 billion Search users interact with AI through AI Overviews"); Des. Rem. Tr. 64:6–14 (Parakh (Google) Dep.) (AI Overviews "serve answers at scale to billions of people.").

141. People who use AI Overviews actually use Search more and are more satisfied with their results. Rem. Tr. 3615:12–3616:2 (Reid (Google)) (agreeing that people who use AI Overviews actually use Search more and are more satisfied with their results); Rem. Tr. 3615:12–3616:2 (Reid (Google)) (agreeing AI has led to a measurable increased number of queries at Google Search); PXR0038 at -303 ("[P]eople who use AI Overviews actually use Search more and are more satisfied with their results").

142. Google Search queries in the United States have increased 1.5 to 2 percent since the introduction of AI Overviews. Rem. Tr. 3616:6–3617:4 (Reid (Google)) (conceding Google

Search queries in the United States had increased 1.5 to 2 percent since the introduction of AI Overviews").

143. As of October 2024, AI Overviews was approaching 1B "users." PXR0033 at -244.

144. As of October 2024, AI Overviews had increased the amount of Search usage by "more than hundreds of millions of queries a month in the U.S. alone." Des. Rem. Tr. 193:10–21 (Fox (Google) Dep.); PXR0033 at -244. Google's VP of Search reported to Google's Board of Directors that the number of queries that trigger an AI Overview will continue to increase over time. Rem. Tr. 3617:22–3618:16 (Reid (Google)) (explaining she reported to Google's Board of Directors that the number of queries that trigger an AI Overview will continue to increase over time); PXR0037 at -229 (describing to the Google Board of Directors that AI Overviews was a Q2 2024 win).

145. Google Search chose to tune its LLM higher on the factuality spectrum, giving up some of the creative powers of LLM. Rem. Tr. 3622:11–21 (Reid (Google)); PXR0019 at -817 (The models powering AI Overviews were "specifically fine-tuned for knowledge and information journeys," thereby "maximizing the quality and reliability of the output, and minimizing low-quality or harmful information from being presented to users."); PXR0029* at -153 (highlighting that, as of February 2024, the model powering [redacted]% of AI Overviews was "optimized for maximal groundedness (using inputs from search) and factuality").

146. AI Overviews do not hallucinate as much as other LLMs. Rem. Tr. 3622:25–3623:3 (Reid (Google)); PXR0019 at -817 (The models powering AI Overviews were "specifically fine-tuned for knowledge and information journeys," thereby "maximizing the quality and reliability of the output, and minimizing low-quality or harmful information from

being presented to users." Google has also been "rolling out model updates and improvements consistently at a rapid pace" to minimize hallucinations.).

147. AI Overviews are more accurate than other LLMs because Google has integrated the web pages more directly in producing the overview, weighing the web pages more significantly, compared to other models that produce output from the model and then double-check with the web pages. Rem. Tr. 3622:25–3623:19 (Reid (Google)).

148. Google recently introduced "AI Mode," which is a feature of Search rather than a separate product, in which users are asking questions twice as long as before. Rem. Tr. 2490:5–2491:12 (Pichai (Google)).

149. AI Mode is an experimental feature available as a tab in Google Search today, but Google CEO Sundar Pichai expects it to become "a deeper part of the Search experience" over time. Rem. Tr. 2491:6–21 (Pichai (Google)).

150. Links to the web will remain a core part of the Google Search experience. Rem. Tr. 2492:19–21 (Pichai (Google)).

151. In the future, Google intends to more fully integrate GenAI into Google Search. Rem. Tr. 3556:10–3557:7 (Reid (Google) (explaining how GenAI can impact Google Search going forward); Rem. Tr. 2458:10–2460:15 (Pichai (Google)) (stating in response to the Court's question that "AI technology is going to deeply transform Google Search" and that "the rate at which it will make Search evolve...will be very profound").

152. Search and GenAI products, such as the Gemini App and ChatGPT, overlap in certain use cases, but also have distinct uses. Des. Rem. Tr. 74:20–76:8 (Fox (Google) Dep.) (Google Search executive recognizing that there is overlap between chatbots like ChatGPT and Search); Des. Rem. Tr. 76:20–21, 76:23–77:11 (Fox (Google) Dep.) (Google Search executive

explaining that there is a spectrum or Venn diagram-like relationship between search and GenAI chatbots); Des. Rem. Tr. 57:1–17 (Fox (Google) Dep.) (describing a market perception of a leap forward with products like ChatGPT); Des. Rem. Tr. 39:5–18 (Kim (Samsung) Dep.) (Samsung executive recognizing a distinction between Search and certain GenAI products).

153. Google will be able to translate its superior search index into winning the AI battle. Rem. Tr. 874:18–875:17 (Weinberg (DuckDuckGo)) (Google is poised to continue to keep an AI advantage due to its distribution advantage.).

154. Google released its own GenAI chatbot, Bard, in February 2023, about three months after ChatGPT was released to the public in late 2022. Rem. Tr. 2498:19–25 (Pichai (Google)).

155. The Gemini App was formerly called Bard. Rem. Tr. 3627:18–3628:2 (Reid (Google)); Des. Rem. Tr. 51:14–23 (Pancholi (Google) Dep.).

156. The Gemini App is a GenAI product that relies on Gemini LLM models to produce results. Rem. Tr. 625:6–15 (Hsiao (Google)); Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot integrates the Gemini model and a Google Search API to provide the response.").

157. The Gemini App is still largely a chatbot. Rem. Tr. 3628:9–12 (Reid (Google)).

158. The Gemini App today is complementary to Google Search. Rem. Tr. 3629:6–8 (Reid (Google)); PXR0019 at -819 ("While [the Gemini App] is complementary to Search, it is a separate experience that serves as a collaborator to help people create and get things done.").

159. The Gemini App and Google Search are a bit of an intersecting diagram where they have some overlapping uses and some distinct uses. Rem. Tr. 3629:9–15 (Reid (Google)).

160. The Gemini App can address certain user needs that Google Search does not, and Google Search can address some user needs the Gemini App cannot. Rem. Tr. 3629:9–15 (Reid (Google)); PXR0019 at -819 ("While [the Gemini App] is complementary to Search," Google views the Gemini App and AI Overviews as "two separate experiences that each helps users with a distinct set of user needs."); PXR0027* at -734 (recognizing that users' expectations that Gemini's capabilities mirror Search's capabilities can create a disconnect).

161. The case for Google Search is more focused on information need-based queries. Rem. Tr. 3629:25–3630:2 (Reid (Google)); PXR0019 at -819 (Compared to the Gemini App, AI Overviews are "designed for information journeys that are focused on seeking out knowledge and consulting a range of sources and perspectives on the web."); PXR0102* at -720 (AI Overviews is a Gemini model customized for Google Search, which gives the user a summary and links to learn more and "greater . . . satisfaction with Search.").

162. While GenAI chatbots do not yet cannibalize Search, the Gemini App relies upon Google Search to generate responses to users' queries. Rem. Tr. 647:21:2–648:16, 648:24–649:21, 638:23–641:20 (Hsiao (Google)); Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot incorporates a Gemini model and Google Search."); Des. Rem. Tr. 63:11–19 (Google-EC 30(b)(6) Dep.) ("So when you send a prompt to the Gemini application, it can use search results in its response."); Des. Rem. Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that the Gemini App has access to the Google Search API, including Google's FastSearch API, to retrieve search results for use in its responses to user queries).

163. Gemini App today grounds itself into the Fast Search system. Rem. Tr. 3635:1–6 (Reid (Google)); PXR0177* at -239, -242–44 (email thread discussing Fast Search and other lightweight search APIs for use in Bard/Gemini App).

164. The Gemini App relies on Search technologies, grounding in Search results, the Knowledge Graph, Related Questions, and Oneboxes. Des. Rem. Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that the Gemini App has access to the full Google Search API, including Google's FastSearch API, to retrieve search results for use in its responses to user queries); PXR0153 at -481 (Oct. 2024 Google presentation noting what Search features the Gemini App has access to).

165. Long press power ("LPP") is an action users can execute to invoke the Gemini App by pressing the power button on Android devices for several seconds. Rem. Tr. 635:14–20 (Hsiao (Google)); Des. Rem. Tr. 173:14–174:2 (Kim (Samsung) Dep.) (Samsung users can access Gemini by using the side key on Samsung devices.).

166. A Hotword includes a user speaking the phrase "Hey Google" or "Hey Gemini" to the Android device to activate the Gemini App. Rem. Tr. 635:6–13 (Hsiao (Google)); PXR0571 at -389 (Gemini-Samsung Commercial Agreement calling out "Hey Google" and "Hey Gemini" as Gemini Hotword invocations).

167. Beginning in 2024 and continuing into 2025, Google began to rollout a process of upgrading the Google Assistant on Android devices to the Gemini App. Rem. Tr. 634:9–17 (Hsiao (Google)); PXR0150 at -412 (June 2024 Google presentation discussing Assistant transition (via waivers)).

168. The Gemini App is free to users and also offers a paid subscription service for $20/month called Gemini Advanced, which offers access to additional features and LLMs within the Gemini App. Rem. Tr. 627:11–25 (Hsiao (Google)).

169. As of October 2024, the Gemini App had over [redacted]M unique daily active users globally. Rem. Tr. 626:14–627:7 (Hsiao (Google)). Unique users are those who had logged into their Google account through the Gemini App. Rem. Tr. 628:4–22 (Hsiao (Google)).

170. Until recently, the Gemini App could only be accessed by signed-in users, but now users can access the App without signing in. Rem. Tr. 628:4–22 (Hsiao (Google)).

171. As of October 2024, the Gemini App had nearly [redacted]M monthly active users, and saw the potential to add [redacted]M through an upgrade of Google Assistant to the Gemini App. PXR0226 at -740–41.

172. As of October 2024, the Gemini App had [redacted]M Advanced subscribers globally, with [redacted]% of those subscribers paying and [redacted]% in a free Advanced trial period. Rem. Tr. 629:10–630:4 (Hsiao (Google)); PXR0226 at -740–41.

173. As of October 2024, the Gemini App's monthly subscription revenue was roughly $[redacted]M. Rem. Tr. 630:5–9 (Hsiao (Google)) (testifying that multiplying the number of paying subscribers by $20 would provide the rough subscription revenue).

174. Google CEO Sundar Pichai believes the Gemini App will expand overall Search use. Rem. Tr. 2492:24–2493:1 (Pichai (Google)).

175. GenAI chatbots like the Gemini App will not replace search engines without incorporating some of the search engine functionality. Rem. Tr. 3630:3–15 (Reid (Google)).

3. Competitors In GenAI

176. Competitors in the GenAI chat products market include, among others, DeepSeek, Grok, Meta's standalone chatbot, Claude, Perplexity, OpenAI's ChatGPT. Rem. Tr. 2461:14–2463:21 (Pichai (Google)); Rem. Tr. 3818:1–12 (Cue (Apple)) ("The more interesting areas have been in the AI space with Perplexity, . . . ChatGPT and Anthropic and Claude, Grok, DeepMind").

177. The distribution of GenAI provides opportunities for differentiated experiences on mobile devices. Des. Rem. Tr. 23:7–24:8 (Laflamme (Motorola) Dep.); Des. Rem. Tr. 114:19–117:1 (Laflamme (Motorola) Dep.) (Motorola recognized a market interest in having differentiation from Apple and Google, and GenAI was a good opportunity to provide that differentiation.); PXR0137 at -170 ("The market is keen on a differentiated solution from iOS and Google.").

178. GenAI distribution also provides an opportunity to reshape some of the economics and financial landscape of the mobile ecosystem. Des. Rem. Tr. 23:7–24:8 (Laflamme (Motorola) Dep.); Rem. Tr. 3842:23–3845:10 (Cue (Apple)) (AI is a "huge technology shift" that is "creating new opportunities for new entrants that just wouldn't exist otherwise.").

179. OpenAI offers both a consumer-facing AI application, ChatGPT, and a developer API for deploying application on top of OpenAI's AI models. Rem. Tr. 373:2–10, 374:10–375:21 (Turley (OpenAI)).

180. One of ChatGPT's core use cases includes answering user questions—questions for which users would otherwise turn to Google. Rem. Tr. 382:5–383:17, 386:1–388:8 (Turley (OpenAI)) ("[W]hat we observed is that users were doing a slice of things that they used to do on Google.com or in Google Search in general, using ChatGPT," like asking factual questions.).

181. OpenAI's goal is to build a differentiated "Super Assistant" GenAI Product that can handle any task, including search—not to replicate Google Search. Rem. Tr. 374:10–375:21, 386:1–388:8, 389:17–390:2, 523:19–524:7 (Turley (OpenAI)).

182. Perplexity offers search and assistive capabilities, similar to Google Search and the Gemini App. Rem. Tr. 712:24–713:22, 714:2–5 (Shevelenko (Perplexity)) (referencing PXR0805).

183. Some competitors, such as Perplexity, do not build their own foundational models and instead take open-source models and tweak or post-train them. Rem. Tr. 705:5–23, 706:11–22, 794:7–9 (Shevelenko (Perplexity)).

184. Perplexity has sought distribution deals with OEMs and carriers but has had little success to date, despite its exhaustive efforts. Rem. Tr. 712:24–713:22, 714:2–24 (Shevelenko (Perplexity)); Rem. Tr. 717:9–13 (Shevelenko (Perplexity)) (Dmitry Shevelenko, Perplexity's CBO, estimates that the great majority of his focus is on obtaining distribution deals with OEMs and carriers. (referencing PXR0805)).

185. Perplexity has sought to be included as a default search engine choice in browsers, such as [redacted], directly competing with Google Search. Rem. Tr. 712:24–713:22, 716:9–717:8 (Shevelenko (Perplexity)) (referencing PXR0805).

186. Perplexity has also sought to be included as an assistant on [redacted] devices, directly competing with the Gemini App. Rem. Tr. 712:24–713:15, 714:2–5, 714:6–24 (Shevelenko (Perplexity)); PXR0805 (Perplexity Rosetta Stone listing OEMs and carriers).

187. Samsung offers a GenAI powered assistant on Samsung devices called Bixby, which provides a more device-control experience as compared to a chatbot experience. Des. Rem. Tr. 247:8–248:9 (Kim (Samsung) Dep.).

188. Anthropic offers a consumer-facing chatbot product called Claude.ai. Des. Rem. Tr. 275:11–25 (Fox (Google) Dep.).

189. Today, Google currently offers a grounding service to third parties through Google's Cloud Platform, called Vertex AI, relying on Google's Fast Search API. Rem. Tr. 3637:22–3638:4 (Reid (Google)); Rem. Tr. 3640:18–3641:2 (Reid (Google)) (confirming in response to a question by the Court that Vertex AI uses Fast Search); Des. Rem. Tr. 69:2–70:11 (Pancholi (Google) Dep.); Des. Rem. Tr. 29:17–30:11, 36:19–37:3, 39:6–18 (Google-EC 30(b)(6) Dep.); Des. Rem. Tr. 104:11–22, 104:24–105:3, 107:12–14, 107:16, 107:18 (Fox (Google) Dep.); Rem. Tr. 4164:20–4165:3 (Hitt (Def. Expert)) (web results offered to Vertex are of lower quality compared to what the Gemini App received); PXR0153 at -478 (explaining how grounding with Google Search on Vertex AI works), -488 (identifying the biggest customers that have adopted grounding with Google Search); PXR0105 at -305 (explaining grounding allows the Gemini model to check search results before generating an answer, which increases the accuracy of the model's response).

190. Google's internal Fast Search API is built to allow quicker grounding on web results for Google's grounded GenAI Products and for the Vertex product, but it only includes a subset of Google Search results. Rem. Tr. 3635:2–3636:20 (Reid (Google)).

191. Google generates revenue from the provision of its Vertex grounding services to third parties. Rem. Tr. 3638:1–20 (Reid (Google)).

192. Google's Vertex grounding is a web-results only grounding service that does not include the additional services around Knowledge Graph and verticals that are offered to the Gemini App. Rem. Tr. 3648:17–3649:20 (Reid (Google)); PXR0153 at -481 ("Gemini app will continue to get much richer search results with Knowledge Graph, Oneboxes, and RelQ than what's offered to Vertex (web results only)").

193. Although Google's Grounding with Google Search API is commercially available to developers, it is currently only available through Google's GenAI models; third-party foundational models cannot currently access Google's Grounding with Google Search API. Des. Rem. Tr. 39:4–40:19 (Google-EC 30(b)(6) Dep.) (discussing restrictions to Google's commercially available search grounding API); PXR0153 at -478 (explaining how Grounding With Google Search on Vertex AI works).

194. Google provides a custom Search API for Meta to ground its LLMs in Google Search. Des. Rem. Tr. 69:2–70:11 (Pancholi (Google) Dep.); Des. Rem. Tr. 278:7–16 (Fox (Google) Dep.); Rem. Tr. 412:2–24, 414:9–23 (Turley (OpenAI)) (describing Google's offering to Meta and OpenAI's desire to have similar access to Google's Search API); PXR0101 (discussing Google's grounding pilot with Meta); PXR0345* at -965 (internal Google calculations for grounding Meta AI with conclusion that doing so would have a "[redacted]" overall impact on Google Search revenues due to user click-through rates to Google—"[redacted]").

195. Google has partnered with Snap, the company behind Snapchat, to bring Google LLM, Search, and Ads capabilities to Snap's GenAI application, MyAI. PXR0099* at -217–18 ("We have been working to build GenAI capabilities for Snap's app, powered by Google LLM, Search, and Ads.").

196. As part of Google's GenAI partnership with Snap, Google has explored both displaying its Search and Ads results within an OpenAI-powered chatbot and integrating Microsoft's search and ads results into a Google-powered chatbot. PXR0099* at -218 (tracking "critical points" during Snap partnership's "test phase," including "Google Search & Ads results

being displayed within an OpenAI powered chatbot" and "Google Cloud LLM powered chatbot being integrated with Search & Ads from MSFT").

197. Around October 2024, Anthropic sought a deal with Google to ground Anthropic's models. Des. Rem. Tr. 274:9–14, 276:1–6, 276:8–24 (Fox (Google) Dep.); PXR0153 (Oct. 2024 Google presentation discussing an Anthropic grounding deal).

198. While considering Anthropic's request, Google recognized that providing GenAI competitors with the ability to ground with Search poses a competitive threat. Des. Rem. Tr. 282:23–283:15, 286:11–24 (Fox (Google) Dep.); PXR0153 at -477, -481.

199. Providing a Search web results API would pose a risk to the Gemini App, which grounds in richer web results than what Google offers to third parties. Des. Rem. Tr. 282:23–283:15, 284:5–19, 285:9–19, 285:23–286:2, 286:4–24 (Fox (Google) Dep.); Des. Rem. Tr. 115:15–25, 116:18–22, 117:11–118:6, 118:8–9, 118:12–13, 120:19–24, 121:1–122:1, 122:25–123:15, 124:25–125:5, 125:11–14 (Parakh (Google) Dep.); PXR0153 at -477, -481.

200. The Gemini App has access to the Knowledge Graph, Oneboxes, and Related Questions via Search grounding. PXR0153 at -481.

201. Google understands that providing grounding capabilities to competitors both improves the competitor's product and provides Google with access to more data. Des. Rem. Tr. 287:22–288:2, 288:4–8, 288:12–23, 288:25–289:11 (Fox (Google) Dep.).

202. Google innovates its GenAI products in response to competition and because Google is trying to innovate. Rem. Tr. 2498:15–18 (Pichai (Google)).

203. Google's Search & other revenues increased from more than $175 billion in 2023 to more than $198 billion 2024. Rem. Tr. 2499:19–2500:8 (Pichai (Google)); PXR0334 at -607.

204. Google's research and development expenditures, which included Search, increased from more than $45 billion in 2023 to more than $49 billion in 2024. Rem. Tr. 2500:9–25 (Pichai (Google)); PXR0334 at -610.

B. On-Device AI

205. "On-device AI" is a type of artificial intelligence (AI) model that runs on a device instead of on a cloud server. On-device AI includes a large language model (LLM) or universal language model (ULM) stored entirely on a device. Rem. Tr. 249:9–17 (Fitzgerald (Google)); Des. Rem. Tr. 20:13–21:13, 22:4–16 (Google-EC 30(b)(6) Dep.) (discussing on-device Gemini Nano and Gemma models); Des. Rem. Tr. 49:11–50:1 (Google-EC 30(b)(6) Dep.) (explaining how on-device AI does not rely on the cloud).

206. Gemini Nano is a Google on-device LLM. Rem. Tr. 249:2–4 (Fitzgerald (Google)); Des. Rem. Tr. 20:13–21:13, 22:4–16 (Google-EC 30(b)(6) Dep.) (discussing on-device Gemini Nano and Gemma models).

207. Google developed Gemini Nano specifically for mobile use cases on Google platforms such as Android or Chrome. Des. Rem. Tr. 23:5–18 (Google-EC 30(b)(6) Dep.).

208. Running on-device LLMs can reduce the costs typically associated with connecting to cloud-based LLMs. PXR0160* at -573 (Rick Osterloh, Head of Google's Platforms and Devices Products division, noting that on-device "could take enormous pressure off our tpu capacity in the cloud, both reducing costs [a]nd opening up an enormous amount of other opportunity for new revenue creation using our totally backlogged Cloud TPUs.").

209. Today, even small LLMs require a lot of memory to run on-device, meaning that a typical mobile device can only hold one on-device LLM. Des. Rem. Tr. 45:19–47:16, 48:18–49:10 (Google-EC 30(b)(6) Dep.) (discussing how Gemini Nano requires up to half of mobile memory, so there is not room for another on-device LLM).

210. Many modern smartphones, including Android smartphones, contain specialized AI accelerators. Rem. Tr. 1554:20–1555:3 (Mickens (Pls. Expert)) (modern smartphones have AI accelerators).

211. AI models run more efficiently if they run on specialized hardware like NPUs or TPUs called AI accelerators. Rem. Tr. 1553:5–1554:19, 1555:4–10 (Mickens (Pls. Expert)) (explaining efficiency differences between CPUs and AI accelerators).

C. Publishers

212. A "publisher" means any person who controls the legal right to any information published or otherwise made available on any website or through any mobile app. Publishers have tools to control what information is crawled from their website or app, as well as which crawlers can access that information. Rem. Tr. 404:21–405:6 (Turley (OpenAI)) (responding to Court question and explaining that publishers select different crawling permissions on a crawler-by-crawler basis); Rem. Tr. 407:21–408:17 (Turley (OpenAI)) (responding to Court and explaining how publishers can opt-out of OpenAI's web crawl); Des. Rep. Tr. 83:25–84:12 (OpenAI-NT 30(b)(6) Dep.) (Access to publicly available web content depends on the voluntary participation of web content providers.).

213. Google is aware that its GenAI search features, such as AI Overviews, can influence whether publisher websites receive user traffic. Des. Rem. Tr. 177:2–4, 177:6–23 (Parakh (Google) Dep.) ("I know that people are concerned about how the traffic is sent through [AI Overviews]."); Des. Rem. Tr. 193:19–194:15, 194:18–25, 195:16–20 (Parakh (Google) Dep.) ([redacted]); PXR0001 at -613 (As far back as 2019, Google saw a [redacted]% abandonment rate for queries with a good answer at the top of the [SERP]" and "[redacted] in clicks to results" when Google's first-party "WebAnswer"

search feature triggers.); PXR0158* at -910 ("When AI Overviews appear, pages that appear as a corroborating link get more clicks than if the page had appeared as a traditional 'blue link' listing for that query.").

214. Google's placement of first-party search features such as WebAnswers and AI Overviews on its SERP has significantly reduced user interactions with organic web results. PXR0001 at -612–13 (User web result interactions on Google "dropped under [redacted]% of all interactions some time" before 2019, and Google has seen a "[redacted]% abandonment rate for queries with a good answer at the top of the [SERP]," including "[redacted] in clicks to results" when Google's first-party WebAnswers trigger.).

215. Google has a partnership with Reddit, whereby Google can pre-train its Gemini models on user content from Reddit. Des. Rem. Tr. 107:6–108:4, 108:8–109:12 (Parakh (Google) Dep.) (discussing PXR0050 and describing how AI Overviews use Reddit data, which are "[redacted]"); Des. Rem. Tr. 113:15–18 (Parakh (Google) Dep.) (confirming that Google pretrains its Gemini models on Reddit data); PXR0050 at .001, .003–.004 (describing Reddit data for Google GenAI models as "[redacted]" when used for grounding and "[redacted]" when used for pre-training); PXR0123* at -196 (listing Reddit data connected to Google's Reddit partnership in the Gemini v3 pre-training data card).

216. Google views Reddit data as [redacted] of its GenAI Products, with Reddit data improving the quality of GenAI responses when used for either pre-training or grounding. PXR0050 at .001, .003–.004 (describing Reddit data for Google GenAI models as "[redacted]

[redacted]" when used for grounding and "[redacted]" when used for pre-training); PXR0123* at -196 (listing Reddit data connected to Google's Reddit partnership in the Gemini v3 pre-training data card).

III. ECONOMIC PRINCIPLES FOR REMEDIES

A. Considerations In Restoring Competition

217. There are two broad economic goals in evaluating the proposed remedies: First, to restore competition to where it would have been absent the anticompetitive conduct; and second, to deter future anticompetitive conduct by ensuring that a dominant firm does not continue to benefit from its past conduct. Rem. Tr. 2132:21–2133:8 (Chipty (Pls. Expert)).

218. The goal of restoring competition is no different whether the firm has engaged in monopoly maintenance or monopoly acquisition. In both cases, the goal is to restore the competitive rivalry that was diminished by the dominant firm's conduct. Rem. Tr. 2133:9–16 (Chipty (Pls. Expert)).

219. Remedies focus on the competitive process, not the ultimate outcomes of that process. Rem. Tr. 2134:15–23 (Chipty (Pls. Expert)).

220. Focusing on the competitive process requires focusing on the barriers to entry in the market. Rem. Tr. 2134:24–2135:4 (Chipty (Pls. Expert)).

221. The barriers to competition in general search services are distribution, scale, brand, and capital costs. Rem. Tr. 2135:5–9 (Chipty (Pls. Expert)).

222. Google's conduct reinforced or protected all these barriers to entry. Rem. Tr. 2135:10–23 (Chipty (Pls. Expert)); Rem. Tr. 4602:18–4603:15 (Chipty (Pls. Expert)).

223. As a matter of economics, remedies need not target only the specific conduct found to be anticompetitive. Rem. Tr. 2137:17–2138:2 (Chipty (Pls. Expert)).

224. Conduct that reinforced one barrier to competition might be offset by a remedy that helps lower another barrier. Rem. Tr. 2137:17–2138:2 (Chipty (Pls. Expert)). A remedy does not have to target just the specific barriers that were reinforced by the unlawful conduct, as it may be more efficient to employ other remedial tools as well. Rem. Tr. 2293:1–6 (Chipty (Pls. Expert)).

225. Understanding the findings of the Court and other factual evidence of the case helps craft remedies to be consistent with the economic goals of remedies. Rem. Tr. 4198:14–4199:2 (Murphy (Def. Expert)).

226. Narrow remedies may be appropriate in cases where there is not yet significant harm or the harm is easy to rectify, but such remedies are not appropriate in this case because Google's conduct has gone on for many years. Rem. Tr. 4604:7–4605:9 (Chipty (Pls. Expert)).

227. A remedy that stops only the anticompetitive conduct at issue may not restore competition. For example, if conduct allows a firm to get an insurmountable advantage over rivals, then simply stopping the conduct will preserve the firm's dominance. Rem. Tr. 4605:10–4606:15 (Chipty (Pls. Expert)).

228. Narrow remedies that stop only the anticompetitive conduct, what Prof. Murphy refers to as "corrective remedies," are not designed to disgorge the fruits of anticompetitive conduct from the defendant. Rem. Tr. 4340:7–17 (Murphy (Def. Expert)).

B. Chicken-And-Egg Problem In This Case

229. The chicken-and-egg problem starts with the fact that general search firms need scale to create a high-quality search product. But users, distributors, and advertisers want a general search product that is already of high quality. As a result, it is difficult for a small general search firm to get scale to build quality. Rem. Tr. 2135:24–2136:12 (Chipty (Pls. Expert)).

230. Data moats built by Google become cold start problems for competitors. Rem. Tr. 1792:15–1793:1 (Epstein (adMarketplace)) ("[The cold start problem is] anything where once you kind of overcome it and you're able to get the access, you could then easily make your technologies and your deal making really effective, but you don't even get a chance to do that if you can't get over the cold start problem.").

231. The chicken-and-egg problem does not necessarily mean that Google would have maintained its monopoly even without engaging in anticompetitive conduct. Rem. Tr. 2136:21–2137:15 (Chipty (Pls. Expert)). If rivals had no chance to challenge Google's monopoly, then Google would not have paid billions of dollars annually for exclusive distribution. Rem. Tr. 2136:21–2137:15 (Chipty (Pls. Expert)).

232. Given more than ten years and the significant technological advances over this period, it is reasonable to expect that one or more rivals would have slowly chipped away at Google's monopoly had Google not engaged in anticompetitive conduct. Rem. Tr. 2136:21–2137:15 (Chipty (Pls. Expert)).

233. The chicken-and-egg problem highlights the time it would take for rivals to challenge Google. Rem. Tr. 2136:21–2137:15 (Chipty (Pls. Expert)). Today, it would take even more time for rivals to challenge Google, because Google's conduct amplified the chicken-and-egg problem. Rem. Tr. 2136:21–2137:15 (Chipty (Pls. Expert)).

C. The Risks Of Antitrust Remedies

234. Antitrust remedies are not a precise tool. Even if one knew exactly what would have happened absent Google's anticompetitive conduct, it would not be possible to perfectly or painlessly engineer those outcomes after the fact. Rem. Tr. 2134:15–23 (Chipty (Pls. Expert)).

235. When choosing a remedy in an antitrust case, the risk of doing too little to restore competition is that the remedy will preserve the status quo and allow the dominant firm to

continue to benefit from its past anticompetitive conduct and potentially further those anticompetitive effects into the future. Rem. Tr. 2315:20–2316:1 (Chipty (Pls. Expert)).

D. Google's Exclusionary Conduct Significantly Contributed To Maintaining Its Monopolies

236. The facts identified below and adduced in the liability and remedies phase trials demonstrate that Google's conduct contributed significantly to the maintenance of its monopolies and thus had a significant causal connection to the durability and strength of Google's monopoly positions. For example, Google "constrained the query volumes of its rivals, thereby inoculating Google against any competitive threat," Mem. Op. at 234. The fruits of Google's anticompetitive conduct include its freedom from competitive threats, such as by significantly weakening existing competitors and raising barriers to entry; significantly enhanced scale advantages, including greater user data, ads data, and search-index data; and a significant enhancement in the quality of Google's GSE, including its search index. Mem. Op. at 216, 226–34.

237. Google's anticompetitive conduct significantly contributed to a lack of new investment and "limited [rivals'] ability to reinvest in quality improvements (both as to search and general search text ads)." Mem. Op. at 237, 264.

238. For example, Google's conduct significantly contributed both to Microsoft's decision not to put additional investment into Bing and to Neeva's decision to exit. Mem. Op. at 237, 239.

239. Google's conduct has significantly contributed to venture capital firms viewing general search as a "no-fly zone." Mem. Op. at 23.

240. Google's anticompetitive conduct "ensure[d] that advertisers w[ould] continue to spend 90% of their text ad dollars with Google, regardless of increases in prices or decreases in quality," Mem. Op. at 264–65.

241. Google's conduct has significantly contributed to rivals' inability to obtain distribution. Mem. Op. at 201 ("Time and again, Google's partners have concluded that it is financially infeasible to switch default GSEs or seek greater flexibility in search offerings because it would mean sacrificing the hundreds of millions, if not billions, of dollars that Google pays them as revenue share."); Rem. Tr. 812:7–22 (Weinberg (DuckDuckGo)) ("Most broadly they [Google] prevent us from reaching users, between the agreements with brothers and OEMs and the self-preferencing we see in Chrome and Android, it's just hard to meaningfully compete with users.").

242. It is not possible to predict precisely what the world would look like but-for Google's conduct. Rem. Tr. 2220:14–20 (Chipty (Pls. Expert)) ("[I]t is not possible for anyone to predict how that world would have played out."); Rem. Tr. 2221:24–2222:8 (Chipty (Pls. Expert)) (explaining that the design of products has been influenced by Google's conduct, and so it is not possible to predict what products might have come to market absent Google's conduct); Rem. Tr. 4633:14–4634:1 (Chipty (Pls. Expert)) (One would have to predict over ten years of a competitive process that never got to play out.); Rem. Tr. 3293:20–3294:5 (Israel (Def. Expert)) ("[I]t sounds like a very difficult exercise.").

243. In contrast to *Sutter Health*, a regression analysis cannot quantify differences from the but-for world in this case because there are no suitable comparison markets where competition played out without Google's anticompetitive conduct. Rem. Tr. 4635:2–12 (Chipty (Pls. Expert)).

244. As Google's economic expert Professor Kevin Murphy agrees, "in many cases—if there is substantial harm to competition going forward, you might" need what Professor Murphy calls "restorative remedies," i.e., remedies that go beyond merely "prohibiting the conduct found anticompetitive." Rem. Tr. 4332:8–13, 4342:1–11 (Murphy (Def. Expert)).

245. In his written direct testimony in *New York v. Microsoft Corp.*, Prof. Murphy opined: "Finally, it is important to note that my analysis does not require that we determine whether the anticompetitive acts reduced the *actual* level of competition in the market for Intel-compatible PC operating systems. As I stated a substantive reduction in *potential* competition would qualify as establishing a causal connection under my analysis." Rem. Tr. 4352:15–4355:19 (Murphy (Def. Expert)) (emphasis in original) (discussing ¶ 186, Professor Murphy's direct testimony from *New York v. Microsoft Corp.*, Apr. 12, 2002).

246. Google's distribution partners requested more flexibility than Google offered. Rem. Tr. 4374:19–4375:6 (Murphy (Def. Expert)).

IV. PLAINTIFFS' PROPOSED REMEDIES WORK TOGETHER TO RESTORE COMPETITION

247. Plaintiffs' RFPJ hits the essential elements, each element being necessary but not sufficient on its own. Rem. Tr. 814:22–815:10 (Weinberg (DuckDuckGo)) (The RFPJ is a little long, but for a good reason.); Rem. Tr. 814:22–815:10 (Weinberg (DuckDuckGo)) (Distribution remedies without scale remedies will not be successful.); Rem. Tr. 812:23–814:21 (Weinberg (DuckDuckGo)) (There is no silver bullet with regard to remedies; an effective package has to simultaneously address multiple issues.).

248. Bans on payments and defaults work together. Rem. Tr. 890:3–12 (Weinberg (DuckDuckGo)) (If rev shares are not banned they become the functional equivalent of a default placement.).

249. Payment bans unlock search access points while data and syndication (for both organic search and ads) accelerate rivals' ability to improve quality. Payment bans without data and syndication remedies would take much longer to restore competition, and data and syndication remedies would not help without payment bans to provide a path to market and incentives to invest. Rem. Tr. 2168:18–2169:3 (Chipty (Pls. Expert)).

250. Even with data and syndication remedies, competitors need time to increase quality and overcome Google's monetization advantage, which will only take longer if Google is permitted to pay for defaults. Rem. Tr. 2185:13–2186:22 (Chipty (Pls. Expert)) (explaining how the data and distribution remedies work in tandem in response to the Court's question); Rem. Tr. 2184:7–2185:6 (Chipty (Pls. Expert)) (explaining that even with more flexibility Google would still win defaults because of Google's quality and monetization advantages).

251. Syndication would help rivals immediately improve and develop their products, whereas data sharing would accelerate rivals' progress in the medium-to-long term. Rem. Tr. 424:18–425:24 (Turley (OpenAI)); Rem. Tr. 844:19–845:9 (Weinberg (DuckDuckGo)); Rem. Tr. 2164:2–13 (Chipty (Pls. Expert)).

252. Even if Google cannot win defaults, users and distributors would not be harmed because the data and syndication remedies would improve the quality of rivals. Rem. Tr. 2168:10–17 (Chipty (Pls. Expert)).

253. Even if Google cannot win defaults, the remedies would facilitate greater competition that would benefit users and distributors. Rem. Tr. 2168:10–17 (Chipty (Pls. Expert)).

254. Plaintiffs' remedies work to lower each of the barriers to entry that were raised by Google's unlawful conduct and that will persist as fruits of its violation unless addressed by the

remedy. *See, e.g.*, Rem. Tr. 2194:3–2195:3 (Chipty (Pls. Expert)) (explaining that Plaintiffs' remedies lower the distribution, scale, brand, and high-capital cost barriers to entry and expansion, while Google's remedies do not); Rem. Tr. 4602:18–4603:20 (Chipty (Pls. Expert)).

V. PROHIBITION ON FORECLOSING OR OTHERWISE EXCLUDING COMPETITORS THROUGH CONTRACTS WITH THIRD PARTIES THAT MAINTAIN GOOGLE'S MONOPOLIES

A. Gemini App Is A Search Access Point

1. With The Gemini App Presenting An Emerging Means For Users To Engage With The Web, Google Has Begun To Build Gemini's Position In The Market

255. The Court found that Google's default positions on the most efficient search distribution channels, including queries on Chrome and other search access points, is "a major barrier to entry." Mem. Op. 159.

256. AI is creating new Search access points. Rem. Tr. 3608:9–11 (Reid (Google)) (agreeing AI is creating new Search access points); Des. Rem. Tr. 23:8–13 (Microsoft-DS 30(b)(6) Dep.) (describing Copilot and GenAI Products grounded in search as "potential future search entry points"); PXR0041* at -280 (Google opting to negotiate as part of Gemini agreements or ACIA an integrated AI widget as an entry point on new and legacy devices).

257. Google is actively testing new Search access points. Rem. Tr. 3607:25–3608:23 (Reid (Google)) (agreeing that "AI is creating new search access points, and "Google is exploring new access points for Search"); PXR0113 at -846 ("AI is creating new search access points, allowing other providers to reach users rapidly; Google should meet users where they are or risk ceding a new ecosystem. . . . Response: explore new Google access points (in AI/in apps), by testing an embedded Search experience for 2 partner segments: Browsers/Search Engines (AI) and Mobile Apps (AI/non-AI)").

258. Users can access the Gemini App through mobile applications on Android and iOS and at the Gemini website, gemini.google.com, as well as through the Hotword and long press power entry points. Rem. Tr. 625:6–12 (Hsiao (Google)); Des. Rem. Tr. 54:5–15 (Pancholi (Google) Dep.); Des. Rem. Tr. 175:23–176:25 (Kim (Samsung) Dep.) (discussing the ways users can access Gemini on Samsung devices); PXR0102* at -719.

259. The Gemini App currently provides a means for users to run Search queries and access a Google search engine results page, all from within the Gemini App. Rem. Tr. 637:11–638:5, 640:1–641:20, 643:5–644:10, 647:15–20 (Hsiao (Google)) (explaining what the "G" button in the Gemini App does, including corroborate answers and provide Search related topics); Des. Rem. Tr. 63:2–10 (Google-EC 30(b)(6) Dep.) ("[Y]ou could define the Gemini application as an agent that can also use Search."); Des. Rem. Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that the Gemini App has access to the Google Search API, including Google's FastSearch API, to retrieve search results for use in its responses to user queries); PXRD005 (showing how the Gemini App takes a user to Google Search); PXR0113 at -846 (introduction of AI is creating new access points).

260. Nick Fox, head of Google Search, would consider the Gemini App a search access point if it has the ability to issue a query to Google Search through the app. Des. Rem. Tr. 304:1–12, 304:18–305:15, 306:2–16 (Fox (Google) Dep.) ("[I]t would be a Search access point if it – if it provides an affordance whereby someone can issue a Search query that would take them to our regular Search results page.").

261. Internally, Google recognized that the Gemini App would eventually begin to siphon queries from Google Search and expressed the urgency of incorporating ads or finding a

means to "kick back to Search." Rem. Tr. 655:17–662:3, 663:3–21 (Hsiao (Google)); PXR0112 at -136 (discussing monetization of the Gemini App).

262. Google has internally evaluated the revenue the Gemini App may generate if Google were to start serving ads, estimating the value to be ~$[redacted] on Android. PXR0150 at -445 (June 2024 Google presentation slide "Sizing the Ad Opportunity on Gemini vs. Search").

263. In Google's Gemini App agreement with Samsung, Google has accounted for the app's potential ad revenue by including ads revenue sharing provisions. Rem. Tr. 252:19–22 (Fitzgerald (Google)); PXR0571 at -384–85.

2. The Market, And Google, Have Begun To Recognize Gemini As An SAP

264. Google recognized that GenAI competitors sought distribution through typical search access point channels and accordingly strategized to secure the Gemini App on those access points. Des. Rem. Tr. 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); Des. Rem. Tr. (Pancholi (Google) Dep.) 96:17–98:19 (explaining that Google recognized that AI competitors were seeking to distribute through search access points); Des. Rem. Tr. 23:11–24:20 (OpenAI-NT 30(b)(6) Dep.) (describing OpenAI's "existential fear" that it would be locked out of Google's access points because "everyone's using their distribution to lock us out."); Des. Rem. Tr. 30:18–31:18 (Beard (Microsoft) Dep.) (discussing failed Motorola deal for Copilot distribution, which focused on [redacted]); Des. Rem. Tr. 248:12–249:8 (Beard (Microsoft) Dep.) (discussing Microsoft's understanding that Motorola sought permission from Google to enter into a Copilot distribution agreement but was told doing so would violate Google's RSA); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google

provided Motorola with financial incentives to cancel a planned Copilot distribution deal); PXR0150 at -403, -407 (June 2024 Google presentation observing that AI companies are aggressively pursuing distribution, including through search access points); PXR0150 at -403, -406 (June 2024 Google presentation on Gemini distribution strategy that states: "To succeed on Android, and given inclusion in the MADA/RSA will be challenged, scaling is contingent upon strategic alignment and standalone deals with Samsung and other OEMS"); PXR0150 at -412, -416 (June 2024 Google presentation discussing 2024–25 Gemini distribution strategy on Android to secure placement of the Gemini App); PXR0150 at -419 (June 2024 Google presentation discussing key terms for Gemini App deals, including homescreen placement and widgets); PXR0198* at -778, -785, -788 (June 2024 Google presentation discussing Gemini distribution on Android); PXR0267* at -177 (Microsoft dropped pursuit of its Copilot preinstallation plan with Samsung after Samsung said Copilot preinstallation would violate Google's RSA.).

265. Distribution partners have requested Gemini be covered as a search access point under the RSA. Des. Rem. Tr. 35:3–36:5 (Ezell (AT&T) Dep.) (AT&T asked to make Gemini a search access point in 2024 RSA extensions.); Des. Rem. Tr. Dep.) 37:10–38:5 (Ezell (AT&T) (Google would not include Gemini as a SAP in the Dec. 2024 RSA extensions, but it might be discussed at a later date.); PXR0131 at -847 (AT&T internal email stating that "Google stiff-armed us on making Gemini Assistant a search entry point (for now, they say . . .).").

266. AT&T asked to make the Gemini App a search access point covered by the RSA but was told by Google to wait. Des. Rem. Tr. 35:3–36:5 (Ezell (AT&T) Dep.) (AT&T asked to make Gemini a search access point in 2024 RSA extensions.); Des. Rem. Tr. 37:10–38:5 (Ezell (AT&T) Dep.) (Google would not include Gemini as an SAP in the Dec. 2024 RSA extensions,

but it might be discussed at a later date.); PXR0131 at -847 (AT&T internal email stating that "Google stiff-armed us on making Gemini Assistant a search entry point (for now, they say . . .).").

267. Verizon had internal discussions to include Gemini as a search access point under the RSA so that Verizon could earn Search Revenues through Gemini; despite Verizon's attempts, Gemini is not included as a search access point under the RSA. Des. Rem. Tr. 61:15–62:19, 64:12–18 (Boulben (Verizon) Dep.) (discussing PXR0128 at -593).

268. Verizon expects Gemini will at some point behave like a search engine. Des. Rem. Tr. 61:15–62:19, 64:12–18 (Boulben (Verizon) Dep.) (discussing PXR0128 at -593).

269. Google has begun to integrate the Gemini App into third-party web browsers, including Mozilla Firefox. Des. Rem. Tr. 248:5–19, 253:2–254:4 (Pancholi (Google) Dep.); PXR0164 at -877.

270. Other third-party browsers have also sought Gemini App integrations. Des. Rem. Tr. 254:19–24 (Pancholi (Google) Dep.); PXR0164 at -875.

271. Google has also explored deeper browser integrations with Mozilla's Firefox. Des. Rem. Tr. 266:11–267:7 (Pancholi (Google) Dep.).

272. If remedies do not apply to GenAI apps, Google may be able to exclude GenAI-based general search rivals like it has historically excluded traditional general search rivals. Rem. Tr. 2171:1–17 (Chipty (Pls. Expert)); Rem. Tr. 2172:6–18 (Chipty (Pls. Expert)) (discussing how Google could use the Gemini App to circumvent distribution remedies that exclude GenAI apps, leading to no change in the market).

273. GenAI apps are a nascent threat to Google because they are developing general search capabilities that might compete with traditional general search firms in the future. Rem. Tr. 2170:9–25 (Chipty (Pls. Expert)).

274. GenAI apps that are developing general search capabilities should qualify for the data and ads sharing and syndication remedies so that they will make the investments necessary to compete with Google. Rem. Tr. 2170:9–2171:17 (Chipty (Pls. Expert)).

275. Google may use the Gemini App to circumvent the remedies in order to protect its lucrative general search monopoly. Rem. Tr. 2171:18–2172:5 (Chipty (Pls. Expert)).

276. Google would have a reduced ability to use the Gemini App as a way to circumvent search distribution remedies if GenAI apps are treated like other search access points. Rem. Tr. 2172:19–24 (Chipty (Pls. Expert)).

277. The remedy should be forward-looking and so should focus on the next generation of potential entrants. Rem. Tr. 2239:12–2240:3 (Chipty (Pls. Expert)) (in discussion of why remedies might extend to OpenAI as a potential entrant).

278. Google could potentially circumvent the payment bans on preinstallation if GenAI apps including Gemini are not treated on equal footing with other search access points. Rem. Tr. 2296:19–2297:21 (Chipty (Pls. Expert)); Rem. Tr. 2301:10–13 (Chipty (Pls. Expert)) ("[I]t's important for forward-looking remedies to anticipate circumvention."); Rem. Tr. 4176:23–4177:13 (Hitt (Def. Expert)) (acknowledging a world where Google could foreclose distribution in GenAI).

B. Circle To Search Is A Search Access Point

279. Circle to Search is a feature on mobile devices that allows a user to circle a portion of the mobile display and execute a Google Search. Rem. Tr. 244:3–8 (Fitzgerald (Google)); Rem. Tr. 3553:13–3555:16 (Reid (Google)); Des. Rem. Tr. 34:12–17 (Google-EC

30(b)(6) Dep.) ("Circle to Search is functionality where the user can press part of their phone and then highlight an area of the screen and then effectively use [Google] Lens to search that content."); Des. Rem. Tr. 225:16–226:1, 226:6–10 (Kim (Samsung) Dep.) (While technically possible, today, Circle to Search only invokes Google Search, not rival search experiences.); Rem. Tr. 3823:11–3824:13 (Cue (Apple)) (Google Lens is "the ability to search" but with an image.).

280. Circle to Search relies on GenAI technology. PXR0197* at -954 (Google presentation highlighting that Circle to Search is a way in which Google leads in AI).

281. Circle to Search can return a search engine results page in response to a user's query. Rem. Tr. 244:9–14 (Fitzgerald (Google)).

282. Circle to Search allows a user to circle something of interest and ask a query based on what they've seen. Circle to Search then returns a results page in response to a query. Rem. Tr. 2494:8–16 (Pichai (Google)).

283. Circle to Search and the Gemini App are two of the reasons Android continues to expand its lead in AI. PXR0197* at -954.

C. Preferential Treatment And Payments To Non-Apple Third Parties Prohibited

1. Google's Exclusionary Contracts Continue Today

284. Google's default and preinstallation contracts continue today and have even in some instances begun to cover the nascent potential threat of GenAI. Rem. Tr. 239:4–6 (Fitzgerald (Google)) (The only change to Samsung's RSA extension signed in July 2024 was extending the term.); Rem. Tr. (Fitzgerald (Google)) 243:2–6 (AT&T currently receives revenue for any search access point that is defaulted to Google.); Rem. Tr. 246:22–247:1 (Fitzgerald (Google)) (Google and Samsung have entered into an agreement to distribute the Gemini App.); Rem. Tr. 259:14–25 (Fitzgerald (Google)) (Google and Motorola have entered into an agreement

to distribute the Gemini App); Rem. Tr. 472:3–473:15 (Turley (OpenAI)) (ChatGPT only serves a small fraction of user search queries compared to Google because of Google's default status and distribution); Des. Rem. Tr. 24:20–25:9 (Ezell (AT&T) Dep.) (AT&T and Google extended the RSA in Dec. 2024 through Sept. 2025.); Des. Rem. Tr. 28:16–29:1 (Ezell (AT&T) Dep.) (AT&T have placement and default obligations they must meet before receiving revenue share payments on search access points.); Des. Rem. Tr. 67:18–68:23 (Beard (Microsoft) Dep.) (Motorola's RSA would not allow Copilot preinstallation carveouts, requiring Microsoft to pursue an RSA-compatible distribution deal that was worse for users.); Des. Rem. Tr. 248:12–249:8 (Beard (Microsoft) Dep.) (discussing Microsoft's understanding that Motorola sought permission from Google to enter into a Copilot distribution agreement with Microsoft but was told doing so would violate Google's RSA); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google provided Motorola with financial incentives to cancel a planned Copilot distribution deal); Des. Rem. Tr. 34:13–16 (Laflamme (Motorola) Dep.) (Motorola and Google extended their RSA agreement in Feb. 2025); PXR0567 at -340–41 (amendment extending Google's RSA with Samsung); PXR0515 at -119–20 (amendment extending Google's RSA with AT&T in which Google pays a revenue share for every access point that is defaulted to Google); PXR0608 (A new RSA signed between Google and Samsung in Apr. 2025 in which Google pays a revenue share for every access point that is defaulted to Google.); PXR0571 (Google's commercial agreement with Samsung to distribute the Gemini App.); PXR0535 (Google's commercial agreement with Motorola to distribute the Gemini App.); PXR0541 (Feb. 2025 RSA with Motorola); PXR0067* at -595 (confirming Google interest in standardizing "key OEM contracts asap" to include Gemini App preinstallation).

285. Google's CEO Sundar Pichai acknowledged the Court determined during the liability phase that Google had paid billions related to the search distribution agreements. Rem. Tr. 2479:23–2480:1 (Pichai (Google)).

286. Google has proposed continuing its use of revenue share agreements for Search, meaning Google would continue to pay for defaults in Search on an access point by access point basis. In fact, Google has already been updating its search distribution agreements to align with its proposal to the Court. Rem. Tr. 2471:4–2472:22, 2480:10–23 (Pichai (Google)). Under the most recent RSAs, Android OEMs and carriers maximize the money they receive from Google by setting Google as the default on all search access points and sending as much traffic as possible to Google via those access points. See, e.g., PXR0597, at -321–22, -324–26, -328 (Verizon); PXR0515, at -119–25 (AT&T); PXR0541, at -195–201 (Motorola); PXR0608, at -046, -048–49, -060–69 (Samsung); PXR0610* at -894–95 (T-Mobile).

287. The 2024 Samsung RSA requires Google defaults, preinstallations, and placements to earn a revenue share for each search access point. Rem. Tr. 239:4–6 (Fitzgerald (Google)) (The only change to Samsung's RSA extension signed in July 2024 was extending the term.); PXR0567 (amendment extending Google's RSA with Samsung).

288. Just days before trial, Google executed a new, six-month RSA with Samsung, effective April 1, 2025, and extending through September 2025. Rem. Tr. 318:2–18 (Fitzgerald (Google)) (acknowledging that Google extended the RSA two days before trial); Rem. Tr. 318:19–319:11 (Fitzgerald (Google)) (The new RSA runs through September 2025, much shorter than the previous agreement.); Rem. Tr. 317:4–12 (Fitzgerald (Google)) (referencing PXR0608); PXR0608 at -039 (new Samsung-Google RSA); UPX5530 at -392 (2020 Samsung-Google RSA effective July 1, 2020 through June 30, 2024).

289. Motorola and Google extended their RSA agreement in February 2025. Des. Rem. Tr. 34:13–16 (Laflamme (Motorola) Dep.).

290. Google and Motorola's Feb. 2025 RSA extension continued to lock down access points in favor of Google. Des. Rem. Tr. 60:14–61:3, 61:5–9, 61:12–22, 62:3–17 (Laflamme (Motorola) Dep.); PXR0541.

291. Google and Motorola's Feb. 2025 RSA extension still places restrictions on Motorola before receiving certain revenue share payments, including default assistive service requirements and Search widget and Chrome placement requirements. Des. Rem. Tr. 56:17–57:2, 57:5–58:4, 59:10–60:6, 60:9 (Laflamme (Motorola) Dep.); Des. Rem. Tr. 69:15–70:11, 70:14–18 (Laflamme (Motorola) Dep.) (Motorola receives less revenue if they do not place the Google Search widget on devices.); PXR0541.

292. Weeks before trial, and just days after the close of fact discovery, Google extended its revenue share agreement with Mozilla. Rem. Tr. 3166:10–3167:3 (Muhlheim (Mozilla)) (Mozilla exercised an option to extend their agreement with Google by a year.); PXR0370* (Mar. 13, 2025 email extending the Mozilla-Google agreement, produced on May 1, 2025, the eve of Mr. Muhlheim's testimony).

293. Google also extended revenue share agreements with U.S. carriers, including Verizon, AT&T, and T-Mobile. Des. Rem. Tr. 24:20–25:9 (Ezell (AT&T) Dep.) (AT&T-Google Dec. 2024 RSA extension through Sept. 2025); PXR0515 at -119–20 (amendment extending Google's RSA with AT&T); PXR0597 (Verizon-Google Jan. 2025 RSA extension through September 2025); PXR0610* (T-Mobile-Google Mar. 2024 RSA extension through June 2025).

2. Google Has Leveraged Its Position To Stifle Emerging GenAI Competition

294. In response to GenAI companies' attempts to distribute through typical search access points, Google has responded with Gemini App distribution of its own. Rem. Tr. 246:22–

247:1 (Fitzgerald (Google)) (Google and Samsung have entered into an agreement to distribute the Gemini App.); Rem. Tr. 259:14–25 (Fitzgerald (Google)) (Google and Motorola have entered into an agreement to distribute the Gemini App.); Des. Rem. Tr. 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); Des. Rem. Tr. 96:17–98:19 (Pancholi (Google) Dep.) (explaining that Google recognized that AI competitors were seeking to distribute through search access points); PXR0150 at -403, -407 (June 2024 Google presentation observing that AI companies are aggressively pursuing distribution, including through search access points); PXR0150 at -403, -406 (June 2024 Google presentation on Gemini distribution strategy that states: "To succeed on Android, and given inclusion in the MADA/RSA will be challenge, scaling is contingent upon strategic alignment and standalone deals with Samsung and other OEMS"); PXR0150 at -412, -416 (June 2024 Google presentation discussing 2024–25 Gemini distribution strategy on Android to secure placement of the Gemini App); PXR0150 at -419 (June 2024 Google presentation discussing key terms for Gemini App deals, including homescreen placement and widgets); PXR0067* at -595 (discussing Google's April 2024 decision to "lean into Gemini as the default assistant" and "push for standardization of key OEM contract[s] asap" to include Gemini App preinstallation).

295. To stifle GenAI competitors' progress, Google sought to secure Gemini App distribution with OEMs through preinstallation, placement, and exclusivity. Rem. Tr. 266:9–11 (Fitzgerald (Google)) (Google wanted Samsung to preload the Gemini App on the home screen.); Rem. Tr. 268:18–25 (Fitzgerald (Google)) (Google expressing the importance of preloading the Gemini App on the Default Home Screen of Samsung devices); Rem. Tr. 340:20–23 (Fitzgerald (Google)) (Samsung was considering deals with Google competitors for GenAI distribution.);

Des. Rem. Tr. 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); Des. Rem. Tr. 157:11–25 (Kim (Samsung) Dep.) (Google and Samsung began Gemini discussions in the summer of 2024); PXR0269 at -489–90 (Mar. 2024 Google email discussing the importance of placing the Gemini App on Samsung device's Default Home Screen); PXR0269 at -494–95 (Mar. 2024 Google email thread discussing a proposed Gemini App term sheet with Samsung); PXR0270* (Mar. 2024 email from Peter Fitzgerald to Jay Kim of Samsung passing alone the Gemini App term sheet); PXR0125 at -450 (Mar. 2024 internal Google emails discussing Samsung's response to the Gemini App term sheet); PXR0280 at -942 (June 2024 Google presentation proposing Gemini App RSA requirements alongside Search requirements); PXR0278 at -097, -099, -106 (Sept. 2024 Google presentation reviewing potential Samsung deal package spanning Search and Gemini); PXR0278 at -106 (Sept. 2024 Google presentation in which Google recognizes that Samsung has gotten other deal offers from GenAI competitors); PXR0278 at -117 (Sept. 2024 Google presentation showing a Samsung-Gemini deal [redacted]); PXR0150 at -403, -406, -412; PXR0150 at -419 (June 2024 Google presentation discussing "key terms" for Gemini App agreements including placement, preinstallation, and exclusivity); PXR0067* at -595 (discussing Google's April 2024 decision to "lean into Gemini as the default assistant" and "push for standardization of key OEM contract[s] asap" to include Gemini App preinstallation); PXR0267* at -167 (Microsoft "will need to bring large [dollars] to make up for [Samsung's] lost revenue from Google" if it wants Samsung to preinstall Copilot instead of the Gemini App.); PXR0267* at -177 (Microsoft dropped its Copilot preinstallation plan with Samsung after Samsung said Copilot preinstallation would violate Google's RSA.).

296. One deal framework Google considered was the Android Commercial Incentive Agreement ("ACIA"), which combined preinstallation and exclusivity of Search, Chrome, and GenAI products, including the Gemini App, in exchange for revenue share payments. Rem. Tr. 321:10–18 (Fitzgerald (Google)) (Google was interested in exploring "a strategic, more comprehensive Gemini deal" spanning multiple areas with Samsung.); Rem. Tr. 324:5–7 (Fitzgerald (Google)) (Google was considering the a new RSA framework referred to as the ACIA); Rem. Tr. 329:18–330:11 (Fitzgerald (Google)) (Google was evaluating conditioning partner revenue share payments on the combination of Search, Chrome, and Gemini App requirements.); Rem. Tr. 334:19–335:6 (Fitzgerald (Google)) (As part of the ACIA, Google contemplated requirements related to Search, Chrome, and Gemini before partners received revenue share payments.); PXR0272* at -247, -371 (July 2024 internal Google Business Council agenda stating that the "ACIA will better suit current market context . . . replacing RSA and GTM/Chowa, which is scheduled to expire in September"); PXR0280 at -935, -942, -944, -004; PXR0272* at -478–79.

297. As part of the ACIA, Google contemplated including Circle to Search and AICore as requirements for revenue share payments. Rem. Tr. 337:1–5, 337:14–17 (Fitzgerald (Google)); PXR0280 at -943, -945, -004.

298. Google recognized in June 2024 that inclusion of Gemini in the MADA/RSA may be challenged, so Google may have to spend $[redacted]B-$[redacted]B to secure Gemini on Android. Des. Rem. Tr. 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); PXR0150 at -406; PXR0067* at -595 (discussing Google's April 2024 decision to "lean into Gemini as the default assistant" on mobile devices, with "all resources focusing on making Gemini successful");

PXR0202* at -062 ("Google may need to spend $[redacted]B-$[redacted]B ([redacted]) to secure Gemini on Android." (emphasis omitted)).

299. Google never entered into any ACIA agreements with US distribution partners, even without Gemini, due to this Court's decision. Rem. Tr. 343:19–344:3 (Fitzgerald (Google)) (Google decided to pause the ACIA in early Aug. 2024.); Rem. Tr. (Fitzgerald (Google)) 344:21–345:3 (Google has put the ACIA "on pause."); PXR0165 at -302 (Sept. 2024 Google document discussing Google's decision to put the ACIA on pause in Aug. 2024); PXR0165 at -302 (Sept. 2024 Google document stating that Google "still believe[s] in the principles behind [the ACIA] framework").

300. To scale Gemini App reach, Google strategized to establish standalone deals with Samsung and other OEMs, including Assistant upgrades to Gemini, strategic partnerships, and "dedicated OS-level contextual entry points." Des. Rem. Tr. 110:2–113:11 (Pancholi (Google) Dep.) (discussing OS-level entry points, including LPP and the hotword); Des. Rem. Tr. 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); Des. Rem. Tr. 174:3–7, 174:9–10 (Kim (Samsung) Dep.) (Samsung executive recognizing that LPP is an "easy way for [the] consumer to find the generative AI service"); PXR0150 at -412, -416; PXR0150 at -406; PXR0067* at -595 (discussing Google's April 2024 decision to "lean into Gemini as the default assistant" on mobile devices and "push for standardization of key OEM contract[s] asap" to include Gemini App preinstallation while retiring Google Assistant); PXR0271* at -312–13 (June 2024 email to Samsung proposing discussions around Gemini experiences including the Floaty, placement on the -1 Screen, and an integrated Gemini AI widget); PXR0276* at -981–83

(Aug. 2024 email to Samsung proposing Gemini terms that include implementation of Gemini widgets, Gemini placement, and default status).

301. Google considered LPP access, the Hotword, and placement of the Gemini App and widget on the home screen as "key levers" to negotiate with partners. Des. Rem. Tr. 115:25–116:14, 118:15–119:11, 121:14–123:14, 89:21–92:18 (Pancholi (Google) Dep.) (explaining that PXR0150 was prepared to present a Gemini distribution strategy to the K&I and Platforms and Devices teams); Des. Rem. Tr. 164:11–23 (Kim (Samsung) Dep.) (recognizing that the Samsung-Gemini deal benefits Google by helping Google understand how users engage with Gemini through different access points); Des. Rem. Tr. 174:3–7, 174:9–10 (Kim (Samsung) Dep.) (Samsung executive recognizing that LPP is an "easy way for [the] consumer to find the generative AI service"); PXR0150 at -419.

302. Google planned for carriers, not just OEMs, to remain important for Gemini App distribution through the ACIA. Des. Rem. Tr. 142:19–144:10 (Pancholi (Google) Dep.) (providing foundation for PXR0143); PXR0143 at -806 (June 2024 Google email exchange observing that "carriers will remain important as part of the Gemini distribution strategy").

303. During this period, Google also began to pursue separate standalone Gemini App deals with carriers that required placing the Gemini App on the default home screen of Android devices. Des. Rem. Tr. 154:10–155:25 (Pancholi (Google) Dep.) (providing foundation for PXR0154); PXR0154 at -103 (June 2024 Google email exchange in which Google was "[a]sking VZ to preload Gemini app on Android devices in instances where Google has not already aligned on such a deal with the OEM(s)"); PXR0275* at -309.

304. Google sought to leverage other distribution deals, including Search, to offer Samsung a comprehensive deal package and beat out other GenAI competitors. Des. Rem.

Tr. 139:22–140:5, 204:1–205:1, 205:4–6 (Kim (Samsung) Dep.) (discussing how Samsung viewed the financial impact across multiple deals with Google in parallel); PXR0125 at -448 (Mar. 2024 Google email acknowledging that Samsung was seeking a more "comprehensive Gemini deal between the companies"); PXR0278 at -097, -099, -106 (Sept. 2024 Google presentation reviewing potential Samsung deal package spanning Search and Gemini); PXR0278 at -106 (Sept. 2024 Google presentation in which Google recognizes that Samsung has gotten other deal offers from GenAI competitors); PXR0278 at -117 (Sept. 2024 Google presentation showing a Samsung-Gemini deal operating loss of $2.8B over three years); PXR0267* at -167 (describing how Microsoft would "need to bring large [dollars] to make up for [Samsung's] lost revenue from Google" if Microsoft wanted Samsung to preinstall Copilot).

305. Beginning on January 1, 2025, Google entered into a three-year agreement with Samsung, including a one-year extension option, to implement Gemini App experiences on Samsung devices. Rem. Tr. 245:14–246:4, 246:22–247:1 (Fitzgerald (Google)); PXR0571 at -363–64.

306. Samsung only receives payments on "Gemini Qualified Devices," which must meet preinstallation, placement, default, and usage requirements. Rem. Tr. 247:13–16, 251:4–9, 254:9–17 (Fitzgerald (Google)); Des. Rem. Tr. 173:7–9, 173:12 (Kim (Samsung) Dep.) (agreeing that the more devices on which Samsung preinstalls Gemini, the more money Samsung receives); PXR0571 at -368–69, -384–85 (§ 2.3, Attachment A).

307. To qualify a device as a Gemini Qualified Device, Samsung must preinstall the Gemini App and place it in the App Tray, either in alphabetical order or next to the Play Store icon. Rem. Tr. 255:9–18 (Fitzgerald (Google)); Des. Rem. Tr. 173:7–9, 173:12 (Kim (Samsung)

Dep.) (agreeing that the more devices on which Samsung preinstalls Gemini, the more money Samsung receives); PXR0571 at -389 (Attachment B).

308. To qualify a device as a Gemini Qualified Device, Samsung must set the LPP action and the Hotword to invoke the Gemini App by default and allow Google to choose other entry point offerings during device setup. Rem. Tr. 248:9–13, 254:18–255:5, 255:21–256:4 (Fitzgerald (Google)); PXR0571 at -368–69, -389 (§ § 2.3(a), 2.3 (c)(i), Attachment B).

309. Samsung must also install AICore and Gemini Nano to qualify a device as a Gemini Qualified Device. Rem. Tr. 248:20–23 (Fitzgerald (Google)); Des. Rem. Tr. 161:3–5, 161:8–162:3 (Kim (Samsung) Dep.) (acknowledging the Gemini deal as encompassing Nano as an "on-device solution"); PXR0571 at -369 (§ 2.3(d)).

310. Google's Gemini Agreement payments to Samsung include fixed, revenue share, and bounty payments. Rem. Tr. 250:21–24, 251:14–17, 252:19–22, 253:8–11 (Fitzgerald (Google)); PXR0571 at -384–85 (Attachment A).

311. Samsung receives up to $[redacted] million a month in fixed payments if Samsung's Gemini Qualified Devices meet certain Gemini App usage levels, or "Key Performance Indicators" ("KPIs"). Rem. Tr. 250:21–251:12 (Fitzgerald (Google)); PXR0571 at -384–87 (Attachments A, A-1).

312. Google's fixed monthly payments to Samsung could go down "if certain KPIs weren't met." Rem. Tr. 251:4–9 (Fitzgerald (Google)); PXR0571 at -384–85 (Attachment A).

313. Samsung also receives a bounty payment, up to $[redacted] per device for premium devices sold in the United States, for activation of Gemini Qualified Devices. Rem. Tr. 251:14–252:9 (Fitzgerald (Google)); PXR0571 at -388 (Attachment A-2).

314. Samsung receives [redacted]% of Net Gemini Ad Revenue and Net Gemini Subscription Revenue per month. Rem. Tr. 252:19–25 (Fitzgerald (Google)); PXR0571 at -364–65, -367, -384–85 (§ § 1.9, 1.19, 1.22, 1.39–1.40, 1.46–1.48, 1.50, Attachment A).

315. Net Gemini Ad Revenue is defined as [redacted]% of all ad revenue generated on Gemini Qualified Devices. PXR0571 at -364–65, -367 (§ § 1.9, 1.19, 1.39).

316. Net Gemini Subscription Revenue is defined as [redacted]% of all subscription revenue generated on Gemini Qualified Devices. PXR0571 at -364–65, -367 (§ § 1.9, 1.40, 1.50).

317. Google also established Gemini agreements with Motorola. In June 2024, Google entered into an agreement with Motorola to preload and place the Gemini App on the Default Home Screen on certain devices. Rem. Tr. 259:14–16, 261:11–14 (Fitzgerald (Google)); PXR0535 at -067–68 (§ 2.2).

318. In exchange for Motorola's preload and placement of the Gemini App, Google agrees to pay Motorola a bounty for Gemini App subscriptions. PXR0535 at -067–67, -069–70 (§ § 2.2, 4.1).

319. Motorola and Google separately signed a $[redacted] marketing agreement in June 2024 to promote Google services, including the Gemini App. Des. Rem. Tr. 43:11–44:21 (Laflamme (Motorola) Dep.); PXR0537*.

320. The June 2024 marketing agreement with Motorola placed restrictions on Motorola, requiring the OEM to only promote Google assets, predominately Gemini. Des. Rem. Tr. 45:4–10, 45:13–46:20 (Laflamme (Motorola) Dep.); PXR0537* at -280.

321. Except for narrow exceptions, Motorola could not use the funds to market non-Google assistive services, namely Gemini, pursuant to the June 2024 marketing agreement. Des. Rem. Tr. 46:21–47:1, 47:5–48:5 (Laflamme (Motorola) Dep.); PXR0537* at -280.

322. The June 2024 Gemini marketing agreement with Motorola was the only marketing agreement at the time. Des. Rem. Tr. 48:15–21 (Laflamme (Motorola) Dep.).

323. The goal of the June 2024 Gemini marketing agreement with Motorola was to bring Motorola closer to where the OEM sought to be with revenue share payments. Des. Rem. Tr. 49:16–20, 50:1–6 (Laflamme (Motorola) Dep.).

324. Motorola and Google signed a new Gemini funding agreement around the same time as the February 2025 RSA extension. Des. Rem. Tr. 71:6–72:1 (Laflamme (Motorola) Dep.); PXR0543.

325. Google and Motorola's February 2025 Gemini Funding Agreement allocates marketing funds specifically to Gemini related activities. Des. Rem. Tr. 72:9–73:3 (Laflamme (Motorola) Dep.); PXR0543.

326. The Gemini App, Google's GenAI product, now comes preinstalled on all U.S. Samsung devices. Rem. Tr. 633:8–23 (Hsiao (Google)); Des. Rem. Tr. 156:6–10, 156:13–20, 156:23–25 (Kim (Samsung) Dep.); PXR0067* at -595 (discussing Google's decision to "push for standardization of key OEM contract[s] asap" to include Gemini App preinstallation).

327. The Gemini App comes preinstalled on new Pixel devices and some qualifying Motorola Android devices. Rem. Tr. 633:8–18 (Hsiao (Google)); PXR0535 at -067–68; PXR0067* at -595 (discussing Google's decision to "push for standardization of key OEM contract[s] asap" to include Gemini App preinstallation).

328. Google CEO Sundar Pichai would like to execute more Gemini distribution agreements. Rem. Tr. 2495:5–10 (Pichai (Google)).

329. While Google secured Gemini distribution on Motorola and Samsung, Google left partner RSAs provisions in place that prevented alternative assistive services, only waiving those

requirements in the week leading up to trial. Rem. Tr. 369:3–10 (Fitzgerald (Google)) (Google sent letters that changed partners obligations to Motorola, Verizon, and AT&T one week before trial.); Des. Rem. Tr. 47:3–48:14 ([redacted] Dep.) ([redacted] was concerned that the RSA prohibited Perplexity as an alternative assistant service, and did not want to put itself in the position of breaching the RSA.); Des. Rem. Tr. 67:18–68:23 (Beard (Microsoft) Dep.) (Google prohibited Motorola from pursuing a Copilot default carveout under their RSA.); Des. Rem. Tr. 248:12–249:8 (Beard (Microsoft) Dep.) (discussing Microsoft's understanding that Motorola sought permission from Google to enter into a Copilot distribution agreement with Microsoft but was told doing so would violate Google's RSA); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google provided Motorola with financial incentives to cancel a planned Copilot distribution deal); Des. Rem. Tr. 64:5–65:19 (Laflamme (Motorola) Dep.) (Motorola pushed for the Feb. 2025 RSA extension to remove ambiguity around whether partners like [redacted] or Perplexity would be excluded by earlier RSA agreements.); PXR0571 at -363 (Samsung-Gemini Commercial Agreement with effective date of Jan. 1, 2025); PXR0535 at -064 (Motorola-AI Premium Agreement with a launch date of June 25, 2024); PXR0606* at -035–36 (Apr. 16, 2025 Google letter to AT&T waiving RSA assistant requirements); PXR0607* at -037–38 (Apr. 16, 2025 Google letter to Motorola waiving RSA assistant requirements); PXR0609* at -073–74 (Apr. 17, 2025 Google letter to Verizon waiving RSA assistant requirements).

330. Google has actively intervened to stop rivals from distributing GenAI products on mobile devices. Des. Rem. Tr. 66:11–67:5, 67:18–68:23 (Beard (Microsoft) Dep.) (Motorola wanted to pursue a Copilot distribution carveout agreement with Microsoft, but Google prohibited the carveout.); Des. Rem. Tr. 109:15–110:7, 251:21–253:15 (Beard (Microsoft) Dep.)

([redacted], Motorola, [redacted], [redacted], and [redacted] were all interested in a Copilot deal with Microsoft, but the deals fell through in part due to Google's intervention.); Des. Rem. Tr. 248:12–249:8 (Beard (Microsoft) Dep.) (discussing Microsoft's understanding that Motorola sought permission from Google to enter into a Copilot distribution agreement with Microsoft but was told doing so would violate Google's RSA); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google provided Motorola with financial incentives to cancel a planned Copilot distribution deal); PXR0156 at -424 (Before Motorola and Microsoft could finalize a Copilot mobile integration deal, "Google ultimately intervened with a significant financial offer and Motorola cancelled the Razr [Copilot] integrations.").

331. The "economic arrangement" between Google and Samsung makes it difficult for rival AI apps to get distribution on Samsung devices. Des. Rep. Tr. 37:2–12 ([redacted] 30(b)(6) Dep.) ([redacted] is in preliminary conversations for distribution on Samsung devices but believes there is a low probability of success.); Des. Rep. Tr. 43:14–44:6 ([redacted] 30(b)(6) Dep.) ([redacted] understands that the "economic arrangement" between Google and Samsung is an impediment to a deal with Samsung.); PXR0267* at -167 (For Microsoft to get Copilot distribution on Samsung devices, Microsoft "will need to bring large [dollars] to make up for [Samsung's] lost revenue from Google."); PXR0267* at -177 (Microsoft dropped its Copilot preinstallation plan with Samsung after Samsung said Copilot preinstallation would violate Google's RSA.).

332. OpenAI concluded it had no hope of distributing on Android, leading it to take a [redacted] with Apple that resulted in [redacted] distribution. Des. Rem. Tr. 23:11–24:20 (OpenAI-NT 30(b)(6) Dep.) ("[T]he thing we were existentially worried about is being locked out of Google, being locked out of Apple, which is

why we entered the deal with Apple, which is [redacted] . . . . [E]veryone's using their distribution to lock us out."); Des. Rem. Tr. 26:24–27:7 (OpenAI-NT 30(b)(6) Dep.) (OpenAI merely received "the ability to distribute using Siri" in Apple deal).

333. Fears of being locked out from distribution led OpenAI to accept [redacted] to gain [redacted] distribution through Apple. Des. Rep. Tr. 23:11–24:20 (OpenAI-NT 30(b)(6) Dep.) (OpenAI's deal with Apple is [redacted]); Des. Rep. Tr. 30:3–31:3 (OpenAI-NT 30(b)(6) Dep.) (OpenAI projected that it would [redacted] through its Apple deal but did the deal because [redacted]); Des. Rep. Tr. 78:10–79:14 (OpenAI-NT 30(b)(6) Dep.) (Under OpenAI's deal with Apple, [redacted]); Des. Rep. Tr. 27:8–16 (OpenAI-NT 30(b)(6) Dep.) (OpenAI's deal with Apple is [redacted]); Des. Rep. Tr. 75:11–76:9 (OpenAI-NT 30(b)(6) Dep.) (If Google could block OpenAI from being the default AI on both Apple and Android, it would make it "very, very difficult for [OpenAI] to distribute [its] product"); Des. Rep. Tr. 23:11–24:20 (OpenAI-NT 30(b)(6) Dep.) (OpenAI entered their deal with Apple because it was "existentially worried about being locked out by Google").

334. Today, the vast majority of ChatGPT's distribution remains on OpenAI's own owned surfaces (e.g., the ChatGPT.com) despite interest in other distribution channels. Rem. Tr. 467:10–17, 472:19–473:15 (Turley (OpenAI)).

335. According to Mr. Turley of OpenAI, when it comes to distribution, "the amount of friction that you have in getting to [the] product is very, very important" which impacts the quality of ChatGPT because "the more people use [ChatGPT], especially for niche things, the more we're able to improve [it]." Rem. Tr. 463:14–465:14 (Turley (OpenAI)).

336. The Perplexity app provides assistive services on Android devices. Rem. Tr. 708:7–15, 710:9–711:5 (Shevelenko (Perplexity)) (in response to the Court asking what it means to be the "default assistant" on Android).

337. After going through an onerous process on Android, users can change the default assistant from Gemini to Perplexity, which allows Perplexity further capabilities on the Android device. Rem. Tr. 708:16–710:08 (Shevelenko (Perplexity)).

338. Setting Perplexity as the default assistant grants Perplexity further Android device permissions, such as accessing and instructing other apps to complete tasks. Rem. Tr. 708:16–710:08 (Shevelenko (Perplexity)).

339. Perplexity has had limited success convincing [redacted] distributors, who are beholden to Google, to distribute Perplexity. Rem. Tr. 716:6–8 (Shevelenko (Perplexity)) (Perplexity has not reached a deal with U.S. carriers including [redacted], [redacted], and [redacted].); Rem. Tr. 712:24–714:5 (Shevelenko (Perplexity)) (Perplexity is neither the default search engine nor assistant on [redacted] or [redacted] [redacted] devices.); Rem. Tr. 714:10–24 (Shevelenko (Perplexity)) (Perplexity has not been able to reach a deal with [redacted].); PXR0805 (Rosetta Stone listing OEMs and carriers).

340. [redacted] sought to negotiate distribution deals with Perplexity, but did not want to put themselves in a position of breaching the RSA. Des. Rem. Tr. 47:3–48:14 ([redacted] Dep.) ([redacted] was concerned that the RSA prohibited Perplexity as an alternative assistant service, and did not want to put itself in the position of breaching the RSA.).

341. While investors have shown interest in Perplexity, Perplexity has had to turn away some investments due to its inability to secure distribution. PXR0120* at -410 (Dec. 2023 internal Perplexity email stating in response to an investment inquiry that "[w]hile we aren't

proactively raising capital, if we can develop a game-changing distribution partnership we'd be open to an equity investment.").

342. Even where Perplexity has reached a deal with Motorola, due to contractual constraints with Google and despite interest from both parties, Perplexity is merely preloaded as an application on the second screen and not set as the default assistant. Rem. Tr. 717:14–718:2 (Shevelenko (Perplexity)) (Perplexity will come preloaded on some new Motorola devices.); Rem. Tr. 718:3–16 (Shevelenko (Perplexity)) (Perplexity and Motorola sought to make Perplexity the default assistant, but could not due to Motorola's obligations with Google.); Rem. Tr. 718:17–719:18 (Shevelenko (Perplexity)) (Perplexity will only be preloaded on the second screen, despite wanting placement on the default home screen, and is not accessible via Hotword.); Rem. Tr. 719:3–721:5 (Shevelenko (Perplexity)) (Perplexity does not have access to a Hotword, while Google's Gemini does, which makes Perplexity harder to use.); PXR0805 (Rosetta Stone listing OEMs and carriers); Rem. Tr. 749:21–750:7 (Shevelenko (Perplexity)) (any of the distribution progress Perplexity has made is because of this trial and the fact that it has made distributors more willing to have conversations with rivals).

3. Payment Prohibitions Unlock The Ecosystem

a) Payment Prohibitions Allow For Rivals To Win Defaults And Begin Building Competitive Products

343. Google's payments to distributors significantly contributed to barriers to entry and distribution that have helped maintain its monopolies and will continue to do so unless addressed by the remedy. As the Court found in its opinion, Google's "payments 'provide an incredibly strong incentive for the ecosystem to not do anything" and "their 'net effect . . . [is to] basically freeze the ecosystem in place[.]'" Mem. Op. 201–02.

344. Plaintiffs' proposed bans on payment for distribution are an important first step to opening the door to an actual contest among Google's general search competitors to become the default. Rem. Tr. 812:23–814:21 (Weinberg (DuckDuckGo)) ("[P]referential payments and . . . revenue share agreements are the root cause of Google's distribution advantage . . . ."); Rem. Tr. 816:3–21 (Weinberg (DuckDuckGo)) ("[I]f you just have revenue shares but you still have preferential payments . . . to make the default or otherwise have payments that are flowing, you get to the same point because you can work around one and use the other to end up with the same financial incentives."); Rem. Tr. 817:8–25 (Weinberg (DuckDuckGo)) (If Google is allowed to make any payments, it will lead to the same incentives as paying for defaults today.); Rem. Tr. 726:6–727:8 (Shevelenko (Perplexity)) (Perplexity cannot simply replace Google's revenue because of Google's size and will need time to get up to the scale to replace payments.); Rem. Tr. 818:15–24 (Weinberg (DuckDuckGo)) (Section IV.A ban on payments for non-Apple third parties is a necessary, though not sufficient, part of the solution to the distribution problem.); Rem. Tr. 819:7–24 (Weinberg (DuckDuckGo)) (Section IV.B ban on payments to Apple is part of the solution to the distribution problem.); Rem. Tr. 821:11–19 (Weinberg (DuckDuckGo)) (Section IV.E is "another key piece" to restore competition.); Des. Rem. Tr. 105:16–106:2 (Beard (Microsoft) Dep.) (explaining that distribution without default placement "isn't enough to have user adoption.").

345. Without distribution, rival search engines and nascent GenAI competitors cannot build the necessary userbase to compete. Rem. Tr. 463:14–464:11 (Turley (OpenAI)) (describing distribution as "existential" for OpenAI); Rem. Tr. 1015:20–1016:8 (Schechter (Microsoft)); Des. Rem. Tr. 46:24–15, 51:3–21 (Beard (Microsoft) Dep.) (discussing need to invest in Copilot distribution—through, e.g., a [redacted] distribution deal codenamed [redacted]—to get enough

user engagement for Copilot to be a success); Des. Rep. Tr. 23:11–24:20 (OpenAI-NT 30(b)(6) Dep.) (OpenAI entered their deal with Apple because it was "existentially worried about . . . being locked out of Google.").

346. The payment bans in Plaintiffs' proposed remedies would likely cause many distributors to shift their defaults away from Google because rivals could pay for defaults but Google couldn't. Rem. Tr. 2141:2–15 (Chipty (Pls. Expert)).

347. The payment bans in Plaintiffs' proposed remedies would create competition among rivals for the defaults. Rem. Tr. 2141:2–15 (Chipty (Pls. Expert)).

348. Section IV payment bans may induce third parties likes Apple, independent browsers, and OEMs to enter GSE market; split defaults, institute choice screens, or make switching easier. Rem. Tr. 819:7–820:5 (Weinberg (DuckDuckGo)).

349. If rivals were to win defaults, they'd have access to scale. And over time, they would be able to make investments to improve search quality and create greater competitive rivalry against Google and also against each other. Rem. Tr. 2141:16–22 (Chipty (Pls. Expert)).

350. Given the importance of defaults, particularly on mobile, winning a default would start to close the scale gap and give competitors the ability to improve search quality. Rem. Tr. 711:9–712:1 (Shevelenko (Perplexity)) (Setting Perplexity as the default would drive future growth, including in usage.); Rem. Tr. 464:15–465:14 (Turley (OpenAI)) (more distribution would help OpenAI improve both its core GenAI Products and its search functionality specifically); Rem. Tr. 1015:20–1016:8 (Schechter (Microsoft)) (Without mobile defaults, Microsoft is in a "vicious cycle" of not getting the users and data it needs to close the scale gap.); Rem. Tr. 175:11–176:10 (Durrett (Pls. Expert)) (Today, Google receives 19 times the number of mobile queries as all rivals combined.).

351. Having default placement would allow a competitor to win some users from Google. Rem. Tr. 711:9–712:2 (Shevelenko (Perplexity)) (If Perplexity is set as the default, it allows them to acquire more users.); Rem. Tr. 819:7–24 (Weinberg (DuckDuckGo)) (Section IV.B. payment ban may induce Apple to set other GSEs as default, especially in different modes.); Rem. Tr. 820:7–821:3 (Weinberg (DuckDuckGo)) (Sections IV.A–B payment ban may result in different default winners.); Rem. Tr. 1018:17–1019:3, 1020:4–22 (Schechter (Microsoft)) (With more distribution, Bing could gain users and improve its quality.); Des. Rem. Tr. 105:16–106:2 (Beard (Microsoft) Dep.) (explaining that mobile user engagement is not just about distribution).

352. Dr. Chipty calculated that Plaintiffs' proposed distribution remedies, including payment bans and the Chrome divestiture, would potentially shift on the order of 38 percentage points of market share from Google to rival search engines, leaving Google with a market share on the order of 51 percent. This calculation assumes Google would lose its defaults and would recover a portion of queries based on historical clawback rates. Rem. Tr. 2138:15–2140:6 (Chipty (Pls. Expert)). The vast majority of the 38 percentage-point shift would come from mobile. Rem. Tr. 2156:7–16 (Chipty (Pls. Expert)). This share shift also does not account for any increase in rivals' quality resulting from the data and syndication remedies. Rem. Tr. 2140:7–17 (Chipty (Pls. Expert)).

353. Of those 38 percentage points of potential share shift, 31 percentage points are a result of the payment bans. Rem. Tr. 2142:4–12 (Chipty (Pls. Expert)).

354. Of those 31 percentage points of potential share shift due to payment bans, 18 percentage points are from Apple devices, 13 percentage points are from Android devices, and

less than one percentage point is from third-party browsers. Rem. Tr. 2142:13–19 (Chipty (Pls. Expert)).

355. This potential share shift calculation is not meant to be the day-one prediction because there might be distributors who decide on day one to keep Google because Google is better and they may not want to disrupt their user experience. Rem. Tr. 2144:12–2146:16 (Chipty (Pls. Expert)).

356. The payment bans would increase the business case for entry because potential entrants would no longer have to overcome Google's revenue share payments. Rem. Tr. 2141:23–2142:3 (Chipty (Pls. Expert)).

357. Payment bans may induce Apple and Mozilla to enter GSE market. Rem. Tr. 820:7–821:3 (Weinberg (DuckDuckGo)).

b) Payment Prohibitions Give Partners Flexibility And Negotiating Power

358. Android carriers and OEMs prefer differentiation and giving consumers many different choices that fit their needs, specifically in search and GenAI. Des. Rem. Tr. 45:2–46:14 (Ezell (AT&T) Dep.) (AT&T wants to give its consumers choices across multiple products.); Des. Rem. Tr. 53:16–54:2 (Ezell (AT&T) Dep.) (Differentiation of applications and services is important to AT&T.); Des. Rem. Tr. 55:20–56:19 (Ezell (AT&T) Dep.) (AT&T finds freedom to choose AI and search services important.); Des. Rem. Tr. 70:13–71:9 (Ezell (AT&T) Dep.) (AT&T would like flexibility in selecting the default AI.); Des. Rem. Tr. 79:20–80:1 (Ezell (AT&T) Dep.) (AT&T would like to have flexibility to work with different AI service providers and LLMs.); Des. Rem. Tr. 66:11–67:5, 67:18–68:23 (Beard (Microsoft) Dep.) (Motorola wanted to preinstall Copilot on a subset of its devices, but Google prohibited the RSA carveout.); Des. Rem. Tr. 109:14–110:7, 251:21–253:15 (Beard (Microsoft) Dep.) ([redacted], Motorola,

[redacted], [redacted], and [redacted] were all interested in a Copilot deal with Microsoft, but the deals fell through in part due to Google's intervention.); Des. Rem. Tr. 25:18–21, 26:3–21 (Laflamme (Motorola) Dep.) (explaining that Motorola wants flexibility with AI partners to optimize the consumer experience and Motorola's financials); Rem. Tr. 52:8–53:10 (Laflamme (Motorola) Dep.) (Motorola was pushing for assistive service and search engine flexibility in January 2025 RSA negotiations.); Des. Rem. Tr. 114:19–117:1 (Laflamme (Motorola) Dep.) (Motorola recognized a market interest in having differentiation from Apple and Google, and GenAI was a good opportunity to provide that differentiation.); Des. Rem. Tr. 96:12–23, 100:20–101:11 (Kim (Samsung) Dep.) (explaining that Samsung did not want an exclusive AI service); PXR0137 at -170 ("The market is keen on a differentiated solution from iOS and Google.").

359. Carriers and OEMs cannot develop third-party relationships when Google has complete control over the Android ecosystem. Des. Rem. Tr. 52:2–53:15 (Ezell (AT&T) Dep.) (Allowing third-party applications on an Android device is a negotiation process and if the OS provider defines the experience, there is no way to differentiate.); Des. Rem. Tr. 57:15–58:9 (Ezell (AT&T) Dep.) (AT&T finds Google very hard to negotiate with, and that Google essentially has a framework that AT&T must follow.); Des. Rem. Tr. 66:11–67:5, 67:18–21, 67:23–68:23 (Beard (Microsoft) Dep.) (Motorola wanted to pursue a Copilot distribution carveout agreement with Microsoft, but Google prohibited the carveout.); Des. Rem. Tr. 109:15–110:7, 251:21–253:15 (Beard (Microsoft) Dep.) ([redacted], Motorola, [redacted], [redacted], and [redacted] were all interested in a Copilot deal with Microsoft, but the deals fell through in part due to Google's intervention.); Des. Rem. Tr. 248:12–249:8 (Beard (Microsoft) Dep.) (discussing Microsoft's understanding that Motorola sought permission from Google to enter into a Copilot distribution agreement with Microsoft but was told doing so would violate Google's RSA); Des.

Rem. Tr. 121:22–122:7, 122:10–13, 122:15–18, 133:4–7, 133:10–15 (Laflamme (Motorola) Dep.) (Google's control of the mobile Android ecosystem means that Motorola does not have "a viable option to recoup what [it] receive[s] from Google today" because Motorola does not "have much leverage to negotiate against [Google]."); PXR0258 at -112–13 (AT&T discussing how opening up the Android ecosystem could increase AT&T influence over third-party search and AI experiences on devices); PXR0138 at -590 (observing Google's "stronghold" on the mobile ecosystem in the context of Motorola negotiating with Microsoft); PXR0156 at -424 (Before Motorola and Microsoft could finalize a Copilot integration deal, "Google ultimately intervened with a significant financial offer and Motorola cancelled the Razr [Copilot] integrations.").

360. Motorola specifically had been seeking more flexibility in its RSA that would not limit search engine and assistive service partnerships, stating that Motorola had to "make absolutely sure that nothing forces us to have Gemini as the default assistant." Des. Rem. Tr. 53:21–55:10 (Laflamme (Motorola) Dep.); Des. Rem. Tr. 64:5–65:19 (Laflamme (Motorola) Dep.) (discussing Motorola pushing for specific carveouts for GenAI apps in the Feb. 2025 RSA amendment); PXR0136 at -894; PXR0541 at -196.

361. Motorola recognizes that if there were more viable general search competitors in the market, then Motorola would have more leverage in RSA negotiations with Google when asking for larger payments. Des. Rem. Tr. 68:17–19, 68:22–69:8, 69:12–14 (Laflamme (Motorola) Dep.) (Motorola signed an underpaying RSA because they had no other option but would have had more leverage were there more options available.).

362. Motorola has explored AI partnerships with multiple companies, due to Google's lower revenue share payments and for purposes of providing user choice. Des. Rem. Tr. 29:6–30:3 (Laflamme (Motorola) Dep.); Des. Rem. Tr. 95:12–98:11 (Laflamme (Motorola) Dep.)

(Motorola has explored assistant service experiences with Microsoft and Perplexity.); Des. Rem. Tr. 132:3–10 (Laflamme (Motorola) Dep.) (Motorola has internally discussed reaching out to [redacted] but has not connected with them.).

363. Google's [redacted] Motorola over the years have been [redacted] than those made to other partners, which Motorola has raised with Google. Des. Rem. Tr. 29:6–30:3, 36:7–37:5, 38:10–13 (Laflamme (Motorola) Dep.).

364. Based on Motorola's internal analysis, Motorola does not get revenue share payments for devices sold through carriers. Des. Rem. Tr. 31:4–16 (Laflamme (Motorola) Dep.).

365. Google's [redacted] Motorola emphasizes partners' need for multiple search and GenAI providers. Des. Rem. Tr. 29:6–30:3 (Laflamme (Motorola) Dep.) (explaining that Motorola wants multiple GenAI partners to supplement Google's [redacted]).

366. Google has reduced its dollar payments to Verizon under the RSA. Des. Rem. Tr. 65:20–66:22, 67:1–5, 68:3–5 (Boulben (Verizon) Dep.) (discussing PXR0129 at -638).

367. Mozilla's CFO thinks it is undesirable to be reliant on one company—Google—for 85% of Mozilla's revenue. Rem. Tr. 3164:3–6, 3165:4–9 (Muhlheim (Mozilla)).

368. Mozilla's Steering Committee told Mozilla's Board that it was important to diversify revenue to be less reliant on Google, but that effort was progressing slower than Mozilla's CFO had hoped. Rem. Tr. 3167:6–3169:19 (Muhlheim (Mozilla)) (discussing PXR0254 at -601).

369. Mozilla has spent "an awful lot of time looking at" what effect it would have on Mozilla if Mozilla could no longer receive revenue share payments or other consideration from

Google in exchange for setting Google Search as the default in Firefox in the United States. Rem. Tr. 3134:12–19 (Muhlheim (Mozilla)).

370. Payment prohibitions also unlock the ecosystem for advertising competitors. Exclusive placement arrangements with publishers impede adMarketplace's ability to improve its AMP Results product by impeding its ability to distribute ads. Rem. Tr. 1792:2–11 (Epstein (adMarketplace)).

371. Google's exclusive control of search access points and queries prevents adMarketplace from competing for those queries. Rem. Tr. 1797:8–1798:7 (Epstein (adMarketplace)) ("So the more that . . . Google has control of the search input box, which is really . . . to me the publishers' . . . property, then it makes it difficult for us to compete and to do anything in that search input box and get access to these queries. So that's why a lot of our business is now on AMP Find, where we're around the box, because we can't always get into the box."), 1798:14–1799:17 (THE COURT: . . . So with respect to the Results product . . . some number of publishers have made deals with Google that when a user enters a query, the query goes to Google as opposed to somebody, a company like your own? THE WITNESS: To Google and only Google. . . . I don't mind competing with Google for who has the highest paying ad or the most relevant ad. I'm sure there's a lot of other firms that can compete on who has the best search result or whatever else. But it's an all-or-nothing deal.").

372. Google's proposed distribution remedies are likely to maintain the status quo. Rem. Tr. 2179:10–2180:19, 2315:3–19 (Chipty (Pls. Expert)).

373. Google's proposed distribution remedies allow Google to pay for defaults, which will impede rivals' ability to access users in the short term. Des. Rem. Tr. 105:16–106:2 (Beard

(Microsoft) Dep.) (explaining that mobile user engagement depends on default placement, not just distribution); Rem. Tr. 2179:19–2180:19, 2315:3–19 (Chipty (Pls. Expert)).

374. Google's proposed remedies do not unlock search access points that Google secured through its historical exclusionary agreements. Rem. Tr. 2179:19–2180:19 (Chipty (Pls. Expert)).

375. As Google's economic expert Professor Kevin Murphy agrees, if Google is allowed to pay for defaults, as Google's remedies would permit, "Google likely, in the very short run, and probably in the medium-to-longer run is going to outbid because they have better monetization and a better product." Rem. Tr. 4325:23–4328:16 (Murphy (Def. Expert)).

376. If Google is allowed to offer unconditional revenue share, then it is "the likely outcome" that distributors will continue setting Google Search as the default. Rem. Tr. 4367:19–4369:17 (Murphy (Def. Expert)).

377. Google's proposed remedies will take much longer to promote competition because rivals would still have to compete with Google being able to pay—with its "enormous monetization advantages"—for defaults. Rem. Tr. 2180:20–2181:10 (Chipty (Pls. Expert)).

378. One-year exclusive distribution agreements would continue to deny rivals access to the user data needed to increase the incentives for rivals to innovate and invest. Rem. Tr. 2183:10–2184:6 (Chipty (Pls. Expert)).

379. Limiting distribution exclusives to one year does not address the competition concern. Rem. Tr. 2183:10–2184:6 (Chipty (Pls. Expert)).

D. Preferential Treatment And Payments To Apple Prohibited

1. Apple Continues To Rely On Google For Search And Other Services

380. Rather than building out Apple's own search capabilities, Apple continues to rely upon Google to prop up its search products and capabilities. Des. Rem. Tr. 212:25–214:15 (Fox

(Google) Dep.) (discussing using Search for long-tail queries in Apple's Spotlight); PXR0274 at -368–71.

381. Google continues to further plan Search integrations into Apple's devices. Des. Rem. Tr. 216:21–220:12 (Fox (Google) Dep.) (discussing integrating Search suggestions into the Safari suggestion box to increase revenue); PXR0274 at -235–37, 350, -360–61 (July 2024 Google email and presentation discussing new and continuing ways to integrate Search into Apple devices); PXR0274 at -372–75 (Apple could increase revenue by integrating Search suggestions into the Safari search bar over Apple's suggestions.).

382. In early 2024, Google and Apple discussed integrating Gemini into Apple Intelligence. Des. Rem. Tr. 129:18–130:8 (Fox (Google) Dep.); Rem. Tr. 3838:17–3839:18 (Cue (Apple)) (Apple evaluated a deal with Google to incorporate Gemini into Apple Intelligence.); PXR0257 at -948 (Google proposed terms for Gemini deal with Apple.); PXR0088 at -029–31 (Apple proposed terms for Gemini deal with Google); PXR0115* at -267–68, -271–73 (internal Google slide deck describing proposed terms of a Gemini-Apple integration deal).

383. In April 2024, Google explored Gemini App integrations with Apple that [redacted], including default status and [redacted]% revenue share payments. Des. Rem. Tr. 195:8–197:14 (providing foundation for PXR0273), 209:312, 209:20–210:6 (Pancholi (Google) Dep.); PXR0273 at -141–42 (Apr. 2024 Google term sheet discussion with Apple that includes Gemini as the default); PXR0273 at -146 (Apr. 2024 Google term sheet discussion with Apple in which Apple requested [redacted]% Gemini revenue share and Google countered with [redacted]% net revenue share and tapering subscription revenue share).

384. Google CEO Sundar Pichai and Apple CEO Tim Cook discussed a Gemini App distribution agreement during a couple calls in 2024. Their respective teams at Google and Apple

were working through the details at that time. Rem. Tr. 2495:11–2496:8 (Pichai (Google)); PXR0115* at -266–74 (internal Google slide deck describing negotiations with Apple for Gemini App distribution and deeper Gemini-Apple integration).

385. Google has forecasted that a Gemini-Apple integration generates [redacted]. Des. Rem. Tr. 238:16–240:1 (Fox (Google) Dep.); PXR0149 at -501–02.

386. Google forecasted a gross positive profit margin of [redacted] Des. Rem. Tr. 243:19–22, 243:24–25 (Fox (Google) Dep.); PXR0149 at -501–02.

387. While Google points to ChatGPT "winning" the AI competition with Apple, today, Google is negotiating a Gemini integration with Apple. Des. Rem. Tr. 188:22–190:22 (Pancholi (Google) Dep.)) (On Feb. 5, 2025, Apple approached Google to begin discussions about a Gemini integration.); Des. Rem. Tr. 191:15–192:25 (Pancholi (Google) Dep.)) (Google and Apple's February 5, 2025 meeting included key stakeholders from both sides.); Des. Rem. Tr. 216:15–20 (Pancholi (Google) Dep.)) (Feb. 5, 2025 is when Apple reengaged Google about a Gemini integration.); Des. Rem. Tr. 44:18–45:17 (Fox (Google) Dep.) (Google was interested in an OpenAI type integration with Apple.); Des. Rem. Tr. 130:9–16 (Fox (Google) Dep.) (Apple and Google continue to discuss integrations as of Feb. 2025); Des. Rem. Tr. 227:21–23, 228:1–229:15, 229:18–24 (Fox (Google) Dep.); Rem. Tr. 3853:7–25 (Cue (Apple)) (Apple is still discussing Gemini integrations.).

388. Apple signed a GenAI distribution agreement with ChatGPT, but Mr. Cook informed Mr. Pichai that Apple plans to expand GenAI distribution to other providers this year. Rem. Tr. 2496:9–18 (Pichai (Google)).

389. Google CEO Sundar Pichai is hoping to execute a Gemini distribution agreement with Apple to power Apple intelligence by mid-2025. Rem. Tr. 2496:19–22 (Pichai (Google)).

390. As of February 2025, Google was holding weekly technical meetings with Apple to design a Gemini integration. Des. Rem. Tr. 193:1–14 (Pancholi (Google) Dep.)) (As of Feb. 7, 2025, Google and Apple were holding weekly technical meetings.); Des. Rem. Tr. 188:22–190:22 (Pancholi (Google) Dep.)) (On Feb. 5, 2025, Apple approached Google to begin discussions about a Gemini integration.); Des. Rem. Tr. 216:15–217:23 (Pancholi (Google) Dep.)) (Apple wanted to quickly engage with Google in Feb. 2025 to build an integration for the Fall 2025 Apple devices.); PXR0115* at -266–69, -271–74 (describing technical discussions and negotiations between Google and Apple regarding Gemini-Apple integration).

391. Google has considered integrating visual Search, including Lens and Circle to Search, with Apple devices. PXR0274 at -362–67.

392. Google has also expanded its ISA agreement with Apple, amending the agreement to include the emerging Google Search technology, Google Lens. Des. Rem. Tr. 225:19–227:3, 227:12–15, 240:16–21 (Pancholi (Google) Dep.); Rem. Tr. 3823:11–3825:2 (Cue (Apple)); PXR0151 at -291.

393. Google and Apple's Lens addendum provides users with the ability to access Search through the camera on Apple products. Des. Rem. Tr. 237:16–238:22 (Pancholi (Google) Dep.) (explaining that Lens users on Apple can access Google Search results through the camera app); PXR0151 at -293.

394. Any revenue generated through the Google Lens experience on Apple devices is [redacted]. Des. Rem. Tr. 238:23–239:17 (Pancholi

(Google) Dep.) (explaining that any revenue generated through the Lens addendum is [redacted]); PXR0151 at -293.

2. Prohibiting Payments Opens Up A Major Distribution Channel And Incentivizes Apple To Enter

395. Google's revenue share payments disincentivize Apple from entering the general search market. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google"); Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (If a competitor like Apple could build a search engine of Google's quality "it would be great to do that from a financial point of view").

396. Cutting off all search-related payments from Google to Apple would strongly alter Apple's incentives. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google"); Des. Rem. Tr. 26:13–27:7, 30:11–31:3 (OpenAI-NT 30(b)(6) Dep.) (OpenAI agreed to [redacted] Apple deal because they were [redacted] by a Google-Apple AI partnership.).

397. Moreover, eliminating the revenue share between Google and Apple would give Apple a much stronger incentive to enter the market for general search services. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google"); Rem. Tr. 2141:2–15 (Chipty (Pls. Expert)); Rem. Tr. 819:7–24 (Weinberg (DuckDuckGo)) (It's hard to predict but Apple could enter search themselves.); Rem. Tr. 820:7–821:3 (Weinberg (DuckDuckGo)) (The monetization gap may induce Apple to enter the GSE market.).

398. Owning a search engine of Google's quality would be a financial boon to Apple. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (If a competitor like Apple could build a search engine of Google's quality "it would be great to do that from a financial point of view").

399. Apple has been investing in building search infrastructure. Rem. Tr. 3852:7–3853:1 (Cue (Apple)) (Apple continues to make search-related investments, to work on search-related projects, and to index the web).

400. Apple currently uses its own searching capability in limited ways on its devices. Rem. Tr. 3852:14–23 (Cue (Apple)) (Apple invests in its own capabilities for Siri and Spotlight).

401. When considering its options, the revenue share Apple receives from Google strongly affected Apple's decision to remain with Google as the default on Safari. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google").

402. Because Google could not pay Apple for the default or for showing a choice screen, Apple would be incentivized to replace Google as the default on Safari, potentially with a new GenAI search service that Apple has been "actively looking at." Rem. Tr. 3833:23–3836:13 (Cue (Apple)) (Apple is "actively looking at" adding an AI provider as a search choice in Safari); Rem. Tr. 2144:12–2146:16 (Chipty (Pls. Expert)) (discussing how payment bans and the data and syndication remedies would allow rivals to earn defaults with Apple).

403. Apple is open to changing or modifying the default on Safari. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple likes having competition and other search providers); Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (The combination of LLMs and search indices could be a revolutionary technology that unseats Google's share); Rem. Tr. 3833:23–3836:13 (Cue (Apple))

(Apple is "actively looking at" adding an AI provider as a search choice in Safari); Rem. Tr. 3833:23–3836:13 (Cue (Apple)) (Apple expects to add AI chatbots into the search engine choice in Safari over the coming year).

404. Section IV.B. ban on default placement for Apple may induce Apple to institute choice screens. Rem. Tr. 819:7–820:5 (Weinberg (DuckDuckGo)) (Apple could make a choice screen.).

405. Section IV.B. ban on default placement for Apple may induce Apple to make switching the search default easier. Rem. Tr. 819:7–820:5 (Weinberg (DuckDuckGo)) (Apple could make switching GSEs defaults easier.).

406. Even new GenAI companies, such as Perplexity, could not reach an agreement with [redacted] to be placed even as an optional secondary default on [redacted]. Rem. Tr. 716:9–717:8 (Shevelenko (Perplexity)); PXR0805 (Perplexity Rosetta Stone listing OEMs and carriers).

407. Apple has "no choice" but to set Google as the default search provider today. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (As the market currently stands, Apple "do[es not] really have a choice today" apart from Google).

408. Apple's devices are an important distribution channel, with Safari being a widely used browser in the United States and by far the most important search access point on Apple devices. Mem. Op. at 102–03.

409. Google recognizes the importance of accessing Apple users, and has pushed for Apple to keep users signed into Google on the Safari browser to increase revenue. Des. Rem. Tr. 221:4–22 (Fox (Google) Dep.); PXR0274 at -376–78.

410. Under OpenAI's deal with Apple, OpenAI [redacted] distribution. Des. Rep. Tr. 29:9–16, 30:3–31:3 (OpenAI-NT 30(b)(6)

Dep.) (OpenAI projected that it would [redacted] through its Apple deal); Des. Rep. Tr. 75:11–76:7, 76:9 (OpenAI-NT 30(b)(6) Dep.) (If Google could block OpenAI from being the default AI on both Apple and Android, it would make it "very, very difficult for [OpenAI] to distribute [its] product").

411. Google's proposed remedies would allow Google to continue paying Apple for defaults. Rem. Tr. 2480:16–18 (Pichai (Google)); Rem. Tr. 4366:22–4367:7 (Murphy (Def. Expert)). Google's proposed remedies allow Google to pay Apple, which would discourage Apple from either entering or sponsoring an entrant. Rem. Tr. 2179:19–2180:19 (Chipty (Pls. Expert)) ("[U]nder Google's proposals, they would still be able to pay Apple, and that would [dis]courage entry by Apple or Apple sponsoring entry.").

412. Google's carve-out of Apple privacy mode in its distribution remedies proposal is too narrow because it does not allow for other modes that might exist in the future. Rem. Tr. 2182:1–2183:2 (Chipty (Pls. Expert)).

E. Exclusionary Agreements With Publishers Prohibited

413. Google has structured its publisher agreements in ways that prevent nascent rivals from accessing important web content. Rem. Tr. 423:9–15 (Turley (OpenAI)) (Accessing content silos available to Google is "very important" as OpenAI builds its own search index.); Rem. Tr. 462:6–11 (Turley (OpenAI)) (discussing formal contractual restrictions by Google).

414. Although publishers can technically opt out of being crawled by Google, that would be "economically prohibitive" for most content providers because they receive the majority of their traffic from Google. Des. Rep. Tr. 84:13–25 (OpenAI-NT 30(b)(6) Dep.) (Although publishers can technically opt out of being crawled by Google, that would be "economically prohibitive" for most content providers because they receive the majority of their traffic from Google); PXR0169* at -816 (The "value exchange is well established" for

publishers giving Google Search access to their content, such that the "vast majority [of publishers] do not [opt out] because [Google] send[s] valuable traffic" to websites.).

415. Google has an advantage in accessing third-party content through its long-standing position as the world's leading search engine provider. Des. Rep. Tr. 83:16–73:24 (OpenAI-NT 30(b)(6) Dep.); PXR0169* at -816 (The "value exchange is well established" for publishers giving Google Search access to their content, such that the "vast majority [of publishers] do not [opt out] because [Google] send[s] valuable traffic" to websites.).

F. Conditional Access And Retaliation Prohibited

416. Under the MADA, Google conditioned its "must have" Play Store on the exclusive distribution of the Google Search App, the Google Search Widget, and Chrome. Mem. Op. at 210–12.

417. Plaintiffs' proposed remedies prohibit Google from using these same tactics going forward, including with new "must have" offerings and in response to cutting-edge technologies. Rem. Tr. 726:6–21 (Shevelenko (Perplexity)) (stating "if you use one Google product, you have to use all of them"); Rem. Tr. 807:16–808:10 (Shevelenko (Perplexity)) (explaining in response to the Court's question that banning default status payments and preventing Google from conditioning certain products is the solution to allowing choice on Android).

418. OEMs view marketing agreements and the RSA agreements to blend together and that the marketing agreements are a bridge to the RSA. Des. Rem. Tr. 79:14–16, 79:18–80:21 (Laflamme (Motorola) Dep.); Des. Rem. Tr. 139:22–140:5, 204:1–205:1, 205:4–6 (Kim (Samsung) Dep.) (discussing how Samsung viewed the financial impact across multiple deals with Google in parallel).

419. Google looks broadly across its deals with Verizon, including the RSA, the marketing agreement, and others to manage Google's overall investment in Verizon. Des. Rem. Tr. 103:8–11, 103:13–106:2 (Boulben (Verizon) Dep.) (discussing PXR0133).

420. Android partners recognize the array of assets under Google's control that Google could leverage to retaliate against Android partners to dictate agreements with third-parties. Des. Rem. Tr. 108:14–110:15 (Laflamme (Motorola) Dep.) (Motorola feared retaliation from Google on multiple fronts if Motorola was to strike a deal with another partner.); Des. Rem. Tr. 169:9–170:14, 191:9–192:2, 192:5–17 (Laflamme (Motorola) Dep.) (Motorola feared losing marketing funds because Motorola is required to get Google's approval before executing a marketing plan.); Des. Rem. Tr. 139:22–140:5, 204:1–205:1, 205:4–6 (Kim (Samsung) Dep.) (discussing how Samsung viewed the financial impact across multiple deals with Google in parallel).

421. To the extent there is retaliation or even a fear of retaliation, distributors would be more likely to set Google as the default. Des. Rem. Tr. 108:14–110:15 (Laflamme (Motorola) Dep.) (Motorola feared retaliation from Google on multiple fronts if Motorola was to strike a deal with another partner.); Des. Rem. Tr. 169:9–170:14, 191:9–192:2, 192:5–17 (Laflamme (Motorola) Dep.) (Motorola feared losing marketing funds because Motorola is required to get Google's approval before executing a marketing plan.); Rem. Tr. 2185:7–12 (Chipty (Pls. Expert)) ("[T]o the extent there is or even fear of retaliation, that would just increase the chances that distributors would set Google as the default."); PXR0139 at -177 ("We indicated that we need . . . [c]ommitment from MSFT that they would back us up (as we would be very exposed to retaliation [from Google]) . . . ."). Rem. Tr. 723:7–21 (Shevelenko (Perplexity)) (explaining how Google operates "like a mob boss" with regards to mobile OEMs and carriers); Rem. Tr. 726:6–21 (Shevelenko (Perplexity)) (explaining an appropriate remedy from Perplexity's view noting

the if "you have to default to Google ones, you have a gun to your head"); Rem. Tr. 727:9–23 (Shevelenko (Perplexity)) (explaining that Perplexity "feared retribution from Google" if it participated in this litigation).

422. Even where Google doesn't place specific restrictions on marketing agreements, the requirement for Motorola to get permission from Google before executing a marketing program has chilled Motorola's willingness to partner for other on-device products and services. Des. Rem. Tr. 169:9–170:14 (Laflamme (Motorola) Dep.) (Motorola feared losing marketing funds if because Motorola is required to get Google's approval before executing a marketing plan.); Des. Rem. Tr. 191:9–192:2, 192:5–17 (Laflamme (Motorola) Dep.) (Motorola fears placing a [redacted] search widget, even if technically allowed, because it could impact Motorola's relationship with Google in other areas, including marketing agreements.).

423. Motorola explored a Copilot agreement with Microsoft but had to abandon a partnership in part because of the uncertainty it would create with Google's MADA and RSA agreements and Microsoft's inability to make Motorola whole on any lost payments. Des. Rem. Tr. 101:13–104:20, 108:4–109:15 (Laflamme (Motorola) Dep.); PXR0139 at -177 (Microsoft would have to provide something comparable to Google's RSA).

424. Motorola feared that Google would retaliate if Motorola partnered with Microsoft on a Copilot deal. Des. Rem. Tr. 108:14–110:15 (Laflamme (Motorola) Dep.); PXR0139 at -177 ("We indicated that we need . . . [c]ommitment from MSFT that they would back us up (as we would be very exposed to retaliation [from Google].").

425. OpenAI understands that its ability to obtain distribution on Android devices has been impacted by Google because, in part, Google "always has more leverage over" Android ecosystem participants due to revenue and other "tie-ins to the Google ecosystem," i.e., "Google

offers many things," including the Android operating system, the Play Store, and Search. Rem. Tr. 474:18–475:5 (Turley (OpenAI)).

G. Revenue Share Payments Prohibited

426. If given the opportunity to continue payments, Google will leverage its dominant position and partners' limited negotiating strength to continue controlling defaults on search access points. Rem. Tr. 2315:3–19 (Chipty (Pls. Expert)) (explaining that allowing Google to continue to pay for defaults will maintain the "status quo"); Rem. Tr. 2180:20–2181:10 (Chipty (Pls. Expert)) (explaining how Google's huge monetization advantages will lead to winning defaults); Rem. Tr. 726:6–727:8 Shevelenko (Perplexity)) (Perplexity cannot simply replace Google's revenue because of Google's size and will need some time to get up to the scale to replace payments.); Rem. Tr. 807:7–13 Shevelenko (Perplexity)) (explaining that a remedy should not have a loophole); Rem. Tr. 807:16–808:10 Shevelenko (Perplexity)) (explaining in response to the Court's question that banning default status payments and preventing Google from conditioning certain products is the solution to allowing choice on Android); Des. Rem. Tr. 57:15–58:9 (Ezell (AT&T) Dep.) (AT&T has been subjected to Google's deal framework and has had "limited negotiating power" in discussions.); Des. Rem. Tr. 66:11–67:5, 67:18–21, 67:23–68:23 (Beard (Microsoft) Dep.) (explaining that Motorola wanted to pursue a Copilot carveout deal with Microsoft but the deal fell through because Google would not permit a carveout if Motorola wanted to keep Google's revenue sharing.); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google provided Motorola with financial incentives to cancel a planned Copilot distribution deal); Des Rem. Tr. 133:4–7, 133:10–15, 69:6–8, 69:12–14 (Laflamme (Motorola) Dep.) (Motorola does not have much leverage to negotiate against Google).

427. If Google revenue share payments remain, carriers and OEMs have the incentive to only replace Google Search where competitors can offer similar levels of revenue. Rem. Tr. 2180:20–2181:10 (Chipty (Pls. Expert)) (explaining how Google's huge monetization advantages will lead to winning defaults); Rem. Tr. 726:6–727:8 (Shevelenko (Perplexity)) (explaining that, due to Google's monetization advantage, it will take a long time for any challenger to "directly replace [Google] dollar for dollar"); Rem. Tr. 806:3–15 (Shevelenko (Perplexity)) (Carriers and OEMs have revenue dependency); Des. Rem. Tr. 117:14–119:22 ([redacted] Dep.) ([redacted] requested payments for a Microsoft Copilot deal that were directionally consistent with Google's revenue share payments, were they to lose those payments.); Des. Rem. Tr. 107:8–109:15 (Laflamme (Motorola) Dep.) (agreeing during discussion of PXR0139 at -177 that Motorola indicated to Microsoft that Motorola needed a deal "comparable to what Motorola gets with Google"); PXR0139 at -177.

428. Google will have a monetization advantage over entrants. Rem. Tr. 4325:23–4328:16 (Murphy (Def. Expert)) ("Google will have an -- over those entrants a monetization advantage."); Rem. Tr. 472:19–473:15 (Turley (Open AI)) (OpenAI was under the impression that its distribution discussions with Android OEMs stalled because the OEMs believed OpenAI could not pay them as much money as Google, telling OpenAI it would need "significantly more money to offer and that [OpenAI] couldn't compete on any other grounds").

429. In the medium to longer run, Google is likely to outbid rivals because it has better monetization and a better product. Rem. Tr. 4325:23–4328:16 (Murphy (Def. Expert)) ("So I think Google likely, in the very short run, and probably in the medium-to-longer run is going to outbid because they have better monetization and a better product.").

430. Google's proposed remedies allow it to pay distributors an unconditional revenue share, which will likely result in Google being set as the default, replicating the outcome in the actual world. Rem. Tr. 4367:19–4369:17 (Murphy (Def. Expert)) (Describing how paying an "unconditional revenue share" could result in Google being set as the default and admitting that "I [Professor. Murphy] think that is the likely outcome.").

431. Google's revenue share payments also incentivize carriers and OEMs to partner with Google on GenAI distribution, limiting AI competitors' negotiating strength. Rem. Tr. 726:6–727:8 Shevelenko (Perplexity)) (Perplexity cannot simply replace Google's revenue because of Google's size and will need some time to get up to the scale to replace Google's payments.); Des. Rem. Tr. 26:13–27:7, 30:11–31:3 (OpenAI-NT 30(b)(6) Dep.) (OpenAI agreed to [redacted] Apple deal because they were [redacted] by a Google-Apple AI partnership.).

432. Unless Google is banned from making revenue share payments, OEMs and carriers will not have a true choice of offering alternative search and GenAI products. Rem. Tr. 807:7–13 (Shevelenko (Perplexity)) (Banning revenue share payments gives OEMs and carriers a true choice to offer alternative products.); Rem. Tr. 807:16–808:10 (Shevelenko (Perplexity)) (explaining in response to the Court's question that banning default status payments and preventing Google from conditioning certain products is the solution to allowing choice on Android); Rem. Tr. 726:6–727:8 (Shevelenko (Perplexity)) (Perplexity cannot simply replace Google's revenue because of Google's size and will need some time to get up to the scale to replace payments.); Rem. Tr. 2315:3–19 (Chipty (Pls. Expert)) (explaining that allowing Google to continue to pay for defaults will maintain the "status quo"); Rem. Tr. 2180:20–2181:10 (Chipty (Pls. Expert)) (explaining how Google's huge monetization advantages will lead to

winning defaults); Des. Rem. Tr. 66:11–67:5, 67:18–21, 67:23–68:23 (Beard (Microsoft) Dep.) (Motorola wanted to preinstall Copilot as a default on a subset of its devices, but Google threatened to stop all revenue share payments.); Des. Rem. Tr. 252:8–253:15 (Beard (Microsoft) Dep.) (describing Microsoft's understanding that Google provided Motorola with financial incentives to cancel a planned Copilot distribution deal); Des. Rem. Tr. 29:6–30:3 (Laflamme (Motorola) Dep.) (When seeking GenAI partners, Motorola has considered Google revenue share payments as a baseline to either replace or supplement with partner agreements.).

433. "True freedom" on Android devices means preventing Google from making payments to be the default. Rem. Tr. 806:3–15, 806:25–808:10 (Shevelenko (Perplexity)).

434. Google's proposed remedy of merely removing exclusivity from distribution agreements does not fix the harm created by Google's conduct. Rem. Tr. 2315:3–19 (Chipty (Pls. Expert)) (explaining that allowing Google to continue to pay for defaults will maintain the "status quo"); Rem. Tr. 792:13–793:8 (Shevelenko (Perplexity)) (Perplexity does not see Google's proposed remedy unlocking user choice.).

435. Google's agreement with Samsung requires Samsung to implement a number of Gemini entry points to receive revenue share. Rem. Tr. 2495:1–4 (Pichai (Google)).

H. Permitted Payments And Other Means For Google To Compete

436. Even without the ability to pay for defaults, Google can compete for users. Rem. Tr. 2159:16–2160:9 (Chipty (Pls. Expert)) (Google can use app store ads and promotional reminders in other Google properties, such as Gmail and YouTube, to promote downloading Google Search app, pay users to search on Google.com, innovate to encourage use of Google Search, and encourage distributors to set Google as the default without payment).

437. Even if Google isn't the default, users can access Google Search. Rem. Tr. 2158:3–20 (Chipty (Pls. Expert)) (users can download Google Search app, search on Google.com, and change the default.).

438. Under Plaintiffs' remedies, Google still has various ways to pay for users. Rem. Tr. 2158:3–2160:18 (Chipty (Pls. Expert)).

439. Google can still compete by continuing to market and advertise Google Search, by paying users directly for Search engagement, and by continuing to innovate Search. Rem. Tr. 2159:16–2160:18 (Chipty (Pls. Expert)).

440. Microsoft and Brave offer rewards programs that reward consumers for searches and activity in adjacent markets. Rem. Tr. 4360:22–4361:16 (Murphy (Def. Expert)); Rem. Tr. 2160:10–20 (Chipty (Pls. Expert)) (explaining that there is precedent for direct-to-consumer incentives or payments both in the general search market and in adjacent markets).

441. Today, Ecosia encourages users to search by planting trees in exchange for user engagement. Rem. Tr. 4362:12–19 (Murphy (Def. Expert)).

442. Google also may, and likely would, continue to innovate to attract users to Search. Rem. Tr. 2160:21–23 (Chipty (Pls. Expert)) (Under Plaintiffs' remedies, Google would continue to innovate and has historically innovated in competitive markets.).

443. Google may also continue to make payments unrelated to Search. Google's payments to Verizon that are not related to search, including the MFA or MSI, offer direct promotion contribution to Verizon supporting the Android ecosystem; payments related to search are not required to support Android. Des. Rem. Tr. 118:1–120:23 (Boulben (Verizon) Dep.).

I. Prior Notification Of Acquisitions And Investments

444. Plaintiffs' acquisition and investment notification requirements do not impose a burden on the GenAI market, because, as Google's own economic expert opines, GenAI firms

are highly competitive and well-funded by non-Google entities. Rem. Tr. 4048:17–4049:20 (Hitt (Def. Expert)) ("[T]here seems to be a lot of money floating around in AI.").

445. Innovation in the GenAI space is also reliant on more than just capital investments; GenAI firms require data, talent, and computing power, which are all readily available to competitors. Rem. Tr. 4027:13–4028:22 (Hitt (Def. Expert)) (discussing ways for competitors to access data generally and observing that "[b]ottom line on all these . . . things is that all these sources are generally available to anybody building an AI model, and they generally tend to be nonexclusive."); Rem. Tr. 4019:19–4020:20 (Hitt (Def. Expert)) ("This high mobility of talent means that talent is available in the market."); Rem. Tr. 4020:23–4023:6 (Hitt (Def. Expert)) (There's "an active entry and progress . . . [s]o it's competitive in that sense" within the computing chip space and "there are many providers of cloud computing services.").

446. Google already holds the lead in search-related GenAI and has expressed an interest in further integrating GenAI into Google Search. Rem. Tr. 3622:25–3623:19 (Reid (Google)) (AI Overviews is more accurate than other LLMs.); Rem. Tr. 3631:4–3632:15 (Reid (Google)) (Google finds it important to combine the superpowers of an LLM and Search to make the best Search experience.).

VI. PROHIBITION ON FORECLOSING OR OTHERWISE EXCLUDING GSE AND SEARCH TEXT AD COMPETITORS THROUGH OWNERSHIP OR CONTROL OF RELATED PRODUCTS

A. Chrome Divestiture Could Further Lower Barriers To Distribution

1. Browsers Are An Important Distribution Channel For General Search Services

447. Chrome is an important distribution channel for online services, including search. Rem. Tr. 1603:7–10 (Tabriz (Google)) (confirming a significant number of Google Search queries start from Chrome home screen and noting the omnibox is one of Chrome's most popular

features); Rem. Tr. 1603:14–20 (Tabriz (Google)) (stating that the Chrome Omnibox is an integrated experience for navigating the web and conducting queries); Rem. Tr. 1612:8–20 (Tabriz (Google)) ("search is a critical functionality of a browser"); Rem. Tr. 728:9–19 (Shevelenko) (Perplexity)) (In Perplexity's view, Chrome is a valuable distribution channel because of its "millions and millions" of users.); Rem. Tr. 825:7–15 (Weinberg (DuckDuckGo)) (Chrome is "the gateway for the Internet for most people."); Rem. Tr. 821:20–822:15 (Weinberg (DuckDuckGo)) ("Chrome is the dominant browser."); Rem. Tr. 2153:10–14 (Chipty (Pls. Expert)) (Chrome "most widely used U.S. browser in the last ten years"); Rem. Tr. 2153:10–21 (Chipty (Pls. Expert)) ("on mobile, Chrome has accounted for about 40 percent of U.S. web traffic"); Rem. Tr. 2152:22–2153:9 (Chipty (Pls. Expert)) (In 2024, 35 percent of Google's U.S. queries came from Chrome.); PXR0196* at -846 ("Chrome and [the Android Google Search App] are by far the major entry points to Search" on Android devices.); PXR0218* at -543 (Chrome is a "key distribution channel for Search and assistive technologies"); Rem. Tr. 1602:4–14 (Tabriz (Google)) (confirming Google Search has been the default in Chrome for over 10 years).

448. The Court previously found that "20% of all general search queries in the United States flow through user-downloaded Chrome, which defaults to Google" Mem. Op. at 25 (citing Liab. Tr. at 5762:22–5763:13 (Whinston (Pls. Expert)) (discussing UPXD104 at 37)). Dr. Chipty calculates that nearly 40% of US web traffic flows through Chrome. Rem. Tr. 2153:10–21 (Chipty (Pls. Expert)).

449. Google describes Chrome as a "gateway to the web loved by billions" and a "critical endpoint for Google across all modern devices" that drives value by expanding Google's reach, preventing disintermediation, and serving as a "key distribution channel" for

both Search and AI technologies. PXR0218* at -542–43 (describing Google's Chrome investment thesis); PXR0209* at -580 (Chrome Platform slide deck, with comments dated June 2024, listing as one of its strengths that it's "Suitable for AI: Web technologies align well with AI/agents"); PXR0212* at -608 (Platforms & Ecosystems 2022 annual planning deck stating "Chrome serves as a critical endpoint for Google businesses on all modern Desktop and Mobile OS"); PXR0206 at -505 (explaining the "tangible value Chrome is delivering" for Search, YouTube, Ads, among other Google products).

450. Google recognizes that Chrome is a "key distribution channel for Search and assistive technologies, including the Gemini app." PXR0218* at -543; PXR0351* at -281 ("Gemini distribution with both users and developers as Chrome is uniquely positioned to accelerate both model and app adoption."); PXR0217* at -157 (Chrome 2025 planning document stating Chrome is a "critical Gemini distribution channel").

451. Google built Chrome from the "ground up" to facilitate the use of Google web applications. Rem. Tr. 2466:23–2467:21 (Pichai (Google)) (describing Google's development of Chrome as a way to support dynamic web applications); PXR0241* at -033 (Pichai describing that "Google Chrome was a browser we built from the ground up within Google" because "the web was evolving from just being like web pages with content to actually being an application . . . like Gmail, Google Maps, Flickr").

452. Google recognizes the power that Chrome has over users' experiences, describing it as Google's virtual operating system. PXR0219* at -151; PXR0220 at -200 ("Chrome is Google's 'OS' for desktop web"); PXR0218* at -542 (Chrome is an "OS atop OS" with "unique cross-platform reach").

453. Search and GenAI companies would have interest in distributing through an independent Chrome. Rem. Tr. 728:9–19 (Shevelenko (Perplexity)) (Perplexity would have interest in partnering with an independent Chrome.); Rem. Tr. 476:23–479:4 (Turley (OpenAI)) (describing OpenAI's interest in both greater distribution and the potential for a deeper AI integration into Chrome); Rem. Tr. 1996:9–20 (Locala (Pls. Expert)) (opining potential buyers could view Chrome as a distribution platform for AI services).

454. Web browsers are a valuable distribution path for search engines because most queries happen within the browser search bar. Rem. Tr. 1250:10–14 (Provost (Yahoo)); PXR0081* at -264 (noting that during research regarding Yahoo's need for a browser, "the strategic value of a browser in aiding nearly every Yahoo product to compete going forward became very clear."). About 60% of queries are conducted in a web browser. Rem. Tr. 1250:25–1251:3 (Provost (Yahoo)).

2. A Chrome Divestiture Would Likely Allow A Rival General Search Firm To Gain Access To An Efficient Distribution Channel

455. Chrome divestiture would "lower distribution barriers," because rivals would be able to compete for the Chrome default, something that has "not been historically possible. Rem. Tr. 2153:22–2154:10 (Chipty (Pls. Expert)).

456. Because of the incentives created by rivals' ability to pay for default status, if Chrome is divested, a rival is likely to become the new default on Chrome, especially once there is a good alternative to Google. Rem. Tr. 2291:2–14 (Chipty (Pls. Expert)); Rem. Tr. 2153:22–2154:10 (Chipty (Pls. Expert)).

457. A Chrome divestiture would shift search market share to a Google general search competitor. Rem. Tr. 2154:11–2155:7 (Chipty (Pls. Expert)) (Dr. Chipty calculated a "7 percent share shift from Google to rivals[] from user-downloaded Chrome" and some share shift from

"Android['s] 13 percent" share if new owner could obtain pre-installation for Chrome on Android). About half of this share shift would occur on mobile. Rem. Tr. 2156:7–15 (Chipty (Pls. Expert)).

458. Yahoo projects that if it acquired Chrome and set Yahoo as the default browser, that it would increase Yahoo's general search market share from 3% to double digits, which would be a significant increase for Yahoo. Rem. Tr. 1253:3–17 (Provost (Yahoo)). Yahoo projects that if it acquired Chrome, query volume and search quality would increase. Rem. Tr. 1254:11–19 (Provost (Yahoo)).

3. Chrome Is A Significant Barrier To Entry

459. Google is set as the default search engine on 92% of Windows Chrome browsers, 95% of Mac Chrome browsers, 98% of Android Chrome browsers, and more than 99% of iOS Chrome browsers. PXR0224* at -712 (cataloguing share of Chrome browsers with Google as default search engine).

460. Chrome is hostile to Google's general search competitors when users try to switch defaults. Rem. Tr. 821:20–822:15 (Weinberg (DuckDuckGo)) (In a fair market it would be easy to switch search engines.).

461. Chrome uses "dark patterns" to prevent switching to a competing general search engine. Rem. Tr. 821:20–824:1 (Weinberg (DuckDuckGo)) (Chrome's pop-ups and dark patterns cut DDG's install rate by half.).

462. Google uses Chrome to promote access to Google products, including Search, and to prevent disintermediation of Google Search by operating system providers. PXR0218* at -542 (Google describes Chrome as a "critical endpoint" that drives value by expanding Google's reach and preventing disintermediation.); PXR0350* at -191 ("Chrome is a key entry point for Search"). Google recognizes the importance of Chrome as a tool to maintain Search share if

Google loses default status on other search access points. PXR0350* at -191 n.1 (noting that "in today's world (where most Safari queries come to Google), there's lower incremental value from users on iGA/Chrome" but that if the fact of most Safari queries coming to Google "changes for any number of potential reasons" then it would be more valuable to shift users from Safari to Chrome).

463. When Microsoft attempted to use Windows 11 to shift users from Chrome to Edge and create "friction" for switching back, Google used its other products to aggressively trigger users to switch their default browser back to Chrome. PXR0216* at -714, -715 (Google internally tracks how Microsoft has taken actions in Windows 11 to attempt to take back share from Chrome.); PXR0216* at -719 (Microsoft created "high friction" for switching default to Chrome.); PXR0216* at -717; -719 (Google changed the user experience of its products by getting "[m]ore aggressive" in triggering users to download or switch their default browser back to Chrome.).

464. Google projected that aggressively triggering users to switch their default browser back to Chrome would increase Chrome's daily and weekly active user counts. PXR0216* at -719 (projecting increases in DAUs and WAUs).

B. Chrome Divestiture Is Technically And Administratively Feasible

1. Chrome Is An Attractive Asset

465. Chrome is an attractive asset given its leading market position, immense usership, and well-known product features, and it will likely generate revenue for the divestiture buyer. Rem. Tr. 476:23–477:16 (Turley (OpenAI)) (describing value OpenAI would receive from Chrome distribution and what value they would provide to Chrome); Rem. Tr. 479:5–7 (Turley (OpenAI)) (OpenAI would be interested in acquiring Chrome); Rem. Tr. 728:9–729:8 (Shevelenko (Perplexity)) (Perplexity would be interested in offering a revenue, both

subscriptions and ads, share agreement to the independent Chrome owner.), Rem. Tr. 808:14–17 (Shevelenko (Perplexity)) (Perplexity would be interested in acquiring Chrome.); Rem. Tr. 825:7–15 (Weinberg (DuckDuckGo)) (Chrome is the gateway for the Internet for most people. All the big tech companies would be interested in buying it.); Rem. Tr. 1994:20–1995:9, 1995:17–1996:20 (Locala (Pls. Expert)) (explaining that Chrome is an attractive acquisition opportunity given user base and well-known product features); Rem. Tr. 2708:12–21 (Zenner (Def. Expert)) (agreeing a divested Chrome would have value in the marketplace); Rem. Tr. 2002:7–2003:2 (Locala (Pls. Expert)) (explaining there are multiple potential avenues for a new owner of Chrome to generate revenue); Rem. Tr. 2008:16–2009:10 (Locala (Pls. Expert)) (noting that "just because Google's internal [financial] reporting practices . . . show that there is no revenue next to Chrome, that that doesn't mean that independent Chrome wouldn't generate revenue"); Rem. Tr. 2013:11–24 (Locala (Pls. Expert)) (opining that divested Chrome could generative sufficient revenue to be financially viable given how Google monetizes the Chrome userbase, the amount of Search revenue generated outside the U.S., and its current cost structure).

466. Chrome has a leading market position with 4.1 billion monthly active users. PXR0206 at -511 (May 2024 Chrome Review presentation providing Chrome has 1.8B DAU and 4.1B MAU worldwide across platforms and its usership is grown by a rate of 5% YoY); Rem. Tr. 1607:7–1608:13 (Tabriz (Google)) (confirming PXR0206 at -513 provides Chrome's market share by platform as of May of 2024); PXR0206 at -513 (May 2024 Chrome Review presentation providing browser market share by platform, with 80% on Android, 12.9% on iOS, 68.4% on Windows, and 59.9% on MacOS); Rem. Tr. 1608:14–16 (Tabriz (Google)) (agreeing that Chrome has majority of the share on all platforms except for Apple mobile devices); Rem.

Tr. 1620:13–15 (Tabriz (Google)) (agreeing Chrome DAUs continue to grow today); Rem. Tr. 1619:23–1620:6 (Tabriz (Google)) (stating over 80% of Chrome MAUs are outside of the United States); PXR0204* at -336 (Chrome has "4.1B [active users over 28 days]."); Rem. Tr. 1998:2–23 (Locala (Pls. Expert)); PXR0211* at -190–91, -202, -209, -216, -218, -224 (showing browser share on major platforms); PXR0216* at -707.

467. Even on Chrome's weakest platform, iOS, the browser's usership is growing rapidly, increasing by 21% from 2023 to 2024. PXR0204* at -336 ("Chrome on iOS (Bling) 107M DAU (+21.0% y/y)"); PXR0206 at -511 ("iOS is the fastest growing platform [for Chrome] with a 21% YoY increase in DAU, driven by continued success with marketing, incremental product bets, and rollout of iOS choice screens in EU."); PXR0214* at -449 (Chrome strategy document, dated Jan. 2024, noting among the platforms, Chrome on iOS experienced the fastest growth rate).

468. Today, Chrome is available to users across every major operating system and a wide range of device form factors. PXR0215 at -251 (highlighting Chrome's availability on Android, iOS, Windows, MacOS, and ChromeOS, as well as on a wide array of devices like phones, laptops, tablets, extended reality devices, and automobiles).

469. Chrome's well-known features include cross-platform availability, speed, and customization. Rem. Tr. 1998:24–1999:16 (Locala (Pls. Expert)) (highlighting value to users of Chrome's cross-platform availability, speed, and customization); Rem. Tr. 1674:25–1675:7 (Tabriz (Google)) (describing Chrome's cross-platform availability); Rem. Tr. 1668:9–19 (Tabriz (Google)) (speed). Of course, feature differentiation is not unique to Chrome, and other browsers have found their own way to add value to the user experience. Rem. Tr. 3147:10–3148:23 (Muhlheim (Mozilla)) (describing "incredibly dynamic way" in which Firefox promotes

search engine choice); Rem. Tr. 1076:11–25 (Schechter (Microsoft)) (highlighting integrations of Microsoft CoPilot into Microsoft Edge).

470. An independent Chrome would have available to it multiple potential revenue streams. Rem. Tr. 2002:7–2003:2 (Locala (Pls. Expert)).

471. The new owner of Chrome could look to how Google and other independent browsers monetize through search and ads displayed directly on the browser. Rem. Tr. 2002:14–2003:2 (Locala (Pls. Expert)) ("The bulk of independent Chrome revenues are going to come from ways that . . . Google itself existing currently monetizes the Chrome users and those would be through search and display ads. . . . Mozilla's Firefox and Opera, they also monetize their users in the same manner"); Rem. Tr. 2003:3–20 (Locala (Pls. Expert)) (opining on availability of revenue-share agreements); Rem. Tr. 2713:12–2714:1, 2714:16–2715:5 (Zenner (Def. Expert)).

472. The new owner of Chrome could also monetize through the distribution of GenAI services. Rem. Tr. 2005:2–18 (Locala (Pls. Expert)) ("I think buyers will take [the possible revenue streams from AI distribution agreements] into account in the scenarios that they develop when they are modeling what an acquisition might look like for them"). Multiple representatives from AI firms at trial testified that they would be interested in securing distribution partnerships with an independent Chrome. Rem. Tr. 476:23–477:12 (Turley (OpenAI)) (describing value OpenAI would receive from Chrome distribution); Rem. Tr. 477:17–478:16 (Turley (OpenAI)) ("I would imagine that you could offer a really incredible experience where either the use chooses or better, we have an opportunity to introduce people into what an AI first experience looks like when they type into Chrome . . . you could imagine very, very deep integrations like that over time"); Rem. Tr. 728:9–729: 8 (Shevelenko (Perplexity)) ("[W]e would be happy to

enter a revenue-sharing agreement that would not just encompass future advertising revenues but subscription revenues, which is . . . where we see . . . the business model shift potentially happening in this space over time.").

473. Chrome is valuable to Google and generates significant indirect revenue, predominantly through search advertising. Rem. Tr. 1610:15–1611:1 (Tabriz (Google)) (confirming PXR0206 at -491 depicts the financial impact of various components of Chrome on Google Search and other products); Rem. Tr. 1615:2–14 (Tabriz (Google)) (confirming PXR0206 at -491 asserts that Search and Ads are the only Google products listed as having an extra-large financial impact from Chrome); PXR0206 at -491 (May 2024 Chrome Review presentation with slide on "[h]ow Chrome creates value for Google"); PXR0162 at -899–901 (displaying all Chrome indirect revenue streams for fiscal year 2023); PXR0212* at -613 (Platforms & Ecosystems 2022 annual planning deck noting 5% Chrome share loss would equate to ~$2B in annual revenue lost that Google wouldn't otherwise recapture); Rem. Tr. 2007:3–2009:13 (Locala (Pls. Expert)) (discussing PXRD011 at 11 and explaining wide variety of indirect advertising revenue that flows through Chrome).

474. In 2023, Chrome generated $[redacted] billion in revenue, $[redacted] billion of which is attributable to Search. PXR0206 at -500 (May 2024 Chrome Review presentation stating "[redacted]B or [redacted]% of Google's 2023 Search & Display Revenue flowed through Chrome clients"); Rem. Tr. 1616:7–1617:14 (Tabriz (Google)) (confirming PXR0206 at -502 shows the 2023 Google Search revenue by platform that flows through Chrome); Rem. Tr. 2007:3–2009:13 (Locala (Pls. Expert)) (discussing PXRD011 at 11 and explaining wide variety of indirect advertising revenue that flows through Chrome); PXR0162 at -899–901 (displaying all Chrome revenue streams for fiscal year 2023); PXR0206 at -502 (disaggregating $[redacted] billion in indirect Search revenue by

platform); PXR0209* at -582 (June 2024 Chrome Platform presentation listing one threat to "[m]onetization" is the "[p]otential illegality of iOS/Google search deal").

475. Approximately $[redacted] billion of the $[redacted] billion in indirect Search revenue generated by Chrome was organic search revenue, and nearly half of indirect Search revenue was driven by searches in the United States. PXR0215 at -261 ($[redacted] billion in organic search revenue channeled through Chrome in 2023); Rem. Tr. 2007:3–2009:13 (Locala (Pls. Expert)) (discussing PXRD011 at 11 and explaining wide variety of indirect advertising revenue that flows through Chrome); PXR0215 at -259 ([redacted] percent of Chrome indirect search revenue was from the United States).

476. "A disproportionate amount of [Chrome's] value" comes from Windows Chrome users, where nearly all Chrome is user-downloaded. PXR0215 at -258 (showing that Windows is 24 percent of Chrome daily active users but channels "nearly [redacted] of its revenue").

477. In 2023, Chrome's costs were only $[redacted] billion, of which only $[redacted] billion was necessary to develop and support Chrome. PXR0215 at -257 (July 2024 Chrome slide deck identifying, as of 2023, ~$[redacted]B in "[c]osts to Chrome," which includes "$[redacted]B to develop & support Chrome"); Rem. Tr. 1636:3–10 (Tabriz (Google)) (clarifying that in PXR0215 at -257, $[redacted]B is the total costs to Chrome and $[redacted]B represents the cost of developing and supporting both the Chrome browser applications and Chromium).

478. Several potential buyers have already expressed interest in acquiring Chrome. Rem. Tr. 479:5–7 (Turley (OpenAI)) (OpenAI would be interested in acquiring Chrome, as would many other parties); Rem. Tr. 808:14–17 (Shevelenko (Perplexity)) (Perplexity would be interested in acquiring Chrome.); Rem. Tr. 825:16–23 (Weinberg (DuckDuckGo)) (DDG would be interested in buying Chrome for the right price.); Rem. Tr. 1252:20–1253:2 (Provost (Yahoo))

(Yahoo would be interested in bidding to buy Chrome); Rem. Tr. 1999:22–2000:22 (Locala (Pls. Expert)) (noting the trial testimony from these firms "is consistent with my opinion that Chrome would be an attractive acquisition opportunity").

479. Mr. Weinberg projected that "pretty much all the big tech companies would be interested" in purchasing Chrome, leading to a "bidding war." Rem. Tr. 825:7–15 (Weinberg (DuckDuckGo)); Rem. Tr. 2711:21–2713:7 (Zenner (Def. Expert)) (based on recent large cash acquisitions of entire companies in the technology sector, "[i]t's definitely possible" that a motivated buyer could raise the capital necessary to buy Chrome at the value range of $20–50 billion).

480. Yahoo is interested in bidding on Chrome. Rem. Tr. 1252:20–22 (Provost (Yahoo)). Yahoo is aware of Plaintiff's proposed remedy for Google to divest Chrome. Rem. Tr. 1252:12–19 (Provost (Yahoo)). Yahoo has done cursory work to evaluate the potential acquisition of Chrome. Rem. Tr. 1253:18–25 (Provost (Yahoo)). Yahoo estimated Chrome will be valued in the tens of billions of dollars range. Rem. Tr. 1254:1–8 (Provost (Yahoo)). Yahoo would work with Apollo in a potential acquisition of Chrome. Rem. Tr. 1254:9–10 (Provost (Yahoo)).

481. While Chrome certainly has a dominant share amongst other browsers today, Google itself has described competition amongst browsers today as "increasingly strong." PXR0206 at -495, -496 (identifying significant investment from incumbents and new entrants).

482. The provision in the Plaintiffs' Revised Proposed Final Judgment prohibiting Google from releasing a browser during the term of the final judgment would make the divested Chrome business more attractive to potential buyers. Rem. Tr. 2001:1–2002:3 (Locala (Pls. Expert)) (explaining a noncompete would be important to potential buyers because it gives the

new owner time to "ramp up monetization" and reduces the possibility of any gamesmanship by Google re the allocation of assets and other resources).

483. A buyer of Chrome will have every incentive to make the product successful. Rem. Tr. 2291:19–24 (Chipty (Pls. Expert)); Rem. Tr. 2292:13–15 (Chipty (Pls. Expert)) ("Q: A new owner of Chrome would certainly be able and incentivized to pay for distribution of Chrome; correct? A: Yes.").

2. Divesting Chrome Is Technically Feasible

484. A Chrome divestiture is feasible from a technical perspective. Rem. Tr. 1429:4–13 (Mickens (Pls. Expert)) (stating opinion); Rem. Tr. 1448:2–16 (Mickens (Pls. Expert)) (feasible to divest without "break[ing] too much" and to keep Chrome running); Rem. Tr. 1457:5–8 (Mickens (Pls. Expert)) (feasible from an engineering perspective).

485. Chrome and other mainstream browsers are not deeply integrated with remote infrastructure, and therefore can be feasibly separated. Rem. Tr. 1448:2–10 (Mickens (Pls. Expert)) (integrations not deep); Rem. Tr. 1453:21–23 (Mickens (Pls. Expert)) (Chrome is not deeply integrated with Google's back-end services.).

486. Chrome is a standalone piece of software that can operate as a browser without connecting to any cloud services. Rem. Tr. 1457:14–23 (Mickens (Pls. Expert)) (divestiture would not impact Chrome's ability to render and display web pages); Rem. Tr. 1448:17–1449:14 (Mickens (Pls. Expert)) (describing PXRD010 at 25) (Chrome is fundamentally a piece of client-side software independently connecting to the web).

487. Google is not the only U.S. company capable of running a browser. Rem. Tr. 2468:4–2469:4 (Pichai (Google)).

488. A Chrome divestiture would not impact Chrome's ability to render and display web pages. Rem. Tr. 1457:14–23 (Mickens (Pls. Expert)); Rem. Tr. 1449:18–1450:3 (Mickens (Pls. Expert)) (Chromium code provides rendering functionality).

489. Chrome's client-side code connects to Google's back-end infrastructure through simple, well-defined APIs. Rem. Tr. 1437:13–1438:7 (Mickens (Pls. Expert)) (defining API); Rem. Tr. 1448:17–1449:14 (Mickens (Pls. Expert)) (Chrome connects to back-end through APIs); Rem. Tr. 1454:12–1455:1 (Mickens (Pls. Expert)) (Chrome's APIs hide complexity, discussing PXR0321*); PXR0321* at -172 (diagram of Chrome architecture).

490. The number of APIs connecting Chrome's client-side code to Google's back-end infrastructure is usual for a software of Chrome's size. Rem. Tr. 1453:5–10 (Mickens (Pls. Expert)) (several hundred Chrome APIs is normal amount).

491. Google has designed Chrome's client-side code to be easily decoupled from Google's back-end infrastructure. Rem. Tr. 1444:10–1445:8 (Mickens (Pls. Expert)) (best practice to design APIs with loose coupling); Rem. Tr. 1453:11–15 (Mickens (Pls. Expert)) (Chrome designed following best practices); Rem. Tr. 1453:16–20 (Mickens (Pls. Expert)) (Chrome loosely coupled).

492. The APIs connecting Chrome to Google's back-end infrastructure abstract away the complexity of Chrome's cloud-enabled services. Rem. Tr. 1444:10–1445:8 (Mickens (Pls. Expert)) (loosely coupled APIs hide complexity); Rem. Tr. 1454:12–1455:1 (Mickens (Pls. Expert)) (Chrome's APIs hide complexity of cloud services, discussing PXR0321* at -172); Rem. Tr. 1532:1–15:33:2 (Mickens (Pls. Expert)) (Borg hides complexity of managing hardware); PXR0321* at -172 (diagram of Chrome architecture).

493. The APIs connecting Chrome to Google's back-end infrastructure hide the implementation details for Chrome's cloud-enabled services. Rem. Tr. 1444:10–1445:8 (Mickens (Pls. Expert)) (best practice to design APIs to hide implementation details); Rem. Tr. 1453:11–15 (Mickens (Pls. Expert)) (Chrome designed following best practices).

494. As the complexity of Chrome's cloud-enabled services increases, the integration between Chrome and Google's back-end infrastructure does not become deeper. Rem. Tr. 1455:18–23 (Mickens (Pls. Expert)) (increased complexity of cloud services does not impact depth of integration if APIs designed following best practices); Rem. Tr. 1453:11–15 (Mickens (Pls. Expert)) (Chrome designed following best practices).

495. Google's cloud-enabled services run on Google datacenters managed by a cluster management system called Borg. Rem. Tr. 1445:9–1446:7 (Mickens (Pls. Expert)) (use of cluster manager is best practice for observability); Rem. Tr. 1531:1–1533:2 (Mickens (Pls. Expert)) (Google uses cluster manager).

496. Cluster management systems like Google's Borg are standard in the industry and are both deployed in other cloud providers and available open source. Rem. Tr. 1532:14–1533:21 (Mickens (Pls. Expert)) (most hyperscalers use a cluster manager and Kubernetes is open source).

497. A Chrome divestiture buyer could use a cloud provider for its hardware needs. Rem. Tr. 2547:22–2551:16 (Nieh (Def. Expert)) ("Maybe you use some cloud provider [for your hardware infrastructure] but then you're paying a third party for some service."); Rem. Tr. 2646:3–2647:19 (Nieh (Def. Expert)) ("So a public cloud provider could be used for the hardware infrastructure and would also provide some amount of software infrastructure.").

498. A Chrome divestiture buyer could use a cloud provider for its infrastructure software. Rem. Tr. 2646:3–2647:4 (Nieh (Def. Expert)) (recognizing that a divestiture buyer could rely on a public cloud provider to "provide some amount of software infrastructure" so that "you can use somebody else's stuff instead of building your own"); Rem. Tr. 2647:10–19 (Nieh (Def. Expert)) ("You delegate the problem to the cloud provider, the problem of scaling up the infrastructure, their infrastructure.").

499. For each API connecting Chrome's client-side code to Google's back-end infrastructure, a Chrome divestiture buyer could either (i) maintain the API connection with Google either directly or through a proxy, (ii) substitute for an API provided by the divestiture buyer or a third-party, or (iii) disable the API. Rem. Tr. 1458:9–1459:5 (Mickens (Pls. Expert)) (discussing PXRD010 at 36–37).

500. From a technical perspective, it would be feasible for Google to make a private API available to a divestiture buyer. Rem. Tr. 1460:16–21 (Mickens (Pls. Expert)).

501. If the divestiture buyer wanted to leave an API call unmodified, the new owner of Chrome would need only to acquire an API key from Google that would allow Google's servers to verify that the requests were coming from Chrome. Rem. Tr. 1459:6–23 (Mickens (Pls. Expert)) (work required to make API call available is simply providing API key).

502. The type of coordination that would be required to maintain API connections between Google and Chrome post-divestiture, including billing, is very similar to the type of coordination currently required for Google to support pre-existing API key agreements. Rem. Tr. 1572:6–21 (Mickens (Pls. Expert)) (level of coordination required to maintain APIs is similar to current work); Rem. Tr. 1460:22–1461:5 (Mickens (Pls. Expert)) (large-scale tech companies like Google are "very skilled" at exposing and maintaining APIs); Rem. Tr. 1461:6–20 (Mickens

(Pls. Expert)) (Google could easily create billing structure for Chrome APIs); Rem. Tr. 1461:21–1462:5 (Mickens (Pls. Expert)) (API billing is common in industry); Rem. Tr. 1462:6–19 (Mickens (Pls. Expert)) (Google already bills for APIs like SafeBrowsing and Maps).

503. Post-divestiture, Google could secure the connections between Chrome and Google's back-end infrastructure. Rem. Tr. 1459:6–23 (Mickens (Pls. Expert)) (API keys could prevent unauthorized access).

504. If Chrome's new owner maintained API connections to Google's back-end infrastructure, from a user's perspective the corresponding Chrome functionality would not change. Rem. Tr. 1462:21–1463:4 (Mickens (Pls. Expert)) (maintaining API connections would cause Chrome to look the same).

505. From a technical perspective, it would be feasible for the divestiture buyer to identify and substitute APIs. Rem. Tr. 1464:13–1465:10 (Mickens (Pls. Expert)) (If the divestiture buyer wanted to substitute the API call, the divestiture buyer would need to find a new service provider, identify the places in the Chrome code where the API is invoked, and make sure all those invocations are compatible.); Rem. Tr. 1465:11–14 (Mickens (Pls. Expert)) (Substituting Chrome's API calls would not require work that is fundamentally different from the type of work required to update software.).

506. If Chrome's new owner substituted API connections from Google to a third-party, the functionality of Chrome might change, and may improve. Rem. Tr. 1465:15–25 (Mickens (Pls. Expert)) (If the divestiture buyer substituted the API call, Chrome's functionality may change, perhaps for the better.).

507. Some of Chrome's back-end services are the types of services regularly created by software companies as a matter of course. Rem. Tr. 1576:15–21 (Mickens (Pls. Expert))

(software companies create auto-update systems as a matter of course); Rem. Tr. 1567:25–1568:3 (Mickens (Pls. Expert)) (other browsers provide crash reporting).

508. Other Chromium-derived browsers have substituted, disabled, or added to Chromium's in-built API calls to Google's back-end infrastructure. Rem. Tr. 1544:10–15:6:5, 1583:7–18 (Mickens (Pls. Expert)) (Microsoft underwent a per-API analysis to build Edge on Chromium, exactly the type of analysis needed for Chrome).

509. The work required to divest Chrome is not substantially different from the work previously done by Microsoft, Vivaldi, and Brave. Rem. Tr. 1467:7–1468:21 (Mickens (Pls. Expert)) (referencing PXRD010 at 43) (Microsoft, Vivaldi, and Brave did similar work to build their browser on top of Chromium).

3. Divesting Chrome Is Administratively Feasible

510. Divestitures generally follow well-established corporate practices that provide a framework for executing a Chrome divestiture. Rem. Tr. 1995:10–14 (Locala (Pls. Expert)); Rem. Tr. 2018:11–2021:8 (Locala (Pls. Expert)) (explaining the three steps of a typical divesture process: preparation, buyer identification, and final negotiations, signing, and closing).

511. "Divestitures are a commonly used corporate tool for companies in all industries, including the technology industry." Rem. Tr. 2017:10–19 (Locala (Pls. Expert)).

512. Companies typically begin the divestiture process by addressing broad, big-picture issues and resolve increasingly specific questions as they progress through the process. Rem. Tr. 2017:20–2018:10 (Locala (Pls. Expert)); Rem. Tr. 2707:19–2708:11 (Zenner (Def. Expert)) (buyers are typically initially given a short document with limited information on the front end, with more detailed analysis provided later in the divestiture process).

513. Potential buyers typically submit preliminary bids based on limited, summary information about the business to be divested. Rem. Tr. 2018:20–2020:7 (Locala (Pls. Expert)); Rem. Tr. 2021:23–2022:10 (Locala (Pls. Expert)).

514. The definition of Chrome in the Plaintiffs' Revised Proposed Final Judgment is sufficient to attract buyer interest to provide a preliminary bid in a divestiture process. Rem. Tr. 2058:4–2061:8 (Locala (Pls. Expert)).

515. In a typical divestiture process, an initial bidding process is followed by extensive discussions and disclosures of information. Rem. Tr. 2018:20–2020:15 (Locala (Pls. Expert)). A legally mandated divestiture would follow a similar, multi-stage process. Rem. Tr. 2021:9–17 (Locala (Pls. Expert)).

516. Chrome is not unique in relying on other parts of Google for administrative services like finance, human resources, and marketing. Rem. Tr. 2027:7–2028:25 (Locala (Pls. Expert)) (describing typical process for handling shared personnel resources during divestiture); PXR0162 at -856 (Chrome relies on the rest of Google for finance, human resources, marketing, and other services).

517. Chrome and Chromium represent an individual product group within Google, which relies on the larger Google organization for certain administrative and technical infrastructure, but which comprises a distinct and identifiable organizational unit.

518. Chrome is managed by a distinct team within Google, which has its own leadership and an employee headcount allocation of approximately 1,200 individuals. Rem. Tr. 1662:7–10 (Tabriz (Google)); PXR0351* at -266–67 (Chrome workforce strategy and employee headcount planning). The Chrome team is responsible for both the browser application and web platform, including Google's code contributions to the open-source Chromium project.

Rem. Tr. 1662:18–1663:2 (Tabriz (Google)) (defining role at Chrome to encompass both the browser application and Chromium); Rem. Tr. 1647:18–1648:5 (Tabriz (Google)) (Chrome acts as a platform for web developers); PXR0351* at -267, -288.

519. The Chrome team relies on certain shared resources and infrastructure provided by Google, such as physical facilities, data centers, and software. Rem. Tr. 1563:22–1565:5 (Mickens (Pls. Expert)). Technical infrastructure allocation from outside the Chrome team accounts for [redacted]% of Chrome's operating expenses. Rem. Tr. 2009:14–2011:21 (Locala (Pls. Expert)) (discussing PXRD011 at 12) (citing PXR0206 at -551; PXR0162 at -864) (Technical infrastructure allocations account for $[redacted] million, or [redacted]%, of Chrome's $[redacted] billion operating expenses.).

520. Intellectual property allocation, personnel allocation, and transition services agreements are standard issues that are often not finalized until the signing of the divestiture agreement. Rem. Tr. 2024:21–2025:22 (Locala (Pls. Expert)); Rem. Tr. 2025:23–2026:14 (Locala (Pls. Expert)) (IP allocation); Rem. Tr. 2027:7–2028:8 (Locala (Pls. Expert)) (personnel allocation); Rem. Tr. 2029:1–2030:4 (Locala (Pls. Expert)) (TSAs).

521. Divestiture transactions in the technology sector have successfully navigated complex intellectual property allocation issues. Rem. Tr. 2026:15–2027:6 (Locala (Pls. Expert)) (referring to Symantec-Broadcom transaction as an example of technology-related divesture involving complex IP issues).

522. The successful divestitures of other technology products and highly integrated companies demonstrate that a Chrome divestiture is feasible from a corporate perspective. Rem. Tr. 2023:12–2024:10 (Locala (Pls. Expert)) (technology products); Rem. Tr. 2038:15–2039:1

(Locala (Pls. Expert)) (highly integrated companies); Rem. Tr. 2697:22–2699:15 (Zenner (Def. Expert)) (highly integrated companies).

4. Potential Risks Of A Chrome Divestiture

523. A Chrome divestiture will not end industry support for open-source Chromium, including support by Google. Rem. Tr. 1666:8–25 (Tabriz (Google)) (confirming that there are a variety of browsers and other products built on Chromium); Rem. Tr. 1691:6–22 (Tabriz (Google)) (agreeing that other companies besides Google contribute to Chromium, including Igalia, Opera, Microsoft, and Samsung); Rem. Tr. 1692:5–9 (Tabriz (Google)) (agreeing that Igalia, Opera, Microsoft, and Samsung have an incentive to continue making Chromium better); Rem. Tr. 1692:14–17 (Tabriz (Google)) (confirming the web browsers built on Chromium include Vivaldi, Edge, Opera, Brave, Arc, Samsung, UCBrowser, Ecosia, Amazon Silk, and Island, as listed on RDXD-12 at .003); Rem. Tr. 1693:19–1694:8 (Tabriz (Google)) (confirming there are other open-source browser platforms, Mozilla's Gecko and Apple's Web Kit, and agreeing these companies have their own incentives to improve their open source web browsers); Rem. Tr. 1694:14–1695:4 (Tabriz (Google)) (agreeing Meta, Microsoft, and Opera have pledged support of the Linux Foundation's Supporters of the Chromium-Based Browsers initiative); Rem. Tr. 788:11–20 (Shevelenko (Perplexity)) (If Perplexity were to acquire Chrome, they would commit to indefinitely supporting Chromium and investing in it.); Rem. Tr. 518:17–19 (Turley (OpenAI)) (OpenAI has explored building a browser based on Chromium); Des. Rem. Tr. 15:17–16:18, 17:7–17(OpenAI-NT 30(b)(6) Dep.) (OpenAI still exploring building products built on Chromium); Des. Rem. Tr. 128:20–129:20 (Standal (Opera) Dep.) (Opera, in becoming a member of the Supporters of Chromium-Based Browser initiative, made an initial contribution of $100,000); Rem. Tr. 1470:4–24 (Mickens (Pls. Expert)) (many technology companies have a deep interest in ensuring web browsers are fast and safe); Rem. Tr. 1471:1–14, 1477:12–18

(Mickens (Pls. Expert)) (developers of Chromium-based browsers have a particular interest in maintaining Chromium); Rem. Tr. 1476:8–1477:11 (Mickens (Pls. Expert)) (Google has technologies built on Chromium, like Webview, such that Google would have incentive to maintain Chromium post-divestiture).

524. If a divested Chrome could still partner with Google, Google's ability to pay would restrict rival distribution through Chrome. Rem. Tr. 477:17–479:4 (Turley (OpenAI)) (explaining that OpenAI could not outspend Google for distribution through an independent Chrome).

525. Prior migrations of open-source projects have been successful. Rem. Tr. 1472:2–1474:10 (Mickens (Pls. Expert)) (discussing PXRD010 at 45) (Kubernetes, Firefox, and Blender migrations were successful).

526. If the new owner of Chrome decided to maintain API calls to Google's back-end infrastructure, the new owner could prevent unauthorized access using API keys. Rem. Tr. 1459:6–1460:14 (Mickens (Pls. Expert)) (use of API keys prevents unauthorized access).

527. If the new owner of Chrome decided to maintain API calls to Google's back-end infrastructure, the new owner could protect sensitive information by encrypting it. Rem. Tr. 1446:8–1447:1, 1447:9–12 (Mickens (Pls. Expert)) (encryption is best practice of distributed systems followed by Google); Rem. Tr. 2339:4–2340:6 (H. Adkins (Google)) (there are ways to secure data exchanges, including cryptographic authentication).

528. Google is replacing the existing version of ChromeOS with Project Aluminium, which will launch in 2026. Rem. Tr. 3989:25–3990:2 (Samat (Google)); PXR0317* at -426. Project Aluminium will help Google distribute new AI features faster and at a greater scale than the current version of ChromeOS. Rem. Tr. 3990:3–3991:23 (Samat (Google)).

5. No National Security Concerns

529. A Chrome divestiture will not raise national security concerns. *See* Pls. RPFJ § V.A. ("The evaluation of any potential buyer shall" be performed by the United States "at its sole discretion" and include evaluation of "any potential risks to national security.").

530. Many of the security innovations developed by Google are now available for purchase or free use by other companies. Rem. Tr. 2324:11–25 (H. Adkins (Google)) (Google's innovative security keys are now available on the market); Rem. Tr. 2331:3–16 (many of Google's security innovations have been "pushed out of Google into either open-source projects or products that we offer or are done through coalitions that are now available" and others "are now considered the recommended advanced practice"); Rem. Tr. 2342:16–2343:10 (H. Adkins (Google)) (some of Google's security infrastructure is "available on the market" and others are "increasingly becoming recommended standards").

531. Google's Vice President of Security Engineering confirmed it was "nearly impossible" for Google to verify the people, processes, and technologies of another company. Rem. Tr. 2359:5–2360:21 (H. Adkins (Google)).

532. The Google executives that expressed concerns about the cybersecurity implications of Plaintiffs' proposed remedies acknowledged their ignorance about the cybersecurity of a future, yet-identified qualified competitor or divestiture buyer. Rem. Tr. 2378:4–17 (H. Adkins (Google)) (recognizing that she was "not providing testimony about the cybersecurity systems that a future divestiture buyer has in place"); Rem. Tr. 2481:7–2482:22, 2483:24–2484:8 (Pichai (Google)) (admitting the impossibility of knowing the cybersecurity posture of as-yet unidentified third parties while claiming general cybersecurity concerns).

533. Google executives and employees do not speak for the United States Government on issues of national security. Rem. Tr. 2505:12–14 (Pichai (Google)) (Google CEO conceded he did "not speak for the United States Government on issues of national security"); Rem. Tr. 2356:10–12 (H. Adkins (Google)) (Google VP of Security Engineering agreed she did "not speak for the United States on issues of national security").

534. The security of complex systems is driven significantly by the initial design of the system, which has already been completed for Chrome. Rem. Tr. 2325:1–16 (H. Adkins (Google)) (asserting that "you have to design the security in the beginning of the design process" and "[Google has] done this with our technology"); Rem. Tr. 2481:11–2482:14 (Pichai (Google)) (recognizing that Chrome has a "multi-process security architecture" where Google "buil[t] many, many layers of protection" into Chrome); PXR0307* at -487 (noting that Google "bake[s] in security from the beginning" to make its products "secure by default").

535. Google is not especially equipped to avoid security vulnerabilities and breaches. Rem. Tr. 2333:1–2334:11 (H. Adkins (Google)) (an attack advanced within Google in 2021); Rem. Tr. 2361:17–22 (H. Adkins (Google)) (Google, like all software manufacturers, has vulnerabilities in its software and has discovered zero days within); Rem. Tr. 2365:21–23 (H. Adkins (Google)) (Google has had data breaches in past, albeit fewer than others have).

536. While Google touts its own cybersecurity prowess, Google has internally recognized its own security investment and funding shortcomings. PXR0305* at -654 (internal Google document recognizing that "[i]n 2023 and 2024 most cybersecurity teams at Google saw a reduction in people and opex (between [redacted]% depending) and report they are struggling to keep up."); PXR0305* at -654 (internal Google document recognizing that "[o]ur Beyond Security plan needs funding . . . there is substantial investment required over the short-medium

term that would be unachievable within our current funding envelopes."); PXR0305* at -655 (internal Google document in which H. Adkins notes that last major cybersecurity investment was "[n]early 16 years ago after operation aurora"); PXR0209* at -581 (Chrome Platform slide deck, dated June 2024, listing as one of its "Security and Privacy Concerns" that "[s]ecurity vulnerability and the lack of strong privacy controls lead to pervasive tracking and reliance on user prompts").

537. In 2024, Google ranked similarly to peers like Microsoft and Apple on its cybersecurity capabilities. Rem. Tr. 2385:1–18, 2386:14–2387:11 (H. Adkins (Google)) (discussing PXR0306) (One 2024 benchmark put Google's cybersecurity scores within three points of other notable peers—and behind financial institutions like Bank of America.); PXR0306 at -352 (benchmarking Google's cybersecurity within three points of Apple, Meta, Amazon, and Microsoft).

538. It is possible to securely move data between two locations. Rem. Tr. 2339:4–2340:6 (H. Adkins (Google)) (there are ways to secure data exchanges, including cryptographic authentication).

539. Many of the advancements in cybersecurity rely on cross-industry collaboration, not something intrinsic to Google. Rem. Tr. 2345:13–2346:1 (H. Adkins (Google)) (Google and rest of industry shares information through government body); Rem. Tr. 2379:22–2382:8 (H. Adkins (Google)) (describing Google's benefits from participation in industry collaboration, standard-setting, and information sharing); PXR0307* at -489 (Google "do[es]n't just design solutions to protect our users, we collaborate with partners, companies, and governments, so that together, we can secure the Internet as a whole.").

540. Google engages in information sharing relationships with industry peers to bolster its internal cybersecurity threat awareness. Rem. Tr. 2380:1–2382:8 (H. Adkins (Google)) (describing Google's information sharing partnerships).

541. Google's systems rely on third-party companies and software whose security Google cannot control. Rem. Tr. 2367:11–2368:2 (H. Adkins (Google)) (Google relies on 30–40 external vendors for cybersecurity alone); Rem. Tr. 2369:22–2370:10 (H. Adkins (Google)) (Google cannot make ultimate decisions about changes to third-party software in Google's software supply chain); Rem. Tr. 2370:14–19 (H. Adkins (Google)) (Google uses close to 19,000 third-party open-source software packages, including in Chrome); Rem. Tr. 2374:15–2375:12 (H. Adkins (Google)) (in 2024, Google had not yet developed a solution to mitigate risks caused by its third-party software); PXR0302 at -304, -327, -328 (outlining Google's use of and risks inherent in third-party software).

542. Google relies on external vendors for some of its cybersecurity needs, because Google cannot address cybersecurity issues on its own. Rem. Tr. 2367:11–2368:2 (H. Adkins (Google)) (estimating that Google relies on 30–40 external cybersecurity vendors, some of whom provide "unique capability"); Rem. Tr. 2483:2–7 (Pichai (Google)) (acknowledging Google's reliance on other vendors to meet cybersecurity needs).

543. Google relies on government leadership to protect its systems. PXR0304* at -832 ("Our security-first approach builds on awareness of an evolving threat environment, industry-wide information sharing, and the leadership of the international security community.").

C. Google Overstates Its Investments In Chrome

544. Google's rate of investment in Chrome has lagged behind the incremental rate of Search profits that flow through Chrome. Rem. Tr. 1637:5–11 (Tabriz (Google)) (discussing PXR0215 at -257); PXR0215 at -252, -257 (showing Chrome indirect revenues far outpacing

Chrome investments in both absolute value and growth rate); PXR0212* at -664 (Platforms & Ecosystems 2022 annual planning deck noting "historically revenue growth has been 3x investment growth" and showing that search revenue through Chrome grew 19 percent per year from 2017 to 2021, compared to a 6 percent annual growth in investment). In 2023, Chrome's total operating expenses were $[redacted] billion, even though Chrome purported to identify only $[redacted] million in operating revenue. PXR0206 at -551 (Chrome 2023 P&L statement).

545. Marketing investments have fueled most of the growth of Chrome usage. PXR0206 at -497 (May 2024 Chrome Review presentation stating "strong marketing investments have fueled growth but it's now essential to grow underfunded product teams").

546. Chrome's product teams are underfunded. PXR0206 at -497 (May 2024 Chrome Review presentation stating "it's now essential to grow underfunded product teams" and noting Google headcount growth was at [redacted]% while Chrome headcount growth was at [redacted]% over the past five years); PXR0206 at -498 (May 2024 Chrome Review presentation stating "it's now essential to increase investments towards product development and reinvest in our partnership teams to drive future growth, innovation, and differentiation" after being "ruthless rebalancing resources due to limited headcount growth over the past 5 years").

547. Google's investment in Chrome represents a very small percentage of the Search revenue generated via Chrome. PXR0215 at -257 (Chrome generates $[redacted] billion in indirect Search and Display revenue, compared to $[redacted] billion in costs.).

548. In April of 2025, Google abandoned its plans originally announced in 2020 to phase out support for third-party cookies in Chrome, which would have enhanced user privacy. Rem. Tr. 1697:2–7 (Tabriz (Google)) (agreeing third party cookies collect browser users' personal information and can raise privacy concerns); Rem. Tr. 1697:8–18 (Tabriz (Google))

(confirming Google announced plans in 2020 to phase out support for third-party cookies in Chrome and stating the "motivation of the project" was preventing cookies' "covert types of tracking"); Rem. Tr. 1698:22–1699:9 (Tabriz (Google)) ("[W]e have said that we will not deprecate third-party cookies at scale."); PXR0214* at -449 (Chrome strategy document, dated Jan. 2024, noting "Google's 3rd Party Cookie deprecation (3PCD) and privacy sandbox efforts are intended to improve privacy on the web, but present risks to web site breakage and Chrome's browser share.").

D. Self-Preferencing Prohibited

1. Google Is Already Self-Preferencing Its Search Access Points In Chrome

549. Google views Chrome as a means to "bring Gemini to scale and put AI in the hands of billions of users around the world through both Google Search and deeply integrated browser features." Rem. Tr. 1642:5–9 (Tabriz (Google)) (confirming that she sees an opportunity for Chrome to deeply integrate with Gemini); PXR0164 at -875; PXR0218* at -543–44 (A Chrome "Segment[] of Focus" is to "[d]eeply integrate Google AI capabilities" including the Gemini App to "drive awareness and usage."); PXR0217* at -157 (Chrome 2025 planning document stating Chrome is a "critical Gemini distribution channel").

550. Google intends to "move towards a fully AI-powered browser." PXR0219* at -152.

a) Google Lens Integration

551. In 2024, Google integrated Google Lens into the Chrome browser. Rem. Tr. 1639:7–16 (Tabriz (Google)); PXR0220 at -194 (Chrome + Gemini Live presentation).

552. Today, Chrome users can only access Google Lens if they set Google Search as their default search engine. Rem. Tr. 1658:9–14 (Tabriz (Google)).

b) Gemini In The Omnibox

553. Google knows that Chrome is a key access point for GenAI. PXR0208* at -714 (Rick Osterloh, Google's Senior Vice President of Platforms and Devices, stating: "In the future when you use AI, where do you start? I'd be surprised if not [C]hrome as that's what they'[re] use[d] to. What is the [entry point] experience? Right now, it's Search in the omnibox.").

554. Google has integrated Gemini in the Chrome omnibox. Rem. Tr. 1645:1–11 (Tabriz (Google)) (confirming the steps to access Gemini in the Chrome omnibox); PXR0285* at -351–52, -357, -363, -373–74.

555. Gemini is preloaded as the default GenAI product that can be accessed from the Chrome omnibox. Rem. Tr. 1645:1–20, 1647:1–10 (Tabriz (Google)).

c) Gemini Agents In Chrome

556. In Google's view, the coming wave of AI agents will "revolutionize how people interact with and build for the web." PXR0220 at -195; Rem. Tr. 1639:1–6 (Tabriz (Google)) (AI agents "could be the next transformation in computing."); PXR0029* at -152 (Google is researching "how [it] can build the best AI agent in the world that's integrated into search."); PXR0206 at -482 (Google envisions that Chrome will "continue to evolve from being a 'window to the web' into a personalized, helpful user agent that can adapt to each person's unique, multifaceted needs.").

557. Google plans to make Gemini the "primary agent" in Chrome, prioritizing its integration over Gemini's rivals and building on Google's history of making switching the default difficult in Android. Mem. Op. at 28; Rem. Tr. 1643:6–1644:2 (Tabriz (Google)) (agreeing with her statement in PXR0203 that she envisions a future "where Chrome integrates deeply with Gemini (as primary Agent and one we'll prioritize)"); PXR0203 at -074 (June 2024 email from Google's VP of Chrome titled "Quick perspective on Chrome+Agents"); PXR0219*

at -153–54 (June 2024 speaker notes for internal meeting with Google's CEO outlining next steps for AI agent integration into Chrome).

558. Rival GenAI agents will be limited to integration into Chrome as Extensions. PXR0220 at -282.

2. Google Is Already Self-Preferencing Its Search Access Points In Android

a) Circle To Search

559. Circle to Search is a search access point. Des. Rem. Tr. 34:12–17, 59:5–61:2 (Google-EC 30(b)(6) Dep.) (discussing process for accessing search through Circle to Search); Rem. Tr. 3907:14–3908:22 (Samat (Google)) (discussing Circle to Search on Android); Rem. Tr. 824:11–25 (Weinberg (DuckDuckGo)) (describing Circle to Search as a newly-introduced search access point that cannot be changed to a rival search engine).

560. Google has integrated Circle to Search into the Android operating system. Rem. Tr. 3908:23–3910:24 (Samat (Google)) (discussing the technical details of Circle to Search); Rem. Tr. 3978:22–3979:9 (Samat (Google)).

561. Samsung's implementation of Circle to Search defaults to Google. Rem. Tr. 3908:23–3909:16 (Samat (Google)).

b) AICore

562. AICore is an Android subsystem that Google designed to manage the loading and operation of on-device LLMs like Gemini Nano. Des. Rem. Tr. 55:1–56:12 (Google-EC 30(b)(6) Dep.); Rem. Tr. 3955:25–3956:15 (Samat (Google)).

563. Currently, AICore only supports Google's on-device Gemini Nano model. Rem. Tr. 1557:18–1558:1 (Mickens (Pls. Expert)) (Gemini Nano is the only model running on AICore.); Des. Rem. Tr. 56:13–22 (Google-EC 30(b)(6) Dep.); PXR0102* at -720 ("Google AI is at the core of Android's operation system . . . ." Gemini Nano is "built for on-device

experiences . . ."); PXR0201* at -221 (Google presentation titled "AICore Plan of Record" noting the "[d]anger of others becoming the de-facto on-device solution").

564. Google recognizes the importance of securing on-device LLM models, such as Gemini Nano. PXR0160* at -573 ("Nano is a critical part of our ongoing strategy [f]or premium devices [a]nd it will become a core part of the Android developer story going forward."); PXR0160* at -573 ("As part of the Gemini deal, we can and should require the bundling of the Nano model."); PXR0160* at -573 ("[I]t could take enormous pressure off of our capacity in the cloud, both reducing costs [a]nd opening up an enormous amount of other opportunity for new revenue creation using our totally backlogged Cloud TPUs."); PXR0223* at -047, -072 (describing Gemini "[o]n-device [for Android and Pixel] [a]s very strategic" and discussing "[r]isks of not moving quickly" including "[i]ncreased Android [f]ragmentation" and "losing feedback loops and lock-in" (emphasis omitted)).

565. Rick Osterloh, head of Google's Platforms and Devices product area, internally noted the huge financial implications of securing Google's Gemini Nano on Samsung devices. PXR0160* at -573 ("I could see this being worth hundreds of millions and perhaps more annually."); PXR0160* at -573 ("The Gemini side of the deal starts to feel like a must win to me. We also need to make sure it includes [a] requirement to bundle the [N]ano model [a]nd have it resident in [RAM].").

566. Carriers and OEMs have sought freedom in selecting GenAI products, including on-device AI models. Des. Rem. Tr. 64:9–24 (Ezell (AT&T) Dep.) (AT&T executives ask internally whether they could have models beyond Gemini Nano on Android devices.); Des. Rem. Tr. 65:14–66:11 (Ezell (AT&T) Dep.) (AT&T wants flexibility to deal with different GenAI partners on Android.); Des. Rem. Tr. 25:18–21, 26:3–21 (Laflamme (Motorola) Dep.)

(explaining that Motorola wants flexibility with AI partners to optimize the consumer experience); Des. Rem. Tr. 52:18–53:10 (Laflamme (Motorola) Dep.) (Motorola was pushing for "more flexibility around having other assistive services on-device" in January 2025 RSA negotiations.); Des. Rem. Tr. 96:12–23, 100:20–101:11 (Kim (Samsung) Dep.) (explaining that Samsung did not want an exclusive AI service); PXR0248 at -113 (AT&T email discussing whether additional GenAI models may be loaded on Android devices in addition to Gemini Nano).

567. Android apps can only access a phone's AI accelerators through the AICore system service. Rem. Tr. 1555:11–1557:1 (Mickens (Pls. Expert)).

568. Google publicly states that AI models run faster through AICore than outside of AICore due to the access to AI accelerators. Rem. Tr. 1556:5–1557:1 (Mickens (Pls. Expert)).

569. Google controls which AI models can run inside AICore. Rem. Tr. 1557:8–17 (Mickens (Pls. Expert)).

570. Google distributes AICore by preloading it onto Android devices. Rem. Tr. 3960:7–3961:10 (Samat (Google)).

571. The number of on-device AI models that can run simultaneously on Android devices is limited by the device's system memory, or RAM. Rem. Tr. 3966:12–3968:15 (Samat (Google)).

572. Google has considered developing future capability for AICore that will allow on-device models to route queries that need search functionality to remote servers, which could, in turn, access the internet for features like RAG. Rem. Tr. 3986:17–3989:9 (Samat (Google)) (discussing PXR0042 at -900).

573. Although an OEM could build its own system service comparable to AICore, most OEMs would not want to do that. Rem. Tr. 1558:2–9 (Mickens (Pls. Expert)).

574. Google has a significant financial incentive to use Android to preference access to Google Search. Rem. Tr. 3996:18–3997:23, 3998:17–3999:7, 4001:14–4002:17 (Samat (Google)) (discussing PXR0162); PXR0162 at -875 (showing Google Search represents approximately [redacted]% of the profit margin Google earns from Android devices), -886 (Aug. 2024 P&D CFO Briefing – Overview Deck showing significant indirect Search revenues that Google attributes to Android).

575. Distributing Search is a strategic part of why Android exists. Rem. Tr. 4003:24–4004:6 (Samat (Google)).

576. Google's proposed remedies do not directly address existing Android devices that have pre-installations that were carried out under agreements the Court found unlawful. Rem. Tr. 4366:7–13 (Murphy (Def. Expert)).

VII. DISCLOSURES OF SCALE-DEPENDENT DATA NECESSARY TO COMPETE WITH GOOGLE

A. Index-Data Sharing Remedies Will Help Make Rivals More Competitive

1. Google Has A Scale Advantage In Building A Web Index

577. Google's conduct significantly contributed to data scale advantages that have helped it maintain its monopolies and will continue to do so unless addressed by the remedy. For example, Google's anticompetitive conduct "has given Google access to scale that its rivals cannot match," including user data, ads data, and data used in its search index. Mem. Op. at 224, 258–59. This significantly contributed to the maintenance of its monopolies.

578. Google has used its unlawfully enhanced scale advantage "to improve its search product and ads monetization." Mem. Op. at 226. Google's anticompetitive conduct has "substantially contributed" to rivals' competitive disadvantage in scale. Mem. Op. at 234.

579. "Armed with its scale advantage" obtained from exclusionary agreements, Google used "that data to improve search quality" including to "expand the index, re-rank the SERP, and improve the 'freshness' of results." Mem. Op. at 230. Without scale it is impossible for rivals to build an index like Google's index. Rem. Tr. 836:21–837:23 (Weinberg (DuckDuckGo)) (Half a dozen companies have tried to match Google scale and gone out of business because it is too costly.); Rem. Tr. 842:4–13 (Weinberg (DuckDuckGo)) (DDG could never get its long-tail index up to scale of Google without index data sharing.).

580. Scale is used to understand both what to crawl and how to store that information in an index. Mem. Op. at 35 ("GSEs must determine the order in which they crawl the web. User data helps GSEs determine which sites to crawl, because it allows general search providers to understand the relative popularity of various sites. . . . User data also helps GSEs determine the frequency with which to crawl websites."); Mem. Op. at 35–36 ("User side data also helps determine where a webpage resides within the larger index. . . . Each page is assigned to a tier based on how fresh it needs to be, and the fresher tiers are rebuilt more frequently."); Rem. Tr. 404:2–20 (Turley (OpenAI)) ("When sources are less common, we may not know that they even exit, and we may, thus, not discover what makes the best source."); Rem. Tr. 840:22–842:13 (Weinberg (DuckDuckGo)) (Only Google has crawled the web at scale to know what's spam and what needs to be indexed.); Rem. Tr. 399:21–402:5 (Turley (OpenAI)) (User location and click-and-query data are helpful when building out a new search index.).

581. Due to Google's scale, publishers permit Google to crawl web content not available to other web crawlers. Rem. Tr. 404:2–20, 407:11–20 (Turley (OpenAI)); Rem. Tr. 404:21–405:6 (Turley (OpenAI)) (responding to Court question and explaining that publishers select different crawling permissions on a crawler-by-crawler basis); Rem. Tr. 406:24–407:9 (Turley (OpenAI)) (responding to Court's question and explaining that OpenAI wants to scale quickly so it is attractive to publishers who currently do not permit OpenAI to crawl their content).

582. Google's search index scale advantages are particularly pronounced for fresh, local, and long-tail queries. Rem. Tr. 404:2–20 (Turley (OpenAI)) ("When sources are less common, we may not know that they even exit, and we may, thus, not discover what makes the best source."); Rem. Tr. 842:4–13 (Weinberg (DuckDuckGo)) (DDG could never get its long-tail index up to scale of Google without index data sharing.); Des. Rem. Tr. 51:17–22 (Microsoft-DS 30(b)(6) Dep.) ("[U]nless you're sharing tail queries, the information is not terribly useful for a search engine to improve its own product and bridge the scale-gap.").

2. Google Has A Scale Advantage In Building A Knowledge Graph

583. A Knowledge Graph is a collection of search indices. Rem. Tr. 839:10–25 (Weinberg (DuckDuckGo)).

584. Google's Knowledge Graph is a first-party data repository that contains a large amount of facts about the world, which Google users can query for factual information. Des. Rem. Tr. 202:12–203:4, 203:12–204:3 (Parakh (Google) Dep.) (describing Knowledge Graph).

585. To build its Knowledge Graph, Google imports data from many sources. Rem. Tr. 2879:15–18 (Allan (Def. Expert)).

586. Google imports data from the open web to build its Knowledge graph. Rem. Tr. 2879:15–21 (Allan (Def. Expert)). To the extent that Google is using web pages to build its

Knowledge Graph where robots.txt is keeping others out, it would have access to data not available to other search engines. Rem. Tr. 2880:21–2881:3 (Allan (Def. Expert)).

587. Google also imports data from its first party database. Rem. Tr. 2881:9–18 (Allan (Def. Expert)). For local information, it incorporates information from Google's Geo Index. Rem. Tr. 2881:12–18 (Allan (Def. Expert)). Incorporating geo index information into the Knowledge Graph can influence the ranking and retrieval of queries like "restaurants near me." Rem. Tr. 2881:19–23 (Allan (Def. Expert)).

588. User-generated content is content that is directly supplied by the user to Google. Rem. Tr. 2884:3–17 (Allan (Def. Expert). Google similarly solicits information from businesses. Rem. Tr. 2884:19–23 (Allan (Def. Expert). Google's scale incentivizes users, including businesses, to generate content for Google. Rem. Tr. 1018:17–1019:6 (Schechter (Microsoft)) (Google's scale incentivizes businesses to provide information "like their opening hours or if they're closed for a special event."); Rem. Tr. 832:10–833:13 (Weinberg (DuckDuckGo)) ("So given Google is where most of the traffic is coming from, there is a strong incentive for [businesses] to [enter updates directly into Google] that they are not doing on either [DuckDuckGo] or other partners.").

589. Google's user-generated content is a source of information that Google imports into the Knowledge Graph for local information. Rem. Tr. 2883:7–2884:1 (Allan (Def. Expert)) (describing DX0208 at -924); DX0208 at -924 ("Much of our [user-generated content] that represents facts about businesses (e.g. business names, locations, hours, phone numbers, or even richer data such as restaurant menus) ends up in the Knowledge Engine.").

590. User-generated content provides a significant amount of local information to Google. Rem. Tr. 2886:5–12 (Allan (Def. Expert)) (discussing DX0208 at -921); DX0208 at -921 (In 2019, 50 percent of the new places on Google Maps came from users.).

591. Plaintiffs' RPFJ calls for Google to provide the databases necessary to construct their own Knowledge Graph (for example, databases containing business hours), not the underlying technology needed to construct that data. Rem. Tr. 2886:15–24 (Allan (Def. Expert)).

3. Plaintiffs' Index Data-Sharing Remedies Will Accelerate Innovation And Competition

592. Providing information about Google Search index to third parties could bridge the quality gap that is a barrier to entry for competition. Rem. Tr. 3848:5–3949:17 (Cue (Apple)) (The only thing besides AI that could aid in the competitive landscape is "to accelerate [competitors'] ability to hav[e] bigger search indexes [sic]."); Rem. Tr. 392:17–394:16 (Turley (OpenAI)) (OpenAI views building its own search index as essential to ensure the accuracy of its GenAI products.).

593. Plaintiffs' index-sharing remedy is similar to what Google originally shared under its agreement with Yahoo Japan to syndicate organic results and features and provide other services. Rem. Tr. 2851:22–2852:2 (Allan (Def. Expert)) (Information provided to Yahoo Japan is very similar to the search index information Plaintiffs have proposed be shared with qualified competitors.); Rem. Tr. 3083:7–3084:3 (J. Adkins (Google)) (same); Des. Rem. Tr. 51:10–52:6 (Google-JA 30(b)(6) Dep.) ("[F]rom 2010 to 2018, Google provided Yahoo Japan with the components of the index identified in Section 2.9 of Exhibit 4 [PXR0598]? A. Yes.") (discussing PXR0598 at -726 (Google-Yahoo Japan Google Services Agreement)).

594. Like the Yahoo Japan agreement, the RFPJ does not require sharing Google's web index in its entirety, but rather requires sharing information about the web index, for

example, DocIDs, a DocID to URL map, whether the document is a duplicate, and a device-type notation (*e.g.,* whether a page is set up to display on a phone or a laptop). Rem. Tr. 3086:21–3089:23 (J. Adkins (Google)); Pls. RPFJ § VI.A.

595. The RPFJ also requires Google share three static signals about the documents contained in Google's search index: popularity, quality and spam. Pls. RPFJ § VI.A.3; Rem. Tr. 2874:7–11 (Allan (Def. Expert). Popularity is a "notion of how popular a page is." PXR0171* at -097. It is based on Chrome visits the website receives. PXR0171* at -098; PXR0356 at -744.

596. Qualified Competitors can use these signals to identify which webpages to crawl and index first. Rem. Tr. 2874:21–2875:6 (Allan (Def. Expert)). In addition, data related to duplicates will help rivals significantly focus their crawling and web content processing efforts. RDX0062 at -216 ("To reduce the [redacted] links to [redacted]" rivals can use "[d]e-duplication, which means determining if a link likely returns the same copy as an already known link (http://microsoft.com vs http://www.microsoft.com)"). The device-type flag will allow rivals to focus on building a mobile-friendly index. Liab. Tr. 2649:15–20 (Parakhin (Microsoft)) ("[D]evice form factor . . . The most distinct sort of basic ones is desktop and mobile . . . . Different advertisers have different affinity to different form factors. For example, on the desktop, you tend to research something that takes more time. Like if you're looking for a new mortgage[.] . . . If you're searching for a restaurant, you're much more likely to be on your cellphone, because it's more likely to be in the moment, where we should eat right now or have dinner later. . . And it's not always a sharp boundary, here is a spectrum. But different -- whether it's a desktop ad or mobile ad is very much significant for advertisers.").

597. Even with the index information called for under Plaintiffs' RPFJ, industry participants will still need to invest in significant hardware and infrastructure to crawl, retrieve, and process content from the web to create an inverted index. Rem. Tr. 2870:1–2872:24 (Allan (Def. Expert)) (discussing RDX0062 at -217); RDX0062 at -217 ("A major challenge Indexing Engine faces is that it must process billions of URLs at sufficient speed to keep the web index fresh.").

598. Building out their core index would help improve the accuracy of a rival's search and GenAI responses. Rem. Tr. 399:21–402:5 (Turley (OpenAI)) (User location and click-and-query data are helpful when building out a new search index.); Rem. Tr. 391:16–392:10, 393:22–394:16 (Turley (OpenAI)) (OpenAI views building its own search index as essential to ensure the accuracy of its GenAI products.).

599. Providing Qualified Competitors with access to information about Google's search index will accelerate the development of rival search indices and incentivize innovation. Rem. Tr. 409:11–410:22 (Turley (OpenAI)) (describing value to both OpenAI's search index development and its ability to pursue broader AI and consumer innovations).

B. Plaintiffs' Publisher Opt-Out Remedy Provides Publishers With More Control Over Their Content

1. Google Extended Opt-Out Only Applies To DeepMind Model Training

600. Google uses crawl data in its index to train its foundation models, like the Gemini model. Rem. Tr. 3348:19–22 (Collins (Google)) (Gemini models are pre-trained on web data.); PXR0123* at -182–236 (Gemini v3 pre-training data card listing extensive datasets Google uses to pre-train its Gemini models, including data from the Google Common Corpus).

601. Publishers today can opt out of the Google Extended Program. Opting out permits a website not to be included in training for Google's foundational models, the Gemini App, and Cloud. Rem. Tr. 3654:7–15 (Reid (Google)).

602. Under the Google Extended Opt Out, if a publisher opts out, that data cannot be used by any form of training in Google DeepMind. Rem. Tr. 3351:25–3352:11, 3353:9–19 (Collins (Google)).

603. Publishers can ostensibly use the Google Extended Opt Out to prevent Google from pretraining its AI models on their content. Des. Rem. Tr. 214:13–215:6 (Parakh (Google) Dep.) (explaining the Google-Extended opt out).

604. In April 2024, Google considered how granular it would make publisher' ability to opt-out of use of their content for SGE training and grounding, and chose to maintain the status quo. This option—referred to internally as "*do what we say, say what we do, but carefully*"—permitted Google to "[s]ilently update" its existing documentation, but not "shout it to the world." Rem. Tr. 3656:7–3660:2 (Reid (Google)) (discussing PXR0026 at -290). Google continues to use ambiguity and a lack of transparency to train its GenAI models on publishers' information. PXR0026 at -290 ("*do what we say, say what we do, but carefully*"); PXR0026 at -290 ("Do not say this opts them out of training, as we don't want to get into the details of distinction between Gemini training and SGE training . . . ."); PXR0026 at -290 ("Recommend not saying this opts them out of grounding, as this is evolving into a space for monetization.").

2. Google Extended Opt-Out Does Not Apply To Search AI Model Training

605. The Google-Extended Opt Out does not restrict what the Google search team can use to train an AI model for a search-specific purpose. Rem. Tr. 3352:8–16, 3353:9–24 (Collins (Google)).

606. Even if a publisher opts out of Google's AI training through the Google-Extended opt-out, Google Search still trains its GenAI models on that publisher's content. Des. Rem. Tr. 220:13–15 (Parakh (Google) Dep.) (Google-Extended only applies to core Gemini model training, not to GenAI model training within Google Search.).

607. The Google Extended Program does not apply to Google Search or AI Overviews. A publisher opting out of Google Extended is still crawled by Google's web index, will still be a part of Google's Search results, and would still appear in response to an AI Overview. Rem. Tr. 3654:16–3655:4, 3660:4–22 (Reid (Google)).

608. The Search team can use the publishers' opted-out content to further pretrain a customized search model. Rem. Tr. 3354:19–3355:10 (Collins (Google)).

609. The Seach team continues to use the publishers' opted-out content to fine-tune its customized search models. Rem. Tr. 3660:13–21 (Reid (Google)).

3. To Opt Out Of Search Ai Model Training, A Publisher Would Need To Be Willing To Forego All Search Traffic

610. Google provides no way to selectively opt out of AI Overviews; publishers must either opt out of having snippets of their content appear on Google's SERP or opt out of appearing on Google's SERP altogether. Des. Rem. Tr. 215:7–216:12 (Parakh (Google) Dep.) (explaining that Google-Extended does not cover use in AI Overviews, so publishers would need to, at minimum, use the no-snippets meta tag to opt out of all of Google's snippets, WebAnswers, and AI Overviews features); Des. Rem. Tr. 310:17–311:2 (Fox (Google) Dep.) (explaining that publisher's opting out via robots.txt means opting out of Google's entire search index).

611. Google leverages its scale advantages to restrict what agreements rivals can enter into with publishers. Rem. Tr. 461:19–462:16 (Turley (OpenAI)) (discussing both publishers' incentives and formal contractual restrictions by Google).

612. Google has levered its position to limit the control publishers have over how their content is used. Des. Rep. Tr. 84:13–25 (OpenAI-NT 30(b)(6) Dep.) (Although publishers can technically opt out of being crawled by Google, that would be "economically prohibitive" for most content providers because they receive the majority of their traffic from Google); PXR0026 at -266 (discussing how to limit publisher opt-out options to best benefit Google.); Rem. Tr. 3660:4–21 (Reid (Google)) (Opted-out content can be used to train search models and can be displayed as part of AI Overviews.).

613. More user traffic to rival search engines and GenAI Products will give publishers more flexibility to decide when to opt-out of Google's web crawl or GenAI model training. Rem. Tr. 405:8–406:18 (Turley (OpenAI)) (describing OpenAI's goals of increasing traffic to publishers and improving ecosystem for publishers who want to control how their content is used).

C. User-Side Data Remedies Will Help Make Rivals More Competitive

1. User-Side Data Is Critical To Enhancing GSE Quality

614. As this Court found, "Google's exclusive agreements have a[n] . . . important anticompetitive effect: They deny rivals access to user queries, or scale, needed to effectively compete." Mem. Op. at 226. User data is a "critical input" used "[a]t every stage of the search process" to "directly improve[] quality." Mem. Op. at 35; Rem. Tr. 1015:20–1016:8 (Schechter (Microsoft)) ("Search is really dependent on scale"); Rem. Tr. 1246:20–1247:13 (Provost (Yahoo)) (Yahoo collects user data to improve the quality of Yahoo products.). Rem. Tr. 2849:9–13 (Allan (Def. Expert)) (It is well understood in the field of information retrieval

that user-side data can improve the quality of a search engine). Google uses user-side data in many parts of its search stack. Rem. Tr. 2849:14–2850:2 (Allan (Def. Expert)). Google's conduct contributed significantly to Google's advantage in user-side data advantages and thereby contributed significantly to the maintenance of Google's monopolies.

615. Via default distribution, Google "derives extraordinary volumes of user data from such searches" which "[i]t then uses . . . to improve search quality", "[g]reater query volume means more user data, or 'scale,'" and "Google has used its scale advantages to improve the quality of its search product . . . user data is a critical input that directly improves quality." Mem. Op. at 2, 34–35.

616. Users demand accuracy and relevance for every search; even a single inaccuracy can undermine a user's trust in a rival search engine. Des. Rem. Tr. 195:23–196:7 (Parakh (Google) Dep.) ("[E]very time we've sort of worked on quality in [the search] product, users return. They value it. It provides them with their daily need."); Rem. Tr. 1017:16–25 (Schechter (Microsoft)) (discussing user retention issues due to inaccurate results); Rem. Tr. 1034:22–1035:8 (Schechter (Microsoft)) (Inaccurate responses to, e.g., local queries are "extinction events" for Copilot's userbase.); Rem. Tr. 1080:4–17 (Schechter (Microsoft)) ("[I]f the relevance, the quality of the results is poor, users will not retain, and we get what we call a leaky bucket where we're pouring users in but they're coming out the bottom."); PXR0025 at -480 ("Trust is still one of the biggest differentiators for Google.").

617. Google's scale advantages are particularly pronounced for fresh, local, and long-tail queries. Rem. Tr. 1016:11–19, 1018:1–16, 1019:10–1020:3 (Schechter (Microsoft)) (describing Bing's struggle to accurately answer fresh, local, and tail queries); Rem. Tr. 1018:17–1019:3 (Schechter (Microsoft)) (Local businesses are more likely to share local data

with search rivals who reach scale.); Des. Rem. Tr. 51:17–22 (Microsoft-DS 30(b)(6) Dep.) ("[U]nless you're sharing tail queries, the information is not terribly useful for a search engine to improve its own product and bridge the scale-gap.").

618. Significantly because of Google's contracts denying it scale, Microsoft has been limited in its ability to improve its search index and effectively compete with Google. Liab. Tr. 2666:21–2667:12 (Parakhin (Microsoft)); Rem. Tr. 1015:20–1016:19 (Schechter (Microsoft)).

619. Quality is an important component of Google Search. Rem. Tr. 3619:10–12, 3620:15–21 (Reid (Google)) (agreeing quality is an important component of Google Search). The definition of high quality is whether these are good answers for the user, based on whatever subset one is looking at. Rem. Tr. 3619:13–25 (Reid (Google)) (defining high quality as good answers for the user, based on whatever subset one is looking at).

620. Everything starts with the query. Rem. Tr. 3610:1–4 (Reid (Google)) ("You can't fill the response until you have a query"). Queries have an impact on the overall quality. Rem. Tr. 3610:5–8 (Reid (Google)) ("Queries have an impact on the overall quality"); PXR0171* at -067 ("starting with a user **query** . . .") (emphasis in original).

621. Query understanding benefits from user-side data. Mem. Op. at 36–37 ("Because humans are imperfect, so too are their queries. Google relies on user data to decipher what a user means when a query is typed imprecisely. For example, user data allows Google to identify misspellings and reformulate queries using synonyms to produce better results.").

622. Glue is, essentially, a "super query log" used to create ranking signals based on users' interactions with the SERP. Rem. Tr. 2808:2–2812:17 (Allan (Def. Expert)); Liab. Tr. 1807:3–12 (Lehman (Google)) ("[Glue is] not a machine learning model. It's a big table of

data. . . . [A] typical entry in this Glue data would be something like. . . a person did this query, and they scrolled through the list of newspaper articles."). Glue extends Navboost to include user interaction with search features. Rem. Tr. 2808:13–2809:6 (Allan (Def. Expert)) ("So Glue contains -- for example, . . . Navboost information."); Liab. Tr. 6403:3–5 (Nayak (Google)) ("Glue is just another name for [N]avboost that includes all of the other features on the page.").

623. User-side data at scale, including clicks, queries, and more, train and refine many of the search signals that ranking algorithms use to identify high quality search results. Mem. Op. at 36–39; Des. Rem. Tr. 36:5–17, 37:16–21 (Parakh (Google) Dep.) (explaining that Google Search's ranking components, including Navboost and Glue models, are built using click-and-query data); Des. Rem. Tr. 209:3–6, 209:13–20 (Parakh (Google) Dep.) (Google uses search quality signals derived from, for example, user query sessions, to determine the authoritativeness of different search results.); Rem. Tr. 843:5–12 (Weinberg (DuckDuckGo)) (User-side data is fed into machine learning modules to learn how to rank links.); Rem. Tr. 3620:1–4 (Reid (Google)) (Google uses user feedback as a signal to decide what constitutes a high-quality result.).

624. Plaintiffs have requested that the user-side data used to build Glue be shared, not the underlying technology that Google uses to build Glue. Rem. Tr. 2808:13–2809:6 (Allan (Def. Expert)) ("Glue itself is not being asked to be revealed, it's the data used to construct Glue.").

625. Another key component of a general search service is its whole page ranking algorithm. Liab. Tr. 10284:8–10285:23 (Oard (Pls. Expert)). Tangram (formerly, Tetris) is a system that determines the ranking of all items on the SERP. Liab. Tr. 6408:8–24 (Nayak (Google)). Glue data is a key signal that affects Tangram's output. UPX0262 at -989 (Glue "is a critical signal in Tetris."); Liab. Tr. 6408:22–24 (Nayak (Google)); Des. Rem. Tr. 78:5–18

(Parakh (Google) Dep.) (describing Google's use of user feedback data in Tangram, Google's system for ranking and organizing all organic features on its SERP); Des. Rem. Tr. 79:25–80:22, 81:1–82:5 (Parakh (Google) Dep.) (describing how Google uses user search queries and search signals to determine whether an AI Overview is useful or relevant to a user query).

626. There are different types of user data. Mem. Op. at. 34. User data includes information regarding when, where, and how the users issue a query. Rem. Tr. 399:21–402:5 (Turley (OpenAI)) (explaining that user location is helpful when building out a search index); Liab. Tr. 2256:11–2257:10 (Giannandrea (Apple)) (Location and time of day are also useful search signals.); Liab. Tr. 6416:24–6417:4 (Nayak (Google)) (Google tracks what type of device from which each query is issued.). In the ordinary course, Google defines "User Data" as "any data collected or processed from or about a User while the User is interacting with Alphabet Company Products. User Data is also any data observed, inferred, or derived from other User Data where the original User can be identified or original data recreated." PXR0173* at -451.

627. User-side data is also useful for building an index because it is a proxy for quality content that should be surfaced in response to a user query. Rem. Tr. 411:3–19 (Turley (OpenAI)) (discussing value of user-side data to build a search index and identify quality search results for the long tail of user queries); Rem. Tr. 401:13–402:5 (Turley (OpenAI)).

628. Microsoft believes Google's proposal to comply with the DMA "falls short of providing the minimum necessary click and query information to be useful to a search engine to 'optimise [sic] their services.'" PXR0255* at -805.

2. User-Side Data At Scale Gives Google A Competitive Advantage In Building A GSE

629. To return useful information, search engines use a number of signals to detect a useful result. Rem. Tr. 2854:12–18 (Allan (Def. Expert)). Raw signals include things like clicks,

terms on a document, and terms within a query. Rem. Tr. 2854:22–2855:25 (Allan (Def. Expert)). Raw signals can be transformed or used to build other signals. Rem. Tr. 2855:1–12 (Allan (Def. Expert)). There are several different types of techniques used to build search signals. Rem. Tr. 2856:1–6 (Allan (Def. Expert)).

630. One method to create signals is to use a counting method. Rem. Tr. 2859:3–9 (Allan (Def. Expert)) (This would be the case where a signal is merely the number of times something happens, and . . . that would be counted up."). Navboost provides a signal that is based on counting clicks on a document. Rem. Tr. 2860:3–21 (Allan (Def. Expert)) ("Yes, the information about the number of clicks a document got for a query is a counting signal for that query document pair."); UPX0191 at -223 (Navboost is a "glorified counting-based system for memorizing clicks."). Glue extends Navboost to count user interactions on other items on the SERP. Liab. Tr. 1806:3–15 (Lehman (Google)) ("[]Glue . . . is well understood as sort of relative to Navboost. . . . Navboost records clicks on search results for queries, but there are other types of interactions with a search page, and there are other things on a search page besides just web search results. There can be all kinds of little boxes with data and images and all that kind of stuff. And . . . Glue attempts to record all those other interaction types on all those other elements of the search page for different queries.").

631. Query understanding systems like spelling and synonyms are also counting models. UPX0191 at -184, -223.

632. Google believes count-based systems are transparent. UPX0191 at -223. A system like Navboost is easy to understand. Rem. Tr. 2936:22–24 (Allan (Def. Expert)); Mem. Op. at 37 ("[Navboost] allows Google to remember which documents users clicked after entering a query and to identify when a single document is clicked in response to multiple queries."); Liab.

Tr. 1805:6–13 (Lehman (Google)) ("Navboost is not a machine learning system. It's just a big table. It says . . . for this search query, this document got two clicks.").

633. Another method to create search signals is to use a deep-learning model like RankEmbedBert. Rem. Tr. 2860:23–2861:10 (Allan (Def. Expert)). RankEmbedBert is a deep learning system that embeds documents and queries into a dimensional space and then uses the distance between documents and queries as a measure of relevance. Liab. Tr. 6356:3–20 (Nayak (Google)) ("[I]f you embedded all these queries [and] documents in this way, if you're given a new query, you embedded into the space and you look in the neighborhood around it for documents that are close by and you retrieve those documents."). While trained on fewer data count-based systems, they are trained on user-side data nonetheless. Mem. Op. at 37.

634. Unlike "transparent" counting-based systems, for LLM or deep learning models it is "difficult to characterize what [the model] is actually doing." Rem. Tr. 2861:13–22 (Allan (Def. Expert)). This why LLMs or deep-learning models are sometimes referred to as "black boxes." Rem. Tr. 2862:4–6 (Allan (Def. Expert)); Rem. Tr. 2936:25–2937:4 (Allan (Def. Expert)) ("[I]t's hard to understand what [RankEmbed] is doing inside that black box . . . .").

635. The lack of transparency in LLM-based signals can be a disadvantage. Rem. Tr. 2936:25–2937:7 (Allan (Def. Expert)). Almost all of Google ranking signals are not built using an LLM based approach. Rem. Tr. 2937:8–15 (Allan (Def. Expert)) ("Many of the signals that Google constructs are nonmachine-learned signals."); PXR0356 at -743 ("Google wants their signals to be fully transparent so they can troubleshoot and improve them.").

636. Systems like RankEmbed can also perform poorly at the tail. PXR0098* at -197 ("Embeddings do very well on the head and torso, terribly on the tail. That's why first impressions are very misleading. With current [neural network] tech anyone can spin up

something that looks credible until you run a rigorous eval on real traffic."); PXR0357 at -748 (RankEmbed is "high quality on common queries but can perform poorly on tail queries.").

637. In addition, deep learning systems like RankEmbed "may not be so good at memorizing facts, but they're really good at understanding language." Mem. Op. at 37 (quoting Liab. Tr. 1846:18–22 (Lehman (Google)) ("Such systems are 'designed to fill holes in [click] data'; they allow Google to generalize from situations where it has data to situations it does not."); Mem. Op. at 37 (quoting Liab. Tr. 1896:2–19 (Lehman (Google)).

638. Google believes that using a mostly non-ML approach to building search signals is a "big advantage that Google has over Bing and others." Rem. Tr. 2938:13–18 (Allan (Def. Expert)); PXR0356 at -743 ("Microsoft builds very complex systems using techniques to optimize functions. So it's hard to fix things to know where to go and how to fix functions. And deep learning has made that even worse."); Rem. Tr. 1023:19–1024:14 (Schechter (Microsoft)) (responding to the Court's question and clarifying that Bing's search ranking is performed by AI models).

639. Google's non-ML, count-based systems (like Navboost and Glue), however, are incredibly scale dependent. UPX0191 at -223 ("NavBoost (a glorified counting-based system for memorizing clicks) is still by far the most important component in search. Its power comes from memorization: model is huge ([redacted]). This is [redacted] times larger than the largest ML model used in Search: RankBrain ([redacted])[.]").

640. The amount of data Google uses to build count-based systems is not available to its rivals without Plaintiffs' data-sharing remedies. Mem. Op. at 37 ("Thirteen months of user data acquired by Google is equivalent to over 17 *years* of data on Bing.") (emphasis in original); UPX0005 at 811 ("Glue Cache (13 months)").

3. Plaintiffs' User-Side Data-Sharing Remedies Will Accelerate Innovation And Competition

641. Providing Qualified Competitors with access to Google's user-side data at scale will help rivals close the scale gap and improve the quality of their GSE. Rem. Tr. 1016:11–19 (Schechter (Microsoft)) (describing value of fresh, tail, and local queries); Des. Rem. Tr. 51:17–22 (Microsoft-DS 30(b)(6) Dep.) ("[U]nless you're sharing tail queries, the information is not terribly useful for a search engine to improve its own product and bridge the scale-gap.").

642. Tail queries particularly benefit from additional scale because these queries are not frequently observed by GSEs. Mem. Op. at 35, 230; Liab. Tr. 2675:14–24 (Parakhin (Microsoft)) (Less frequent queries like tail or location-specific queries tend to benefit more from scale.); UPX1079 at -996 ("[T]he vast number of queries we see rarely or even just once [are] the tail [queries]."); Liab. Tr. 10343:2–10345:9 (Oard (Pls. Expert)) ("And so it follows exactly what you would expect, that the long tail queries are where user-side data can be particularly valuable, because if I have a head query, a query that's occurring very often . . . then I don't have to have a whole lot of user-side data before I've seen a lot of [that head query]. And if I see a lot more [of that head query] I'm not probably going to get a whole lot better. But if I'm seeing zero or 20, there's a big difference.").

643. Mobile scale is necessary to improve the quality of mobile search and compete in general search. Mem. Op. at 34, 230, 234; Liab. Tr. 3495:23–3496:16 (Nadella (Microsoft)) (User quality for search requires participation in both desktop and mobile.); Liab. Tr. 2260:22–25 (Giannandrea (Apple)) (Differences between mobile and desktop make access to mobile queries at scale important to search quality on mobile.).

644. And fresh queries at scale are important for a GSE to provide useful responses to queries, as the meaning of search queries and search results change over time. Mem. Op. at 35;

Liab. Tr. 10337:12–10339:6 (Oard (Pls. Expert)) (By observing users, Google learns that words have new meanings based on new events.); Liab. Tr. 1899:25–1902:4 (Lehman (Google)) ("[O]ld school techniques" that train on fresh user-side data are used to keep up with current events.).

645. Google sharing its user-side data will allow rivals to accelerate the development of a competitive search product. Rem. Tr. 2163:8–2165:9, 2194:3–2195:3 (Chipty (Pls. Expert)) (explaining how data remedies are needed to supplement distribution remedies to allow competitors to develop and have a chance at catching up to Google); Rem. Tr. 409:11–411:3–19 (Turley (OpenAI)) (Accessing Google's user-side data would enable OpenAI to accelerate the development of its own index, invest more in core AI innovations, and compete more quickly.); Rem. Tr. 843:5–17 (Weinberg (DuckDuckGo)) (DDG does not have the queries nor scale to acquire enough user-side data to properly rank links.); Rem. Tr. 843:24–844:18 (Weinberg (DuckDuckGo)) (User-side data could move DuckDuckGo forward by years because indices are so difficult to build.); Rem. Tr. 1248:5–20 (Provost (Yahoo)) (Google click-and-query data would be useful to Yahoo to refine the quality of Yahoo products.).

646. Industry participants could use these data to build out their core index and ranking technology, and it would also help improve the accuracy of an answer and search grounding. Rem. Tr. 399:21–402:5 (Turley (OpenAI)) (User location and click-and-query data are helpful when building out a new search index.); Rem. Tr. 1248:21–24 (Provost (Yahoo)) (If the Court ordered the data sharing remedies recommended by Plaintiffs, Yahoo would use that data.).

647. Sharing Google's user-side data will enable faster competition by overcoming rivals' cold-start problem for long-tail queries. Rem. Tr. 411:3–19 (Turley (OpenAI)); Des. Rem. Tr. 51:17–22 (Microsoft-DS 30(b)(6) Dep.) ("[U]nless you're sharing tail queries, the

information is not terribly useful for a search engine to improve its own product and bridge the scale-gap.").

648. Sharing user-side data would reduce the importance of scale as a barrier to entry. Rem. Tr. 2162:22–2163:7 (Chipty (Pls. Expert)). It would also enable potential entrants and rivals who do not win defaults to invest. Rem. Tr. 2163:8–2164:1 (Chipty (Pls. Expert)). Further, it would allow rivals to develop their own capabilities faster than they otherwise could. Rem. Tr. 2163:8–2169:1 (Chipty (Pls. Expert)).

D. Data Sharing Remedies Are Feasible

649. Plaintiffs' data sharing remedies are feasible from a technical perspective. Rem. Tr. 1523:5–21 (Mickens (Pls. Expert)) (Plaintiffs' proposed data sharing remedies are feasible).

650. As part of its indexing process, Google already creates intermediate files with relevant search index prerequisites. Rem. Tr. 1525:11–1526:8 (Mickens (Pls. Expert)) (Google creates documents called Cdocs that summarize the most important parts of each webpage,).

651. Google's distributed systems are already designed to facilitate data sharing within and among Google's systems. Rem. Tr. 1524:1–16 (Mickens (Pls. Expert)) (Google's distributed systems have technical mechanisms to allow data sharing tasks.); Rem. Tr. 1533:24–1534:20 (Mickens (Pls. Expert)) (Taking data sets and making them available to some tasks but not other tasks is something that hyperscaler companies like Google do all the time.); Rem. Tr. 1533:24–1534:20 (Mickens (Pls. Expert)) (What Plaintiffs' data sharing remedies require are things that Google's infrastructure is already good at doing.); Rem. Tr. 1536:15–1537:9 (Mickens (Pls. Expert)) (What Plaintiffs' data sharing remedies require are things that Google's infrastructure already does.).

652. Plaintiffs' data sharing remedies could be implemented in multiple ways. Rem. Tr. 1535:22–1536:14, 1539:22–1541:4 (Mickens (Pls. Expert)) (asserting that Plaintiffs' data

sharing remedies could be implemented in multiple different ways); Rem. Tr. 1537:10–1538:10 (Mickens (Pls. Expert)) (could give Qualified Competitors ability to run tasks in Google data centers or export data over IP to own data centers); Rem. Tr. 1539:22–1540:22 (Mickens (Pls. Expert)) (could ship physical storage devices to QCs).

653. Google's pre-existing search infrastructure is amenable to providing search engine prerequisites and user data to qualified competitors on-demand. Rem. Tr. 1523:5–21 (Mickens (Pls. Expert)) (Google's pre-existing search infrastructure is amenable to providing data to qualified competitors.); Rem. Tr. 1524:1–16 (Mickens (Pls. Expert)) (Google could comply with the Plaintiffs' proposed remedies by leveraging their pre-existing technical infrastructure.).

654. Google's hardware and back-end software infrastructure is technically capable of scaling to manage an increased workload without additional engineering work. Rem. Tr. 1531:1–25 (Mickens (Pls. Expert)) (Google runs a cluster manager to efficiently allocate tasks).

655. It is feasible for Google to isolate qualified competitors' data requests to prevent Google from seeing what data competitors are requesting. Rem. Tr. 1537:10–1539:21 (Mickens (Pls. Expert)) (describing isolation techniques).

E. User Side Data Can Be Shared While Preserving Privacy

656. The data that is at issue in the proposed remedy can be safely shared by Google in a way that assures privacy while providing utility to Qualified Competitors. Rem. Tr. 1182:12–1183:23 (Evans (Pls. Expert)) ("The purpose for the [Q]ualified [C]ompetitors is to improve their own search engine and improve their products for [their] users . . . not for one particular user . . . . [T]here are solutions that can be done in a principled way that satisfy those utility goals that the remedy has and that don't compromise any privacy risk."); Rem. Tr. 1163:20–1165:8 (Evans (Pls. Expert)) (explaining that there are multiple privacy-enhancing techniques that could be

used, and that they could be used together to preserve privacy, and that "the data that is at issue in the proposed remedy can be safely shared by Google in a way that assures privacy while providing utility"); Rem. Tr. 1133:5–22 (Evans (Pls. Expert)) (explaining that even Google's privacy expert agrees it is possible to share user-side data while preserving privacy); Rem. Tr. 1165:9–1166:6 (Evans (Pls. Expert)) (responding to the Court's question and explaining that today's privacy-enhancing techniques prevent bad actors from re-identifying individuals in a released dataset); Rem. Tr. 3730:2–12, 3805:24–3806:7 (Culnane (Def. Expert)) (explaining generally that useful data can be shared while protecting privacy).

657. While data security focuses on preventing unintended releases of data, data privacy focuses on preventing the disclosure of sensitive information when intentionally releasing data. Rem. Tr. 1134:14–1135:19 (Evans (Pls. Expert)) (comparing data security versus privacy).

658. When a data release is for private actors who have agreed to maintain the confidentiality of the data, the protections do not necessarily need to be as strict as if for a public release. Rem. Tr. 3685:8–3686:12 (Culnane (Def. Expert)) (stating that "public releases are often deemed the most at risk because by definition everyone has access to it").

659. Companies like Google collect information about individual users in the form of raw data, which they can then process in various ways before using or transferring the data. Rem. Tr. 1134:14–1135:19 (Evans (Pls. Expert)) (explaining the general steps a company takes when collecting data).

660. Google collects a wide array of user-side data for use in its search engine, including user queries, click-through rates, how long users hover over links, and location data. Des. Rem. Tr. 36:5–17, 37:16–21 (Parakh (Google) Dep.) (explaining that Google Search trains

its AI models and ranking algorithms, including Navboost and Glue models, on click-and-query data it collects from users); Des. Rem. Tr. 101:1–102:3 (Parakh (Google) Dep.) (describing how Google collects user feedback data for its AI Overviews Search feature); Des. Rem. Tr. 105:13–106:11 (Parakh (Google) Dep.) (Google trains Search-specific Gemini models on user search queries.); Rem. Tr. 3694:2–21 (Culnane (Def. Expert)) (Google uses and protects location data in determining whether a user making a commercial query translates to a physical in-store purchase.); Rem. Tr. 1136:12–1137:5 (Evans (Pls. Expert)) (describing various types of user-side data that Google could share with Qualified Competitors).

661. Over the last two decades, the privacy field has made significant strides in formalizing definitions of privacy that mathematically ensure that privacy will be protected. Rem. Tr. 1138:19–1139:13 (Evans (Pls. Expert)) (describing advances in the privacy field since 2000); Rem. Tr. 1163:20–1164:9 (Evans (Pls. Expert)) ("[T]here are hundreds of different privacy definitions [today], many more being invented by the academic community every month."); Rem. Tr. 1165:9–1166:6 (Evans (Pls. Expert)) (responding to the Court's question and explaining that today's privacy-enhancing techniques prevent bad actors from re-identifying individuals in a released dataset).

662. The strongest formal definition of privacy is differential privacy, which guarantees a mathematical limit on anything that could be exposed in a data release. Rem. Tr. 1140:1–1141:1 (Evans (Pls. Expert)) (responding to the Court's question and explaining scope of formal privacy guarantees); Rem. Tr. 3686:22–3687:16 (Culnane (Def. Expert)) ("[d]ifferential privacy in its purest form can have a guarantee"); PXR0167* at -569 (Google document stating that differential privacy has "[r]obust privacy guarantees," making it "mathematically impossible to extract more information from the data than intended").

663. Privacy-enhancing techniques ("PETs") are mechanisms that satisfy formal privacy definitions such that sensitive, private information is protected when releasing data. Rem. Tr. 1133:5–22, 1134:1–1135:19, 1139:14–1141:1 (Evans (Pls. Expert)) (responding to the Court and explaining how companies can use PETs to assure privacy beyond just anonymity).

664. PETs are designed to preserve privacy for both direct identifiers, like Social Security numbers, and indirect identifiers, which may identify an individual when paired with other data. Rem. Tr. 1137:6–1141:1:1 (Evans (Pls. Expert)) (addressing the Court's question and describing how privacy mechanisms can ensure privacy for both direct and indirect identifiers); Rem. Tr. 1188:11–19 (Evans (Pls. Expert)) (explaining why just removing direct identifiers would not be an appropriate way to balance privacy and utility).

665. There are several well-established PETs that can be used to protect privacy while providing Qualified Competitors with high-utility data. Rem. Tr. 1134:1–13 (Evans (Pls. Expert)) ("There are many well-established privacy-enhancing techniques. There are many different ways to use them, to combine them" in order to "ensure privacy while providing high utility."); Rem. Tr. 1139:14–1141:1 (Evans (Pls. Expert)) (responding to the Court and explaining how companies can use PETs to assure privacy beyond just anonymity); Rem. Tr. 1163:20–1164:9 (Evans (Pls. Expert)) ("[T]here are hundreds of different privacy definitions . . . . And then there are lots of different mechanisms to satisfy those definitions."); Rem. Tr. 3731:25–3732:14 (Culnane (Def. Expert)) (agreeing with Plaintiffs' privacy expert that many formal privacy definitions exist and many privacy-techniques can be applied to satisfy the many privacy definitions).

666. Determining the appropriate PETs to apply to a data release depends on understanding both the properties of the data and the intended use cases for that data, then

conducting a privacy-utility tradeoff. Rem. Tr. 1164:18–1165:8 (Evans (Pls. Expert)) (explaining factors that someone would need to consider in order to make the appropriate privacy-utility tradeoff for a data release); Rem. Tr. 1166:22–1169:8 (Evans (Pls. Expert)) (referencing PXRD007 at 31–37) (explaining the privacy-utility tradeoff curve and how different combinations of PETs can achieve better privacy-utility tradeoffs); Rem. Tr. 1170:2–1171:7 (Evans (Pls. Expert)) (responding to the Court and explaining that, to understand the appropriate utility level in this case, a Technical Committee would need to understand the Qualified Competitors' specific use cases); Rem. Tr. 1171:8–1173:25 (Evans (Pls. Expert)) (referencing PXRD007 at 39) (describing how organizations across industry and government, including Google, conduct privacy-utility tradeoffs in the ordinary course); Rem. Tr. 1174:1–1179:8 (Evans (Pls. Expert)) (responding to the Court's questions and detailing one way the Technical Committee could determine the appropriate PETs to use when sharing data in this case); Rem. Tr. 1181:9–1182:11 (Evans (Pls. Expert)) (referencing PXRD007 at 43) (explaining importance of having the Technical Committee make this determination); Rem. Tr. 1214:19–1217:11 (Evans (Pls. Expert)) (walking through one potential process for determining the appropriate privacy-utility tradeoff); Rem. Tr. 1217:22–1219:3 (Evans (Pls. Expert)) (referencing RDXD083) (explaining the privacy-utility tradeoff policy generally and that you learn a little about privacy and a little about the use cases, learning more as the process goes along, making the process iterative rather than linear); Rem. Tr. 3735:7–15 (Culnane (Def. Expert)) (determining which privacy-enhancing techniques to apply is technical and iterative).

667. The objective in performing the privacy-utility tradeoff is to maximize utility while maintaining an acceptable level of privacy. Rem. Tr. 1236:15–1237:11 (Evans (Pls.

Expert)); Rem. Tr. 3733:22–9 (Culnane (Def. Expert)) ("That's a reasonable level to get – while analyzing it . . . .").

668. The technical committee is well-positioned to assess the proper levels of privacy and utility. Rem. Tr. 1237:2–12 (Evans (Pls. Expert)) (explaining the technical committee will need input from the Qualified Competitors and from Google to make assessment decisions); Rem. Tr. 3680:1–22 (Culnane (Def. Expert)) (explaining that the privacy assessment is not a mathematical or numerical line, but an analysis of properties); Rem. Tr. 3686:22–3687:16 (Culnane (Def. Expert)) (stating that privacy experts look at "risk assessments as opposed to absolute guarantees"); Rem. Tr. 3735:16–23 (Culnane (Def. Expert)) (explaining the need for a privacy expert and either a search engine expert or an information retrieval expert to perform the utility use case analysis); Rem. Tr. 3806:4–3807:4 (Culnane (Def. Expert)) (making general recommendations, including applying differential privacy techniques to aggregate data, remaining open to applying different privacy protections, and having independent experts examine data releases).

669. For most data use cases, a combination of different PETs will achieve the best balance of privacy and utility. Rem. Tr. 1166:22–1170:1 (Evans (Pls. Expert)) (referencing PXRD007 at 31–37) ("For the remedy, it's probably not just one [privacy-enhancing] technique . . . And most uses of privacy-enhancing techniques, at least many uses, find the best solution is to combine several."); Rem. Tr. 3732:15–3733:1 (Culnane (Def. Expert)) (stating that privacy-enhancing techniques can be combined); PXR0167* at -573–74 (Google has proposed combining differential privacy, k-anonymity, and generalization in the past to release click data, view data, ranking metrics, and query counts.).

670. There are three main categories of PETs: those that add noise to data, like differential privacy mechanisms; those that add frequency bounds to data, such as those meant to satisfy k-anonymity; and those that use cryptographic methods to enable data usage while keeping the data encrypted. Rem. Tr. 1141:12–1142:11 (Evans (Pls. Expert)); Rem. Tr. 1145:2–1146:23 (Evans (Pls. Expert)) (explaining how one can mathematically ensure that noise protects privacy by satisfying differential privacy).

671. Adding noise to data entails adding random values from a probability distribution to each data entry in a data release. Rem. Tr. 1142:12–1144:25 (Evans (Pls. Expert)) (responding to the Court and explaining how applying noise to the data in this case could preserve privacy).

672. Adding noise to a data release will distort the specific value of each data entry but will still provide highly useful data to recipients. Rem. Tr. 1142:12–1144:25 (Evans (Pls. Expert)) (responding to the Court and explaining how applying noise to the data in this case could preserve privacy).

673. Adding random noise to a dataset is a privacy-enhancing technique meant to satisfy differential privacy. Rem. Tr. 1145:2–1146:23 (Evans (Pls. Expert)) (describing mathematical basis for ensuring privacy using differentially private noise).

674. The privacy loss parameter, epsilon, allows for precise control over the privacy utility tradeoff when applying a differential privacy mechanism to a data release. Rem. Tr. 1145:2–1146:23 (Evans (Pls. Expert)) ("[B]y picking that [epsilon] value and using this definition [of privacy], you have precise control over the privacy utility trade-off."); PXR0167* at -574 (Google document that views privacy loss parameters as means to "control 'how much' personal information is revealed in the worst case").

675. Under differential privacy, a higher epsilon value provides more utility with less noise while a lower epsilon value provides more privacy with more noise. Rem. Tr. 1146:24–1147:17 (Evans (Pls. Expert)) (responding to the Court's question and explaining that the privacy loss parameter is set depending on the use and privacy needs for a data release).

676. Under differential privacy, there is no absolute rule on what the correct value of epsilon should be; the appropriate value for epsilon depends on what the dataset includes and what the desired use cases for the data are. Rem. Tr. 1147:18–1148:14 (Evans (Pls. Expert)) (responding to the Court's question and explaining standards for setting the epsilon value for a data release).

677. Both in industry and government, organizations have already applied privacy-enhancing techniques to achieve differential privacy when releasing data. Rem. Tr. 1148:15–1149:1 (Evans (Pls. Expert)) (discussing PXRD007 at 18).

678. Another formal definition of privacy is k-anonymity, which is satisfied if every record in a released dataset is indistinguishable from at least k-1 other records. Rem. Tr. 1150:1–1151:3 (Evans (Pls. Expert)).

679. Organizations like Google need not set a k-threshold based only on raw data to preserve user privacy when sharing data; they can also apply several techniques like generalization, suppression, and query-intent grouping to process data such that high-utility data can still be shared while preserving privacy under k-anonymity. Rem. Tr. 1154:19–1156:10 (Evans (Pls. Expert)) (explaining steps Google could take to release more and higher quality search data while satisfying k-anonymity); Rem. Tr. 1158:17–1160:20 (Evans (Pls. Expert)) (responding to the Court's question and identifying several techniques Google could have used to release more data under the DMA data release while preserving privacy); Rem. Tr. 3795:9–

3797:10 (Culnane (Def. Expert)) (responding to the Court's question and explaining that generalization (grouping queries by intent) is a technique that can meet a noisy threshold to satisfy differential privacy); Rem. Tr. 3798:23–3800:24 (Culnane (Def. Expert)) (describing by way of example several different ways to generalize and suppress data including enlarging a geographic area, increasing a data range, or suppressing the date all together (discussing RDXD0029 at -.022)).

680. Across industry and government, organizations routinely frequency thresholds—often when paired with other PETs—to preserve privacy when releasing sensitive data. Rem. Tr. 1156:11–1157:21 (Evans (Pls. Expert)) (discussing PXRD007 at 24–25) (describing several examples, including examples from Google).

681. Basic forms of data processing, such as generalizing user locations and correcting spelling typos, would be trivial to implement while increasing the amount of data that Google could release. Rem. Tr. 1161:15–1163:9 (Evans (Pls. Expert)) (describing steps Google failed to take for the DMA data release); Rem. Tr. 1210:18–1212:10 (Evans (Pls. Expert)) (responding to the Court and explaining that generalization and suppression could even enable Google to share some useful data from search queries containing users' addresses).

682. The data encompassed in the AOL data release is not comparable to the data sharing remedy proposed in this case. Rem. Tr. 1162:22–1169:8 (Evans (Pls. Expert)).

683. The 2006 AOL data release did not involve the use of any privacy-enhancing techniques. Rem. Tr. 1137:16–1138:18 (Evans (Pls. Expert).

684. When AOL released user search query data logs in 2006, it only swapped users' names with numerical identifiers, making it easy to re-identify an individual based on their queries. Rem. Tr. 1137:16–1138:18 (Evans (Pls. Expert)).

685. The 2006 AOL data release was reckless even by the standards of 2006, resulting in AOL firing the engineers responsible. Rem. Tr. 1137:16–1138:18 (Evans (Pls. Expert)).

686. Today, Google automatically removes all personally identifiable information from user queries and QSessions before it uses them to improve its search engine and GenAI Products. Des. Rem. Tr. 170:6–24, 171:7–20, 171:24–25 (Parakh (Google) Dep.) (describing how Google automatically strips all PII from query data before use as part of its standard user logs processing pipelines); Rem. Tr. 3731:13–17 (Culnane (Def. Expert)) (acknowledging that Google would use mechanisms to remove PII); Rem. Tr. 3523:4–3524:23 (Reid (Google)) (describing how "other techniques to remove things like Social Security numbers and credit card numbers" are generally "easier" techniques).

687. Specifically, Google has used differential privacy on several occasions to preserve user privacy when collecting and releasing similar data to the data at issue in this case. Rem. Tr. 1149:2–25 (Evans (Pls. Expert)) (describing Google's use of differential privacy for search data, user keyboard entries, and location data); Rem. Tr. 1179:19–1181:3 (Evans (Pls. Expert)) (responding to the Court and describing examples of Google using differential privacy to safely release high-utility data); PXR0282* at -499 (Google document providing an example of Google using differential privacy in the regular course of business); PXR0167* at -569–70 (Google document describing Google's use of differential privacy to release, e.g., "multiple datasets to help researchers and health officials fight the pandemic").

688. Google has used k-anonymity to safely release sensitive search query data, location data, and more. Rem. Tr. 1156:23–1157:21 (Evans (Pls. Expert)) (discussing PXRD007 at 25) (describing recent examples of Google voluntarily sharing sensitive search and location data).

689. Google uses spelling correction techniques every day. Rem. Tr. 3792:24–3793:5 (Culnane (Def. Expert)); Rem. Tr. 3810:16–23 (Culnane (Def. Expert)) (discussing PXRD023 at 4) (showing Google's spell correction techniques when searching for Taylor Swift's birthday).

690. Google groups queries by intent every day. Rem. Tr. 3793:6–15 (Culnane (Def. Expert)); Rem. Tr. 3794:19–23 (Culnane (Def. Expert)) (discussing PXRD023 at 4) (showing Google's ability to group different queries by intent when searching for Taylor Swift's birthday).

691. Google has explored ways to privately share user data with Apple for the purpose of integrating Google products with Apple Intelligence. Des. Rem. Tr. 214:16–216:7 (Fox (Google) Dep.) (discussing a deal to integrate with Apple Intelligence to provide user data in a privacy safe manner); PXR0274 at -369, -371.

692. There were adequate ways in which Google could protect user privacy while sharing data through Apple Intelligence. Des. Rem. Tr. 216:16–20 (Fox (Google) Dep.).

693. Google publicly announced that it would comply with the European Parliament's 2022 Digital Markets Act provision requiring Google to share click-and-query data with third parties. Rem. Tr. 2501:09–2502:5 (Pichai (Google)).

694. The DMA analysis cannot be used as a substitute for a new analysis here because it is a different data set. Rem. Tr. 3738:20–3739:3 (Culnane (Def. Expert)) (explaining that because the data is different here, he could not rely on the DMA privacy analysis—a new analysis would need to be performed); Rem. Tr. 3790:1–3, 3790:9–11 (Culnane (Def. Expert)) (did not evaluate the use cases or perform a utility analysis here).

695. Google's approach to k-anonymity under the DMA resulted in the company removing 99 percent of all queries from its data release. Rem. Tr. 1159:13–1160:20 (Evans (Pls. Expert)) (responding to the Court's question and stating "[Google] released about 1 percent of

the queries. And that meant they were removing the other 99 percent."); Rem. Tr. 1163:10–19 (Evans (Pls. Expert)) (Google's approach under the DMA "does not seem like the approach one would use if you wanted to release high utility data."); Rem. Tr. 870:4–17 (Weinberg (DuckDuckGo)) ("In the guise of privacy [Google] removed 99 percent of the queries," making the released information "useless."); Des. Rem. Tr. 73:4–19 (Microsoft-DS 30(b)(6)) (describing how Google cited privacy concerns as the basis to resist "any meaningful data sharing of click and query data in Europe.").

696. For its DMA data release, Google applied a k-threshold only on exact query text, meaning a single typo could be enough to remove a non-sensitive query from the released dataset. Rem. Tr. 1159:13–1160:20 (Evans (Pls. Expert)) (responding to the Court and explaining the shortcomings of Google's approach using exact query matches); Rem. Tr. 3705:24–3706:6 (Culnane (Def. Expert)) (responding to the Court that the data released under the DMA did not group queries by intent—"this is purely unique . . . there isn't any attempt to save queries in this mechanism"); Rem. Tr. 3795:3–8 (Culnane (Def. Expert)) (discussing PXRD023 at 4) (explaining that under the DMA the queries for Taylor Swift's birthday would not be released because more than one character difference exists); Rem. Tr. 3812:5–12 (Culnane (Def. Expert)) (discussing PXRD023 at 4) (confirming that for purposes of the DMA release, queries like in the Taylor Swift example, could not be released because the strings differ by one character).

697. For its DMA data release, Google failed to perform a utility analysis. Rem. Tr. 3706:19–3707:3 (Culnane (Def. Expert)) (explaining that he was not qualified "to look at how to do that utility analysis"); Rem. Tr. 3736:6–15 (Culnane (Def. Expert)) (explaining that in determining that a frequency threshold was the only technique that should be applied, he did not

perform a utility analysis because he is not a utility analyst); Rem. Tr. 3739:6–9, 3790:4–8 (Culnane (Def. Expert)) (no utility analysis was performed).

698. For its DMA data release, Google failed to evaluate any use cases. Rem. Tr. 3789:21–24 (Culnane (Def. Expert)).

699. Google is not the only U.S. company capable of protecting user privacy. Rem. Tr. 3664:10–12 (Reid (Google)).

700. Privacy is an issue that all tech companies face. No company is perfect at addressing privacy concerns, including Google. Rem. Tr. 2484:21–2485:6 (Pichai (Google)); Rem. Tr. 3664:15–18 (Reid (Google)) (acknowledging Google has its own history of issues with data breaches and privacy breaches).

701. Google has dealt with privacy issues in the past. Rem. Tr. 2485:4–6 (Pichai (Google)).

702. In some instances, companies have even rejected Google because they believed its privacy standards were insufficient. Rem. Tr. 3105:14–25 (J. Adkins (Google)); Des. Rem. Tr. 20:12–23:3 (Google-JA 30(b)(6) Dep.) ("[I]t was certainly an issue in ongoing negotiations with any kind of partnership with Snapchat in any kind of potential ads deal that they simply didn't believe that it was good enough for their private data -- or their -- for their personal data and for theirs. So there are definitely examples where companies in this industry don't believe that Google's standards are good enough for them.").

703. In 2011, the Federal Trade Commission alleged Google violated its own privacy promises to its consumers with its social network, Google Buzz. Rem. Tr. 2486:7–12 (Pichai (Google)).

704. Google and the FTC ultimately entered into a consent order as a result of the Google Buzz administrative proceeding. Rem. Tr. 2486:13–16 (Pichai (Google)). As a result of this order, Google agreed in March 2011 to implement a comprehensive privacy program to protect user data through 2031. Rem. Tr. 2486:21–2487:12 (Pichai (Google)); PXR0348. Google has ongoing obligations related to that consent order today. Rem. Tr. 2488:4–8 (Pichai (Google)); PXR0348.

705. In 2012, Google was fined $22.5 million for violating the Google Buzz consent order. Rem. Tr. 2488:19–25 (Pichai (Google)) (discussing PXR0349).

706. Google is not the only U.S. company capable of providing data security to its users. Rem. Tr. 2484:9–12 (Pichai (Google)) (explaining Google is not the only U.S. company capable of providing data security to its users); Rem. Tr. 3664:6–14 (Reid (Google)) (Google is not the only company capable of protecting user privacy.).

707. Google is not the only U.S. company capable of preventing data breaches. Rem. Tr. 2484:9–16 (Pichai (Google)).

708. Google has not experienced any data breaches in its process of implementing the Digital Market Act's data-sharing requirement. Rem. Tr. 2503:4–8 (Pichai (Google)).

709. Yahoo protects the user data that it tracks. Rem. Tr. 1249:15–24 (Provost (Yahoo)). In the past 3 years, there have been no major data breaches at Yahoo. Rem. Tr. 1238:21–24, 1249:25–1250:2 (Provost (Yahoo)).

710. Yahoo can use Google user data even if it is anonymized. Rem. Tr. 1248:25–1249:5 (Provost (Yahoo)).

F. Ads Data Sharing Remedies Will Improve Competition

711. Section VI.E of the RFPJ generally requires disclosure to Qualified Competitors of Ads Data serving as inputs into the components of Google's auction and Prediction stack,

including models computing "predicted click-through rates", or similar models predicting if a click is good.

712. This Court recognized the critical role scale and access to Ads Data played in maintaining Google's monopoly: "Understanding which advertisements users click on (or scroll past) enables Google to evaluate ad quality and serve more relevant ads in the future. . . . The more precisely targeted an ad, the greater likelihood that it will be clicked, which translates into higher revenues that Google uses to make larger revenue share payments." Mem. Op. at 230.

713. This Court also noted, and trial evidence confirmed, that user scale "improves search ads monetization"—and thus the ability to compete—by enabling ads algorithms to select higher quality, more relevant ads, improving predicted and actual click-through rates; thereby improving per-query and per-impression revenue. Mem. Op. at 230; Rem. Tr. 3304:14–3305:4 (Israel (Def. Expert)) (agreeing that "all else equal," more scale improves ads quality); Rem. Tr. 1803:23–1804:13 (Epstein (adMarketplace)) (Ads data sharing permits "data scientists to go in and start to back test different algorithms and see how they would work, and that is -- that is useful for sure."); Rem. Tr. 845:23–847:12 (Weinberg (DuckDuckGo)) (About a third of queries return ads. Although users want some ads, ads displayed at the wrong time, e.g., on navigational queries, will upset users.); Rem. Tr. 851:17–852:7 (Weinberg (DuckDuckGo)) (Ads data would help Microsoft and DDG fine tune the ads network that DDG participates in.).

714. The Ads Data sharing remedies will increase competition in the search text ads marketplace by enabling rivals to overcome the scale barrier. Rem. Tr. 1814:20–1815:11 (Epstein (adMarketplace)). Sharing ads data would reduce the importance of scale as a barrier to entry, Rem. Tr. 2162:22–2163:7 (Chipty (Pls. Expert)), and would allow rivals to develop their

own capabilities faster than they otherwise could, Rem. Tr. 2163:8–2169:1 (Chipty (Pls. Expert)).

715. Google uses a large amount of user data other than the search query in its ad models. Rem. Tr. 4407:21–4408:22 (Muralidharan (Google)).

716. Google's LLM advertising models train on some user interaction data. Rem. Tr. 4459:22–4460:8 (Muralidharan (Google)).

717. LEMs trained on user interaction data and used in Google's ad stack drive 85–90% of incremental search ads RPM; they are critical for ads in Google. Rem. Tr. 4463:16–4464:2, 4464:14–23, 4466:6–9 (Muralidharan (Google)) (discussing PXR0246 at -164).

718. High quality algorithms do not eliminate the need for scale in improving ads monetization. Rem. Tr. 1815:12–1816:7 (Epstein (adMarketplace)) ("[T]he algorithms aren't really the tough part. It's the access to the data that's difficult. You can, you know -- if you have enough data, you can run algos all day and just A/B test and figure out the ones that are the most effective. But if you don't have access to, you know, the data, then you can have the most brilliant algorithm in the world, you're never going to be able to test it and see if it works, or A/B test it or tune it.").

719. The ads data sharing provision in Section VI.E requires only the raw data serving as inputs to the identified models, not any outputs from those models; for interim models trained on outputs from other models, Section VI.E seeks only the constituent raw data underpinning the interim outputs, not any interim outputs themselves.

720. For a platform serving search ads, "relevance is revenue," and monetization depends on the platform's ability to serve relevant, targeted ads to the user. Rem. Tr. 1822:19–1825:3 (Epstein (adMarketplace)); Rem. Tr. 1794:10–1797:3 (Epstein (adMarketplace)) ("[I]n

search, if you don't have a Grade A standard product, you're just not going to have any chance to do any of the other things like charge advertisers less or pay ad publishers more or, you know, re-rank in ways that you find more compelling to audiences.").

721. For GSE users, ad quality is an important component of overall search quality and well-targeted, useful ads improve the overall user experience, attracting more users and contributing to competition for queries. Rem. Tr. 845:23–847:12 (Weinberg (DuckDuckGo)) (About a third of queries return ads, and users even want some ads.); Rem. Tr. 848:9–21 (Weinberg (DuckDuckGo)) (When ads are good people don't notice them, or even like them, but complain about them when they are bad.); Rem. Tr. 4614:10–4615:16 (Chipty (Pls. Expert)) (discussing PXR0246 at -156 as well as PXR0240* at -033 and -064); Liab. Tr. 1328:14–1329:2 (Dischler (Google)) ("[W]e believe that it's an actually a worse user experience to not have ads on the page.").

722. Plaintiffs' Ads Data sharing remedies will enable rivals to improve their ad algorithms. Rem. Tr. 1803:23–1804:13 (Epstein (adMarketplace)); PXR0047* at -427 ("Need performance data (e.g., clicks), since Ads LLMs fine-tuned on content + performance data give gains"); Rem. Tr. 4460:9–16 (Muralidharan (Google)) (LLMs are part of Google's ad stack, which is the set of models and algorithms Google relies on to select and serve search ads.).

723. Ads Data sharing will improve long-tail search results. Rem. Tr. 848:3–8 (Weinberg (DuckDuckGo)) (Fewer queries mean less ads data.).

724. Plaintiffs' proposed remedy requiring that Google share its ads data contains provisions safeguarding against any incentive concerns by requiring that any rival seeking data or syndication services demonstrate a "plan to invest and compete" in a relevant market. Pls. RPFJ § III.U.

725. With Google sharing its ads data, rivals will have incentives to invest to differentiate themselves from each other and Google, and Google will retain the incentive to invest to avoid falling behind. Rem. Tr. 2166:12–2167:18 (Chipty (Pls. Expert)) (explaining that data enables rivals to innovate, that rivals have incentives to differentiate themselves, and that Google must respond to greater competitive rivalry); Rem. Tr. 4389:22–4390:3 (Murphy (Def. Expert)) (agreeing that product differentiation is an important part of competition); Rem. Tr. 4393:17–22 (Murphy (Def. Expert)) (saying that for browsers, "if you just copycat, you are not providing independent value").

726. Sharing ads data would enable potential entrants and rivals who do not win defaults to invest. Rem. Tr. 2163:8–2169:1 (Chipty (Pls. Expert)).

727. Google's concerns regarding reverse engineering are overstated and impractical. Rem. Tr. 191:21–195:23 (Durrett (Pls. Expert)) (responding to the Court's question and explaining that an LLM trained on search results is not performing the same function as a GSE and as such, one cannot reverse engineer the entire process of Google Search with an LLM); Rem. Tr. 195: 24–197:19 (Durrett (Pls. Expert)) (explaining the difference between mimicking and reverse engineering—one might be able to train a model to do the same thing, but that model would not provide a copy of what Google's system does, nor the component structure, for something like the Fast Search system); Rem. Tr. 835:5–836:6 (Weinberg (Duck Duck Go)) (explaining that not enough information is provided in terms of code, subsystems, and outputs to reverse engineer Google with syndicated search results).

G. Ads Data Sharing Is Feasible

728. Plaintiffs' ads data sharing remedies are feasible from a technical perspective. Rem. Tr. 1523:5–21 (Mickens (Pls. Expert)) (opining that Plaintiffs' proposed data sharing remedies are feasible).

729. Google already logs ads data, which it stores in ads storage systems like FLOGs. Rem. Tr. 1528:25–1530:12 (Mickens (Pls. Expert)) (As part of its ads serving process, Google stores log data in ad storage systems, including FLOGS.).

730. Google's FLOGS and Kansas databases are the primary systems used to store data that ad models are trained on. Rem. Tr. 4411:12–4412:6 (Muralidharan (Google)).

731. FLOGS is very important for training some of the algorithms Google uses. Rem. Tr. 4464:24–4465:9 (Muralidharan (Google)).

732. While the Kansas database contains individual user-level information, Google's FLOGS database does not contain individual user identifiers, although it may contain information about user activity. Rem. Tr. 4411:12–4412: 9 (Muralidharan (Google)); PXR0247* at -925 ("Flogs and Woodshed handle privacy compliance, data freshness, and other logs / data management.").

733. Google's distributed systems are already designed to facilitate data sharing within and among Google's systems. Rem. Tr. 1524:1–16 (Mickens (Pls. Expert)) (Google's distributed systems have technical mechanisms to allow data sharing tasks.); Rem. Tr. 1533:24–1534:14 (Mickens (Pls. Expert)) (Taking data sets and making them available to some tasks but not other tasks is something that hyperscaler companies like Google do all the time.); Rem. Tr. 1536:15–1537:9 (Mickens (Pls. Expert)) (What Plaintiffs' data sharing remedies require are things that Google's infrastructure already does.); Rem. Tr. 1533:24–1534:20 (Mickens (Pls. Expert)) (What Plaintiffs' data sharing remedies require are things that Google's infrastructure is already good at doing.).

734. Plaintiffs' ads data sharing remedy could be implemented in multiple ways. Rem. Tr. 1535:22–1536:14, 1539:22–1541:4 (Mickens (Pls. Expert)) (asserting that Plaintiffs' data

sharing remedies could be implemented in multiple different ways); Rem. Tr. 1537:10–1538:10 (Mickens (Pls. Expert)) (could give Qualified Competitors the ability to run tasks in Google data centers or to export data over IP to own data centers); Rem. Tr. 1539:22–1541:4 (Mickens (Pls. Expert)) (could ship physical storage devices to Qualified Competitors).

735. Google's pre-existing search infrastructure is amenable to providing ads data to Qualified Competitors on-demand. Rem. Tr. 1523:5–17 (Mickens (Pls. Expert)); Rem. Tr. 1524:1–16 (Mickens (Pls. Expert)) (Google could comply with the Plaintiffs' proposed remedies by leveraging their pre-existing technical infrastructure.).

736. Google's hardware and back-end software infrastructure is technically capable of scaling to manage an increased workload without additional engineering work. Rem. Tr. 1531:1–25 (Mickens (Pls. Expert)) (Google runs a cluster manager to efficiently allocate tasks.).

737. It is feasible for Google to isolate Qualified Competitors' data requests to prevent Google from seeing what ads data competitors are requesting. Rem. Tr. 1537:10–1539:21 (Mickens (Pls. Expert)) (describing isolation techniques).

VIII. SYNDICATION OF SEARCH RESULTS NECESSARY TO BUILD GSE QUALITY AND SCALE OF QUALIFIED COMPETITORS

A. Search Syndication Can Provide A Bridge For Competition

738. In the context of a general search engine, "search syndication" is when a GSE's search results and other organic content is syndicated for display on a different search engine's website. Rem. Tr. 2957:25–2958:9 (J. Adkins (Google)).

739. Using data to develop a high-quality service takes time, meaning that rivals need syndication services to enter the markets and meaningfully compete in the short run. Rem. Tr. 424:20–425:24 (Turley (OpenAI)) (responding to Court's question and explaining that syndication is helpful in the short-term because it will "immediately improve the quality of the

product," while data sharing and index remedies "aid[] us in the medium run, because it allows us to own our own destiny and not just partner for real-time information but build a great, high-quality index that is, you know, proprietary and that can serve our product over time"); Rem. Tr. 426:2–427:19 (Turley (OpenAI)) (responding to Court's question and explaining that, even with full access to Google data, it would take OpenAI at least five years to determine whether answering 100% of user queries with its own index is achievable); Rem. Tr. 827:16–828:12 (Weinberg (DuckDuckGo)) (SSL could save billions of dollars and many years of development.); Rem. Tr. 828:20–829:9 (Weinberg (DuckDuckGo)) (SSL would help DDG close the scale gap in the short term and build indices in the long term.); Rem. Tr. 844:19–845:9 (Weinberg (DuckDuckGo)) ("if you think about the remedies package as a whole, you know, we -- if we start today and close the gap with syndication data, we need to be simultaneously building up our own indexes so that as that tapers and the remedies ultimately expire, we can transfer to our own indexes."); Rem. Tr. 2164:2–13 (Chipty (Pls. Expert)) ("The syndication remedy is more of an immediate solution that would give rivals the ability to more rapidly create consumer-facing products").

740. When implemented properly, organic syndication can encourage competition and innovation. Rem. Tr. 423:16–424:8 (Turley (OpenAI)) (describing organic syndication as a necessary component for OpenAI's future "Super Assistant"); Rem. Tr. 424:20–425:24 (Turley (OpenAI)) (responding to Court's question and explaining that syndication is helpful in the short-term by immediately improving their product quality, while data sharing remedies helps OpenAI in the medium to long run by enabling OpenAI to improve its own search index); Rem. Tr. 427:1–13 (Turley (OpenAI)) ("[I]f the index is slower, then we would need the API for longer."); Rem. Tr. 475:6–24 (Turley (OpenAI)) (syndication remedies would allow OpenAI to

"build a better product faster," both by improving the quality of real-time information used by their product and "indirectly by accelerating [their] own research and development so that [they] can focus on other parts"); Rem. Tr. 828:20–829:9 (Weinberg (DuckDuckGo)) (SSL would allow the building of indices to compete independently with Google.); Rem. Tr. 2194:3–2195:3 (Chipty (Pls. Expert)) (explaining how syndication remedies are needed to allow competitors to develop and have a chance at catching up to Google while still incentivizing innovation).

741. Search syndication can provide a bridge until a new search engine can become fully independent. Rem. Tr. 3023:16–20 (J. Adkins (Google)); Rem. Tr. 3026:10–23 (J. Adkins (Google)) (discussing PXR0189).

742. "Backfilling" is a technique where a new search engine could use syndicated results to serve "backfilled" organic results or ads where the new search engine may not have great quality results. Rem. Tr. 3025:9–23 (J. Adkins (Google)).

743. A search engine can use other search services in its early days while it is building its own search engine to augment their own results and to improve. Rem. Tr. 3027:3–19 (J. Adkins (Google)) (discussing PXR0189).

744. Qualified Competitors can also use syndicated search results and the Fast Search API for Retrieval Augment Generation. Rem. Tr. 2933:1–6 (Allan (Def. Expert)). Using syndicated search results for RAG would allow competitors to improve the accuracy of a qualified competitor's response to a user prompt. Rem. Tr. 2933:18–23 (Allan (Def. Expert)).

745. The proposed SSL would be less expensive than commercial SSLs. Rem. Tr. 829:10–17 (Weinberg (DuckDuckGo)) (commercial SSLs are very expensive.).

746. The proposed SSL would allow for reranking and product differentiation. Rem. Tr. 830:6–18 (Weinberg (DuckDuckGo)) (Reranking allows competitors to distinguish their search engines from Google.).

747. The proposed SSL would allow for removing spam. Rem. Tr. 830:19–831:10 (Weinberg (DuckDuckGo)) (DDG receives complaints about spam results but is not allowed to remove them.).

748. SSL provides needed local data. Rem. Tr. 832:10–833:13 (Weinberg (DuckDuckGo)) (DDG would improve significantly with local search data only Google has.); Rem. Tr. 834:10–19 (Weinberg (DuckDuckGo)) (Local information allows DDG to minimize rage quit queries.); Rem. Tr. 1018:1–16, 1019:4–9 (Schechter (Microsoft)) (discussing value of local data and the fact that local businesses only provide that information to Google).

B. Synthetic Queries Can Assist With Quality

749. The proposed SSL would allow for storing synthetic queries to collect data that can be used to improve ranking. Rem. Tr. 832:2–9 (Weinberg (DuckDuckGo)) (Storing synthetic queries would improve ranking algorithms.).

750. Google has allowed its syndication partners to issue synthetic queries. Rem. Tr. 2852:5–7 (Allan (Def. Expert)).

751. Synthetic queries are not generated by end-users. Rem. Tr. 2852:8–20 (Allan (Def. Expert)).

752. The Yahoo Japan syndication agreement permits Yahoo Japan to submit machine generated queries to Google to assist with Yahoo Japan's own search quality initiatives, in numbers capped to approximately thousands or tens of thousands per day. Rem. Tr. 3106:24–3108:3, 3108:24–3109:5, 3109:11–24 (J. Adkins (Google)).

753. The Yahoo Japan agreement permits Yahoo Japan to store user queries and clicks to assist in its search quality initiatives. Rem. Tr. 3110:1–13 (J. Adkins (Google)).

754. While competitors have restrictions on the use of syndicated data, those restrictions are part of a commercial offering, not a service offered as part of a remedial order. Des. Rem. Tr. 110:9–21 (Microsoft-MS 30(b)(6) Dep.) (noting that restrictions are because the purpose of their syndication products is because it is meant to "power search experiences" and "not to enable others to create their own search engines.").

C. Google Has Syndication Agreements Today

755. Google provides its syndicated search results through an API. Rem. Tr. 2999:4–8 (J. Adkins (Google)); Rem. Tr. 2850:8–12 (Allan (Def. Expert)) ("I learned that Google syndicated search results in a couple of instances, yes.").

756. Google's current organic syndicated search offerings provide some of the features on Google.com. Rem. Tr. 2999:4–3000:6 (J. Adkins (Google)); Rem. Tr. 2850:13–17 (Allan (Def. Expert)).

757. Google has approximately six Web Search Syndication (WSS) partners in the United States and between 22–40 total globally. Rem. Tr. 3008:1–7 (J. Adkins (Google)).

758. Factors that go into WSS pricing are historical pricing and how Google can maintain good relationships with search partners. Rem. Tr. 3019:21–3021:1 (J. Adkins (Google)).

759. While Google would price WSS-only syndication deals by price per 1000 queries if sold as a stand-alone product, all existing United States WSS deals include an AFS component that provides Google's compensation for its services. Rem. Tr. 3021:3–3022:6 (J. Adkins (Google)).

760. Jesse Adkins, head of syndication for Google, is unaware of any efforts to calculate the incremental cost of a query served through Google's web search API. Rem. Tr. 3022:17–3023:3 (J. Adkins (Google)).

761. Under a white labeling service, a user could enter a query into another search engine which would return Google search results without the user ever knowing. Rem. Tr. 3010:2–12 (J. Adkins (Google)).

762. PXR0364 accurately reflects the gross revenue Google receives from the search syndication partners identified in it. Rem. Tr. 3014:8–3015:4 (J. Adkins (Google)).

763. Among Google's syndication agreements is an agreement with Yahoo Japan to provide syndication and other services. PXR0598 is the current Yahoo Japan contract in effect as a result of renewals. Des. Rem. Tr. 32:24–33:15 (Google-JA 30(b)(6) Dep.); Des. Rem. Tr. 32:24–33:15 (Google-JA 30(b)(6) Dep.). PXR0598 is the Yahoo Japan agreement that has been amended and is currently in effect. Rem. Tr. 3079:3–9 (J. Adkins (Google)). Google's internal code name for the Yahoo Japan syndication agreement is "Wasabi." Rem. Tr. 3012:5–14 (J. Adkins (Google)). Yahoo Japan is a different entity than, and has no corporate relationship with, the United States-based search engine known as Yahoo, except that Yahoo Japan licenses the name Yahoo from the U.S. entity. Rem. Tr. 3009:2–9 (Adkins (Google)).

764. Plaintiffs' organic syndication remedy is similar to Google's current practices under its Yahoo Japan agreement. Rem. Tr. 3083:17–3084:3 (J. Adkins (Google)) (Jesse Adkins, Google head of syndication, acknowledging that the Yahoo Japan agreement served as a foundation for certain data-sharing remedies in Plaintiffs' remedies).

765. Under the syndication agreement, Yahoo Japan has its own advertisers, but Google provides the core ads technology to run Yahoo Japan's search ads business. Rem.

Tr. 3017:24–3018:23 (J. Adkins (Google)); PXR0192* at -177 (describing key deal terms of Yahoo Japan agreement for ads), -174, -176 (illustrative Yahoo Japan SERPs).

766. Jesse Adkins, head of syndication for Google, has been responsible for implementation of the Yahoo Japan agreement since 2020. Rem. Tr. 3077:16–3078:3 (J. Adkins (Google)).

767. The Yahoo Japan syndication agreement is a white label service, which means Google provides its search services and Yahoo Japan repackages them as it sees fit. Rem. Tr. 3078:7–13 (J. Adkins (Google)); PXR0318 at -078; PXR0187* at -903, -917 (describing white label search). "Since inception, YJ has always had flexibility in the implementation . . . They can switch search providers entirely or in part (query by query) and customize the results. . . . They can use any 1P or 3P monetization option, including [Google's] white-labeled ads system." PXR0192* at -167, -171 ("Wasabi Key Deal Terms: Search"), -174, -176 (illustrative Yahoo Japan SERPs).

768. Google's US-based partners would like white labeled, disaggregated individual search results, including white labeled ads. PXR0191* at -254–55.

769. Section 2.9 of the Yahoo Japan agreement (PXR0598) identifies information Google provided to Yahoo Japan for a period of the agreement; it has subsequently been amended. Rem. Tr. 3083:7–16 (J. Adkins (Google)).

770. Google was obligated under its agreement to provide Yahoo Japan a variety of information from its web index, including DocIDs, a DocID to URL map, a database of static signals, and a variety of other signals. Rem. Tr. 3086:21–3089:23 (J. Adkins (Google)).

771. From 2010 to 2018, Google provided Yahoo Japan information called for by Section 2.9 of the agreement via a "data dump," also called a file transfer. Rem. Tr. 3085:14–3086:8 (J. Adkins (Google)). Des. Rem. Tr. 49:6–23, 50:9–52:3 (Google-JA 30(b)(6) Dep.).

772. After 2018, Google was obligated to provide the information addressed in Section 2.9 of the agreement in real time via an API whenever Yahoo Japan submitted a query to Google. Rem. Tr. 3086:9–20 (J. Adkins (Google)).

773. Much of the index information identified in Plaintiffs' proposed index syndication provisions mirrors the original Yahoo Japan agreement. Rem. Tr. 3090:6–3092:19 (J. Adkins (Google)) (discussing PXR0598).

774. Appendix 2 of PXR0598 lists data provided by Google to Yahoo Japan (and vice versa) in connection with the Yahoo Japan syndication agreement. Rem. Tr. 3093:7–3096:6 (J. Adkins (Google)).

775. Google provided extensive search features to Yahoo Japan in connection with the syndication services. Rem. Tr. 3096:7–3098:18 (J. Adkins (Google)).

776. Adkins did not see privacy concerns being implicated in connection with the data sharing identified in 2.9 of the Yahoo Japan agreement, but rather viewed it as research and development. Rem. Tr. 3103:7–3104:15 (J. Adkins (Google)).

777. During a negotiation with Snapchat, Snapchat rejected the syndication agreement because Google's privacy standards were not high enough for its private data. Rem. Tr. 3103:7–3104:15 (J. Adkins (Google)).

778. Google negotiated a syndication agreement with Startpage that required Google to present a different implementation of syndication to address Startpage's privacy standards. Rem. Tr. 3106:1–23 (J. Adkins (Google)).

779. Under the Yahoo Japan agreement, Google syndicates portions of the knowledge panel to Yahoo Japan. Rem. Tr. 3111:4–7 (J. Adkins (Google)).

D. Technical Feasibility Of Data Syndication

780. From a technical perspective, Google can feasibly satisfy the syndication requirements in Plaintiffs' RPFJ. Rem. Tr. 1523:5–21 (Mickens (Pls. Expert)) (Plaintiffs' proposed syndication remedies are feasible); Rem. Tr. 1541:8–20 (Mickens (Pls. Expert)) (Google's data centers are architected to permit the new tasks required by Plaintiffs' syndication remedies).

781. Google's past syndication agreements provide a template for feasibly achieving Plaintiffs' syndication remedies. Rem. Tr. 1523:5–21 (Mickens (Pls. Expert)) (Google can draw on its experience with syndicating its search feeds to satisfy Plaintiffs' proposed syndication remedies).

782. Google's Yahoo Japan syndication is very similar to the syndication proposed by Plaintiffs. Rem. Tr. 1541:8–1543:14 (Mickens (Pls. Expert)) (Google's syndication agreement with Yahoo Japan is very similar to the syndication required by Plaintiffs' remedies from a technical perspective and thus serves as a concrete existence proof); Rem. Tr. 1544:10–21 (Mickens (Pls. Expert)) (differences between proposed remedies and Yahoo Japan do not undermine external validity).

783. Google's hardware and back-end software infrastructure is technically capable of scaling to manage an increased workload without additional engineering work. Rem. Tr. 1531:1–25 (Mickens (Pls. Expert)) (Google runs a cluster manager to efficiently allocate tasks).

784. It is feasible for Google to isolate qualified competitors' data requests to prevent Google from seeing what qualified competitors are requesting. Rem. Tr. 1537:10–1538:2, 1538:11–1539:21 (Mickens (Pls. Expert)) (describing isolation techniques).

785. When a web search syndicator makes a request, it passes Google its account identifier for billing purposes, the user's IP address, the query, and any optional parameters like language or country code. Des. Rem. Tr. 14:21–15:10 (Google-JA 30(b)(6) Dep.).

E. Plaintiffs' Search Ads Syndication Remedies Will Encourage Competition And Provide New Entrants A Bridge To Independence

786. In the context of a general search engine, search ads syndication is when the GSE displays search ads from a third-party syndicator on the GSE's SERP, often by the GSE transmitting a user query to the syndicator who returns or otherwise serves search ads on the GSE's SERP. Rem. Tr. 2957:25–2958:17, 2959:25–2960:14 (J. Adkins (Google)) (describing a typical process for syndicating search ads while referencing Google's process).

787. Google currently offers an ads syndication product known as AdSense for Search or AFS, which syndicates Google search text ads from Google.com advertisers who do not opt out to Google's "Search Partner Network," i.e., third-party publishers. Rem. Tr. 2957:18–24, 2959:8–15 (J. Adkins (Google)) (describing AdSense for Search and the Search Partner Network); RDX0420 at -461 (combined syndication/AFS contract referring to AdSense for Search as AFS); PXR0242* at -114 ("AdSense for Search is a publisher product for serving search (shopping, app, etc) ads on 3rd party search engines (i.e. ask.com, startpage.com, web.de) and commerce sites (ebay.com, bestbuy.com).").

788. Each of Google's organic syndication (WSS) agreements with general search engines in the United States includes an AFS component to compensate Google for the organic syndication and to provide income to the syndicator. PFOF ¶¶ 757–59.

789. When an AFS partner requests an ad, it provides Google with its account identifier, the query, an ad style identifier, and the maximum number of ads it should return; Google then creates Google code that will create a direct connection with the user's browser and

that will collect the IP address of the user. Des. Rem. Tr. 15:11–17:13 (Google-JA 30(b)(6) Dep.).

790. Currently, there exist only two syndicators of general search text ads of significance—Google and Bing—and more networks would foment competition. Rem. Tr. 849:14–850:8 (Weinberg (DuckDuckGo)) (responding to the Court's question and explaining that there are only two ad networks today); Rem. Tr. 851:17–852:14 (Weinberg (DuckDuckGo)) (Sharing ads data could "help people start other ad networks," which would benefit DuckDuckGo in the long term.).

1. The RPFJ's Search Ads Syndication Remedy Contains Provisions Necessary To Fulfill Its Remedial Purpose

791. To satisfy its remedial purpose, the RPFJ requires Google to permit Qualified Competitors using the ad syndication remedy to see or know the identity of and CPCs paid by advertisers whose ads appear on the Qualified Competitors' web sites. Pls. RPFJ § VIII.E (Google must provide "the identity of the advertiser and CPC paid, and conversion data where available, without restrictions on use of the Ads Data including restrictions on using it to market or solicit advertisers for the Qualified Competitors' own advertising products."); Pls. RPFJ § VIII.C (Google must provide advertisers' placement information.).

792. Google's AFS product restricts publisher's visibility into and control over the ads appearing on their sites. Google displays AFS ads in an "iFrame" on the publisher's web site, which is a direct connection between the consumer viewing the web page and Google's servers, meaning that no ads data goes to the publisher's computers or servers, including the identity of the advertiser. Rem. Tr. 2959:25–2960:14 (J. Adkins (Google)). This means that AFS publishers cannot see, and Google does not provide, the identity of the advertisers whose ads appear on the

publisher's website or the individual CPCs paid by those advertisers but instead receive only some aggregated data. Rem. Tr. 2969:16–2970:16 (J. Adkins (Google)).

793. If advertisers know when their ads appear on a Qualified Competitor's web site and at what CPC and, conversely, if Qualified Competitors know what syndicated advertisements appear on their web sites and at what CPC, syndicators can compete on price to create direct relationships with advertisers, lowering advertiser costs and encouraging switching between ad platforms. Rem. Tr. 1807:15–1809:1 (Epstein (adMarketplace)) ("[T]he advertisers who were buying through Google could then see that they're getting a substantial portion of volume through us and come to our system directly. Now you've gotten rid of the backfill problem. They're now saving money on how much they're spending per click, and yet you're still able to, you know, pay a lot to the publisher."). Google acknowledges preventing this competition is why it withholds advertiser information from its AFS syndicators. Rem. Tr. 2970:5–16 (J. Adkins (Google)) ("[D]oes the information given include the identity of the advertiser? A. No. Q. Why not? A. It's important, I mean, it's a trade secret for Google. It is our customer list . . . .").

794. To satisfy its remedial purpose, the RFPJ requires making the purchase of syndicated ads by Qualified Competitors available to AFS advertisers on a nondiscriminatory basis and also requires providing advertisers the option to appear on each individual Qualified Competitor's sites on a site-by-site basis. RPFJ § VIII.E. Thus, regardless of whether an advertiser selects inclusion in Google's Search Partner Network, it would have the freedom to choose whether it is or is not eligible to appear on any Qualified Competitors' site. Pls. RPFJ § VIII.E.

795. Google provides its advertisers with limited opt-out rights for its AFS product: advertisers placing campaigns must either opt out of the Search Partner Network entirely (and thus appear only on Google owned and operated sites) or opt in to the Network while blocking individual sites on a site-by-site basis. Rem. Tr. 2959:8–15 (J. Adkins (Google)). Google views the percentage of Google.com advertisers who opt out of the Search Partner Network as "basically our [AFS'] customer satisfaction signal." PXR0232* at -759. The opt-out rate has steadily climbed in recent years, and now approximately [redacted]% of advertiser spend on Google.com opts out of Google's existing Search Partner Network. Rem. Tr. 3005:1–3007:12 (J. Adkins (Google)) (discussing PXR0806); PXR0232* at -758 (showing steadily increasing opt-out rate for search partner network from 2022 to 2024); Rem. Tr. 1810:10–1812:13 (Epstein (adMarketplace)) (responding to the Court's question and explaining that AdSense for Search "is not a very good feed").

796. As is necessary to satisfy the remedial purpose, the RPFJ bars Google from placing "any conditions on how any Qualified Competitor may use or display syndicated content under this Paragraph VIII.E, including on scraping, indexing, or crawling the syndicated results." Pls. RPFJ § VIII.E.

797. Google bars its current ads syndication partners from scraping, indexing, crawling, or storing the syndicated results. Rem. Tr. 2987:23–2990:3 (J. Adkins (Google)) (discussing RDX0420). Google imposes this restriction to prevent its current syndication partners from using the syndicated results to build or improve the quality of their own search engines, and the RPFJ accordingly removes this restriction. Pls. RPFJ § VIII.E; Rem. Tr. 3030:6–19 (J. Adkins (Google)).

798. Google restricts a syndicator's ability to reorder ads, and the RPFJ removes this restriction. Rem. Tr. 2971:24–2972:21 (J. Adkins (Google)); Pls. RPFJ § VIII.E. At trial, Google presented a combined syndication/AFS contract with a GSE containing provisions requiring the GSE to give AFS ads preferred placement over equivalent ads requested from other sources. RDX0420 at -468 ("If for any Search Query (other than an EEA Query), Company requests Equivalent AFS Ads, (a) Company will also request AFS Ads for that Search Query, and (b) Company will display the AFS Ads on the applicable Results Pages so that no Equivalent AFS Ads appear above or directly adjacent to the AFS Ads.").

799. As is necessary to fulfill the remedial purpose, the RPFJ requires the ad syndication remedy to provide "latency, reliability, and performance functionally equivalent to what Google provides for Search Text Ads on its own SERP." Pls. RPFJ § VIII.E. Provisions of the ads syndication remedy requiring Google to provide latency, reliability, and performance substantially equivalent to that on Google's SERP impose no burden because Google claims to already provide this for its existing syndication products. Rem. Tr. 2964:15–2965:22 (J. Adkins (Google)) (comparing what Google provides through AFS to what it provides on its own SERP and claiming that "generally, our goal is for the system to perform the same").

2. The Ads Syndication Remedy Will Help Rivals Overcome The Cold Start Problem

800. New GSEs seeking to monetize through search advertising face two cold start problems related to advertising: (1) a lack of access to scale, which impedes ad targeting and query understanding and (2) a lack of advertiser liquidity, i.e., individual advertisers seeking to place ads on the newcomer's website. Rem. Tr. 1794:5–1797:3 (Epstein (adMarketplace)) (responding to the Court and describing three cold start problems present in this case as a lack of

user-side data to scale query understanding, a lack of advertiser liquidity, and lack of data to scale search keyword understanding).

801. The RFPJ's syndication remedies will help overcome the cold start problem. Rem. Tr. 1803:7–22 (Epstein (adMarketplace)) ("Q Do you believe that the government's proposed syndication advertising remedies will assist with what you call the cold start problem? A Absolutely."); Rem. Tr. 1809:2–21 (Epstein(adMarketplace)) ("I would call the syndication remedies as kind of a temporary transition period to overcome the cold start problems, the data motes that Google has built.").

802. The effects of scale on ad targeting are described in Paragraphs 712–13.

803. Syndication enables Qualified Competitors to overcome the cold start problem related to user scale, and build their own products. Rem. Tr. 1794:5–1797:3 (Epstein (adMarketplace)) (responding to the Court's question and describing how syndicating Google's "Suggest" API would help adMarketplace overcome its cold start problem for AMP Suggest ads, how syndicating Google ads would help overcome the cold start problem for advertiser liquidity, and how organic search syndication would help overcome the cold start problem for organic search); Rem. Tr. 1800:11–18 ("Access to the Google API for Suggest" and "QBST [query-based salient terms] . . . would be very helpful because, you know, the ability to have accurate predictions of what the relevant search term is from a partial query is useful.").

804. Syndication enables Qualified Competitors to overcome the cold start problem related to advertiser inventory by using Search Text Ads syndication to "backfill" their own ads on a query-by-query basis while building their own ad inventory. Rem. Tr. 1807:20–1809:1 (Epstein (adMarketplace)) ("[W]e'll obviously be selling our own text -- our own text ads, but we're not going to have every advertiser . . . if we also could what we call backfill with the

Google feed, then, you know, we'd have more liquidity, attract more supply, be able to, you know, negotiate terms and pay out higher yields."); Rem. Tr. 1794:5–1797:3 (Epstein (adMarketplace)) (responding to the Court and describing cold start problems including advertiser liquidity). Access to more advertisers—known as "advertiser liquidity" or "inventory"—increases the possibility that search ad publishers will find a relevant match. Rem. Tr. 1791:18–1792:1 (Epstein (adMarketplace)) ("[T]he more [advertiser] liquidity or inventory you have, the more able you are to find a relevant match.").

805. adMarketplace and other syndicators could help a new GSE entrant by building a custom ad solution for the new entrant. Rem. Tr. 1813:14–1814:9 (Epstein (adMarketplace)) ("Q To build on the Court's question, do you believe adMarketplace would be helpful to a new search engine -- general search engine entrant into the marketplace? A Yeah. With these remedies? For sure. Q Why? A Because we could build a custom solution for them that would include not only our own ads but Google-sold ads, and they'd have a lot of flexibility in how they want to, you know, create that ad experience. And as long as -- you know, we just talked about, the quality of the click is high, that's, you know, like, we have skin in the game on that, too, we have our own advertisers.").

806. Using data to develop a high-quality service takes time, meaning that rivals need syndication services to enter the markets and meaningfully compete in the short run. Rem. Tr. 843:24–847:12 (Weinberg (DuckDuckGo)) (describing how using Google's user-side data to develop a high-quality search engine "will take years," explaining how syndication can "close the gap" with Google in the short term while a search engine builds up its own indexes, and explaining that ads syndication gives new search entrants a path to a business model).

807. Users of the Search Text Ads Syndication remedy will still invest in their own technology and products. Rem. Tr. 1809:2–21 (Epstein (adMarketplace)) ("Q If adMarketplace was able to use a text ad syndication remedy, would adMarketplace continue to invest in its own technology and products? A Well, 100 percent. . . . [I]f all you're doing is just brokering Google, you're not going to -- you know, there will be other competitors who will come in and do a lot more than that, and we plan to be one of them.").

808. The Search Text Ads Syndication pricing will disincentivize long-term reliance on syndicated Google ads. RPFJ § VIII.E (permitting nondiscriminatory pricing of Search Text Ads syndication; Rem. Tr. 1816:8–14 (Epstein (adMarketplace)) (explaining how the proposed ad syndication remedies would enable competitors to undercut Google's current supercompetitive pricing, allowing advertisers to opt out of syndicated Google ads and incentivizing Google to lower their pricing to advertisers).

809. When implemented properly, ad syndication can encourage competition and innovation. Rem. Tr. 852:21–854:3 (Weinberg (DuckDuckGo)) (Access to Google's search ads syndication market would provide a "built-in business model" for new search entrants, "enabling new businesses and existing ones to enter the market successfully."); Rem. Tr. 1816:8–14 (Epstein (adMarketplace)) (explaining how the proposed ad syndication remedies would enable competitors to undercut Google's current supercompetitive pricing, incentivizing Google to lower their pricing to advertisers).

810. Google's Search Ads monetize at a higher rate than those on other search platforms. Rem. Tr. 850:22–851:8 (Weinberg (DuckDuckGo)) ("[F]or the same queries or set of queries [Google is] going to make more money than a DuckDuckGo would because they have

more advertisers, to the judge's point, bid in and it's an auction that is going to result in higher prices.").

811. Under the Yahoo Japan contract, Yahoo Japan provides Google with Yahoo proprietary data, as defined in Appendix 2 of the contract. Des. Rem. Tr. 35:21–36:10, 36:14–16 (Google-JA 30(b)(6) Dep.); PXR0598 at -749–50 (Appendix B of the Yahoo Japan contract).

812. Under the Yahoo Japan agreement, Google is explicitly prohibited from sharing information from Yahoo Japan with Google sales in the Japan market, although ads engineers have access to it. Des. Rem. Tr. 37:23–39:9 (Google-JA 30(b)(6) Dep.) (discussing PXR0598).

813. Google permits Yahoo Japan to issue machine-generated or synthetic queries to enable Yahoo Japan to assess Google's quality and suggest improvements. Des. Rem. Tr. 33:16–35:18 (Google-JA 30(b)(6) Dep.) (discussing PXR0598 at -723).

814. Google's contract with Yahoo Japan requires Google to provide Yahoo Japan an impression log showing ads that appeared. Des. Rem. Tr. 41:16–44:15 (Google-JA 30(b)(6) Dep.) (describing process where Google provides Yahoo Japan with advertiser-level impression data showing when an ad appeared and when a user clicked on the ad).

815. Google does not provide Yahoo Japan information about its ad auction algorithms or related calculations because "the purpose of this agreement is not for Yahoo Japan to build their own ad service or improve their ad services." Des. Rem. Tr. 45:8–47:2 (Google-JA 30(b)(6) Dep.).

IX. GENAI MODELS DO NOT REPLACE THE NEED FOR DATA-SHARING REMEDIES AND SYNDICATION REMEDIES

816. The scale gap between Google and its search rivals persists today despite the advent of deep learning and GenAI. Rem. Tr. 1033:6–1034:1, 1082:1–1083:2 (Schechter (Microsoft)) (explaining that the scale gap persists even after Bing's GenAI improvements);

Rem. Tr. 3601:13–15 (Reid (Google)) (agreeing that the advent of AI has not eliminated the need for search).

817. GenAI products rely on search results to improve GenAI model outputs. Des. Rem. Tr. 183:14–184:13 (Parakh (Google) Dep.) (explaining that a "[l]ack of good [search] APIs is an innovation killer" for GenAI Products, which need access to accurate information in order to scale); Rem. Tr. 388:9–389:6, 390:7–11, 390:20–22, 391:16–392:10, 417:6–418:5 (Turley (OpenAI)) (explaining that "search technology is a necessary piece" of OpenAI's product and that OpenAI currently partners with multiple search results providers to improve its GenAI model outputs); Rem. Tr. 699:16–701:5 (Shevelenko (Perplexity)) (explaining that Perplexity currently partners with multiple search engine results aggregators to improve its GenAI model outputs); Rem. Tr. 1036:21–1037:10 (Schechter (Microsoft)) (Improving Bing's search results would improve the quality of Copilot LLM responses.); PXR0025 at -481 ("[Google has] differentiation in local/maps. [Search] can help with APIs so that we can call these sources of information. Lack of good APIs is an LLM innovation killer."); Rem. Tr. 177:6–179:20 (Durrett (Pls. Expert)) (discussing how Google's AI Overviews relies on Google Search to retrieve and generate results).

818. "Search grounding is . . . often also referred to as RAG, or retrieval-augmented generation." Rem. Tr. 2853:6–2854:1 (Allan (Def. Expert)); Rem. Tr. 168:13–169:17 (Durrett (Pls. Expert)) (describing how RAG allows an LLM to incorporate knowledge from outside an LLM's training data).

819. RAG can serve many purposes. Rem. Tr. 2853:6–2854:1 (Allan (Def. Expert)).

820. One purpose of RAG is to have a model answer using sources provided by a retrieval system as opposed to what the model has learned during pre-training. Rem.

Tr. 3366:24–3367:2 (Collins (Google)); Rem. Tr. 2853:6–2854:1 (Allan (Def. Expert))("[M]ost large language models, these are Generative AI models, typically are trained on up to a certain point in time, and those grounding technologies, or retrieval-augmented generation technologies, allow it to pull in additional information that's newer."); Rem. Tr. 3634:11–14 (Reid (Google)) (agreeing that "grounding is when an LLM model uses some class of data, often from the web, in order to improve the accuracy of its response"); Rem. Tr. 391:16–392:10 (Turley (OpenAI)).

821. Another purpose of RAG is to pull "in material that is relevant to the query, . . . and then instruct[] the Generative AI model to use that information to make references to that, and so that's where you might see the equivalent of links in a Generative AI output." Rem. Tr. 2853:6–2854:1 (Allan (Def. Expert)).

822. A typical use case for RAG is giving the model access to a database with real-time information that the model can use in its responses. Rem. Tr. 3367:3–10 (Collins (Google)) (without RAG, AI chatbots can't provide the scores to last night National-Phillies game).

823. AI hallucinations are incorrect or misleading results that LLMs, including Gemini models, generate. Rem. Tr. 3369:23–3370:3 (Collins (Google)).

824. RAG can reduce hallucinations. Rem. Tr. 3370:15–3371:1 (Collins (Google)); Rem. Tr. 169:24–170:13 (Durrett (Pls. Expert)) (describing how "[s]earch is what anchors an AI model's output in reality").

825. For GenAI Products that ground on search results, the quality of the search index used is one of the most important factors for determining the quality of AI-generated responses. Des. Rem. Tr. 93:13–94:5 (Parakh (Google) Dep.) (describing search grounding, or retrieval augmented generation, as a way to "make sure the output [GenAI systems] produce is of higher quality"); Rem. Tr. 417:2–418:5 (Turley (OpenAI)).

826. Users demand accuracy and relevance for every search; even a single inaccuracy can undermine user trust in rival GenAI Products. Des. Rem. Tr. 181:17–182:10 (Parakh (Google) Dep.) (explaining how the quality and factuality of Google's search product "builds trust. And if people trust you, they come back."); Rem. Tr. 399:21–401:11 (Turley (OpenAI)) (discussing need for user-side data to maintain quality and user trust in ChatGPT search functionality and noting that "all it takes is one user running into a bad answer" to "go back to their old habits of using the search engines they're used to").

827. Google's Gemini App heavily integrates with Search for Search grounding. Rem. Tr. 3367:11–14 (Collins (Google)).

828. Google's advantages in search assisted in building high-quality GenAI models and GenAI Search products. Rem. Tr. 174:23–176:10 (Durrett (Pls. Expert)).

829. When the Gemini App grounds with search, it is essentially reaching out to the search engine and issuing a query. Rem. Tr. 3368:1–17 (Collins (Google)); Rem. Tr. 3368:19–3369:8 (Collins (Google)) ("[The Gemini App] will generate a prompt, a search query based on the user's prompt. That search query will then be passed to the search API . . . to retrieve the documents from Search, . . .[and] those documents will be given to the model and put in its context window to be used when the model is asked to generate a response.").

830. The Gemini App will often annotate the output and provide links to the URLs that came back from the Search results. So that user could click through to the publisher if they want to see the source document. Rem. Tr. 3369:9–21 (Collins (Google)).

831. Google's GenAI chatbot, the Gemini App, relies on search to verify its responses to user queries. Des. Rem. Tr. 29:2–14 (Google-EC 30(b)(6) Dep.) ("The Gemini chatbot integrates the Gemini model and a Google Search API to provide the response."); Des. Rem.

Tr. 124:25–125:5, 125:11–14 (Parakh (Google) Dep.) (explaining that the Gemini App has access to the Google Search API, including Google's FastSearch API, to retrieve search results for use in its responses to user queries).

832. AI Overviews, which are a GenAI feature that appear on some of Google's SERPs, call on search to find relevant information and "ground" the GenAI model output. Rem. Tr. 3615:5–11 (Reid (Google)) (discussing PXR0038 at -303) ("To ensure AI Overviews are high quality, we've integrated our core web ranking systems into this experience, which are fundamentally designed to surface reliable and relevant information."); Des. Rem. Tr. 29:17–30:11 (Google-EC 30(b)(6) Dep.) ("[F]eatures like AI Overviews also incorporate Gemini models and search results."); Des. Rem. Tr. 39:1–40:23 (Parakh (Google) Dep.) (describing how AI Overviews ground on both Google Search results and other Search features); Des. Rem. Tr. 80:1–22, 81:1–25, 82:1–5 (Parakh (Google) Dep.) (describing how the GenAI model powering AI Overviews incorporates search results and search signals to ground its responses and determine whether an AI Overview will be useful or relevant to a user query); Rem. Tr. 3626:11–3627:7 (Reid (Google)) (discussing PXR0037 at -238) ("Our AI Overviews will be the most accurate, personal and powerful, capable of reasoning using tools and accessing Search's trillion[s] of data points.").

833. AI Overviews also call on Google's Knowledge Graph to find relevant information and "ground" the GenAI model output. Rem. Tr. 3613:16–20 (Reid (Google)) (discussing PXR0038 at -303) ("AI Overviews use a customized Gemini model which works in tandem with our existing Search systems, like our quality and ranking systems and the Knowledge Graph.").

834. GenAI chatbots would not eliminate the need for GSEs anytime in the foreseeable future, and in fact GenAI chatbots need to incorporate aspects of search engines to be successful. Rem. Tr. 383:18–384:20 (Turley (OpenAI)) (LLMs like ChatGPT cannot do everything a search engine can do and need to rely on search engines for real-time information); Rem. Tr. 697:5–17, 698:15–699:15 (Shevelenko (Perplexity)); Rem. Tr. 1033:15–1034:21 (Schechter (Microsoft)) (LLMs and GenAI Products need real-time information from search engines in order to generate quality responses.); Rem. Tr. 3630:3–15 (Reid (Google)) ("I do not believe [chatbots] will replace search engine[s] without incorporating some of the search engine experience in order to do so.").

835. Neither Google nor rival search engines have replaced traditional search results with GenAI search features on their SERPs. Rem. Tr. 3376:3–5 (Collins (Google)); Rem. Tr. 1037:11–16 (Schechter (Microsoft)) ("If you go to Bing, the traditional results are still the primary interface you'll see, but you can opt into Copilot Search or choose to use the Copilot product.").

836. Google trains the GenAI model that powers AI Overviews with search data. Des. Rem. Tr. 105:16–106:11 (Parakh (Google) Dep.) (Google trains Gemini models powering AI Overviews on user search queries); Des. Rem. Tr. 154:4–15, 169:20–170:5 (Parakh (Google) Dep.) (describing how Google pre-trains and post-trains the GenAI model powering AI Overviews on search data, including user queries and "inputs that would be relevant to that query at that point in time and in that location"); PXR0014* at -600 (The goal of Google Search's GenAI models, including those used for AI Overviews, is "maximizing value from Gemini for K&I which includes training on search data as one of the primary mechanisms.").

837. Industry participants recognize that user-side data would be very useful to their GenAI products. Rem. Tr. 395:22–397:7 (Turley (OpenAI)) ("[A] bit more than half of what our users want to do in ChatGPT relies on long-tail queries."); Rem. Tr. 411:3–19 (Turley (OpenAI)) (explaining that access to Google's click-and-query data would accelerate OpenAI's GenAI product development); Rem. Tr. 464:12–466:12 (Turley (OpenAI)) (User-side data is helpful both for improving GenAI models and improving GenAI search integrations.); Rem. Tr. 706:23–707:20 (Shevelenko (Perplexity)) (Perplexity leverages user-feedback data to refine Perplexity's systems, including Perplexity's ranking algorithms.); Rem. Tr. 1033:15–1034:21, 1081:18–25 (Schechter (Microsoft)) (Microsoft's GenAI Products need access to fresh, local, and long-tail queries.); Rem. Tr. 1036:21–1037:10 (Schechter (Microsoft)) (More user data would improve both Bing results and Copilot LLM responses.).

838. GenAI search innovations, including search back-end improvements and user-facing search features, are not enough to close the scale gap between Google and its rivals. Des. Rem. Tr. 183:14–184:13 (Parakh (Google) Dep.) (explaining that a "[l]ack of good APIs is an innovation killer" for GenAI Products, which need access to accurate, real-time information in order to scale effectively); Rem. Tr. 1020:23–1021:5, 1021:19–1022:5, 1023:9–1024:14, 1033:6–1034:21, 1081:18–1082:16 (Schechter (Microsoft)) (discussing Bing's investments in GenAI search improvements and how they didn't overcome Google's scale gap).

839. GenAI Products and search features do not obviate rivals' need for user-side data. Rem. Tr. 1033:15–1034:1 (Schechter (Microsoft)) (While GenAI can approximate some user behavior, real user-side data is needed to close the scale gap—especially for local, and long-tail queries.); Rem. Tr. 1082:1–1083:2 (Schechter (Microsoft)) (GenAI quality improvements can never replace user-side data because user expectations and long-tail queries change over time.);

Des. Rem. Tr. 45:8–23 (Microsoft-BU 30(b)(6) Dep.) (explaining that even the best algorithm, cannot surmount a lack of scale).

X. AN LLM CANNOT BE USED TO REPLICATE GOOGLE'S GSE

840. LLMs are black boxes and it is not generally understood how they learn. Rem. Tr. 3348:23–3349:5, 3349:16–23 (Collins (Google)) (Google doesn't understand how AI models learn what they learn.); Rem. Tr. 193:1–194:10 (Durrett (Pls. Expert)) ("[W]e typically talk about large language models as black boxes. And what that means is that when we use a large language model, it is very, very difficult, effectively impossible to understand how exactly it produced the output from the inputs that it's given.").

841. LLMs and search engines are fundamentally different pieces of technology. Rem. Tr. 3373:18–20 (Collins (Google)); Rem. Tr. 173:22–174:22 (Durrett (Pls. Expert)) (explaining the differences between LLMs and search engines). "LLMs by themselves cannot replace all of search functionality." Rem. Tr. 3601:20–23 (Reid (Google)).

842. Even a model trained on all of Google's search logs and ranking information would not be comparable to Google Search. Rem. Tr. 3374:1–3375:3 (Collins (Google)).

843. Google today hasn't tried to supplant its entire search stack with an AI model. Rem. Tr. 3376:3–5 (Collins (Google)).

844. Google's VP of Product at DeepMind, Eli Collins, believes that no one in the industry has taken the approach of supplanting a search engine with an LLM. Rem. Tr. 3378:3–14 (Collins (Google)).

845. Google's VP of Product at DeepMind, Eli Collins, believes the correct approach is to teach a large language model how to use tools like search engines rather than trying to replicate a search engine as an LLM. Rem. Tr. 3314:20–21, 3377:5–18 (Collins (Google)).

846. RankEmbed, is just one component of Google Search; it is not equivalent to Google Search. Rem. Tr. 3374:8–3375:3 (Collins (Google)); Rem. Tr. 2947:6–19 (Allan (Def. Expert)) ("[RankEmbed] is not all of Google's search technology."); PXR0172 at -143–44 (depicting full Search stack).

847. Google's Information Retrieval expert did not offer the opinion that a rival could use an LLM to reverse engineer Google's source code. Rem. Tr. 2846:7–12, 2847:16–2848:12 (Allan (Def. Expert)).

848. Google's Information Retrieval expert's "reverse engineering" opinion's "goal was to look at whether a [Qualified Competitor] could improve their systems, not whether they could be as good as Google." Rem. Tr. 2948:23–2950:1 (Allan (Def. Expert)) (providing an example that a competitor could improve its product by 25%, not that it would be able to match Google).

849. Google's Information Retrieval expert did not offer the opinion that Google's end-to-end search stack could be reverse engineered using the data called for in Plaintiffs' RPFJ. Rem. Tr. 2951:22–2952:8 (Allan (Def. Expert)) (referencing PXR0172 at -143–44) ("I'm not offering the opinion that these components could be determined based on the learning approaches I talked about . . . it would be a long slog to get through all of them.").

XI. IF THE DATA-SHARING AND SYNDCATION REMEDIES WERE ORDERED, RIVALS WOULD STILL HAVE INCENTIVES TO INVEST

850. Building search engine technologies takes time, money, and talent, necessitating a longer access period. Rem. Tr. 397:8–398:4 (Turley (OpenAI)) (responding to the Court and explaining that, even without coverage for long-tail queries, building a search index is a "multi-year project"); Rem. Tr. 426:1–427:13 (Turley (OpenAI)) (responding to the Court's questions and explaining that, even with full access to Google data and a "smart group of people" at

OpenAI, it would take the company at least five years to determine whether it could build a search index that could "stand on its own feet" without relying on third-party search providers); Rem. Tr. 794:13–798:12 (Shevelenko (Perplexity)) (discussing the costs, time, and talent required to build Perplexity's search technologies); Rem. Tr. 2163:8–2165:9, 2194:3–2195:3 (Chipty (Pls. Expert)) (explaining how data and syndication remedies are needed to supplement distribution remedies to allow competitors to develop and have a chance at catching up to Google).

851. Even with Google sharing its user-side data, rivals will nonetheless have incentives to invest to differentiate themselves from each other and Google, and Google will retain the incentive to invest to avoid falling behind. Rem. Tr. 409:11–410:22 (Turley (OpenAI)) (explaining that having access to Google's data would enable OpenAI to invest more in its core GenAI products and differentiate itself); Rem. Tr. 2166:12–2167:18 (Chipty (Pls. Expert)) (explaining that data enables rivals to innovate, that rivals will want to differentiate themselves, and that "Google would have to innovate in response to greater competitive rivalry"); Rem. Tr. 1546:25–1547:19 (Mickens (Pls. Expert)) (offering opinion that qualified competitors would want to differentiate themselves from Google if given Google's user-side data); Rem. Tr. 4389:22–4390:3 (Murphy (Def. Expert)) (agreeing that product differentiation is an important part of competition); Rem. Tr. 835:5–836:6 (Weinberg (DuckDuckGo)) (stating that it's not a "good business strategy to just copy the competitor" because there's "not enough differentiation"); Rem. Tr. 4393:17–22 (Murphy (Def. Expert)) (saying of browsers that "if you just copycat [Google's current operation of Chrome], you are not providing independent value").

852. Plaintiffs' proposed remedy requiring that Google share its user-side data contains provisions safeguarding against these incentive concerns by requiring that any rival seeking data

or syndication services demonstrate a "plan to invest and compete" in a relevant market; requiring rivals to achieve independence by tapering down the organic syndication services they use; and allowing Google to set any non-discriminatory price it wants for ad syndication services. Pls. RPFJ § § III.U., VII.C., VIII.E.

853. Google's concerns regarding reverse engineering are overstated and impractical. Rem. Tr. 835:5–836:6 (Weinberg (DuckDuckGo)) (explaining that the data sharing required under Plaintiffs' proposed remedies does not provide enough information for someone to "reverse engineer" Google, and the idea that rivals could do so is "extremely far-fetched"); Rem. Tr. 835:5–836:6 (Weinberg (DuckDuckGo)) (explaining how a Google syndicator, Startpage, has tried to replicate Google Search "for the last 20 years and they've never gotten much market share").

854. Google defines "reverse engineering" overbroadly, including a syndication partner using Google's web results to enhance or compare the quality of their search results to their own to help the development of their own search engine. Rem. Tr. 3028:12–3030:5 (J. Adkins (Google)).

855. Building a search engine today would also require building an LLM. Rem. Tr. 3851:1–7 (Cue (Apple)) ("If you wanted to build a general search engine today, you would have to build a large language model as well.").

856. Even fine-tuning an LLM to perform search-like tasks can be expensive. Rem. Tr. 3350:24–3351:10 (Collins (Google)).

857. Building a search engine today would take "many, many years," certainly more than five and perhaps as many as thirty. Rem. Tr. 3851:1–3852:6 (Cue (Apple)) (stating that building a search engine has "gotten harder," such that building one in 30 years might even be a

"low" estimate); Rem. Tr. 426:1–427:13 (Turley (OpenAI)) (responding to the Court's questions and explaining that, even with full access to Google data, it would take OpenAI at least five years to determine whether it could build a search technology that could "stand on its own feet" without relying on third-party search providers); Rem. Tr. 397:8–398:12 (Turley (OpenAI)) (responding to the Court's question recognizing that the timeline for building a search technology would be on the "order of years"); Rem. Tr. At 460:6–461:1 (Turley (OpenAI)) (explaining that OpenAI envisions "index technology" as a whole search system technology").

858. Plaintiffs' proposed data sharing and syndication remedies would also spur innovation by Google to stay ahead of nascent or better-equipped competition, compounding the incentives for rivals to invest. Rem. Tr. 2160:21–2161:23 (Chipty (Pls. Expert)) (opining that, under Plaintiffs' proposed remedies, "greater competitive rivalry" would cause "Google to innovate more"); Rem. Tr. 2166:12–2167:18 (Chipty (Pls. Expert)) (observing that free-rider effects must be balanced against the investment-enhancing effects of the proposed remedies and that rivals would have "greater ability to innovate" under Plaintiffs' proposed data sharing and syndication remedies); PXR0035* at -405 (describing Google's "innovator's dilemma," where its "existing metrics only reward incremental improvements," but without dramatic changes to Search, Google "may not remain competitive for too long").

859. To win distribution and users, Google's rivals will need to differentiate themselves from each other and Google, particularly if copying Google is easy. PXR0189 at -474 (internal notes from Jesse Adkins stating that syndicators would "need differentiated value proposition or large marketing spend to switch users away from incumbents"); Rem. Tr. 835:5–836:6 (Weinberg (DuckDuckGo)) (stating "I don't think it's a good business strategy to just copy the competitor . . . I think you need to distinguish yourself with different user experience and

ranking" and describing the possibility of reverse engineering Google Search as "extremely far-fetched"); Rem. Tr. 2166:12–2167:18 (Chipty (Pls. Expert)) ("Rivals would also want to differentiate themselves from each other because they'll be competing to be the default provider. And so the way to win is to provide a value proposition that someone else doesn't. Rivals and Google would have to differentiate from each other to win users.").

XII. SEARCH TEXT AD TRANSPARENCY AND REDUCTION OF SWITCHING COSTS

A. Search Query Report

860. As the Court previously determined, one way in which Google's search text ads product has degraded over time is that advertisers receive less information in search query reports (SQRs). Mem. Op. at 263–64.

861. This has "diminished advertisers' ability to tailor their ad strategy in light of such [low-volume] queries." Mem. Op. at 263.

862. Section VIII(A) provides certain metrics that Google must include in its SQRs "for each Search Text Ad served or clicked . . . at the individual ad level," as well as the means by which such information must be made available. Pls. RPFJ § VIII.A. Although Google currently provides most of the metrics called for by the RPFJ in its SQRs, it does so at a high level of aggregation and only for clicked ads. Rem. Tr. 4429:22–4430:25 (Muralidharan (Google)). Indeed, Google's current SQRs only provide impression-level reporting at an aggregated level. Rem. Tr. 4433:17–19 (Muralidharan (Google)). As discussed in more detail below, aggregated data is less useful when analyzing ad spend. PFOF ¶¶ 871–74.

863. Moreover, although Google currently provides data for search text ads that appear in response to some queries, Google has reduced the scope of queries for which data is reported in SQRs, thereby diminishing the usefulness of the report to advertisers. As Mr. Vallez

explained, "[Google's search query report] has diminished over time in terms of what searches are included in there. And we use that report for a lot of different services that we offer and so it's become less valuable over time as a result." Rem. Tr. 1383:12–21 (Vallez (Skai)).

864. As for the requirement that Google include conversion data, that data is based on information provided to Google by the advertiser receiving the report. Rem. Tr. 4410:9–11 (Muralidharan (Google)).

865. Section VIII.A also provides that the SQRs must include "any other metric necessary for the advertiser to evaluate its ad performance." Pls. RPFJ § VIII.A. The advertising industry generally agrees on the key metrics that are important for understanding how ads are doing. Rem. Tr. 4537:8–24, 4573:20–4574:11 (Jerath (Pls. Expert)). Section VIII.A thus gives advertisers the flexibility to respond to changes as they happen in this industry, by requesting that SQRs include new metrics that may be warranted. Rem. Tr. 4537:8–24, 4573:20–4574:11 (Jerath (Pls. Expert)).

866. Google's behavior, including recent conduct, emphasizes the need to future-proof the Section VIII.A. remedy and build in flexibility to include new metrics. Rem. Tr. 4537:25–4538:12, 4573:20–4574:11 (Jerath (Pls. Expert)). For example, in October 2024, Google announced that it was placing search text ads in its new AI Overview search feature. Rem. Tr. 3623:45–3625:1 (Reid (Google)); PXR0231* at -050; PXR0019 at -819 ("Search ads are a critical way for businesses to reach their customers and for people to find new information, and they continue to be a core part of the Search experience with [AI Overviews]."); PXR0237* at -007 ("Accompanying the AI-powered overview, ads in [AI Overviews] are providing useful options for people to take action and connect with businesses across different use cases," but Google is "still in the early stages of understanding what a great user interface is for [AI

Overviews]" and "actively experimenting with how ads will appear as part of [AI Overviews]—such as building ads directly into the summarized results.").

867. An internal communications document shows that Google anticipated being "pressed on what's actually in STR [search terms report]," including whether advertisers would receive segmented reporting indicating when ads were shown as part of the AI Overviews, and anticipated other questions such as the ROI for ads shown in AI Overviews and whether advertisers could opt out of having their ads appear in AI Overviews. PXR0231* at -055–56. Google disallowed advertisers to opt out and would not provide segmented reporting for AI Overview, even as Google acknowledged that it did not yet know the ROI for ads appearing in AI Overview. PXR0231* at -055–56.

868. Remedies witnesses universally rejected Google's privacy justifications for reducing granularity of its SQR in 2020. UPX0983 at -162 (SQR change "one of the egregious examples of Google removing transparency from advertisers under the banner of 'privacy'. . . [SQR] data has always [been] inherently anonymized and aggregated."); Mem. Op. at 94; Liab. Des. Tr. 259:13–260:22 (James (Amazon) Dep.) ("I have no recollection of conversations regarding privacy concerns in the search query report data prior to this change.").

B. Access To Data Reports

869. Section VIII.C concerns data that is generated from advertisers' own ad spend and their own ad campaigns. Pls. RPFJ § VIII.C; Rem. Tr. 4541:6–4544:3 (Jerath (Pls. Expert)). This remedy requires Google to permit advertisers to export data concerning only their own ad spend and prohibits Google from placing limitations on such exports. Pls. RPFJ § VIII.C.

870. For context, advertisers bid for search text ads at the keyword level. Mem. Op. at 63–64; Rem. Tr. 1377:9–1378:2 (Vallez (Skai)) ("We bid at the keyword level. . . . When we make decisions, it's at the keyword level[] . . . ."). Having access to data about their search text

ad spend on a keyword level would benefit advertisers in managing their ad spend. Rem. Tr. 1377:21–1378:22 (Vallez (Skai)). As Mr. Vallez of Skai explained, "[T]he more that we're able to get down to the user intent and give a relevant response, then the higher performance it's going to be. . . . [B]ecause the consumer is engaging at the keyword level, we want to engage at the same level so we can have the right context and make better decisions on behalf of the advertiser." Rem. Tr. 1378:23–1380:2 (Vallez (Skai)) (responding to question from the Court); Rem. Tr. 3309:9–22 (Israel (Def. Expert)) (agreeing that in general customers can better evaluate options when they have more information).

871. Currently, only some of the data identified in Section VIII.C can be downloaded using an API, and even then, the data is aggregated. Rem. Tr. 1377:9–1378:2 (Vallez (Skai)) ("[M]ore often than not, [the data Google provides is] aggregated at a higher level."); Rem. Tr. 4541:6–4544:3, 4581:9–11 (Jerath (Pls. Expert)). For example, advertisers cannot export unaggregated raw data pertaining to their own ad spend that is contained within Ads Data Hub and BigQuery. Rem. Tr. 4437:6–22 (Muralidharan (Google)). Moreover, the ads data that is available for export is not updated in real time; rather, it can be delayed by as long as 24 hours. PXR0009* at -856 ("In most cases, your account statistics (such as clicks, conversions, and impressions) are delayed by less than 3 hours. . . . Conversions attributed using attribution models other than "Last click" are typically delayed up to 15 hours. However, some metrics and reports take longer to process or are only calculated once a day.").

872. Indeed, the data that Google makes available to advertisers has declined over time. Rem. Tr. 1380:3–16 (Vallez (Skai)) ("[O]ver the years, the amount of keyword data [Skai has] been getting has diminished, and so it's less and less."); PXR0228* at -117 (March 2020 internal Kenshoo (later Skai) email) ("[We] have been informed that Google plans to *entirely*

deprecate [conversion data] files next year. Additionally, Google explained that they have no intention of providing a replacement to these files – essentially killing our ability to integrate this data . . . . They did provide a few possible alternatives right now which mainly revolve around Google capturing additional information (Kenshoo ID's) in their Floodlight tags, however this approach will need to be fully scoped (and will not be the same level of granular data that we see in the current Data Transfer files)." (emphasis in original)).

873. The currently available aggregated data is insufficient for advertisers to conduct their own advanced independent analysis of their ad spend. Rem. Tr. 4541:6–4544:3 (Jerath (Pls. Expert)). Advertisers—both large and small—have alternative methods of analyzing their ad spend outside of Google's owned-and-operated products, such as using their own tools or those offered by third parties. Rem. Tr. 4544:5–13, 4593:10–4594:17, (Jerath (Pls. Expert)) ("A]dvertisers also have their own software; they have third-party software. So we shouldn't think of advertisers as these, like, dumb people sitting there and Google being the smart one."); Rem. Tr. 4594:22–4595:2 (Jerath (Pls. Expert)) ("[S]maller ones can use third-party tools, and the larger ones have in-house tools and they also use third-party tools."). To conduct an independent analysis, however, advertisers need to be able to join their Google ads data with their own first-party data. Rem. Tr. 4541:6–4544:3 (Jerath (Pls. Expert)). As data gets more aggregated, such as at a campaign level, "it's harder to make more informed decisions." Rem. Tr. 1380:3–16 (Vallez (Skai)).

874. As advertisers can only download aggregated data, they are unable to join their Google ads and first-party data with high fidelity. Rem. Tr. 4541:6–4544:3 (Jerath (Pls. Expert)). The aggregated data currently available thus impedes advertisers' ability to independently analyze their ad spend. Rem. Tr. 4541:6–4544:3 (Jerath (Pls. Expert)); PXR0193* at -677

("BigQuery also requires any usage of this data to use Google specific systems. If a recipient wants to work with this data day-to-day, they will need to actively use Google Cloud to do so, and will never be able to fully decouple from Google Cloud, i.e. download a full copy of the data for local processing."); PXR0229* at -118 ("The inability to map campaign level performance data from DCM into Kenshoo [Skai] can negatively impact a clients performance by not having all conversions to leverage for optimization."). In its own internal documents, Google concedes that "[a]ggregate data [is] not informative enough for a robust statistical model." Rem. Tr. 4544:14–23 (Jerath (Pls. Expert)) (discussing PXR0243* at -910); PXR0243* at -910.

875. Having more data would enable advertisers to "make more informed decisions and ultimately drive better performance." Rem. Tr. 1378:3–22 (Vallez (Skai)); Rem. Tr. 3309:9–22 (Israel (Def. Expert)) (agreeing that, in general, customers can better evaluate options when they have more information). As an example, Mr. Vallez confirmed that having access to ad spend data on a keyword level would enable Skai to innovate more and improve the quality of its products, to advertisers' benefit. Rem. Tr. 1378:3–12, 1384:9–1385:1 (Vallez (Skai)). Notably, this includes improvement to Skai products that aid in reducing friction for advertisers and shifting ad spend between search engine platforms. Rem. Tr. 1378:3–12 (Vallez (Skai)). As Mr. Vallez explained, "[a] lot of value that [Skai] provide[s] is reducing friction" and giving advertisers "the tools to be able to make better decisions around how to optimize [the] next dollar spent," which saves advertisers money. Rem. Tr. 1370:11–1371:5, 1374:4–17 (Vallez (Skai)); Rem. Tr. 4593:10–4594:17 (Jerath (Pls. Expert)) (discussing use of tools outside of Google).

876. If Google were to increase the granularity of impression and click-and-query data, for example, that would enable Skai "to make more informed recommendations, and some of those could lead to budget shifting." Rem. Tr. 1385:2–11 (Vallez (Skai)); Rem. Tr. 4593:10–

4594:17 (Jerath (Pls. Expert)) ("[T]here are outside autobidding tools which are very good, potentially better than Google if Google would tell us what Google's tools were, right."). Google recognizes internally that "with a lot more granularity of data . . . advertisers can use this precise data to better understand the distribution." PXR0230* at -932. Google, however, views that as a risk because giving advertisers more data "makes it harder for [Google] to pursue [its] pricing work." PXR0230* at -932.

877. Sharing ads data while protecting privacy is feasible. For example, disclosure can be limited to only those entities that have demonstrated the ability to protect user privacy—a practice that is already in place in the industry today. Rem. Tr. 1402:23–1403:10 (Vallez (Skai)). As Mr. Vallez explained, "The way the industry works today, the way we work with any data that we receive from Google, it's based on an authorization process, an approval process to demonstrate that you have the tools, capabilities to maintain that data. And so I would just assume that any data that we receive from Google or Bing would go through that same rigor and same process. And so only individuals or entities that have demonstrated their ability to maintain user privacy would have access to it. That's the way it works today." Rem. Tr. 1403:15–1404:5 (Vallez (Skai)).

C. Keyword Matching

878. This Court previously concluded that Google's search text ads product has degraded in part because advertisers "no longer can opt out of keyword matching." Mem. Op. at 263–64.

879. Section VIII.B concerns keyword matching and focuses on making available to advertisers a "true exact match" option when selecting the keyword match for a particular keyword. Pls. RPFJ § VIII.B; Rem. Tr. 4545:9–18 (Jerath (Pls. Expert)).

880. Although Google has repeatedly pointed to the rise of autobidding as a basis for rejecting Section VIII.B, having a "true exact match" option available is still important. Keyword matching and autobidding play different roles. Rem. Tr. 4546:9–22 (Jerath (Pls. Expert)). Keyword matching focuses on identifying when an advertiser would like for their ad to be shown. Rem. Tr. 4546:9–22 (Jerath (Pls. Expert)). Autobidding, by contrast, focuses on what the advertiser's bid should be and what the price should be when their ad is eligible to be shown. Rem. Tr. 4546:9–22 (Jerath (Pls. Expert)).

881. In addition, the "true exact match" option would allow advertisers to have precise control over when their ad may be shown and at what price. Rem. Tr. 4546:23–4547:18 (Jerath (Pls. Expert)). For example, advertisers may have unique value propositions for minor fluctuations in spelling for a particular keyword. Rem. Tr. 4441:1–21 (Muralidharan (Google)). With autobidding, by contrast, Google matches variations of the advertiser's keyword to the query, and the advertiser necessarily must accept Google's estimate of the advertiser's bid for those queries—even if Google's matching and bid do not align with what the advertiser wants. Rem. Tr. 4546:23–4547:18 (Jerath (Pls. Expert)).

882. The "true exact match" option would thus allow advertisers to use their own matching and bids instead of accepting Google's. Rem. Tr. 4546:23–4547:18 (Jerath (Pls. Expert)); Rem. Tr. 3284:4–9, 3311:10–14 (Israel (Def. Expert)) (agreeing that advertisers can and should speak for themselves "with regard to how they design ad campaigns").

883. The desire for a "true exact match" option is also evident in the fact that today advertisers still accept Google's "exact match" option but then use negative keywords to rule out misspellings and other variants. Rem. Tr. 4548:18–4549:9 (Jerath (Pls. Expert)).

884. Finally, the mere fact that advertisers use autobidding does not mean they only and always use autobidding. Rem. Tr. 4584:6–11 (Jerath (Pls. Expert)). For example, some advertisers value control over automation. Rem. Tr. 4457:6–18 (Muralidharan (Google)); PXR0233* at -912 ("[T]rust in Google Ads has dropped 5% between 2022 and 2023 . . . we speculate that this may be related to perceived loss of control over time."); PXR0238* at -040 ("Advertiser appetite for full automation may not be as high as initially thought – e.g., [automatically created assets] adoption hasn't grown significantly in the past year and is currently [redacted]% of search ads spend across Search and PMax campaigns."). In fact, Mr. Muralidharan, Google's Vice President of Product Management on the Search Ads team, conceded that multiple small advertising agency search advertising experts have told him that they want more information on ad placement, performance, and additional metrics. Rem. Tr. 4457:19–4458:12 (Muralidharan (Google)).

D. Search Text Ads Auction Changes

885. This Court previously found that "Google designs the auction and controls underlying inputs that can affect the ultimate price generated by the auction." Mem. Op. at 82. This Court further found that Google influences auction outcomes and pricing by adjusting its auction using "pricing knobs" and launches such as rGSP. Mem. Op. at 83–85.

886. Section VIII.D of Plaintiffs' RFPJ concerns the required disclosure of changes that Google makes to its search text ad auction. Pls. RPFJ § VIII.D.

887. Contrary to Google's assertions at trial, requiring Google to disclose changes to its search text ads auction would benefit advertisers. Rem. Tr. 4550:22–4551:5 (Jerath (Pls. Expert)). Indeed, advertisers base their bidding choices on the auction rules, and when auction rules change, advertisers respond to those changes. Rem. Tr. 4550:22–4551:5 (Jerath (Pls. Expert)).

888. Advertisers also consider auction rules when conducting experiments with their ad spend. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). To conduct an experiment, as a first step an advertiser needs to have a starting point, or bid. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). The advertiser will then see the results of their experiment and determine how to respond to those results. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). At each step—determining a starting point and determining a response to results—the decision can be different when auction rules change. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). And for different auctions, the advertiser would experiment differently. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)).

889. In a similar vein, advertisers consider auction rules even when they use autobidding. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). Advertisers provide the autobidding program with inputs such as starting bid and budget. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)). These inputs can be different if advertisers know the auction rules are different. Rem. Tr. 4551:6–4552:17 (Jerath (Pls. Expert)).

890. Google's assertions that advertisers would be harmed by the proposed auction disclosures in Section VIII.D underestimate the outside tools available to advertisers and their capabilities for evaluating their ad spend. Rem. Tr. 4593:10–4594:17 (Jerath (Pls. Expert)).

891. Although Google claims the disclosures required under Section VIII.D would be unduly burdensome, evidence in the case shows otherwise. Jerry Dishler, then-head of Google Ads, testified: "[W]e do roughly a thousand experiments per year in search ads quality. I would say 20 percent of them are related to the auction in some way, and then only a fraction of those are actually launches." Tr. 1206:10–15 (Dischler (Google)). At the same time, advertisers are

spending billions of dollars on Google search text ads. Rem. Tr. 4552:22–4553:16 (Jerath (Pls. Expert)).

XIII. CHOICE SCREENS ON EXISTING NON-APPLE DEVICES, GOOGLE DEVICES, AND GOOGLE BROWSERS

A. Choice Screens For Google Search Access Points On Existing Non-Apple, Third-Party Devices

892. The Court found that Google's contracts establishing it as the preloaded default were exclusionary and has a significant effect in preserving Google's monopoly. Mem. Op. at 216.

893. Bias is a fundamental term in behavioral economics. Rem. Tr. 531:25–532:8 (Rangel (Pls. Expert)). Bias refers to changes in the decision context in the way the consumer encounters the decision that affects the consumer's decision but has no impact on the economic fundamentals, the cost and benefits of the options, the number of options that the consumer has, or the information that the consumer has about them. Rem. Tr. 531:25–532:8 (Rangel (Pls. Expert)); Rem. Tr. 879:13–16 (Weinberg (DuckDuckGo)) (Users are "more receptive" to a choice screen if they receive prior information about it.).

894. Allowing Google to retain defaults and preinstallation agreements, even with some constraints, would continue to bias consumer choices in favor of Google. Rem. Tr. 559:1–9 (Rangel (Pls. Expert)).

895. Choice friction refers to the complexity and amount of effort that it takes to make the choice. Rem. Tr. 533:15–17 (Rangel (Pls. Expert)). The impact of defaults increases with choice friction. Rem. Tr. 560:9–561:10 (Rangel (Pls. Expert)).

896. Not all forms of distribution are created equal, in part because of sizable and robust default effects. Des. Rem. Tr. 105:16–106:2 (Beard (Microsoft) Dep.) (explaining that distribution without default placement "isn't enough to have user adoption."); Rem. Tr. 560:9–

561:10 (Rangel (Pls. Expert)). When there is third-party distribution, but with much higher choice friction, the default effect increases. Rem. Tr. 560:9–561:10 (Rangel (Pls. Expert)).

897. A choice screen is a user interface that asks the consumer to make an explicit choice among a number of options. Rem. Tr. 532:9–24 (Rangel (Pls. Expert)). Choice screens on pre-existing Android devices would address defaults on devices that have already shipped. Rem. Tr. 2177:3–20 (Chipty (Pls. Expert)). Google's proposed remedies do not address devices already in customers' hands. Rem. Tr 4366:7–21. (Murphy (Def. Expert)).

B. Choice Screen Design

898. Choice architecture refers to changes in how the information is presented to the consumer that do not affect the economic fundamentals of decision, including cost, benefits, and information of a set of options, but can have a powerful effect on the decisions that are made. Rem. Tr. 532:25–533:5 (Rangel (Pls. Expert)). Examples of choice screen design include randomizing the order the candidates are listed on the ballot in an election to avoid favoring the one that is listed first or the number of clicks that have to be made to complete a decision. Rem. Tr. 533:6–14 (Rangel (Pls. Expert)). How accessible the information is out of the options that are being presented is another example of choice architecture. Rem. Tr. 533:6–14 (Rangel (Pls. Expert)).

899. The technology industry is aware of the importance of choice architecture. Rem. Tr. 548:8–13 (Rangel (Pls. Expert)). Google, for example, recognizes the importance of ordering in the choice screen. Rem. Tr. 543:23–544:19 (Rangel (Pls. Expert)) (discussing PXRD004 at 14); UPX1103 at -775.

900. Not all choice screens are created equal. Rem. Tr. 534:9–15 (Rangel (Pls. Expert)). Elements of the choice architecture affect the performance of a choice screen. Rem. Tr. 549:21–23 (Rangel (Pls. Expert)). The performance of the choice screen will depend on the

choice architecture; if the choice architecture is appropriate, it will be more effective. Rem. Tr. 534:9–15 (Rangel (Pls. Expert)). Examples of such elements include that no option should be set as a default, options should be listed in a random manner, consumers should have easily useful and accessible information about the different options, the application should avoid fear messaging, consumers should be required to scroll through so they see the full set of options before making a selection, and the number of clicks should be minimized. Rem. Tr. 549:21–551:5 (Rangel (Pls. Expert)) (discussing PXRD004 at 20–21); PXR0064* at -079.

901. Prior to deployment, the choice screen architecture should be reviewed by someone with behavioral expertise to identify problems with the choice architecture that are likely to generate biases and decrease the effectiveness. Rem. Tr. 547:16–548:7 (Rangel (Pls. Expert)).

902. When the European choice screens were initially introduced, there were some problems with the choice architecture. Rem. Tr. 864:1–865:4 (Weinberg (DuckDuckGo)) (European choice screens were only shown once.); Rem. Tr. 865:5–866:3 (Weinberg (DuckDuckGo)) (European choice screens did not have a tagline, did not change all the search access points, and did not allow users to go back to the choice screen.); Rem. Tr. 862:6–14 (Weinberg (DuckDuckGo)) (European choice screens had a small positive effect on DuckDuckGo's market share, though they would have had more with more advertising.); Rem. Tr. 536:6–538:4 (Rangel (Pls. Expert)). Experts have estimated, using a counterfactual analysis, that if some of the problems had been resolved, and all of the individuals in Android in Europe had access to the choice screen, the effect would have been 3%. Rem. Tr. 536:6–538:4 (Rangel (Pls. Expert)).

903. The term for the practice to induce consumers to make product selections that are consistent with technology companies' objectives is "dark patterns." Rem. Tr. 548:8–17 (Rangel (Pls. Expert)). Google has designed choice architecture to increase the use of its products, including Search. Rem. Tr. 548:18–549:20 (Rangel (Pls. Expert)).

904. Google has tracked the amount of choice friction associated with changing search defaults and the amount of choice friction associated with privacy preferences. Rem. Tr. 548:18–549:20 (Rangel (Pls. Expert)). Google has enforced contracts with third-party manufacturers to make sure that the degree of choice friction stays high enough that defaults are hard to change. Rem. Tr. 548:18–549:20 (Rangel (Pls. Expert)) (discussing PXRD004 at 19); UPX0149 at -062.001–.003.

905. Google, however, has also complained to the European Commission about the Apple choice screen adding significant friction by forcing users to take the additional step of opening the app store. Rem. Tr. 551:9–555:17 (Rangel (Pls. Expert)) (discussing PXRD004 at 22).

1. Search Access Point Choice Screen

906. Introducing choice screens would help reduce biases in consumer choice, both in search applications and search engines, which are associated with previous defaults. Rem. Tr. 533:18–24, 536:6–14 (Rangel (Pls. Expert)). The introduction of choice screens is unlikely to harm consumer welfare. Rem. Tr. 534:20–535:10, 555:22–558:4 (Rangel (Pls. Expert)).

907. Despite the fact that choice screens will help, they will not be sufficient if introduced by themselves, even if they are well designed, to fully undo the system that form biases. Rem. Tr. 533:25–534:8 (Rangel (Pls. Expert)). Allowing Google to retain default installation agreements, even with some constraints about their distribution, continues to generate consumer bias in its favor. Rem. Tr. 535:11–20 (Rangel (Pls. Expert)).

908. Choice screens result in a sizable reduction on the existing default biases. Rem. Tr. 536:15–537:9 (Rangel (Pls. Expert)). For example, in 2023, Mozilla ran a study with 12,000 subjects across three countries in Europe about the impact of introducing choice screens for browsers, not search engines, and they found that they had a sizable effect on consumer choices. Rem. Tr. 538:5–25 (Rangel (Pls. Expert)); PXR0043*. Consumers were 13% more likely to choose independent third-party browsers, defined as a browser older than Samsung, Chrome or Edge, and this is in comparison to a condition where there was no choice screen and instead just the defaults that came with the device. Rem. Tr. 538:5–25 (Rangel (Pls. Expert)).

909. As another example, the App Tracking Transparency choice screen introduced by Apple in 2021 resulted in over 80% of users opting out through the use of a choice screen after only a few months from its introduction. Rem. Tr. 539:1–19 (Rangel (Pls. Expert)).

910. Choice screens are well tested in the marketplace. Rem. Tr. 539:20–541:23 (Rangel (Pls. Expert)). Google itself uses choice screens, for example, when a consumer downloads the Chrome browser app from the Apple Store for an iPhone. Rem. Tr. 539:20–541:23 (Rangel (Pls. Expert)).

911. A study comparing the impact of defaults with a number of choice screens showed that with a controlled condition with a basic choice screen, when Google users were asked to switch to Bing, about 1.1% switched, consistent with the European data. Rem. Tr. 544:20–546:14 (Rangel (Pls. Expert)). The study also incentivizes people in another control who are Google users to use Bing for two weeks, and at the end of the two weeks, 33% stayed with Bing, showing that when people tried a new product they may not have with only a choice screen, given the strong brand familiarity with Google, discover they like another product and want to stay with it at least in the short-term. Rem. Tr. 544:20–546:14 (Rangel (Pls. Expert)).

2. Search Default Choice Screen

912. As Prof. Antonio Rangel explained, "[Choice screens] . . . by themselves, even if the choice architecture is well designed, . . . will be unlikely . . . [to be] sufficient to fully undo the persistent Google default biases." Rem. Tr. 541:24–542:16 (Rangel (Pls. Expert)); (Apple has not found choice screens to be highly effective, because people still choose the best product, which today is Google.); Rem. Tr. 3848:5–3849:17 (Cue (Apple)) (Choice screens alone would be insufficient to remedy Google's anticompetitive conduct.).

913. If the Court introduces other remedies that improve the quality and distribution of other engines, that would show up on the choice screens and make the choice screens more effective. Rem. Tr. 541:24–542:16 (Rangel (Pls. Expert)).

914. There is a difference between introducing a default and removing it. Rem. Tr. 542:21–543:22 (Rangel (Pls. Expert)). When there are defaults, consumers engage with these search and search applications through strong defaults, that favor the defaults. Rem. Tr. 542:21–543:22 (Rangel (Pls. Expert)).

915. Default applications build up a strong brand. Rem. Tr. 542:21–543:22 (Rangel (Pls. Expert)). Other things being equal, when a consumer is put in an explicit situation to make a choice, they are more likely to choose what is more familiar that has a stronger brand. Rem. Tr. 542:21–543:22 (Rangel (Pls. Expert)). Default effects are higher for more familiar brands, and options with a higher brand familiarity, and the history of exposure to the other default will affect also that likelihood of switching. Rem. Tr. 586:20–587:11 (Rangel (Pls. Expert)).

916. The effectiveness of choice screens will change over time, especially as part of a broader remedy package that improves the quality and distribution of the competition. Rem. Tr. 546:15–21 (Rangel (Pls. Expert)). It matters how long the default has been in place. Rem. Tr. 586:20–587:11 (Rangel (Pls. Expert)).

917. There are cases in which choice screens can be very effective to mitigate certain problems. Rem. Tr. 3175:8–16 (Muhlheim (Mozilla)). For example, choice screens give small browsers a chance to compete against the dominant players that have self-preferencing issues. Rem. Tr. 3175:8–16 (Muhlheim (Mozilla)).

918. Mozilla published a study about the effectiveness of browser choice screens in 2023. Rem. Tr. 3175:17–19, 3176:2–11 (Muhlheim (Mozilla)) (discussing PXR0716). Mozilla concluded that "98% of the people who select a browser through a choice screen expect to remain with it." Rem. Tr. 3175:17–3176:11 (Muhlheim (Mozilla)) (discussing PXR0716 at -010). Mozilla's report also concluded that 97 to 98% of the people in the survey reported that they wanted to be shown a choice screen. Rem. Tr. 3177:5–3178:10 (Muhlheim (Mozilla)) (discussing PXR0716 at -048); Rem. Tr. 555:22–558:14 (Rangel (Pls. Expert)) (discussing PXRD004 at 26).

919. In terms of the browser choice screen study, Mozilla's CFO asserts that choice is an important value for Mozilla, despite not supporting search engine choice screens. Rem. Tr. 3178:19–3179:9 (Muhlheim (Mozilla)) (discussing PXR0716).

920. Choice screens on Chrome for as long as Google owns it address the issue of opening up the search access points for which Google does not pay for defaults. Rem. Tr. 2178:19–2179:9 (Chipty (Pls. Expert)). If Google were allowed to pay distributors to have a choice screen rather than set a competing GSE as the default, it would be important to take steps, including the additional remedies, to make the remedy effective. Rem. Tr. 2189:8–2191:18 (Chipty (Pls. Expert)) (explaining that if the Court allowed such payments, steps such as allowing maximum payment flexibility, prohibiting payments to Apple, and the data and syndication remedies are examples of steps to take to make the remedy more effective).

921. There is a recently published economics article by Decarolis and several people in which they study the impact of introducing choice screens in Europe, and what they found is that the introduction of these choice screens early on decrease, on average, Google market share between half and 1.5 percentage points, depending exactly on how the estimation was done, which is consistent with a reduction of the default biases by that amount. Rem. Tr. 536:6–538:4 (Rangel (Pls. Expert)). The DeCarolis study leveraged the following: Before the choice screen is introduced in each of the different European countries, there is a little bit of variation about the market share of the competitors. And that allows them to ask if the impact of the choice screen is larger in contrast to which of the competitors have a higher market share. And the answer is yes. Rem. Tr. 544:20–546:14 (Rangel (Pls. Expert)).

XIV. INNOVATION AND INVESTMENT INCENTIVES

A. The Remedies Will Increase Distributors' Incentives To Make A Rival Search Engine And Change The Default

922. The Court found that Google's revenue share payments "undoubtedly have had" the effect of "keeping Apple on the sidelines of search." Mem Op. 242.

923. Apple would be incentivized to make a rival search engine the default if the disincentive of Google's revenue share payments disappeared. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google.").

B. The Remedies Will Increase Rivals' Incentives To Invest And Innovate

924. Google's conduct has "reduced the incentive to invest and innovate in search." Mem. Op. 236, 250.

925. In time, distributors and users would be better off under Plaintiffs' remedies because of greater competition. Rem. Tr. 2288:23–2289:5 (Chipty (Pls. Expert)).

926. If Google is prohibited from making search distribution payments, it is possible that payments to distributors will go down in the short run, but in the long run it is possible they will go up because of the increase in competition. Rem. Tr. 2288:23–2289:9 (Chipty (Pls. Expert)).

927. Distribution remedies target Google's scale advantage, giving rivals both the incentive and the ability to innovate. Rem. Tr. 2162:22–2163:7 (Chipty (Pls. Expert)) ("[S]cale is a significant barrier in the relevant markets," "there's a close link between scale and quality in both relevant markets," and "Google's [distribution] agreements have, for years, deprived rivals of scale."); Rem. Tr. 2166:12–2167:18 (Chipty (Pls. Expert)) (recognizing that rivals would "have an incentive to innovate because they have access to distribution they didn't have before").

928. If competition spurred payments to Apple in the remedial or competitive worlds that were high enough to disincentivize Apple's entry into search, that would mean that the competition problem would have been resolved through non-Apple competitors. Rem. Tr. 2289:17–2290:5 (Chipty (Pls. Expert)).

929. The point of the remedies is to create competition through entry by non-Google rival general search firms, with Apple as only one potential source of entry or sponsored entry. Rem. Tr. 2289:17–2290:5 (Chipty (Pls. Expert)).

930. The remedies will create incentives for rivals to invest in product differentiation. Rem. Tr. 2185:13–2186:22 (Chipty (Pls. Expert)) (responding to the Court's question and explaining that, "for rivals to compete against Google, they will have to differentiate" rather than clone Google); Rem. Tr. 4257:21–4259:20 (Murphy (Def. Expert)) (respond to the Court and stating, "I think rivals always have an incentive to differentiate their product").

931. The remedies will increase the incentives for rivals to invest. Rem. Tr. 2194:3–2195:3 (Chipty (Pls. Expert)) ("[P]laintiffs' remedies give rivals a much more important, significant path to market, and so will increase their incentives to incur the high capital costs of entry and expansion.").

932. Many new entrants will succeed against Google by being differentiated and providing consumers value. Rem. Tr. 4325:23–4328:16 (Murphy (Def. Expert)) (responding to the Court and stating that "the most important thing is the way many of these rivals are going to succeed is by being differentiated" and "by providing consumers value").

C. The Remedies Will Increase Apple's Incentive To Enter

933. Apple would be incentivized to make a rival search engine if the disincentive of Google's revenue share payments disappeared. Rem. Tr. 3825:7–3829:2 (Cue (Apple)) (Apple's SVP of Services "can't say [he] would disagree" that "it was a disincentive for us to do a search engine based on the payments that we were receiving from Google.").

D. The Remedies Will Likely Increase Google's Incentives To Invest And Innovate

934. Google did not innovate on AI in search because it does not have competition. Rem. Tr. 874:18–875:17 (Weinberg (DuckDuckGo)) ("[I]t took Google two and a half years . . . to roll out AI mode after ChatGPT launched.").

935. Google will innovate more due to greater competitive rivalry. Rem. Tr. 2160:21–2161:13 (Chipty (Pls. Expert)) ("[I]f remedies are successful in this case, I would expect Google to innovate more because of greater competitive rivalry."); Rem. Tr. 2161:14–23 (Chipty (Pls. Expert)) (describing two examples of Google innovating in more competitive markets); PXR0035* at -405 (Google describing its "innovator's dilemma," where its "existing metrics only reward incremental improvements," but without dramatic changes to Search, Google "may not remain competitive for too long").

936. Over the past decade of Google's monopoly, Search has not meaningfully improved as a product. Rem. Tr. 3861:10–3862:7 (Cue (Apple)) (Search results have not gotten better in the last 20 years, but they are starting to improve with AI.); Rem. Tr. 3865:15–3866:12 (Cue (Apple)) (Search technology improvements in the last five to ten years have been small.); Rem. Tr. 3845:13–3847:3 (Cue (Apple)) ("There's a lot of capabilities that I think searching can get a lot better [at] than it is today."); PXR0035* at -405 (describing Google's "innovator's dilemma," where its "existing metrics only reward incremental improvements," but without dramatic changes to Search, Google "may not remain competitive for too long").

937. Integration of GenAI into generative Search could be disruptive. Rem. Tr. 3818:13–3819:4 (Cue (Apple)) (AI competitors entering the search market is "the first time" that "there are things that are more interesting happening in the space" than what Google is doing.); Rem. Tr. 3822:22–3823:10 (Cue (Apple)) (Although Google's Search quality has improved since the fall of 2023, the "real opportunity" for "significant incremental improvements[] is in the area of AI."); Rem. Tr. 3822:22–3823:10 (Cue (Apple)) (AI Overviews have made Google's search product better.); Rem. Tr. 3837:12–3838:15 (Cue (Apple)) (responding to the Court's question and explaining that "the combination of a search index and the LLMs" could provide "way better results" than what search engines can currently provide); Rem. Tr. 3842:23–3845:10 (Cue (Apple)) ("AI is a huge technology shift" that is "creating new opportunities for new entries that just wouldn't exist otherwise.").

XV. TIMELINES THAT INFORM THE DURATION OF THE REMEDIES IN FORCE

A. Duration Of The Anticompetitive Conduct

938. Google's default agreements, which it has had with its top distributors for around 20 years, have been found to be anti-competitive for at least 10 years. Mem. Op. at 200, 214, 223–25; Rem. Tr. 2175:20–2176:5 (Chipty (Pls. Expert)). Google "has enjoyed an over-80%

share since at least 2009." Mem. Op. at 157. For 10 to 20 years, Google has been able to make investments that give it an advantage that will take rivals time to overcome. Rem. Tr. 2175:20–2176:5 (Chipty (Pls. Expert)).

B. There Has Been No Significant Share Shift In Europe After Five Years Of Choice Screens

939. Choice screens were rolled out in Europe beginning about five years ago and have expanded in use since that time. Rem. Tr. 2174:22–2175:19 (Chipty (Pls. Expert)). Data sharing provisions in Europe began about two years ago. Rem. Tr. 2174:22–2175:19 (Chipty (Pls. Expert)). Even so, Google's share in Europe remains well over 90%. Rem. Tr. 2174:22–2175:19 (Chipty (Pls. Expert)).

C. There Has Been No Meaningful Entry In The Markets For U.S. General Search Services And General Search Advertising For 15 Years

940. There has been no meaningful entry in general search in the last 15 years. Mem. Op. at 200; Rem. Tr. 2174:1–8 (Chipty (Pls. Expert)).

941. Neeva's attempt at entry, which began in 2019, suggests how long de novo entry might take in general search. Rem. Tr. 2174:9–21 (Chipty (Pls. Expert)). Neeva was well-funded and its team was highly experienced, yet it failed in about four and a half years. Mem. Op. at 11, 200; Rem. Tr. 2174:9–21 (Chipty (Pls. Expert)).

942. Mozilla would benefit if there were at least one other competitor to Google of equal quality and equal ability to monetize searches. Rem. Tr. 3159:1–8 (Muhlheim (Mozilla)) (agreeing with the Court's hypothetical).

943. AI entrants are the first meaningful search entrants in a long while. Rem. Tr. 3818:13–3819:4 (Cue (Apple)) (AI competitors entering the search market is "the first time" that "there are things that are more interesting happening in the space" than what Google is doing, "so we're starting to see what I believe are potential formidable competitors.").

D. Practical Considerations

944. The duration of remedies should be long enough to allow rivals to overcome the barriers to entry and expansion. Rem. Tr. 2173:1–12 (Chipty (Pls. Expert)).

945. It will take time for Google's rivals to develop the capabilities to work with the data Google is expected to share under Plaintiffs' remedies. Rem. Tr. 2176:6–15 (Chipty (Pls. Expert)); Rem. Tr. 426:1–427:19 (Turley (OpenAI)) (responding to the Court's question and explaining that, even with full access to Google data, it would take OpenAI at least five years to determine whether answering 100% of user queries with its own index is achievable); Rem. Tr. 840:22–842:3 (Weinberg (DuckDuckGo)) (explaining that making use of the data remedies requires risk and investment to become independent by the end of the remedies).

946. Creating and building a search engine is not an easy thing and has a number of different components to it. Rem. Tr. 3152:12–3153:11 (Muhlheim (Mozilla)). Building viable alternatives to Google's search results and ads will not happen overnight. Rem. Tr. 3153:12–3154:3 (Muhlheim (Mozilla)). It will take time and investment for companies to create a Google competitor of equal quality and equal ability to monetize search. Rem. Tr. 3159:1–18 (Muhlheim (Mozilla)) (responding to the Court's question). Building a search engine takes many years and has only gotten harder. Rem. Tr. 3851:1–3852:6 (Cue (Apple)) (agreeing that building a general search engine would take many years and explaining that doing so has gotten harder recently).

947. If Google entered into flexible default agreements that could be canceled by a distributor at any time, it would still take a long time for rivals to accumulate the kind of scale they would need to challenge Google. Rem. Tr. 2184:7–2185:6 (Chipty (Pls. Expert)). Because Google has a monetization advantage, it will take time for rivals to increase quality even with data and syndication remedies, and that time will be longer if there is not at least some period of

time over which Google is not permitted to pay for defaults. Rem. Tr. 2185:13–2186:22 (Chipty (Pls. Expert)) (responding to the Court's question).

948. Rivals who choose to syndicate will need time to differentiate themselves from Google in order to have a realistic chance of competing. Rem. Tr. 2185:13–2186:22 (Chipty (Pls. Expert)) (responding to the Court's question).

949. Because Google has engaged in its conduct over many years, rivals will not be able to quickly catch up to where they would have been. Rem. Tr. 4605:1–9 (Chipty (Pls. Expert)).

950. Building indices that will allow GSEs to stand on their own will take years. Rem. Tr. 871:8–872:13 (Weinberg (DuckDuckGo)) (Building search indices at scale and ensuring they "work as effectively as" Google's will take years, and fine-tuning them will take "some years after that.").

951. Scaling a user base large enough to have the user interaction data to support a rival search index and related systems will take several years. Rem. Tr. 871:8–872:13 (Weinberg (DuckDuckGo)) (Growing a rival search engine's user base to scale requires a "longer timeline" than building out a search index.).

952. It will take years of marketing a rival GSE to build a user base. Rem. Tr. 871:8–872:13 (Weinberg (DuckDuckGo)) ("Now we are talking about marketing, word of mouth, building the user base year after year. That just takes time to compound.").

953. Even after ten to fifteen years, it would be unlikely for a rival search engine to match Google's scale. Rem. Tr. 871:8–872:13 (Weinberg (DuckDuckGo)) (describing the process and timeline of venture capital investment into potential search rivals).

954. A three-year remedy period is too short for rivals to compete. Rem. Tr. 872:14–21 (Weinberg (DuckDuckGo)) ("It would take us a few years just to work through these remedies, you know, to get implemented and launched and get to working," so a three-year remedy period "would make the entire investment not make any sense."); Rem. Tr. 2174:1–2176:25 (Chipty (Pls. Expert)) (explaining how various informative historical timelines suggest a remedy duration of three years is too short, and a duration of ten years is better than three); Rem. Tr. 2202:16–2203:3 (Chipty (Pls. Expert)) (The remedy should be "at least five years and possibly more.").

955. It will take rivals multiple years to build a search index that can compete with Google's index on head queries alone. To compete on long-tail queries, rivals will need several more years. Rem. Tr. 397:8–398:4 (Turley (OpenAI)) (responding to the Court and stating that, even without coverage for long-tail queries, building a search index is a "multi-year project"). Restoring competition will take at least five years. Rem. Tr. 2176:16–25 (Chipty (Pls. Expert)) (stating that "restoring competition will take at least five years, maybe more").

956. A remedies period of at least five years is necessary. Rem. Tr. 1820:7–1821:19 (Epstein (adMarketplace)) ("I've said five years would be probably sufficient. . . . I'd say five to ten years.").

XVI. TECHNICAL COMMITTEE

957. The Technical Committee could establish privacy protections and perform the privacy-utility tradeoff. Rem. Tr. 860:18–12 (Weinberg (DuckDuckGo)) (responding to the Court and explaining that a technical committee could establish protocols to prevent a future incident similar to the AOL data leak while balancing privacy and utility); Rem. Tr. 1170:2–1171:7 (Evans (Pls. Expert)) (responding to the Court and explaining that a Technical Committee would be well-positioned to make the necessary privacy-utility tradeoff in this case after understanding the data and the Qualified Competitors' specific use cases); Rem. Tr. 1174:1–

1179:8 (Evans (Pls. Expert)) (responding to the Court's questions and describing one potential process whereby the Technical Committee could conduct a privacy-utility tradeoff to protect privacy while sharing high-utility data); Rem. Tr. 1181:9–1182:11 (Evans (Pls. Expert)) (explaining the importance of having the Technical Committee determine the mechanisms for sharing data in order to ensure the best privacy-utility tradeoff).

958. The Technical Committee could test to determine optimal choice screen implementation. Rem. Tr. 866:4–868:2 (Weinberg (DuckDuckGo)) (discussing the utility of the Technical Committee as a source of technical expertise and describing the absence of a technical committee under the European choice screen mandate as a "fatal flaw").

959. The lack of a technical committee in Europe has undermined the effectiveness of antitrust remedies and laws. Rem. Tr. 867:11–868:2 (Weinberg (DuckDuckGo)) (describing the lack of a technical committee in Europe as a "fatal flaw" and explaining how a technical committee could have prevented Google from using their "infinite resources" to frustrate reforms or circumvent remedies); Rem. Tr. 869:8–870:17 (Weinberg (DuckDuckGo)) (Without a technical committee in Europe, Google was allowed to define what click-and-query data it shared under the DMA, which made the data "pretty useless" to other competitors, with 99% of the queries removed.); Des. Rem. Tr. 64:23–24, 65:1–14 (Microsoft-DS 30(b)(6) Dep.) (Microsoft believes the presence of a technical committee in Europe would have been "useful in ensuring compliance with any remedies" under, e.g., the Digital Markets Act.).

960. The Technical Committee would give Qualified Competitors an opportunity to give input on remedies. Rem. Tr. 871:2–7 (Weinberg (DuckDuckGo)) (A Technical Committee would allow Qualified Competitors to give input into the remedies process.).

961. Even after being subject to a technical committee in *United States v. Microsoft*, Microsoft views a technical committee as "useful in ensuring compliance with any remedies that are imposed," and believes that a lack of a Technical Committee "can create challenges." Des. Rem. Tr. 64:23–24, 65:1–14 (Microsoft-DS 30(b)(6) Dep.).

962. A Technical Committee and divestiture trustee can play a helpful role in the divestiture process. Involvement of the Government or Technical Committee in the buyer identification and approval process can be consistent with common divestiture practices. Rem. Tr. 2055:6–2056:23 (Locala (Pls. Expert)) ("[I]t's normal for sellers to ask buyers, especially in a divestiture . . . for things like investment plans, what do you plan to do with the business, and they factor that in. So it's not an uncommon part of the process . . . but you do have, you know, involvement of another party."). A Technical Committee could be a helpful tool in the divestiture process, providing additional detail to define the perimeter around the transaction. Rem. Tr. 2707:7–18 (Zenner (Def. Expert)) (expanding on response to prior question from the Court).

XVII. COLORADO PLAINTIFFS' PUBLIC EDUCATION REMEDY

A. Habit, Inertia, And Brand Recognition Are Barriers That Protect Google's Monopolies

963. The Court previously found that "the vast majority of individual searches, or queries, are carried out [by] habit, because search is a high frequency activity done on a familiar device that provides an instant response." Mem. Op. at 26 (quoting Liab. Tr. 543:2–9 (Rangel (Pls. Expert))). The Court also found that many users are "habituated to a particular [search engine] option, they are unlikely to deviate from it," and they consequently are driven by "Inertia" when carrying out searches. Mem. Op. at 27.

964. The strong influence of habit and inertia in driving search queries to Google remain to this day. Rem. Tr. 477:4–12 (Turley (OpenAI)) ("[M]ost people don't even think about

what search engine to use or how to get their real-time information"); Rem. Tr. 815:16–816:2 (Weinberg (DuckDuckGo)) ("[W]here we find ourselves today is, everyone doesn't choose Google. It's just there as their default search engine based on them, you know, being the near universal default on all access points; that in and of itself is the crux of the issue."); Rem. Tr. 472:3–15 (Turley (OpenAI)) ("[I]f you just simply type into your Chrome bar without thinking, you go to Google.com. You type into your Safari without thinking, you go to Google.com. If you follow your own muscle memory, you will go to Google.com.").

965. The Court also previously found that "[m]any users do not know that there is a default search engine, what it is, or that it can be changed." Mem. Op. at 27. Further, '[e]ven users who 'are not in this habitual mode and [] try to change the default will get frustrated and stop the process' if there is 'choice friction.'" Mem. Op. at 27–28 (quoting Liab. Tr. 547:5–16 (Rangel (Pls. Expert))).

966. Users' limited knowledge that there is a default search engine on many search access points, what it is, that it can be changed, or how to change it all persist to the present day. Rem. Tr. 815:16–816:2 (Weinberg (DuckDuckGo)) ("[P]eople aren't . . . thinking about alternatives [or] even realize that they can switch or [] are able to."); Rem. Tr. 878:19–879:16 (Weinberg (DuckDuckGo)) ("I think it is a key place where we lose people today certainly in trying to get them to understand how to switch"); Rem. Tr. 1255:19–1256:2 (Provost (Yahoo)) ("I think it would be helpful in the sense that it's not the easiest process. And any efforts to educate folks on how to change that setting or understand they have choices there, I think would be helpful."); Rem. Tr. 708:16–709:17 (Shevelenko (Perplexity)) (explaining the process of switching defaults in the context of the default Android assistant).

967. In addition, the Court previously held that Google's superior brand recognition is a "significant barrier[] that protect[s] Google's market dominance in general search." Mem. Op. at 157. In support of that holding, the Court found that the Google "brand is synonymous with search" and "Google's brand recognition also provides its distribution partners with a powerful incentive to retain Google as the default GSE." Mem. Op. at 1, 160.

968. Brand recognition remains a powerful driver in use of Google Search and would remain so even if Google loses default status. Rem. Tr. 862:22–863:25 (Weinberg (DuckDuckGo)) ("[B]rand awareness is key to being selected. You will not choose something that you never heard of."); Rem. Tr. 543:1–22 (Rangel (Pls. Expert)) ("[T]hose default applications, they build up a strong brand. And because of this, other things being equal, . . . when a consumer is put in an explicit situation to make a choice, it's more likely to choose the thing that is more familiar that has a stronger brand.").

B. The Public Education Remedy Would Reduce Those Barriers And Aid Informed User Choice

969. As a matter of economic principle, "providing more information will tend to help people make better decisions." Rem. Tr. 1874:15–1875:2 (Luca (State Pls. Expert)); Rem. Tr. 3309:18–22 (Israel (Def. Expert)) (agreeing that "giving customers more information can help them evaluate better options")).

970. A public education campaign is an organized effort to provide relevant information to the public at scale. Rem. Tr. 1868:12–1870:2 (Luca (State Pls. Expert). Public education campaigns empower people to make informed decisions, and can be particularly useful where people face informational barriers or where there is new information that is likely to effect informed choice. Rem. Tr. 1872:6–15, 1878:20–1879:9 (Luca (State Pls. Expert)).

971. A public education campaign can disseminate information through various channels, including blog posts, direct digital notifications, online advertising, or direct mail notification. Rem. Tr. 1879:18–1881:12, 1882:2–22 (Luca (State Pls. Expert)). They have been used successfully as part of antitrust remedies, as part of legal settlements, and when a company implements changes while facing legal scrutiny. Rem. Tr. 1881:13–23, 1882:23–1883:1 (Luca (State Pls. Expert)).

972. A public education campaign here would improve user choice because search engine users currently face informational barriers and, with the benefit of Court-imposed remedies, will encounter new and changed search options and ways to access them. First, information could be provided about the outcomes of this case and the recently imposed remedies, including that users may encounter new defaults, new choice screens, or new and improved search engine options. Rem. Tr. 1886:17–1887:8 (Luca (State Pls. Expert)). Second, information could be provided about alternate search engines and their distinct features. Rem. Tr. 1885:9–1886:16. Third, information could be provided about how to select an alternate search engine, whether by changing a default setting, using a choice screen, using a choice dropdown, or another method. Rem. Tr. 1885:9–1886:16, 1889:10–15, 1889:24–1890:20 (Luca (State Pls. Expert)). All of this information would reduce the effects of habit, inertia and brand recognition, and instead encourage active search engine choice and experimentation. Rem. Tr. 1885:9–1887:8, 1904:9–25 (Luca (State Pls. Expert)).

973. Providing information about alternate search engines is important because search engines are multidimensional, meaning they have distinct characteristics that may appeal to different users and align with their preferences. Rem. Tr. 1888:3–1889:9 (Luca (State Pls. Expert)). For example, whereas Google promotes itself as the "the world's most used search

engine," DuckDuckGo highlights that it has "fewer ads" and "never tracks you," Microsoft highlights that it is "powered by ChatGPT," and Ecosia highlights that it "plant[s] trees as you search." Rem. Tr. 1888:3–1889:9 (Luca (State Pls. Expert)) (discussing PXRD013 at 15); Rem. Tr. 865:5–866:3 (Weinberg (DuckDuckGo)) ("[A] short description of text about the search engine [] would help it differentiate. So if you think of DuckDuckGo, we're a privacy search engine, you never heard of us. All you see is 'duck' and the name. You have no idea what that is or what would be the reason to choose it.").

974. The public education remedy serves a distinct and complementary purpose apart from rivals' incentives to market their specific products and potentially offer incentive payments to use their products. Rem. Tr. 1972:17–24, 1974:5–13 (Luca (State Pls. Expert)). Rivals are generally not incentivized to provide public information about the range of alternate search engines and their attributes, as the public education remedy would. Rem. Tr. 1972:17–24, 1974:5–13 (Luca (State Pls. Expert)). Nor are rivals generally incentivized to encourage users to explore and experience a variety of alternate search engines and their distinct attributes, again as the public education remedy would. Rem. Tr. 1961:1–10, 1965:3–14 (Luca (State Pls. Expert)).

975. In addition, the barriers to switching that exist given Google's longstanding monopoly and control of defaults leave rivals limited incentive to invest in marketing today. Rem. Tr. 877:3–23 (Weinberg (DuckDuckGo)) (explaining that in today's world, marketing is only "marginally" profitable because "we get people to maybe come to our website but it's hard for them to switch still because switching is difficult and they have never done it before."). For that reason, Mr. Weinberg explained that the public education remedy would "increase the efficiency of [DuckDuckGo's] marketing and probably enable us to do it at a bigger scale." Rem. Tr. 877:3–23 (Weinberg (DuckDuckGo)).

976. Mr. Weinberg of DuckDuckGo and Mr. Provost of Yahoo testified that the proposed public education campaign would lower informational barriers and help them and other search engines to attract users. Rem. Tr. 877:3–879:16 (Weinberg (DuckDuckGo)); Rem. Tr. 1255:8–1256:2 (Provost (Yahoo)).

C. Incentive Payments Would Further Support Informed User Choice

977. Search engines are experience goods, meaning their quality can only be fully assessed through use. Rem. Tr. 1890:21–1892:7 (Luca (State Pls. Expert)).

978. Many people use Google Search simply because they are more familiar with it, i.e., they lack experience using other non-Google search engines. Rem. Tr. 542:23–543:22 (Rangel (Pls. Expert)); PXR0044* at -358 (Aug. 2024 Google presentation titled "Google Search Brand Perceptions") ("There's a significantly positive relationship between Familiarity and [Google Search] product usage."); PXR0007* at -866 (2017 Google presentation titled "Understanding Change Aversion and Minimizing User's Pain") ("The mere exposure effect showed the familiarity breeds liking.").

979. A recent study by Allcott et al. concluded that users underestimate the quality of Bing due to lack of experience using Bing, and that "just giving them a couple days of experience seemed to have an impact on their beliefs, leading them to more favorably view Bing after gaining experience with it relative to before." Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)).

980. A foundational economic principle is that financial incentives tend to influence consumer behavior. Rem. Tr. 1874:15–1875:2 (Luca (State Pls. Expert)); Rem. Tr. 544:20–546:14 (Rangel (Pls. Expert)). A large body of academic literature supports the role of incentives in encouraging changed behavior and experimentation. Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)).

981. Providing short-term incentive payments to use non-Google search engines would encourage users to experience those search engines, overcome the current lack of familiarity that creates a bias in favor of Google, and permit more accurate assessment of quality and preference. Rem. Tr. 1890:21–1892:7 (Luca (State Pls. Expert)). Such payments would complement the public information component of this remedy, insofar as certain information about search engines can only be gained through experience. Rem. Tr. 1890:21–1892:7 (Luca (State Pls. Expert)); Rem. Tr. 883:24–884:8 (Weinberg (DuckDuckGo)) (Incentive payments "would probably increase the conversion of people to other search engines.").

982. The Allcott study tested the role of incentives in encouraging users to explore a different default search engine. Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)) (discussing PXRD013 at 13). The authors offered participants $10 to switch their default search engine from Google to Bing for two days. Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)) (discussing PXRD013 at 13). The study found that "a large share of people are willing to take that incentive and try a different default search engine," and "up to 56 days afterwards, that people persist and that many people continue to use Bing even after the experiment, even after they're no longer required to do so for the purposes of the incentive." Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)) (discussing PXRD013 at 13). The authors concluded that "a significant share of participants revised their perception about Bing after the default change." Rem. Tr. 1892:8–1894:10 (Luca (State Pls. Expert)) (discussing PXRD013 at 13).

983. Another part of the Allcott study offered participants incentive payments of $1, $10, or $25 to change their default search engine to Bing for fourteen days. Rem. Tr. 1894:18–1896:22 (Luca (State Pls. Expert)) (discussing PXRD013 at 20). At the end of the fourteen days, participants were sent a direct notification that the experiment had ended and instructions to

change back to their original search engine. Rem. Tr. 1894:18–1896:22 (Luca (State Pls. Expert)) (discussing PXRD013 at 20).

984. As shown, this part of the study found that the higher the payment, the greater the number of participants that took the payment and switched their default from Google to Bing. Rem. Tr. 1894:18–1896:22 (Luca (State Pls. Expert)) (discussing PXRD013 at 20). Notably, participants in all three incentive groups continued using Bing after they were no longer required to do so and after they received instructions about how to change their default back to Google. Rem. Tr. 1894:18–1896:22 (Luca (State Pls. Expert)) (discussing PXRD013 at 20). The authors concluded that this continued usage of Bing—across all three incentive groups—was because "[u]sers exposed to Bing positively updated their beliefs about its quality, and in higher payment groups, a larger fraction of users update their beliefs, resulting in higher market share [for Bing] after the incentive periods end." Rem. Tr. 1894:18–1896:22 (Luca (State Pls. Expert)) (discussing PXRD013 at 20).

985. Short-term incentive payments to try other search engines can thus encourage users to gain new and unique information about non-Google search engines, thereby reducing their reliance on habit, inertia and brand recognition in their search engine use. Rem. Tr. 1897:9–17, 1904:9–25 (Luca (State Pls. Expert)).

D. The Public Education Remedy Can Be Readily Implemented With Input From The Technical Committee

986. Plaintiffs' RPFJ directs the Technical Committee to assess the design and funding level of the public education remedy, including the role of short-term incentive payments. Pls. RPFJ § IX.E. The Technical Committee would make recommendations to Colorado Plaintiffs, followed by ultimate review and approval by the Court. Pls. RPFJ § IX.E.

987. The Technical Committee can use established empirical tools to make recommendations for the design and funding of the public education remedy. Rem. Tr. 1900:17–10 (Luca (State Pls. Expert)). Principally, this would entail a short period of pilot testing to test different components of the remedy. Rem. Tr. 1901:11–1903:19 (Luca (State Pls. Expert)).

988. For the public information component, the Technical Committee could test different content and channels. Rem. Tr. 1901:11–1903:19 (Luca (State Pls. Expert)). The testing could measure salience, meaning the extent to which information is received and understood. Rem. Tr. 1901:11–1903:19 (Luca (State Pls. Expert)). Such testing is commonplace for companies or ad agencies when designing a marketing campaign. Rem. Tr. 1901:11–1903:19 (Luca (State Pls. Expert)).

989. For the incentive payments component, the Technical Committee could test different payment amounts, durations, and targeted groups. Rem. Tr. 1901:11–1903:19 (Luca (State Pls. Expert)). For example, incentive payments could be limited to users whose devices show a choice screen or those that continue to have a Google search default after imposition of other remedies. Rem. Tr. 1899:11–1900:7, 1901:11–1903:19 (Luca (State Pls. Expert)). The Technical Committee could also test ways to provide incentive payments and monitor compliance at large scale, such as with a browser extension. Rem. Tr. 1897:18–1900:7, 1901:11–1903:19 (Luca (State Pls. Expert)).

990. The Technical Committee could weigh these considerations against the costs of implementing the public education remedy. Rem. Tr. 1883:2–1885:5, 1900:17–1901:10 (Luca (State Pls. Expert)). Prof. Luca provided examples of successful public education campaigns costing between $40–100 million per year. Rem. Tr. 1981:1–24 (Luca (State Pls. Expert)). In

comparison, Google spent $[redacted] million marketing its Search product in 2022, $[redacted] million in 2023, and $[redacted] million in 2024. PXR0719* at -446 ("Google Total Marketing Expense").

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