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17 **UNITED STATES DISTRICT COURT**
18 **NORTHERN DISTRICT OF CALIFORNIA**
19 **SAN FRANCISCO DIVISION**

20 **IN RE GOOGLE PLAY STORE**
21 **ANTITRUST LITIGATION**

22 THIS DOCUMENT RELATES TO:

23 *Epic Games Inc. v. Google LLC et al.*, Case
24 No. 3:20-cv-05671-JD

Case No. 3:21-md-02981-JD

**GOOGLE’S PROFFER REGARDING
EPIC’S PROPOSED REMEDIES**

Judge: Hon. James Donato

PUBLIC REDACTED VERSION

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1 **I. INTRODUCTION**

2 At the Court’s direction, ECF No. 978, Google respectfully submits this proffer describing
3 the technical work and estimated costs to: (i) provide third-party app stores with access to Google
4 Play’s app catalog; (ii) provide “library porting” of users’ Play-installed apps to third-party app
5 stores; and (iii) distribute third-party app stores through the Google Play store. Accompanying
6 this proffer are the declarations of four senior Google employees: (1) Vitor Baccetti (Group
7 Product Manager), (2) Edward Cunningham (Director of Product Management), (3) David
8 Kleidermacher (Vice President of Engineering for Security and Privacy for Android and Made-by-
9 Google Products and Services), and (4) Christian Cramer (Finance Director for Android
10 Ecosystem).

11 In submitting this proffer, Google does not waive and maintains its objections to Epic’s
12 proposed injunction, *see* ECF No. 958. Google’s description of how it would attempt to
13 implement catalog access, library porting, and/or Play distribution of third-party stores, if ordered
14 by the Court, does not reflect any agreement by Google that these remedies, as described in Epic’s
15 proposed injunction, are reasonable, appropriate under the law, or feasible absent significant
16 expense and fundamental changes to the way Play and Android operate.

17 As discussed below, these proposed remedies would require a dramatic redesign of the
18 Play store and Android that would harm Android users and developers, the trust and safety of the
19 Play store, and the Android ecosystem and require Google to become a forced dealer for its
20 competitors. Catalog access would fundamentally change Play’s relationship with developers, and
21 would require the design and implementation of a new system to provide developers with
22 information about the options available to them under this new program on a regular basis. It
23 would also require the design and implementation of a new method to provide metadata on
24 Google’s catalog to third-party app stores, and additional installation and update services for apps
25 discovered in third-party app stores. Library porting, as described in Epic’s proposed injunction,
26 would require changing the Android operating system in ways that would compromise the security
27 of Android users. Distribution of third-party app stores would effectively require Google to build
28 a team to screen third-party app stores for malware, pirated apps, and other content that violates

1 Play store policies on an ongoing basis. This remedy would also require fundamental alterations
2 to the Play store to transform it from an app store that distributes only apps to an app store that
3 also distributes other app stores—a change that would inevitably harm users, developers, and the
4 Play store brand. It would also require changes to fundamental user security protections in the
5 Android operating system.

6 These remedies would be very costly and would take a substantial amount of technical
7 work and time to implement. Google’s best assessment at this point in time is:

- 8 ● Catalog access would require 12-16 months to implement, and would cost Google
9 between \$27.5 million and \$66.9 million to build, implement, and maintain for the
10 duration of the injunction.
- 11 ● Library porting, as described in Epic’s proposed injunction, would require a year to
12 implement, and would cost Google between \$1.7 million and \$2.4 million to build,
13 implement, and maintain.
- 14 ● Distribution of third-party app stores would take 12-16 months to implement. This
15 remedy would cost Google between \$32.1 million and \$67.7 million to build,
16 implement, and maintain for the duration of the injunction, with an additional
17 annual ongoing cost for review of apps and updates in third-party app stores. The
18 cost of this ongoing review depends on the number of third-party app stores that
19 request distribution through Play and the size of their catalogs. Assuming the
20 catalogs of those app stores led to a 20 percent increase in the current review work
21 performed by Play, that cost would be approximately [REDACTED] per year. For an
22 injunction of two to six years in duration, that additional cost would be between
23 [REDACTED] and [REDACTED]

24 These estimates reflect the technical and review costs to Google. They do not include the
25 incalculable costs that Google would suffer from the harms to the Google and Play brands or to
26 the security and viability of the Android ecosystem caused by these proposed remedies.

27 This proffer reflects Google’s current analysis within the timeframe provided and based on
28 the limited description of the proposed remedies set forth in Epic’s proposed injunction. Google

1 reserves the right to modify this description in response to any further submission by Epic
2 describing these proposed remedies in more detail. Should the Court order Google to implement
3 one or more of these remedies, it is possible that, in the course of complying with that order,
4 Google could encounter unanticipated consequences of the Court's order. That may require
5 Google to pursue different methods of implementation (which may involve different timelines),
6 and Google reserves its right to do so.

7 Finally, in submitting this proffer, Google renews its request for the opportunity to submit
8 further briefing. In addition to implementation and cost issues, the technical details of Epic's
9 novel proposals raise significant legal issues, particularly in light of the fact that Epic asks this
10 Court to impose a worldwide injunction. Google respectfully requests the opportunity to brief
11 those issues before the Court issues any injunction in this matter.

12 **II. CATALOG ACCESS**

13 Epic's proposed injunction would require Google, for a specified period of time, to provide
14 third-party app stores—Google's competitors—with “access [to] the Google Play Store's catalog
15 of apps not then available on those” stores. ECF No. 952, Proposed Injunction § II.D.1. If a user
16 “wishes to download and install an app not then available on that” third-party store, Google would
17 be required to “have the Google Play Store download and install that app on the Third-Party App
18 Store User's device.” *Id.* Epic's injunction effectively asks the Court to override the developers'
19 decision on where to distribute their own apps (which are the developers' intellectual property)
20 and force Google to distribute each developer's apps on stores with which the developer has no
21 relationship and without the developer's express consent. The proposal further allows third-party
22 app stores to free ride on Google's substantial investment in building its catalog, by focusing on
23 building relationships with developers of profitable apps while getting free apps from Google.

24 If Google were ordered to implement this remedy over its objection, Google currently
25 expects that it would do so in four steps: (1) build, launch, and maintain a method for delivery of
26 the metadata associated with the apps in the Play store catalog, as well as a method for installation
27 of apps through the Play store; (2) create a developer consent mechanism to allow developers to
28 decide whether to participate in catalog access and further share its intellectual property, and if so

1 in which third-party app stores; (3) develop and implement a model for charging third-party app
2 stores for the service of catalog access and value of Play’s catalog; and (4) develop and implement
3 eligibility criteria for third-party app stores that wish to participate in catalog access to mitigate
4 harm to users and developers.

5 **A. App Catalog Metadata Export**

6 Epic’s proposed injunction does not describe how Google should provide third-party app
7 stores with “access” to the Play store’s catalog or what “access” would constitute in this context.
8 Google assumes that such “access” involves some technological ability for a third-party app store
9 to obtain a listing of the apps available in the Play store.

10 Google proposes to provide such access through the metadata export process discussed in
11 the Declaration of Vitor Baccetti. *See* Baccetti Decl. ¶¶ 7-10. Specifically, Google would export
12 “metadata” (information about an app, such as the app’s name, the developer name, image of the
13 app icon, and app category) associated with the generally available apps in its catalog through a
14 server capable of providing that metadata to any authorized third-party app store’s serving
15 system.¹ As discussed below, access to this metadata would be subject to terms of service set by
16 Google. Google would regularly export and refresh this metadata. The third-party store would be
17 able to maintain its own local database containing the exported data, as well as a local database of
18 apps published directly in its store. When displaying apps to a user, the third-party store could
19 query both databases and merge the results to create a single user-facing catalog in the third
20 party’s storefront. This process would satisfy Epic’s proposal that Google provide third-party app
21 stores with “access” to the “Google Play Store’s catalog of apps not then available on those”
22 stores, as Google understands this requirement. ECF No. 952, Proposed Injunction § II.D.1.i.

23 As Mr. Baccetti explains in his declaration, if the user selects an app published directly in
24 the third-party app store, the store would use its own code to download and install the requested
25 app and Google would not be involved. Baccetti Decl. ¶ 11. If the user selects an app that is
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28 ¹ The export would not include metadata for apps that are not publicly available, such as apps that
are published only for users in a specific domain (e.g., enterprise-specific apps) or apps in closed
beta.

1 published by Play, but not by the third-party app store, then the third-party store could request that
2 the Play store install the app and deliver the download. This request would be made through an
3 Application Programming Interface (“API”) that Google would provide. The API would then
4 render a Google-generated user interface that allows the user to download the app without leaving
5 the third-party app store.² (If the user is not eligible to install the app—for example because the
6 user is a minor or because the app is not available in the user’s country or is not compatible with
7 the user’s device—then the Google-generated user interface would inform the user of this
8 fact.) This interface would contain Play branding, so that the user is on notice that they are
9 downloading an app from the Play store (rather than the third-party store) and that they are signed
10 into a Play account and are agreeing to Play’s terms and conditions, just as if they were installing
11 an app directly from the Play store itself. In addition, certain jurisdictions have regulatory
12 requirements regarding the information displayed to users at the point of install, and because Play
13 is fulfilling the installation, Google must be able to generate the interface so it can ensure
14 compliance with those regulations. This process addresses Epic’s proposal that such installation
15 be accomplished through “a background process similar to the Alley Oop integration offered by
16 Google to certain third-party Developers,” as Google understands that term. ECF No. 952,
17 Proposed Injunction § II.D.1.i .

18 Because the Play store is handling the installation (and subsequent updates) of the app, the
19 user is treated in the same way as a user who installs an app directly from the Play store. Baccetti
20 Decl. ¶ 18. This means, for example, that the user will be required to agree to relevant Play terms
21 of service (if they have not already done so) and will receive Play points for the installation (if
22 enrolled), and the Play store will, as with any Play user, communicate with the user about updates
23 as well as notifications about Play store products and promotions. The user will also be required
24 to sign into the Play store to complete the installation, and if the user has not previously signed
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27 ² Google will also need to build and implement an additional security layer that ensures that the
28 app store seeking to call the Play API is, in fact, an app store that the developer has authorized to
make the app available through catalog access. This mechanism would involve building and
maintaining, in real time, a list of approved callers of the Play API described above. Baccetti
Decl. ¶ 16.

1 into the Play store, then the user will be redirected to the Play store to register. These steps are
2 necessary because the Play store has no mechanism to install apps for a user that is not signed into
3 the store.

4 The metadata provided to the third-party app store will include fundamental identifiers for
5 the apps in Google's catalog, such as the name of the app, the associated package name, and the
6 name of the developer. Baccetti Decl. ¶ 8. The provided metadata will also include some basic
7 information *provided by the developer* to Google about the app, such as the countries in which the
8 app may be distributed and whether the app offers in-app purchases. The purpose of providing
9 this additional data is to allow the third-party app store to reduce the number of instances in which
10 a user clicks on an app in the third-party app store that the user is not eligible to download, for
11 example because the app is not available in the user's country. The metadata provided by Google
12 to the third-party app store would *not contain any user data*. Requiring Google to share user data
13 with third-party app stores would raise very significant security, privacy, and regulatory
14 concerns. Google does not understand the proposed injunction to suggest that Google would be
15 required to share user data as part of the catalog access remedy. Nor would the metadata provided
16 by Google include any data generated by Google itself, like auto-translations, age ratings, or
17 install counts. *Id.*

18 Google would provide the catalog data to the third-party app stores using the method
19 described above rather than through a method that directly connects Play's catalog into the third-
20 party app store, because that approach would require far deeper technical integration with
21 Google's competitors than the method described above. *See* Baccetti Decl. ¶¶ 28-30. A direct
22 connection to Play's catalog would require establishing and maintaining server-to-server or client-
23 to-client connections between Google and the third-party app stores, effectively partnering the
24 technical operations of Google with those of its competitors. This level of integration goes far
25 beyond what is necessary to provide access to the Play store catalog. And this approach would
26 increase the complexity, implementation time, and cost for Google and likely also for third-party
27 app stores because it would require integration of the third-party app store's discovery function
28 with Google's systems. This approach would also require Google to build, support, and maintain

1 servers to handle the traffic of users browsing another app store. Finally, this method of
2 implementation would deprive third-party app stores of the ability to differentiate themselves from
3 competitors by organizing and building their own discovery functions, recommendations, and
4 merchandising capabilities within their storefront. *Id.*

5 Building and implementing Google’s proposal for catalog access as described above would
6 be extremely challenging and costly. *See* Baccetti Decl. ¶¶ 32-35; Cramer Decl. ¶ 12. Google
7 could have to build and implement a system to aggregate and export metadata for approximately 3
8 million apps, as well as a system to refresh that metadata. Google would also be responsible for
9 communicating with the approximately one million developers who list their apps in the Play store
10 about the details of the catalog access program and the options available to them. Google would
11 also have to tailor the metadata provided to the third-party app stores enrolled in catalog access
12 based on the responses of each developer. Depending on the number of third-party app stores that
13 enroll in catalog access, this could be incredibly burdensome—there are hundreds of third-party
14 app stores on Android today. Cunningham Decl. ¶ 71. Google would have to repeat this process
15 as developers list new apps in the Play store and as new third-party app stores elect to participate
16 in the catalog access program.

17 Google would also have to devote resources to developing a billing system, onboarding
18 third-party app stores, and creating a policy enforcement team to ensure compliance by third-party
19 app stores with terms of service and developer preferences. Based on the information currently
20 available to Google, and in the limited time available, Google estimates the total cost of building
21 and implementing this remedy to be approximately \$13.6 million to \$23.7 million. Cramer Decl. ¶
22 12. In addition, Google estimates an ongoing maintenance and policy enforcement cost of \$7.5
23 million to \$27 million, depending on the duration of the injunction. *Id.* It is Google’s practice in
24 its quarterly planning exercises to build in a 20-30 percent buffer to account for unforeseen costs.
25 Applying the same approach here brings the total cost of this remedy to \$27.5 million to \$65.9
26 million. *Id.* It would take Google 12-16 months to implement this remedy. Baccetti Decl. ¶ 36.

1 **B. Developer Consent Mechanism**

2 The second aspect of Google’s technical implementation of this remedy would be to build
3 a mechanism to obtain developer consent to participate in catalog access generally, and
4 specifically for particular third-party stores. This could be accomplished through a checkbox that
5 developers can select to include an app in the catalog access program generally, as well as
6 individual checkboxes allowing developers to identify the authorized third-party app stores that
7 would have access to the app metadata through the program. Google would send a message to all
8 developers upon implementation, as well as periodic updates as additional third-party app stores
9 enroll in the catalog access program. *Id.* ¶¶ 19-20.

10 At the May 23 hot tub proceeding, Epic’s expert proposed an “opt out” rather than opt in
11 approach for this developer consent. In this context, “opt out” is both practically unwarranted and
12 legally insufficient.

13 From a practical perspective, catalog access would fundamentally change Google’s
14 relationships with app developers. Since the launch of Android Market, the Play store’s
15 relationships with developers have been premised on Google’s distribution of the developers’ apps
16 only in the Play store. This limitation is set forth in the Developer Distribution Agreement
17 (“DDA”), Baccetti Decl., Ex. A, and in the commercial agreements that Google enters with app
18 developers regarding the distribution and the use of their intellectual property. In addition, some
19 developers enter into sublicenses of the intellectual property of third parties (e.g., the property of a
20 movie studio or music producer) for purposes of distributing their apps, and those sublicenses may
21 themselves limit the developer’s distribution authority when it comes to app stores. *See* Baccetti
22 Decl. ¶¶ 20-21.

23 The catalog access remedy would upend this premise for all developers, with enormous
24 implications. Developers would now have to assess the scope of their own intellectual property
25 sublicenses, the reputational and regulatory concerns associated with distribution of their apps in
26 other app stores, and (potentially) the capabilities and nature of every third-party app store that
27 participates in catalog access. If the Court adopts Epic’s request for a worldwide injunction,
28 developers would suddenly face a host of regulatory and compliance risks associated with

1 advertisement and distribution of their apps around the world. And Google would have to explain
2 all this to the developers—what the program is, how it works, the options available to developers,
3 and so on, in many different languages. Under these circumstances, it is not reasonable to assume
4 that developers consent to have their apps distributed in every third-party app store that
5 participates in catalog access unless the developer affirmatively opts out.

6 Moreover, Google would have no way to enforce a developer’s decision to de-list their app
7 from a particular third-party app store. Baccetti Decl. ¶¶ 21-22. Once the initial tranche of
8 metadata associated with the Play catalog has been sent to a third-party app store, Google would
9 have no way to claw that metadata back, and so even if a developer’s app is removed from the
10 next tranche, the third-party app store will still have all the metadata from the previous updates.
11 While Google would make it a condition of terms of service for catalog access that third-party app
12 stores abide by developer decisions, Google would have no technical way to prevent the third-
13 party app store from continuing to use the metadata already in its possession. As a result, in
14 certain circumstances, the third-party app store may be able to use that metadata to continue listing
15 the developer’s app in the store, notwithstanding the developer’s decision to opt out.

16 As a legal matter, implementing catalog sharing on an opt-out basis would violate
17 developers’ intellectual property rights. Developers own substantial IP rights in their apps,
18 including copyrights on the software and trademarks for brand features like logos and other
19 images. The DDA grants Google a nonexclusive license to use developers’ IP “in connection
20 with” “the operation and marketing of Google Play.” DDA § 5.1 (copyrighted software products);
21 *see also id.* § 6.2 (comparable license for brand features, including trademarks). Google has no
22 ability under the DDA to sublicense developers’ content to third-party app stores. On the
23 contrary, Google’s only sublicensing authority is a highly limited sublicense permitting Google to
24 allow third-parties to perform certain security functions, *see* DDA § 5.1(e), and developers
25 expressly state that Google possesses no other “right, title, or interest” from developers. DDA
26 §§ 4.4, 6.1.

27 Implementing catalog sharing would thus exceed the scope of Google’s rights to
28 developers’ IP under the DDA, as Google would now be using the intellectual property of

1 developers in connection with the operation of third-party app stores, by providing the third-party
2 app stores with the metadata necessary to list those apps in their stores. This Court lacks authority
3 to compel non-party developers to grant third-party app stores the necessary licenses, or to compel
4 them to grant Google the ability to sublicense their content to third-party stores. The Court's
5 injunctive power extends only to Google and any non-parties working "in active concert or
6 participation" with Google. *See* Fed. R. Civ. P. 65(d). This is a demanding standard, and Epic has
7 not attempted to show that the test is satisfied with respect to non-party developers. *See Comedy*
8 *Club, Inc. v. Improv West Assocs.*, 553 F.3d 1277, 1287 (9th Cir. 2009) (narrowing injunction
9 improperly imposed on non-parties). Thus, to the extent the Court is inclined to order catalog
10 sharing, it must do so on an opt-in basis, which would ensure that developers have consented and
11 granted third-party stores the necessary licenses to distribute apps.

12 **C. Fee for Catalog Access**

13 The third aspect of Google's technical implementation of the catalog access remedy would
14 be to develop and implement a model for charging third-party app stores for the services provided
15 by Google through catalog access. Epic's proposed injunction does not state (as it does in the
16 provision regarding distribution of third-party app stores) that Google may not charge such a fee.

17 As discussed above, Google estimates that it would cost approximately \$27.5 million to
18 \$65.9 million to build and implement catalog access and to provide ongoing maintenance support
19 and policy enforcement for the duration of the injunction. Those costs do not include the billions
20 of dollars in costs that Google has incurred to build the enormous catalog that its competitors
21 would now be permitted to access, nor does it account for the likely strategy of third-party app
22 stores only developing direct relationships with apps that execute in-app transactions for digital
23 services, meaning Google Play will supply all free apps without the potential of earning any
24 revenue in return. These costs weigh strongly against an order compelling Google to implement
25 this remedy at all. But if Google is forced to implement catalog access, then it must be permitted
26 to charge third-party app stores for the significant services and value that Google is providing. An
27 injunction to the contrary would amount to an order that Google perform valuable work for its
28 competitors for free.

1 **D. Eligibility Criteria**

2 Finally, as part of its implementation of catalog access, Google would need to develop
3 eligibility criteria for third-party app stores to mitigate the risk that catalog access would
4 legitimize app stores that distribute malware, violate the intellectual property of developers
5 through pirated or “unlocked” versions of apps (for example, an unauthorized version of a
6 subscription app with the subscription requirement removed so that the user can access the content
7 in the app for free), or otherwise promote illegal activity or objectionable content (e.g.,
8 pornography, hate speech). Google would also need to develop and implement an ongoing audit
9 and enforcement system to ensure that third-party app stores enrolled in catalog access continue to
10 meet those criteria. *See* Baccetti Decl. ¶¶ 23-24.

11 There are hundreds of third-party app stores that vary in terms of quality, sophistication
12 and policies with respect to objectionable or illegal content. *See* Cunningham Decl. ¶¶ 71-75.
13 App stores that traffic in malware or pirated content often have fewer apps in their catalogs
14 because app developers do not want to legitimize these stores or associate their apps and brands
15 with them. Without eligibility criteria, this proposed remedy would require Google to provide
16 such app stores with the ability to appear like legitimate app stores, and would effectively place
17 Google’s imprimatur on them by showing the user a full catalog of apps from Play in those stores
18 and funneling users to Play-branded pages.

19 As the technical implementation discussion above makes clear, such ill-intentioned app
20 stores could then intermingle the apps from Google’s catalog with malware or pirated apps from
21 their own catalog, so that users are unable to distinguish legitimate Google-provided content from
22 these app stores’ objectionable or illegal content. This would harm Android users, who would be
23 more likely to download malware that is intermingled with Google’s catalog. It would also harm
24 app developers both financially and reputationally, as pirated versions of their apps would be
25 downloaded at higher rates when those pirated versions sit next to legitimate Play catalog apps. It
26 would harm Google and the Play store, whose brands would be tarnished by having the Play store
27 catalog mixed with unlawful or objectionable content. And it would harm Android, by increasing
28 the prevalence of malware and pirated content in the ecosystem.

1 This is not a theoretical problem. Android app stores that traffic in malware or pirated
2 content exist today. For example, HappyMod is an app store dedicated to hosting “modified”
3 apks—that is, pirated, unlocked, or cracked—Android apps. Cunningham Decl. ¶ 72. Allowing
4 these apps to flow through Android app stores using Play’s trusted brand and catalog would
5 further harm competition between Android and Apple’s iOS.

6 To partially mitigate these harms, Google would create and implement a set of eligibility
7 criteria for third-party app stores requesting catalog access, and a system to implement and enforce
8 the criteria. *See* Baccetti Decl. ¶¶ 23. At a minimum, those criteria would include that an app
9 store has: (1) a minimum number of apps in its own catalog and the basic infrastructure in place to
10 conduct app store business; (2) bans on malware, pirated apps, and other illegal content; (3)
11 procedures in place to enforce those bans; and (4) reasonably sufficient safeguards to protect the
12 exported metadata.

13 The eligibility criteria would also include an agreement to terms of service with
14 Google. Terms of service would be necessary to ensure compliance with local laws and
15 regulations, and to address the novel questions arising from the unprecedented forced partnership
16 between Google and its competitors created by catalog access. As noted above, terms of service
17 are critical to mitigate the risk that third-party app stores will not abide by developer requests to
18 remove their apps from catalog access. Such terms of service would also address other possible
19 topics of dispute between Google and third-party app stores around catalog access, such as:
20 unauthorized redistribution of the catalog metadata; responsibility for addressing developer
21 complaints; responsibility for customer service; use of Google’s brands and trademarks; and
22 destruction of the catalog metadata when the injunction expires. Google must be able to require
23 qualifying third-party app stores to abide by terms of service that address these and scores of other
24 questions that are likely to arise during and after the period of any imposed injunction. And
25 Google must be able to enforce those terms of service, including by disqualifying violating third-
26 party app stores.

1 **III. LIBRARY PORTING**

2 Epic’s proposed injunction requires “Google to provide users with the ability, subject to a
3 one-time user permission, to change the ownership” for any or all apps installed by the Google
4 Play store “such that the Third-Party App Store becomes the update owner for those
5 apps.” Proposed Injunction § II.D.1.

6 The existing capabilities of Android largely address the goal of the library porting remedy.
7 Android 14 already enables third-party app stores to request user permission to update apps
8 installed by other app stores. The additional permissions required by Epic’s proposed
9 injunction—to allow for bulk transfer of updating permissions and to allow app stores to change
10 the ownership of all apps, including apps that are not distributed by the third-party app store—are
11 unnecessary and would have serious negative consequences for the security of Android users and
12 would impose significant costs and technical work on Google.

13 **A. Existing Capabilities of Android 14**

14 Epic’s proposed remedy is unnecessary because Android’s controls over cross-store
15 updates already allow most of what Epic refers to in its proposed injunction as “library porting.”
16 Prior to Android 14 (released in October 2023), any preloaded app store on the user’s device could
17 update any app on the device without user permission or notification. For example, if the user had
18 three preloaded app stores on the device, all three app stores could attempt to automatically update
19 any app that was installed by the user from any app store. When app stores push updates to apps
20 that the user expects to be updated via a different app store, problems for the user can arise. Such
21 unauthorized cross-store updates, sometimes called “app clobbering,” can result in loss of the
22 user’s prior in-app purchases or purchased subscriptions, and could cause apps to crash more
23 frequently. Unauthorized cross-store updates can also create problems for developers, for example
24 by frustrating their efforts to roll out new versions of their apps to a fraction of their user base in
25 the first instance in order to ensure that any bugs in the new version are fixed before the new
26 version is released more broadly (a process known as staged release). Cunningham Decl. ¶¶ 5-10.

27 To address these problems, Android 14 introduced the concept of “update ownership.”
28 This concept allows an app store to protect the user by requiring user confirmation before a

1 different app store can update apps installed from that app store. In other words, any app store can
2 ensure that, by default, an app installed from that app store will receive automatic updates only
3 from that app store unless and until the user decides otherwise. But any app store on the device
4 can request user permission on an app-by-app basis to update an app that was installed by another
5 app store when the new store has a compatible update available. When “update ownership” is
6 cleared from the app, any app store on the device (including but not limited to the app store that
7 requested the permission) can then update the app. *Id.* ¶¶ 11-14.

8 These existing features of Android largely achieve the goal of library porting as described
9 by Epic’s expert. In his statement, Dr. Bernheim explains that the purpose of library porting is to
10 “allow[] users to transfer the responsibility of updating apps that were originally downloaded from
11 the Google Play Store to the third-party app store such that the third-party app store would be
12 responsible for automatic updates of apps (and would from that point forward be entitled to any
13 ongoing revenues from the developer),” resulting in “competition between Google Play and its
14 rivals” that “will directly benefit users.” ECF No. 952-1, Bernheim ¶ 64. Android allows third-
15 party app stores to update apps in this way by requesting permission from the user to “clear
16 ownership” on an app-by-app basis. Cunningham Decl. ¶¶ 11-14. This app-by-app permission
17 requirement is not particularly burdensome on the app store because there is no limit to the
18 number of update requests that an app store can send the user. And if the developer has provided
19 the third-party app store with a version of the app that incorporates the third-party store’s billing
20 system (or has otherwise complied with that app store’s policies on billing), then the third-party
21 app store could start collecting service fees on in-app purchases (assuming it collects a fee for
22 equivalent digital goods and services) once it has updated the app on the user’s phone with that
23 version.³

24
25 _____
26 ³ As discussed in Mr. Cunningham’s declaration, developers must take certain actions with respect
27 to their apps to allow for the possibility of third party app stores updating their apps, thereby
28 receiving “ongoing revenues” as Dr. Bernheim describes. In particular, the developer would have
to provide the third party app store with updated versions of the developer’s apps incorporating the
third party app store’s billing system. The developer would also have to ensure that the Android
operating system recognizes the third party app store’s version of the app as the same app that the
user acquired from a different app store. As Mr. Cunningham’s declaration explains, the

1 **B. Changes Required to Implement Remedy**

2 Epic’s library porting proposal would require the addition of two capabilities that do not
3 currently exist in Android 14. The first is a bulk update request (described by Epic as a “one-time
4 User permission” to change ownership for all apps on the phone).⁴ The second is a “change
5 ownership” permission rather than a “clear ownership” permission. These changes would
6 significantly harm Android users and impose substantial technical work and costs on Google.

7 **1. Bulk Update Request**

8 The Android operating system requires app stores to request permission to clear ownership
9 on an app-by-app basis when the third-party app store has a compatible update available, rather
10 than (as Epic has proposed) through a bulk request. To implement the “one time User permission”
11 requirement of Epic’s proposal, which would require *bulk* ownership change of apps on the user’s
12 device, Google would have to modify the Android operating system. Specifically, Google could
13 introduce a new Android API to request a bulk ownership change, with a corresponding “behind-
14 the-scenes” permission that app stores would declare in their app manifest and that governs the use
15 of this API. When this API is invoked along with a list of app package names, the API would
16 display a user interface that the app store could use to seek user consent to perform updates to one
17 or more apps without the per-app update ownership dialog prompt. The actual change in update
18 ownership for each app would be deferred until the app store successfully installs an update for
19 each app. Cunningham Decl. ¶ 19.

20 This change to Android 14 would harm users. The app-by-app approach to cross-store
21 updates was designed to give users a straightforward decision they can make quickly and easily
22 one app at a time. This approach makes sense because users may have good reasons to prefer to
23 have different apps updated by different app stores. For example, App Store A may offer

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25 developer could accomplish this in several ways, including through the use of a single signing key
26 for the app across app stores. Cunningham Decl. ¶¶ 33-39.

27 ⁴ Google understands the term “one-time User permission” to mean that an app store can issue a
28 single update ownership request for a group of apps already installed on the phone, and not that an
app store can issue a single request for permission to automatically update all apps acquired from
any source in the future. The latter interpretation would lead to a host of additional problems
discussed in Mr. Cunningham’s declaration. Cunningham Decl. ¶ 22.

1 exclusive content for one app on a user’s device, while App Store B may offer promotional
2 discounts for a different app on a user’s device. This is consistent with the way users already
3 make decisions about installation of apps on their device—one app at a time. By contrast, requiring
4 the user to make a single decision about all the apps on their device at one time is likely to confuse
5 the user. Indeed, a user presented with a “one-time User permission” to update all apps on the
6 device from a single app store may not realize that the consequences of agreeing to that request
7 will be to lose protection against having *any* app store update *any* app on the device. *Id.* ¶ 18.

8 To mitigate these harms, if Google were ordered to implement this change to the Android
9 operating system, Google would also modify the operating system to permit the developer to
10 choose whether to allow its apps to be subject to the new bulk ownership change protocol. Google
11 would do this by giving developers the ability to indicate in the code of their APKs whether the
12 app can be transferred in bulk along with other apps, or if instead the per-app permission would
13 continue to apply to that app. Google would also give the developer the opportunity to indicate in
14 the code of the APK which third-party app stores are permitted to obtain ownership over the app
15 by means of the bulk transfer. *Id.* ¶ 20.

16 2. Change Ownership

17 The second change to the Android operating system that would be required by Epic’s
18 proposed injunction is to add a “change ownership” capability. As described above, the Android
19 operating system does not allow a user to “change the ownership” of an app from one store to
20 another. Instead, Android enables a user only to “clear ownership” of an app so that the app can
21 be updated by *any* app store, not just the app store that requested the update permission, without
22 any further authorization by the user.

23 If Google were ordered to implement Epic’s “change ownership” proposal, Google would
24 create a capability in the Android operating system to perform the update owner switch. Google
25 would also create a new “update ownership” dialog, design, and language to accommodate this
26 change in behavior. *Id.* ¶ 30.

27 Here again, Epic’s proposed change would harm Android users. *See id.* ¶¶ 24-27. The
28 proposed “change ownership” permission (unlike “clear ownership”) would allow only the app

1 store that requested the permission to update the app. The problem is that an app store could ask a
2 user to “change ownership” of an app that the app store does not actually distribute. (The Android
3 operating system has no way to tell whether an app store actually distributes any particular app,
4 and so the operating system has no way to limit the “change ownership” permission to an app
5 store that actually distributes the app.) In that circumstance, the user would stop receiving updates
6 for the app. This would lead to several harms. First, the app developer (who has no association
7 with the third-party store) would be unable to push updates out to its users, significantly harming
8 the developer’s business. Second, users would stop receiving security updates. Many apps,
9 including banking apps, push updates to users on a regular basis to patch security holes. Mr.
10 Cunningham describes a recent example in his declaration. *Id.* ¶ 26.

11 If users were unable to obtain these kinds of security updates—because an app store that
12 does not actually distribute the app has convinced the user to “change ownership” of the app—the
13 results could be disastrous for the user. These risks would not be apparent to a user who is simply
14 shown a dialog box asking for permission to “change ownership.” Android 14 addresses these
15 risks by allowing an app store to request user permission to “clear ownership” on an app-by-app
16 basis, but not “change ownership” for a user’s entire set of apps. As discussed above, the “clear
17 ownership” permission does not prevent another app store from updating the app, thereby
18 preventing the scenario described above. *Id.* ¶ 27.

19 The risks to users associated with Epic’s proposed “change ownership” permission are
20 even greater when considered alongside Epic’s proposed “bulk update” permission. If Google
21 were required to implement both of these changes to Android 14, then an app store could send a
22 one-time user permission to “change ownership” of every app on a user’s device, including apps
23 that the third-party app store cannot update. At that point, every app on a user’s phone will be
24 incapable of updating, potentially including apps that are integral to the functioning of the phone.
25 *Id.* ¶ 28.

26 Here again, if Google were ordered to modify the Android operating system to implement
27 Epic’s “change ownership” proposal, then Google would also have to build some protections into
28 the operating system to mitigate these harms. Google would do so through a developer choice

1 protocol similar to the “one time User permission” mitigation discussed above. A developer could
2 embed a statement inside the APK file indicating whether ownership of the APK can be
3 transferred, and if so which particular app stores are authorized to change ownership of the app.
4 OEMs and carriers could configure the same permission for apps they preload. *Id.* ¶ 30. This
5 approach is consistent with the provision in Epic’s proposed injunction that the new store would
6 become the “update owner” of bulk-transferred apps only “if and when those apps become
7 available on the Third Party Store.” These protections would potentially mitigate, but not
8 eliminate, the harms to the user that may arise from an app store taking advantage of the single
9 permission to take control of apps.

10 **C. Costs of Library Porting**

11 These changes to the Android operating system would be very costly. Changes to the
12 Android operating system are enormously consequential. The operating system is the underlying
13 software that powers billions of Android phones. An error or bug in the operating system can
14 have disastrous consequences for users, developers, OEMs and Google. Accordingly, changes to
15 the Android operating system that involve behavior changes to APIs and that impact external
16 developers, like those that would be required to implement Epic’s proposed remedy, require
17 extensive developer previews, beta testing, feedback from users and OEMs, and final bug fixes
18 prior to a public release.⁵ Because these tasks must be scheduled well in advance and take several
19 months to complete, Google sets a regular cycle for Android updates. *Id.* ¶ 47.

20 Making the changes to the Android operating system proposed by Epic earlier than that
21 would not be feasible. New features implemented into the operating system take time to build in a
22 way that avoids unintentional regressions in device functionality, including unforeseen
23 interference with the operation of users’ apps. It takes time to test out the changes and establish
24 the possible app compatibility impact, and it takes time for impacted app developers to make
25 necessary adjustments to their apps as well. Google’s testing of changes to the Android operating
26

27 _____
28 ⁵ More minor changes to the Android operating system—like enhancing screen sharing
functionality or adding an option from the “quick settings” panel to share Wi-Fi credentials—occur
on a more frequent cadence.

1 system includes public developer preview and beta programs to ensure that the changes operate as
2 intended. Google solicits feedback from developers and users participating in these programs to
3 identify bugs and other issues. These programs take several months, and there is no way to fast
4 track them because this kind of testing requires users to operate their devices in the ordinary
5 course over a period of time. *Id.* ¶ 49-51.

6 Another important aspect of the operating system testing process involves OEMs, since it
7 is the OEMs that ultimately decide whether to adopt Android changes in their updates or new
8 releases. OEMs engage in significant engineering work to assess and integrate changes, typically
9 also implementing their own testing programs. In many countries, there is yet another level of
10 testing conducted by mobile carriers. The timing of OEM and carrier testing of new versions of
11 the operating system is not within Google’s control. *Id.* ¶ 49-52.

12 The technical costs to implement and maintain these changes to Android would be
13 approximately \$1.7 million to \$2.4 million. Cramer Decl. ¶ 13. If Google were ordered to
14 implement these changes off-cycle, the cost to Google would be far higher, as Google would have
15 to initiate a separate round of user, developer, and OEM testing and feedback described above.
16 Cunningham Decl. ¶ 53.

17 **IV. DISTRIBUTION OF THIRD-PARTY APP STORES**

18 Epic’s proposed injunction would require Google, for a specified period of time, to “allow
19 distribution of competing Third-Party App Stores on the Google Play Store.” ECF No. 952,
20 Proposed Injunction § II.D.2. Under the proposed injunction, Google would not be permitted to
21 charge third-party app stores for this service. *Id.* § II.D.2.ii. The details of technical
22 implementation of distribution of third-party app stores discussed below show several of the
23 problems associated with this proposed remedy.

24 Google’s implementation of this proposed remedy would involve four steps: (1) redesign
25 the Play store to accommodate the distribution of app stores; (2) implement a thorough ongoing
26 vetting process for the policies, conduct and catalogs of app stores that request to be distributed
27 through the Play store; (3) change the Android operating system; and (4) build and implement a
28 charging model for third-party app store distribution.

1 **A. Redesign of the Play Store**

2 The Play store as it exists today is designed to distribute apps, not app stores. This change
3 would require a fundamental redesign of the Play store. As explained in the declaration of Mr.
4 Baccetti, that redesign would include the following steps. Google would have to reconfigure the
5 Google Play Console to allow developers to declare an app as an app store, agree to abide by Play
6 store policies, and accept additional terms of service. Google would also have to create ways for
7 the Play store to handle the display of app stores within the store and design a method to track and
8 identify for users which apps in the store are “app stores.” And Google would have to build and
9 implement a warning that advises users when they are about to download an app store. *See*
10 Baccetti Decl. ¶¶ 38-41.

11 **B. Vetting Process**

12 Google would implement a thorough vetting process for app stores requesting distribution
13 through the Play store. This vetting process would likely include three components: (a) initial and
14 ongoing review of all apps and updates in the app store’s catalog for compliance with Play’s
15 security and content policies; (b) initial and ongoing review that the app store meets criteria set by
16 Google to qualify as an “app store”; and (c) initial and ongoing review that the app store complies
17 with behavior policies set by Google.

18 **1. Review of App Store Catalogs**

19 As Dave Kleidermacher testified at trial, and as summarized in his declaration, the Play
20 store performs a human review of all new apps to determine compliance with Play’s security and
21 content moderation policies. Kleidermacher Decl. ¶ 8. The Play store also employs a
22 sophisticated infrastructure that conducts a machine-based review, scrutinizing the application and
23 the developer for signals of risk that would trigger further human review. Google also reviews all
24 app updates using a machine-based review. An app or update is not published until the Play store
25 completes these reviews. Millions of apps and updates are submitted to the Play store annually,
26 and Google conducts the review described above for all those submissions. This app review
27 process is an integral component of the Play store business model and the Google brand. *Id.*

28

1 If Google were ordered to distribute third-party app stores through the Play store, then
2 Google would subject the catalogs of those third-party app stores to the same rigorous review,
3 because the content of those stores would now be accessible through the Play store. This would
4 include a thorough review of the third-party app store’s catalog at the time the store first requests
5 distribution through Play. Once the third-party app store is listed on Play, Google would conduct
6 the same review for every update to every version of every app in the third-party app store, as well
7 as every app that the third-party app store proposes to add to its catalog, before the app can appear
8 in the third-party store. No app or update could be published in a third-party store distributed
9 through the Play store until Google has cleared that app or update for compliance with Google’s
10 safety and content policies. *Id.* ¶ 9. Google would be required to devote substantial resources to
11 enforcing the outcomes of this rigorous review, both by instructing third-party app stores to
12 remove non-compliant apps and updates and by potentially removing app stores that did not
13 comply with Google’s review process from Play.

14 The risk to the Play store and Google brands posed by the distribution of third-party app
15 stores is not a purely theoretical concern. As noted above, there are hundreds of Android app
16 stores today, some of which list and even promote content that violates the Play store’s
17 policies. Mr. Cunningham notes in his declaration, for example, the Nutaku Android store
18 advertises itself as “the world’s largest 18+ gaming platform,” and features apps with adult
19 content. Cunningham Decl. ¶ 74. Similarly, Aptoide (another Android app store) hosts adult apps
20 including Pornhub and an unrestricted version of Telegram that allows adult content, as well as
21 pirated apps. *Id.* HappyMod is an example of an Android app store dedicated to distributing
22 pirated or “unlocked” versions of Android apps and games. *Id.* ¶ 72. And CepKutusu.com was an
23 example of an app store that intentionally distributed malware, incorporating banking malware
24 into every app downloaded from the store. *Id.* ¶ 73. If users were able to access this type of
25 content through the Play store by downloading these app stores from Play, the reputation for
26 safety, security, and content moderation that the Play store has spent over a decade and billions of
27 dollars building would be irreparably damaged.

28

1 At the May 23 hot tub proceeding, the Court suggested that Google could show a screen to
2 a user who is about to download a third-party app store from the Play store disclaiming any
3 responsibility for the consequences. While Google certainly would want the ability to implement
4 such a warning, that alone is far from sufficient to protect users, for the same reason that it is not
5 enough simply to show such a screen when a Play user downloads an app. Kleidermacher Decl.
6 ¶ 23. The brand and reputation of the Play store are built on providing users with a safe, secure,
7 reliable experience, not on disclaimers. That experience includes browsing the Play store,
8 downloading the app, and safely using the app after it is downloaded. A “buyer beware”
9 disclaimer does not repair the harm to the Play store’s brand when a child is able to view adult
10 content through an app store acquired from Play, or when a user’s device is infected with malware
11 from an app store acquired from Play as a result of this proposed remedy. In those scenarios, the
12 Play store is the platform that connects the user with the app stores that inflict those harms. It is
13 unrealistic to expect that the user will not blame the Play store at least partially for those harms,
14 just as it is unrealistic to expect that a user will not blame the Play store at least partially for harms
15 inflicted by an app downloaded directly from the Play store. If users are exposed to unsafe content
16 through Play on Android, users will naturally consider other options they perceive to be more
17 secure, such as Apple’s iOS.

18 2. App Store Criteria

19 Google’s vetting process would also include a definition of what constitutes an “app
20 store” for these purposes. In connection with this protection, Google would set criteria as to
21 which apps are eligible to be distributed as app stores through the Play store. Such criteria are
22 necessary to mitigate the risk that any number of apps on Play would immediately build in the
23 capability to start installing other apps on the devices of users with a single one-tap screen. The
24 evidence at trial showed that Epic distributes its game Fortnite on Android using the Epic Games
25 Launcher, a separate app that has the capability to install Fortnite on a device. This proposed
26 remedy would allow a developer like Epic to avoid Google’s service fee simply by distributing the
27 launcher on the Play store as a “third-party app store.” To avoid this scenario, if this remedy is
28 implemented over Google’s objection, then Google must be allowed to set eligibility criteria for

1 app stores distributed through the Play store, including prohibiting “launchers” like the Epic
2 Games Launcher, so that developers cannot evade any obligation to pay for the value of the Play
3 store simply by calling their app an app store. *See* Baccetti Decl. ¶¶ 40-41.

4 **3. Behavior of App Stores**

5 Google’s vetting of third-party app stores would also include compliance with terms of
6 service setting guidelines for the behavior of app stores distributed through the Play store. For
7 example, one of Google’s criteria for app store distribution would be that the third-party store does
8 not automatically install apps on a device that the user has not expressed an intention to install.
9 One recent example of this was the Redstone installer, a pre-installed system app on Android
10 mobile devices sold in Germany that automatically installed malware on the device.
11 Kleidermacher Decl. ¶ 13.

12 **C. Change to Android Operating System**

13 This remedy as described in Epic’s proposed injunction would also require a change to the
14 configuration of installer permissions in the Android operating system. Currently, Android has
15 two installer permissions: `INSTALL_PACKAGES` and `REQUEST_INSTALL_PACKAGES`.
16 `INSTALL_PACKAGES` is granted by the OEM when it configures the device. For example, on a
17 Samsung Galaxy Phone, the Samsung Galaxy Store and the Play store are preinstalled with
18 `INSTALL_PACKAGES` when the device is shipped. `INSTALL_PACKAGES` allows the app
19 store to install other apps on the device without requesting user permission for each install.
20 Cunningham Decl. ¶ 57.

21 `REQUEST_INSTALL_PACKAGES` does not require OEM permission—any app can
22 configure itself to request this permission from the user. For security reasons, each time a user
23 attempts to install an app through another app that has the `REQUEST_INSTALL_PACKAGES`
24 permission, the user is shown a consent screen. The purpose of this distinction between the two
25 installer permissions is to protect the user from a malicious app installing other apps (including
26 malware) in the background without the user’s knowledge or consent. App stores downloaded
27 from the Play store would have the `REQUEST_INSTALL_PACKAGES` permission (because they
28 were not configured on the device by the OEM), and therefore each time a user installs an app

1 through an app store acquired from the Play store, the user would see a consent screen. *Id.* ¶ 58.
2 This would appear to violate Section II.D.2.i of the proposed injunction, although the language of
3 this provision is not entirely clear.

4 To implement this change, Google would remove the need for user confirmation for
5 installation of apps, and add a new behind-the-scenes permission that app stores would add to their
6 manifest. To partially mitigate security vulnerabilities arising from this change, Google would
7 likely add a technical restriction that the new permission must be granted by the installer of the
8 app store itself. For app stores distributed through the Play store, this would mean that Play would
9 grant the third-party app store the permission exempting that app store from the per-app
10 confirmation dialog.⁶ *Id.* ¶¶ 61-63.

11 **D. Charging Model**

12 Finally, if Google were forced to implement this remedy, Google would build a model for
13 charging third-party app stores for distribution on Play.

14 The provision in Epic’s proposed injunction stating that Google cannot charge for app
15 store distribution is entirely unwarranted. This proposed remedy would require Google to provide
16 valuable services to competitors on an ongoing basis for free. The evidence at trial showed that
17 the Play store’s business model is to provide benefits to app developers and to receive
18 compensation for those benefits through a service fee on in-app purchases within apps
19 downloaded from the Play store. The evidence showed that this is a very common business model
20 among app stores on various platforms, including the Epic Games Store on PCs. An injunction
21 stating that Google cannot charge third-party app stores for distribution through Play would mean
22 that Google would be required to provide these valuable services to its competitors—using
23 Google’s proprietary systems and intellectual property—for no compensation whatsoever. This
24 outcome is particularly drastic when considered in tandem with the other proposed remedies
25 discussed in this proffer, which would force Google to provide valuable services to competitor app
26

27 ⁶ In addition, to lessen the risk of silent background installation of harmful and unwanted apps,
28 Google may also require that installing a new app (without a confirmation dialog) be permitted
only in response to a proactive install decision by the user, for example by tapping an “install”
button that the store renders for the user. Cunningham Decl. ¶ 64.

1 stores while giving those app stores a mechanism to deprive Google of the service fees that reflect
2 its compensation for those services. Considered together, these remedies amount to an
3 unprecedented forced subsidy to Google's competitors.

4 **E. Total Cost**

5 As explained in Mr. Cramer's declaration, Google estimates that the cost to reconfigure
6 the Play store to distribute other app stores would be \$15.1 million to \$18.5 million. In addition,
7 the cost of ongoing maintenance, policy, and policy enforcement support would be \$9.1 million to
8 \$32.2 million, depending on the duration of the injunction. Building in a buffer of 30 percent of
9 the cost, which is Google's standard practice in quarterly planning exercises, yields an aggregate
10 total cost of \$31.4 million to \$66.7 million. *See* Cramer Decl. ¶ 14. The additional changes to
11 Android to accommodate this remedy would also be between \$628 thousand and \$751 thousand to
12 build and implement, and then between \$79 thousand and \$282 thousand to supervise and
13 maintain depending on the injunction's duration.

14 On top of that, the cost to vet other app stores for distribution on Play would depend on the
15 number of apps in the app stores that were not already in the Play store. Without knowing details
16 about the catalogs of the app stores that would apply for distribution through the Play store, it is
17 impossible to estimate the cost of this vetting. The most Google can say is that the cost of that
18 vetting would depend on the degree to which the vetting of the catalogs of third-party app stores
19 increases Google's current app review process. Mr. Kleidermacher estimates that Play's app and
20 update review process, at its current level, costs approximately [REDACTED] annually.

21 Kleidermacher Decl. ¶ 14. If the vetting associated with distribution of third-party app stores
22 resulted in a 20 percent increase in Play's app and update review workload (and Mr.
23 Kleidermacher believes that is a reasonably likely possibility), then the cost to Google would be
24 [REDACTED] annually. For an injunction lasting two to six years, that would cost Google between
25 [REDACTED] and [REDACTED].

1 DATED: June 24, 2024

Respectfully submitted,

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23 Defendants have concurred in this filing.
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