

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of

**CERTAIN MOBILE ELECTRONIC
DEVICES AND RADIO FREQUENCY
AND PROCESSING COMPONENTS
THEREOF (II)**

Inv. No. 337-TA-1093

**ANALYSIS AND FINDINGS WITH RESPECT TO THE PUBLIC INTEREST, AND
RECOMMENDATION ON REMEDY AND BOND**

Administrative Law Judge MaryJoan McNamara

(April 16, 2019)

I. PUBLIC INTEREST

**A. Overview: The Parties' Arguments in Brief on Public Interest and On
Remedy**

1. Legal Standard

The Commission directed me to take evidence and to provide it with findings of fact and a recommended determination with respect to the public interest pursuant to Commission Rule 210.50(b). 19 C.F.R. § 210.50(b); *see* 83 Fed. Reg. 835 (Jan. 8, 2018). For this Investigation, I considered the effects of a proposed remedy on each of the four (4) public interest factors: (1) the public health and welfare; (2) competitive conditions in the United States economy; (3) production of like or directly competitive articles in the United States; and (4) the impact on United States consumers. 83 Fed. Reg. 834-35 (Jan. 8, 2018); *see* 19 C.F.R. §§ 210.42(a)(1)(ii)(C), 210.50(b)(1) (2018).

**2. Qualcomm and Apple Have Different Positions on the Issues and On
the Remedies**

On March 26, 2019, I issued an Initial Determination on Violation in this Investigation

("1093 ID"). In the 1093 ID, I found that certain of Respondent Apple, Inc.'s ("Apple") products infringe claim 8 of U.S. Patent No. 8,063,674 ("the '674 patent") and that Apple violated Section 337.¹ 19 U.S.C. § 1337. The findings of fact and conclusions of law with respect to the other two (2) Asserted Patents, U.S. Patent No. 9,473,336 ("the '336 patent") and U.S. Patent No. 9,154,536 ("the '536 patent") may be found in the 1093 ID. Had a violation of Section 337 with respect to the '336 or '356 patent been found, the recommendation on Remedy and Bond would be the same although, for each of those patents, only a subset of the iPhones accused of infringement would have been affected.²

The "Overview" of the 1093 ID gives some indication of the recommendations I planned to make based upon the evidence in this Investigation. (1093 ID at 1-3.). This document contains my recommendations on the Public Interest and on Remedy and Bond. It fulfills the requirements of 19 C.F.R. § 210.42(a)(1)(a)(A)(B) and (C).

Not surprisingly, Complainant Qualcomm Incorporated ("Qualcomm") and Apple (together, "the Private Parties") endorse and have advocated vigorously their different positions on whether the Commission should enter *any* remedy against Apple for a patent violation, and the effects that a remedy, or as Qualcomm argues, *the lack of a remedy*, would have on the public interest and as precedent. (*See generally*, RPBr. at 128-130; RBr. at 1-2; CPBr. at 116-128; CBr. at 118-122.).

¹ Attached hereto as Exhibit A is the List of Abbreviations used in the 1093 ID, which is also used in this document. Similarly, the original evidentiary hearing ("Hearing") transcripts are cited.

² If Apple had been found to infringe, or were to be found to infringe, either or both of the '356 or '336 patents, available Apple substitutes would include all 2016 and 2017 iPhones, that is the iPhones 7, 7Plus, 8, 8Plus and X. (*See* Tr. (Mulhern) at 1164: 9-24.). Additionally, earlier iPhone models, such as the iPhones 5, 5s, 6s and 6 Plus that are still available for sale would not be affected by an exclusion order issued against the features of any of the Asserted Patents. (*See e.g.* CX-5119C.33-48; CX-5476C.77-78; CX-2261.9-10; CX-5530C at 37:22-38:17.).

From the outset of this Investigation, and with the first oral argument during the *Markman* hearing, both Qualcomm and Apple staked out positions that at times appeared to focus more on the history of their long-running conflict than on the scope of public interest considerations in this Investigation.³ At times, Qualcomm and Apple seemingly conflated the scope of this Investigation with other cases that are pending between them in other courts that are adjudicating Apple's and Qualcomm's antitrust or copying allegations.⁴

³ Qualcomm's and Apple's history of conflict appears to stem, in part, from Apple's selections of suppliers for its iPhones. Apple selected Infineon Wireless ("Infineon") for the first-generation iPhones issued as the iPhone, iPhone 3G, the iPhone 3GS, and iPhone. (See RBr. n. 33 (citing Tr. (Evans at 1420:9-22; 1420:24-1421:9)). Intel purchased Infineon's baseband chipset business, which enabled Intel to enter the baseband chipset market. Apple continued using these chips in its iPhones until 2011. In 2011, Apple selected Qualcomm to be its exclusive baseband chip provider from 2011 to 2014. Then, from 2014-2017, Qualcomm used both Intel and Qualcomm chipsets for its iPhones. (CPBr. at 164.). For the 2018 iPhones, Apple chose to use Intel chips exclusively. (See *id.*; see also RBr. at 123 (citing Tr. (Blevins) at 1264:1-15; Tr. (Evans) at 1484:19-23)).

Apple contends that it would have selected Intel for the earlier iPhone models but could not do so because of the "billions of dollars" Apple would have lost as result of what Apple witnesses described as Qualcomm's anti-competitive rebate and exclusive licensing agreement requirements. (*Id.* at 124 (citing Tr. (Blevins) at 1296:3-1297:2)). Apple then selected both Intel and Qualcomm for the iPhones 7, 7Plus, 8, 8 Plus and X in order to have two sources for its iPhone chipsets, which Apple preferred. (*Id.* (citing Tr. (Blevins) at 1285:17-21)). According to Ms. Evans, Intel "invested _____" in chip development to again compete for Apple's business and has _____. (Tr. (Evans) at 1437:18-1438:2.). According to Ms. Evans, even before Intel sold any chipsets, it invested approximately _____ dollars per year, with _____. (*Id.* at 1438:14-1439:10.).

Part of the conflict between Apple and Qualcomm also stems from what Apple has described as Qualcomm's "no license, no chips" policy of refusing to sell its chips unless buyers of the chips purchased a Qualcomm license. (See Tr. (Thompson) at 231:2-239:21; see *id.*, generally (Blevins) at 1265:10-1268:23.). Apple's witness, Mr. Tony Blevins, described it as a unique policy in the industry. Apple then had a practice of _____ or _____. At some point Apple stopped that practice of _____. (Tr. at 89:1-24; see also Tr. (Blevins) at 1267:25-1272:14; see also RX-959C.). Qualcomm is aggrieved because it claims Apple owes it royalties. (See Tr. at 89:1-13; see also, e.g. RBr. at 121 n.29.).

⁴ See e.g., *FTC v. Qualcomm, Inc.*, No. 5:17-cv-00220-LHK (N.D. Cal. Jan. 17, 2017) (Public Version, Feb. 1, 2017, Dkt. 38 (attached as Attachment A to Apple's Post-Hearing Brief)); *Apple v. Qualcomm, Inc.*, Case No. 3:17-cv-00108-GPC-MDD (N.D. Ca. Jan. 20, 2017)). See also *Qualcomm Inc. v. Apple, Inc.*, Case No. 37-2017-00041389-CU-BC-NC (Superior Ct. of CA, County of San Diego, North County Division (Nov. 1, 2017) as amended (Nov. 30, 2018) (Breach of contract, Trade Secret Misappropriation); See *Qualcomm Inc. v. Apple, Inc.*, Case No. 37-2017-00041389-CU-BC-NC (Superior Ct. of CA, County

No matter how much Apple and Qualcomm describe each other as a monopolist (Qualcomm) or as a monopsonist (Apple), and notwithstanding the arguments that Qualcomm and Apple each made about the other's anti-competitive behavior, this Investigation does not contain an anti-trust cause of action.⁵ (*See* Compl., Doc. ID No. 630377 (Nov. 30, 2017); *see also* Tr. (Scott Morton)⁶ at 1580:1-22; 1526:6-12; *id.* Tr. (Blevins)⁷ at 1309:13-1310:4; 1277:15-1278:3; RPB. at 28, 129-131; 134; 137; 159-164-168; RBr. at 146-147; 158-164; *see also* CPre

of San Diego, North County Division (Nov. 1, 2017) as amended (Nov. 30, 2018) (Breach of contract, Trade Secret Misappropriation). Clearly not all of the pending legal actions in which Apple and Qualcomm are engaged are listed. There are also regulatory actions pending worldwide involving one or both Apple and Qualcomm. (*See* RPB. at 165 n.45 (listing worldwide regulatory actions against Qualcomm)).

⁵ Apple repeatedly argued that Qualcomm's history of anti-competitive behaviors should be a barrier to an exclusion order. (RPB. at 130, 134, 137, 159, 160-164; RBr. at 160-162.). Apple argued that the Commission's entry of an exclusion order would eliminate "the only threat to Qualcomm's dominance for premium chip set sales" and would thereby "frustrate" and "undercut" the Federal Trade Commission's ("FTC") "ability to restore competition in that market." (RPB. at 164; RBr. at 161.). Apple also argued that Qualcomm should be satisfied with money damages from other court proceedings in lieu of an exclusion order. (RBr. at 162-163.).

⁶ When she testified during the Hearing on September 21, 2018 on behalf of Apple, Dr. Fiona Scott Morton was the Theodore Nierenberg Professor of Economics at Yale School of Management, Yale University where she focuses on competitive strategies and industrial organization with an emphasis on empirical studies of competition in areas such as pricing, product differentiation and entry into markets. (Tr. (Scott Morton) at 1519:12-15; *see also* RDX.20.2; RPSt. at Ex. E.). Dr. Scott Morton holds a BA in economics from Yale and a Ph.D. in economics from the Massachusetts Institute of Technology. Among her other positions, Dr. Scott Morton is a visiting Professor at the University of Edinburgh, Scotland, and consultant with Charles River Associates. (Tr. (Scott Morton) at 1521:24; 1522: 3.). Among her other accomplishments and positions she has held Dr. Scott-Morton previously held the position as Assistant Attorney General for Economic Analysis in the Anti-Trust Division of the Department of Justice, otherwise known as the Chief Economist. (*Id.* (Scott Morton) at 1522: 18-22.). Dr. Scott-Morton was called to testify on the public interest and how it would be affected by an exclusion order involving Apple devices containing Intel chipsets and how that would affect U.S. consumers. (*Id.* at 1523:22-1524.).

⁷ When he testified during the Hearing on September 21, 2018, Mr. Tony Jackson Blevins, was employed by Apple as Vice President of Procurement in Cupertino, California. (Tr. (Blevins) at 1256:9-10.). In that capacity, Mr. Blevins supervised some 1100 Apple employees had the responsibility for "acquiring the components, materials, assemblies, subassemblies and services that Apple requires to build and ship all Apple products, which would include iPhones, iPods, iPads, Mac computers, *et. cetera.*" (*Id.* at 1256: 17-1.22.).

at 163-164; CBr. at 126.).⁸ Qualcomm's counter to Apple's claims of Qualcomm's history of monopolistic tendencies is that Apple wields such power in the United States as the current major seller/supplier of smartphones that it is a monopsonist. (CBr. at 121; *see* Tr. (Blevins) at 1317:18-1318:3.). For example, according to testimony whichever company Apple selects as its supplier for chipsets automatically, because of Apple's dominance in worldwide sales, has the largest share of global chipset sales for high-end smartphones. (*See* CBr. at 163 (citing Tr. (Thompson) at 207:5-7).).⁹

Qualcomm also points out that contrary to Apple's assertions, Qualcomm did not purposely "target" third-party Intel Corporation ("Intel") with any intention to drive Intel, Qualcomm's primary competitor in the baseband chip¹⁰ market, out of that market. (*See* RPB. at 160; *see also* CBr. at 127.). Qualcomm firmly argues that its target is the infringer of its patents, in this case, Apple. (CBr. at 129 (citing Tr. (Thompson) at 278:24-25; 279: 8-10 ("This is 100% about Apple...The exclusion order is about Apple's lack of respect for our intellectual property.")).).

Apple's argument that no exclusion order should issue rests, in part, on the arguable

⁸ *See, e.g., Intel Corporation's Statement on the Public Interest Raised by the Complaint and the Section 210.8(B) Statement filed by Qualcomm, Inc.* (Doc. ID No. 631513 (Dec. 14, 2017)).

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¹⁰ Baseband processor chipsets are the components of mobile handsets that enable them to interact with a carrier's cellular network such as Verizon or AT&T. As Mr. Thompson described, a baseband processor chipset is comprised of three (3) parts: a baseband processor, a radio frequency (RF) integrated circuit (or transceiver), and a power management integrated circuit. (*See* Tr. (Thompson) at 191:24-192:7; *see also* CMBR. at 7-8; SBr. at 42.). Baseband processor chipsets can be integrated with applications processors on a single silicon die into a system-on-a-chip, or "SoC." (*See* Tr. (Thompson) at 191:14-20; 265:8-12.). Baseband processor chipsets that are not sold in SoC form are referred to as "thin modems." *Id.* Apple purchases only thin modems from Intel or Qualcomm, because it uses its own in-house application processors. (*Id.*). As incorporated into the infringing Apple iPhones, these Apple processors include the Apple A10, A11, and A12.

premise that restraints on Qualcomm should be imposed because of its past behavior and that this should occur in lieu of imposing restraints on Apple's present behavior of patent infringement. (See e.g. RPB. at 159-160; 161-162.). Part of Apple's argument also is *predictive* or speculative: that Qualcomm will revert to its allegedly anti-competitive behaviors and the American economy will suffer if there is no company such as Intel to act as a counterforce of competition. (RBr. at 160-161.). Finally, Apple's and Intel's arguments about the effects of an exclusion order rest upon the also speculative testimony that Intel will withdraw from the chipset market and from 5G development "with near certainty." (See e.g., Tr. (Evans) at 1513:7-1514:3; *contra*, Tr. (Chevalier) at 2087:5-15.).¹¹

Neither Apple nor Intel offered any planning documents, financial analyses, or even Securities and Exchange Commission filings that even hinted at let alone supported the outcomes Intel and Apple project if an exclusion order were to issue. There was no economic modeling.

Basic economic principles about how monopoly or monopsony power may affect the public interest negatively are generally held propositions. Both clearly can have negative consequences because they can affect supply, price, and quality negatively. (See e.g. Tr. (Scott Morton) at 1545:24-1546:19; *see also* Tr. (Thompson)¹² at 278:10-20; 279:21-280:16; 1065 ID

¹¹ When she testified during the Hearing on September 26, 2018, on behalf of Qualcomm, Dr. Judith Chevalier was the William S. Beinecke Professor of Economics and Finance at the Yale University School of Management. (Tr. (Chevalier) at 2082: 9-13; CX-5475; CPSt. at Ex. B.). Dr. Chevalier has a BA in economics from Yale and her Ph.D. in economics from the Massachusetts Institute of Technology. (Tr. (Chevalier) at 2082: 20-24.). Dr. Chevalier's academic focus is in the area of competition and industrial organization where she examines strategic interactions among firms. Her recent focus has been on emerging technologies and the "effect of the digital economy on people, firms and public policy." (*Id.* at 2083: 7-15.). She has worked in the area of cellular technology. She was called to testify specifically with respect to the effect of an exclusion order on competitive conditions in the U.S. economy as it relates to the development of 5G technologies. (*Id.* at 2085:16-2086:19.).

¹² When he testified during the Hearing as a corporate representative for Qualcomm on September 17, 2018, Dr. James Thompson was Qualcomm's Vice President of Engineering and Chief Technology Officer. (Tr. (Thompson) at 183: 4-6.). He holds a BA, and MA and a Ph.D. in electrical engineering.

at 192.).

Similarly, there can be little doubt about the enormous investments in time, personnel and money it has taken for Qualcomm, Apple, and Intel to reach their current dominant market positions, and none of them is likely to be pleased with legally imposed remedies. (*See e.g.* RBr. at 146-147 (citing RPX-0541C (IMC Profit and Loss Data); RPX-0561C (IMC Profit and Loss Data; Q1 2018); RX-900C, reflecting Intel's sunk development costs (Intel Modem Pricing Proposal); Tr. (Evans) at 1419:6-17 (other citations omitted.); *see also* 1093 ID at 340-343; Initial Determination Granting Complainant's Motion for Summary Determination that the Economic Prong of the Domestic Industry Requirement is Satisfied As To the '356 and '674 Patents (Motion Docket No. 1093-023 (Nov. 19, 2018)).¹³

There also can be little doubt that the possibility that Intel might leave the baseband chip market and abandon its development of 5G technology is concerning and must be considered and weighed. According to the information that was provided, U.S. industry has invested approximately \$500 billion in developing and deploying next generation 4G and 5G technology. An additional \$275 billion is estimated as likely costs for the ongoing development of 5G. (*See* RX-1047.). AT &T, Sprint, T-Mobile and Verizon have all conducted 5G trials in the United States and have announced their estimates for the commercialization rollouts of their products.

(*Id.* at 183: 20-184:12.). While working for Qualcomm, Dr. Thompson was at one point involved in creating the standardization for CDMA, and then later became chief of the chip division. (*Id.* at 185: 6-24.). He oversees the work of some 20,000 engineers at Qualcomm, or about one-third of the company. (*Id.* at 186: 1-11.). He is a named inventor on 10 patents. (*Id.* at 187:4-5.).

¹³ When she testified during the Hearing on September 21, 2018, Ms. Aichatou (Aicha) Evans was Intel's Chief Strategy Officer and former General Manager of Intel's Communication and Devices Group. (Tr. (Evans) at 1421:8-12.). In the former position, Ms. Evans was involved in overseeing the transformation of Intel from "PC to data-centric" and as such "I look at everything that goes across the corporation and the changes we need to make to grow the company." (*Id.* at 1421:10-12.). Ms. Evans also served on Intel's Management Committee.

(*Id.*). According to evidence, Intel has already developed a 5G modem, the XMM 800 5G that is not yet ready for commercial use. (*See* SBr. at 105 (citing CX-5476C (Mulhern Reb. Rpt.) at ¶ 51).).

There is also no dispute among the economists, the Parties, or any of the other witnesses who testified with respect to 5G about the importance of 5G to the United States, its national security interests, or to its telecommunications industry. (*See* Tr. (Mulhern) at 1228-1231:10; Tr. (Eisenach) at 2004:2-2005:11; Tr. (Chevalier) at 2105:25-2106:3; Tr. (Evans) at 1513-1514:3; Tr. (Scott Morton) at 1545:24-1546:9; Tr. (Thompson) at 278:10-20; *see also* CX-2747 (Ltr. From Treasury Dept. to Broadcom and Qualcomm (Mar.5, 2018) at 2-3; *see also* e.g. SBr. at 57-64.). How this issue comes into play in a recommendation is up to the Commission to determine, and presumably, part of the considerations that will be made during the Presidential Review Period.

However, no matter how credibly and thoughtfully the opposing economics experts, Dr. Scott Morton, Dr. Eisenach,¹⁴ Dr. Chevalier or Ms. Mulhern¹⁵ testified with respect to their

¹⁴ When he testified during the Hearing on behalf of Apple on September 26, 2018, Dr. Jeffrey Eisenach was employed by NERA Economic Consulting in Washington, D.C. where he is the Managing Director, Co-chair of the Internet and Media Practice, and a member of the Board of Directors. (Tr. (Eisenach) at 1982:19-1983:4; RPSt. at Ex. B.). Dr. Eisenach holds a Ph.D. in Economics from the University of Virginia. He is a Visiting Scholar at the American Enterprise Institute, and an Adjunct Professor at George Mason University Scalia School of Law. (*Id.* (Eisenach) at 1982:11:17.). His academic focus has been in the economics of regulation, competition, dynamic markets, and specifically in information technology markets. (*Id.* at 1983: 9-4.). He was called to testify on behalf of Apple on the effects of an exclusion order on the public interest. (*Id.* at 1985:5-8.). Unlike Apple, who moderated its position somewhat by designating competitive conditions in the U.S. economy as the most important of the factors (RBr. at 151), Dr. Eisenach testified that all four (4) prongs of the public interest would be “complicated.” (Tr. (Eisenach) at 1985:20-25.).

¹⁵ When she testified during the Hearing on September 20, 2018 on behalf of Qualcomm, Ms. Carla Mulhern was a managing principal with Analysis Group, Washington, D.C. As an economist by training, Ms. Mulhern described her work as “the application of microeconomics to principles of complex litigation.” (Tr. (Mulhern) at 1158: 3-7; *see also* CPSt. at Ex. E.). She also described her work as involving the “valuation of intellectual property, damages assessment as well as the application of economic principles to issues arising out of Section 337 at the ITC.” (*Id.* (Mulhern) at 8-12.). Ms.

beliefs and views and what *might* happen economically,¹⁶ or the alleged motives of Qualcomm and Apple, and how they wield their market power, the propositions the economists espoused in opposition to one another ultimately do not preclude a remedy when the concrete and specific evidence is weighed and considered. *See, e.g. Certain Wireless Devices with 3G and 4G Capabilities and Components Thereof*, Inv. No. 337-TA-868, Order No. 84 at 4 (Dec. 18, 2013) (“the public interest inquiry is not an inquiry into the moral worthiness of a complainant to receive relief, and “must be tethered to the four statutory factors.”). The economic opinions were helpful. However, clearly, the impact of an exclusion order is an issue about which reasonable minds may differ and they certainly did during this Investigation.

The recommendations made in this document do not include a discussion or finding with respect to explicit copying allegations as a discrete cause of action by either Qualcomm or Apple of the other’s intellectual property, although at times those allegations also were made and then

Mulhern was called by Qualcomm to testify as an expert in applied economics as that field applies to the public interest. (*Id.* (Mulhern) at 1160:2-4.). Ms. Mulhern was asked to address the public interest factors and whether the requested remedy would be adverse to the public interest. (*Id.* at 1160:15; 1161:11.).

¹⁶ When he testified on behalf of Qualcomm during the Hearing on September 20, 2018, Dr. William O. Kerr, Ph.D., was a consultant at Berkeley Research Group and William O. Kerr & Company. (CPSt. at Ex. D.). Qualcomm identified Dr. Kerr as an expert to provide testimony with respect to the economic prong of Qualcomm’s domestic industry assertions, as well as the appropriate remedy and issues related to issuance of a cease and desist order in the event Apple is found in violation of Section 337. (*Id.* at 3.). However, Dr. Kerr gave limited testimony on remedy.

Additionally, Qualcomm identified Dr. Gregory J. Sidak, Ph.D., founder and Chairman of Criterion Economics, LLC, as an expert in antitrust, regulation and intellectual property as well as damages and valuation in complex litigation and international arbitration generally who would testify on whether Qualcomm’s requested remedies would have an adverse effect on the public interest. (CPSt. at 5; CPSt. Ex. G.). Among his many accomplishments, Dr. Sidak has served as Resident Scholar and F.K. Weyerhaeuser Fellow in Law and Economics at the American Enterprise Institute and as Deputy General Counsel at the Federal Trade Commission. (CPSt. Ex. G at 1.). Dr. Sidak did not testify during the 1093 Hearing. He did, however, testify during the 1065 Hearing.

largely abandoned without a thorough evidentiary development.¹⁷

Finally, Qualcomm did not produce enough evidence for a sound determination that Apple “misused” Qualcomm confidential information despite a pre-trial motion *in limine* ruling that allowed one of Qualcomm’s witnesses to provide testimony on that subject, very generally, to the extent he could tie his testimony to the public interest. This issue of alleged confidential information misuse was clearly a sore point for both Qualcomm and Apple.¹⁸

¹⁷ On September 19, 2017, Apple filed its Response to the Complaint and NOI (“Response”). (Doc. ID No. 634670 (Jan. 24, 2018)). In its Seventh Affirmative Defense of Unclean Hands, Apple alleged that Qualcomm “has engaged in a continuing anticompetitive scheme,” and brought this Investigation “as an end run around an existing FTC action” and “retaliation” against Apple for purchasing premium LTE baseband chipset requirements from Intel); Ninth Affirmative Defense of Patent Misuse Apple alleged that Qualcomm is “seeking to use the threat of an exclusion order . . . as an end-run around the pending FTC action against Qualcomm and to coerce Apple to take a portfolio license from Qualcomm on unfair and unreasonable terms,” “seek[ing] to extend its monopoly over premium LTE baseband chipsets,” “has engaged in illegal tying by conditioning the sale of its baseband chipsets on the purchase of a license to, inter alia, a portfolio of hundreds of patents that include the Asserted Patents,” and “has conditioned licenses to its cellular standard-essential patents (‘SEPs’) on the purchase of a license to, inter alia, the Asserted Patents” that have “significant anticompetitive effects.” (Resp. at 37-43.).

On July 5, 2018, Apple withdrew from this Investigation its Seventh and Ninth Affirmative Defenses during the telephone conference (“Teleconference”) during which Apple also acknowledged that the allegations it was withdrawing included copying. (Order No. 25 (July 13, 2018); Motion Docket No. 1093-020 (July 5, 2018); Doc. ID No. 653939 (July 12, 2018 Teleconference Tr.) at 92:10-21 (Aug. 24, 2018)).

¹⁸ Apple filed a Motion to Strike Expert Testimony and Opinions of Michael Brogioli, Ph.D. (Motion in *Limine* No. 1 (“MIL No. 1”); Motion Docket No. 1093-024 (Aug. 6, 2018.) to which Qualcomm filed its opposition on August 16, 2018. (Doc. ID No. 653208.). Staff also filed a Response on August 17, 2018. (Doc. ID No. 653271.). Qualcomm named Dr. Brogioli as an expert on the Public Interest. Dr. Brogioli holds a BA, an MA and a Ph.D. in electrical engineering. (Tr. (Brogioli) at 1033:12-16.). His Ph.D. background is in “baseband chipset design, tools design, simulation and programming language and tools. (*Id.* at 1033:22-24.). I granted-in-part and denied-in-part Apple’s MIL No. 1 during a telephone management conference (“Teleconference”) I held with the Parties on September 18, 2018 in which I explained my rationale. (Tr. (Judge McNamara) at 342-43, 1012-16 (Sept. 18, 2018); *see also* 1093 ID at 11-12.). As I noted during the September 18, 2018 Teleconference, while much of Dr. Brogioli’s Expert Report was devoted to Apple’s alleged misuse of Qualcomm’s confidential information, as a part of his proposed testimony on the Public Interest, I noted that Dr. Brogioli’s expert report referenced the Public Interest in only one paragraph of his Expert Report, i.e. ¶ 6, and did not discuss any of the four (4) factors individually. However, I provided limiting instructions with respect to the relevance and scope of his testimony to the extent it served as a rebuttal to Apple’s contention that Intel is an innovator in the baseband chipset space, and thereby affected the public interest. All of Dr. Brogioli’s testimony was subject to Apple’s preserved objections. (Tr. at 85:1-7: *id.* (McNamara, J.) at 1011:01-1021:12.).

As in the companion 1065 Investigation,¹⁹ Qualcomm again seeks in this Investigation a permanent, limited exclusion order (“LEO”) directed to infringing products manufactured by or on behalf of Apple, its subsidiaries, related companies, and agents pursuant to 19 U.S.C.

§ 1337(d). Qualcomm requests that the Commission bar from entry into the United States *all* mobile electronic devices that do not incorporate a Qualcomm brand baseband processor modems and that infringe one or more claims of the Asserted Patents. (CPBr. at 124-125; CBr.

In its Post-Hearing Brief, Apple argues at length that Dr. Brogioli is not an expert “in areas of cellular feature development and development and tools as they relate to hardware and software for baseband chipsets” as Qualcomm represented. (RBr. at 107.). Moreover, Apple argued that Dr. Brogioli’s testimony was not material and should be given no weight under Fed. R. Evid. 702(a). (RBr. at 107-108.). Apple severely criticized both Dr. Brogioli’s expertise and his opinions. (RBr. at 108-116.)

Qualcomm argues in its Post-Hearing Brief that Dr. Brogioli was able to establish that Intel was not an innovator in baseband chip technology. (CBr. at 168-169.). Through Dr. Brogioli and documents, Qualcomm contends that beginning in with Apple’s

(CBr. at 169 (citations to exhibits omitted.)). Qualcomm also contends that during

(*Id.* at 169.). However, during the September 18, 2018 Teleconference, Qualcomm acknowledged that none of its engineers who had access to at least some of the same information as Dr. Brogioli and who were deposed were able to confirm that Apple copied Qualcomm technology. While I permitted Dr. Brogioli to testify for limited purposes on September 20, 2018, ultimately, I did not find his testimony to be sufficiently corroborated to be conclusive in terms of a proposition whether Intel was, is, or is not innovative. It follows that Dr. Brogioli’s testimony was not sufficiently supported to lead to a public interest-related argument on Intel’s innovation or the effect on the public interest, let alone on Apple’s alleged misuse of Qualcomm confidential information. Dr. Brogioli’s extensive credentials can be found at Ex. A to Qualcomm’s Prehearing Statement. (Doc. ID No. 653433 (Aug. 20, 2018).)

¹⁹ *Certain Mobile Electronic Devices and Radio Frequency and Processing Components Thereof*, Inv. No. 337-TA-1065 (“1065 Investigation.”). Although the 1065 Investigation implicated different patents than this Investigation, the Parties filed a Joint Cross-Use Stipulation in which they agreed that certain discovery (such as certain pleadings, documents, trial and deposition testimony) from the 1065 Investigation could be used in the 1093 Investigation. (See Doc. ID No. 646641 (6/04/2018).). Additionally, the Parties agreed that the information in this Investigation could be used in the Southern District of California, *Qualcomm Incorporated v. Apple Incorporated*, Case No. 3:17-cv-02398-DMS-MDD (S.D. Cal.). Certain witnesses in the 1065 Investigation also testified during this Investigation. These included: Intel’s Aicha Evans, Apple’s Tony Blevins, Qualcomm’s Dr. James Thompson, Apple’s economic experts Dr. Jeffrey Eisenach and Dr. Fiona Scott Morton, and Qualcomm’s expert on the public interest and remedy, Carla Mulhern. (See RBr. at 116 n.29.). No point-by-point comparison is made with the 1065 ID or evidence because of the volume of evidence admitted in both investigations.

at 116-118.).²⁰

Qualcomm also asks for a permanent cease and desist order (“CDO”) pursuant to 19 U.S.C. § 1337(f) that would prohibit Apple, its domestic subsidiaries, related companies, and agents from engaging in the importation, sale for importation, marketing and/or advertising, distribution, offering for sale, sale, use after importation, sale after importation, and other transfer within the U.S. of mobile electronic devices that do not incorporate a Qualcomm brand baseband processor modem. (*Id.*). Apple would accept a CDO containing a carve out that would enable Apple to service its current customers and repair or replace parts. (RPBr. at 128, 173-174.).²¹ However, Apple objects even to a LEO. Apple objects, at least in part, because of the possible effects it might have on Intel who provided what Apple has described as premium baseband chips (or chipsets) for the iPhones found to infringe the ’674 patent. Because of the significance of this issue for Intel, Intel is the focus of Sections B.2.c)-f). Apple has argued that Qualcomm should be satisfied with money damages from other court proceedings in lieu of an exclusion order, apparently relying upon the economic views of one of Apple’s experts, Dr. Fiona Scott Morton. (RBr. at 162-163 (citations omitted)).

Qualcomm’s position is that the public interest factors enumerated in 19 U.S.C. § 1337(d) do not preclude the issuance of Qualcomm’s requested relief. (CPBr. at 124; CBr. at 119.). Staff agrees with that proposition albeit with some tailoring. (SPBr. at 107; SBr. at 26.). Qualcomm argues that its requested relief flows necessarily from Apple’s infringement under Commission rules and precedent and it wants its intellectual property rights vindicated. (CBr. at 123.).

²⁰ If the Commission were to find that Apple infringes either (or both) the ’336 or the ’356 patents, and that both are valid, the iPhones the available substitutes would include all 2015, 2016 and 2017 iPhone models, but not the 2018 iPhones. (Tr. (Mulhern) at 1165:9-24.).

²¹ Apple did not argue for a repair and servicing carve out in its Initial Post-Hearing Brief.

With that latter proposition, I agree for reasons explained below. Additionally, I agree with Staff that limited tailoring to a limited exclusion order and a cease and desist order is warranted, albeit for a limited period. *See* Sections II.A.1-2.

3. The Devices That Have Been Found to Infringe Are Apple iPhones Containing Apple Application Processors and Non-infringing Intel Chips²²

The iPhone components that have been found to infringe the '674 patent are the Accused Apple Chips, the Apple A10, A11 and A12 processors. (*See generally* 1093 ID at 190-193; 198-251; *id.* at xvii.). If the infringement and validity analyses contained in the 1093 ID are upheld for the '674 patent, together with the finding that Apple violated Section 337, the proposed remedies, if adopted, would affect the iPhones 7, 7 Plus, 8, 8Plus and X (the so-called “anniversary” edition that celebrated 10 years of iPhones) that *do not* incorporate Qualcomm chips. (*See* 1093 ID at xvii; *see also* CPBr. at 124-125; CBr. at 117.).

For those enumerated iPhone models, that is those Apple released in September 2015 (iPhones 7 and 7 plus), September 2016 (iPhones 8 and 8 plus) and November 2017 (iPhone X) respectively, Qualcomm has asked that those iPhones that contain *Qualcomm chips* that are manufactured outside the United States *not be* covered under an exclusion order. (*See* JX-9 (Qualcomm Stipulation Re: Scope of Remedy); *see also* CPBr. at 124; CBr. at 117, 123-124; SBr. at 29.). Conversely, recommended remedial orders, if adopted, would affect those earlier

²² The Apple iPhones that have been found to contain infringing Apple processors also contain Intel baseband chipsets that are designed for use on LTE networks with legacy WCDMA/GSM carriers such as AT&T and T-Mobile. (Tr. (Foty) 624:14-15.). The remaining iPhones contain baseband chipsets that can be used on any carrier network because they are backward compatible with GSM and CDMA networks. (*See* Tr. (Thompson) at 249:7-25; *id.* (Blevins) at 1263:7-22; *id.* (Scott Morton) at 1525:9-19.). At the time testimony was taken, Intel was planning to incorporate CDMA capability into its later manufactured chipsets thereby allowing Intel to compete for operability with Qualcomm chips on CDMA networks. (Tr. (Blevins) at 1342:5-10; *id.* (Scott Morton) at 1570:22-25.). This is important because it would then be feasible for Intel to compete head to head with Qualcomm in all networks.

iPhone models that incorporate *Intel chips* (or chipsets).

The proposed remedies also would affect the Apple, XR, XS, and XS Max (“2018 iPhones”), that is those iPhones released for shipment on or about September 21, 2018, virtually simultaneously with the evidentiary hearing (“Hearing”) in this Investigation. The 2018 iPhones incorporate Intel chips exclusively.²³ (See Tr. (Blevins) at 1302:4-11.).

Unlike Apple, Qualcomm is not a smartphone manufacturer. According to un rebutted testimony, there are *no* smartphones sold in the United States that are manufactured in the United States. (See Tr. (Thompson) at 204:9-11.). Consequently, none of the Apple iPhones are manufactured in the United States although both Qualcomm and Intel manufacture some of their chipsets in the United States.

Thus, Qualcomm’s asserted domestic products are not mobile devices such as smartphones, or tablets or wearable devices of the type Apple makes and imports. Instead, Qualcomm’s products include chips, including the baseband processor chips and the chipsets and mobile testing platforms that contain them. (SBr. at 29 (citing CPBr. at 28, 50, 90; CDX-000C.7; CX-1031; CX-1032; CX-1034; CX-1035; see 1093 ID at 46.). With respect to the chipsets contained in the Accused Apple Devices found to infringe in this Investigation, Qualcomm competes with Intel, not Apple.

4. Apple and Intel Will Have Benefited from Millions of Dollars of Sales of Infringing Apple iPhones by the Time Remedial Orders Might Issue

As Qualcomm points out, by the time remedial orders might issue during the summer of

²³ Dr. James Thompson, Qualcomm’s Vice President of Engineering testified that Qualcomm spent some and Dr. Thompson stated that from Apple. (See Tr. (Thompson) at 202: 18-22.).

2019, if they do, Apple will have had at least 10 months of 2018 iPhone sales according to the un rebutted testimony of Ms. Mulhern, one of Qualcomm's economic experts, and Mr. Tony Blevins, Apple's Director of Procurement. (See Tr. (Mulhern) at 1170: 9-1171:18; *id.* Tr. (Blevins) at 1393:7-17.). Mr. Blevins acknowledged with Ms. Mulhern that Apple sales up to the point at which remedial orders might issue would include the _____ for the 2018 iPhones, which typically is _____. (See. Tr. (Mulhern) at 1170:24-1171:18; *id.* Tr. (Blevins) at 1392:25-1393:17.). Additionally, by the time remedial orders might issue in this Investigation, Apple will have had three (3) years of sales of the iPhones 7 and 7Plus, two (2) years of sales of the iPhones 8 and 8 Plus, and more than one and one-half (1) years of sales of the iPhone X (issued November 2017).

Apple has known since the filing of the Complaint in this Investigation, on or about November 17, 2017, of Qualcomm's assertions of patent infringement by the various Apple iPhones. If the decision on violation Section 337 is upheld, Apple will have received hundreds of millions of dollars in revenues from sales of millions of infringing phones in the United States (and worldwide), while Intel also will have benefited from its share of those sales.

5. It Is Unclear Whether 2019 Apple iPhones Would Be Affected by Remedial Orders but There Are Other Substitutes

While proposed remedial orders *might* affect the 2019 iPhones, the testimony on that point was mixed and inconclusive. During the Hearing, Mr. Blevins testified that Apple has _____ Intel as its _____ and it was _____. (See Tr. (Blevins) at 1302:4-11; 1343: 8-13; 1394:23-1395; *see id.* Tr. (Thompson) at 206:15-25; 263:14-264:2.). That seems to be an accepted fact and likely. However, neither Intel-Apple contracts for the 2019 iPhones nor for 2019 Apple iPhone designs were submitted as exhibits to this Investigation. The only contract or scope of work that was

contained in the admitted Hearing exhibits is CX-1304C, an unsigned “Master Development and Supply Agreement Between Apple and Intel Corporation” (“Master Agreement”) that was to take effect on October 23, 2014. (CX-1304C.). That Master Agreement was not germane to the 2018 iPhones.

Apple’s witness, Mr. Blevins, testified during the Hearing that the 2019 iPhones were . . . (See CBr. at 135 (citing Tr. (Blevins) at 1301-23; 1365: 15-19; *id.* Tr. (Evans) at 1428: 21-1429.)). Mr. Blevins could not say whether the 2019 iPhones would have the . . . (See Tr. (Blevins) at 1365:25-1366:5; 1395:2-4.). Consequently, it is not clear whether 2019 iPhones, even if they do contain Intel chips, would contain the same infringing Apple A10, A11, or A12 processors that would infringe. Therefore, it follows that it is unclear whether they would be affected by remedial orders.

However, whether the 2019 iPhones might infringe, and setting those iPhones aside, Apple might be in a position rapidly to increase its supply of non-infringing iPhones both from its current inventories of non-infringing devices and in part because of its buying power to request and obtain rapidly increased production of non-infringing iPhones. (See CPBr. at 132 (citing CX-5119C.59-64; CX-5476C.78-79; CX-2247; CX-2367; CX-2557C; CX-2762C).). For example, Apple acknowledged that it would

. . . (CPBr. at 133 (citing CX-5119C.64-67; CX-5476C.79; CX-4551C at 62:10-63:9; CX-5210C; CX-4547C at 15:2-21.)).

Qualcomm argues that it should not have to suffer from a violation of its patent rights

because a subset of infringing Apple devices also incorporate Qualcomm chipsets. In other words, as Qualcomm argues, the infringing Apple iPhones 7, 7 Plus, 8, 8 Plus and X that may contain Qualcomm chips should be allowed to be sold in the United States even if remedial orders issues against Apple. Even one of Apple's witnesses, Steven Bowers,²⁴ Intel's Director of Quality Assurance, testified during his deposition that an exclusion order against iPhones that contain Qualcomm chipsets "doesn't make any sense." (CBr. at 128 (citing Dep. Tr. (Bowers) CX-4412C at 120: 14-20).).

To that same point, Qualcomm notes that for the months that Apple produced data on iPhone sales, Apple sold almost iPhones in the United States that contained Qualcomm chipsets. (*See* CBr. at 128.). At , Qualcomm's chipset sales to Apple represent some in revenues for Qualcomm that may serve as an approximation of revenues that Qualcomm might lose (albeit with likely diminishing sales) if the Apple iPhones containing Qualcomm chips were to be excluded from the U.S. market. (*See id.* (citing Tr. (Blevins) at 1286: 13-16; *id.* (Mulhern) at 1187:14-25; Tr. (Eisenach) at 2040: 1-8).). The effects on Intel are discussed in more detail in Sections B.2.c)-f).

6. While Apple Argued Intel Would Leave the Chipset Market if an Exclusion Order Issues, The Testimony on Point Is Speculative

While Apple has taken the position that no exclusion order should issue, Apple does not object to a "tailored" cease and desist order that would permit Apple to service, repair, and provide replacement parts for Apple's existing customers. (RPBr. at 128, 173-174.). However,

²⁴ When he gave deposition testimony, Mr. Steven Bowers served as Assistant Director of Intel Product Assurance and Security Legal. He testified with respect to the factual bases for Apple's exclusion order position, and particularly with respect to the implications for 5G technology. (See excerpts from deposition testimony of Steven Bowers at RX-1293C; RX-1260C; RX-1261C; *see also* RPSt. at 3.).

Apple, with Intel, have argued from the outset of this Investigation that if an exclusion order without tailoring issues, Intel will be forced to leave the United States “premium” baseband chip market which, in turn, would leave Qualcomm as the only major player left—or as a monopolist—in that market in the United States. (See RPBr. at 140-156; 160-166; *see also* RBr. at 160-166.).

One of Apple’s corollary arguments, with Intel, is that if Intel is driven from the baseband chip market after years of investment losses in research and development of chipsets, Intel’s revenues would be so diminished that it also will be forced to withdraw its participation in the worldwide, red-hot competition for the development and United States’ hoped for commercial dominance of 5G technology. (RPBr. at 129, 151-157; RBr. at 133-137 (citations omitted).). To Apple and Intel, one argument is premised on another and both are posed and argued as near certainties. (See RPBr. at 141; 142-147; RBr. at 135 (citing Tr. (Evans) at 1451:23-1452:2; *id.* at 1445:1-1445:9; *see also* SBr. at 44-45.). Both Intel and Apple argue that these *mere possibilities* of harm to Intel militate against a LEO and even an unqualified CDO. (See e.g. RPBr at 159; RBr. at 126-129.). Together, Apple with Intel argue that any patent infringement by Apple should be excused because of speculation about what Intel *might* do and what Apple *might do* if remedial orders issue. (See RPBr. at 144-149.).

If any of these arguments were adopted and were to sway the issue of remedy, it would leave Qualcomm without a remedy in this Investigation. Moreover, Apple has gone so far as to argue that this Investigation is a continuation of “Qualcomm’s pattern of anti-competitive conduct.” (RBr. at 123.). However, as Qualcomm points out, under an application of the *Noerr-Pennington* doctrine, it is not an antitrust violation for Qualcomm to enforce lawful patents. (See CBr. at 112; *see also Eastern Railroad Presidents Conference v. Noerr Motor Freight, Inc.*, 365

U.S. 127 (1961) and *United Mine Workers v. Pennington*, 381 U.S. 657 (1965); *California Motor Transport Co. v. Trucking Unlimited*, 404 U.S. 508 (1972).).

With respect to whether Intel *might* withdraw from the development of the baseband chipset market, as Qualcomm, rightly notes, even recently, the Commission has rejected crediting speculation for the effects that an exclusion order might have as a by-product of a party's patent infringement. (See. CBr. at 129 (citing *Certain Magnetic Data Storage Tapes and Cartridges Containing the Same*, Inv. No 337-TA-1012, Comm'n Op. at 139-140 (April 2, 2018) ("*Data Storage Tapes*") ("[W]e do not believe [Respondents'] speculation about what could occur is sufficient to override the actual fact of [Respondents'] infringement.")).

7. The Recommended Remedies Could Be Tailored²⁵

With my reasoning explained below, because of considerations involving Intel, I am recommending that the Commission issue a tailored Cease and Desist Order ("CDO") and a tailored, Limited Exclusion Order ("LEO") against Apple products that contain features that have been found to infringe claim 8 of the '674 patent"). Consistent with Staff's recommendations, two (2) carve outs to any remedial orders are recommended here. (*Accord*, SBr. at 72-77.). First, Apple should be permitted to service, that is repair and replace its iPhones in the United States. Second, the Commission should allow a carve out for iPhones and testing platforms used to test and develop 5G and to test prototypes or design-arounds in the infringing Apple iPhones. The '674 patent is not a standard essential patent ("SEP"). (See CBR. at 87, 89,

²⁵ It has been consistent with my own practice to recommend tailored EOs or CDOs as a result of fact finding and public interest analyses. See, e.g., *In the Matter of UV Curable Coatings UV Curable Coatings for Optical Fibers, Coated Optical Fibers, and Products Containing Same*, 337-TA-1031, Initial Determination on Violation at 207, 227 (Doc. ID No. 636638 (Feb. 15, 2018)); see also *In the Matter of Radio Frequency Identification ("RFID") Products and Components Thereof*, 337-TA-979, Initial Determination on Violation at 289 (Doc. ID No. 615017 (June 22, 2017)).

135.). None of the Asserted Patents are SEPs. (*Id.*).

8. Remedial Orders Could Serve as Incentive for Apple to Engineer A Design Around²⁶

As the Overview of the 1093 ID suggests, as the first trillion-dollar capitalized company in the United States, Apple presumably has the financial capability and engineering prowess to engineer a design-around for what have been found to be the infringing Apple A10, A11 and A12 processors. By doing so, Apple could spare its corporate collaborator, Intel, from the effects of Apple's infringement. (1093 ID at 3; *id.* at n.124.). If Apple's sentiment is correct that the patents at issue, including the '674 patent, are "narrow" and of no real consequence, then Apple may be able to quickly find a design that would eliminate a possible by a remedy entered against it as it has argued. (*See* RRBBr. at 1.).

The Overview notes that one of Apple's own engineers may have provided a possible solution to Apple's infringing A10, A11 and A12 processor circuitry. (*See* 1093 ID at 4; *id.* at 242 n.124.). The Commission has encouraged design-arounds historically. *See, e.g., Baseband Processor Chips and Chipsets, Transmitter, and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Tel. Handsets*, Inv. No. 337-TA-543 (Oct. 1, 2011) ("[R]espondent might simply design around the infringed patent without complainant gaining any sales. This result is anticipated by the statute, not discouraged."); *TiVo Inc. v. EchoStar Corp.*, 646 F.3d 869, 883 (Fed. Cir. 2011) ("[L]egitimate design-around efforts should always be encouraged as a path to spur further innovation.").

²⁶ In the 1065 Investigation, in response to the Commission's Question A, asking Apple how long it would take Apple to design around claim 1 of the '490 patent that was found to infringe, Apple filed "Respondent Apple Inc.'s Written Submission Regarding the Commission's Questions On The Issues Under Review, And On Remedy, Bonding And The Public Interest." Apple informed the Commission that it changed its software system (iOS) to remove the accused functionality. (Doc. ID No. 666275 at 29 (Feb. 7, 2019.). Perhaps Apple would be able to similarly, with the same speed, also engineer a design around if infringement of the '674 patent is upheld.

As the voluminous evidence and Commission precedent were considered, it was both helpful and persuasive that the Commission has a history of protecting intellectual property even as it considers the balancing of interests, and even when that leaves only one dominant player in a given market. As Qualcomm notes, there has not been a case since the 1980's in which the Commission has found a violation of Section 337 without issuing an exclusion order. In the cited cases, below, there were no substitutions available for the products excluded. (*See* CBr. at 153 n.24 (*citing Certain Automatic Crankpin Grinders*, Inv. 337-TA-60 (Dec. 1979); *Certain Inclined-Field Acceleration Tubes & Components Thereof*, Inv. No. 337-TA-67 (Dec. 1980); *Certain Fluidized Supporting Apparatus & Components Thereof*, Inv. No. 337-TA-182/188).).

In this case, there was persuasive evidence to support a finding that there are viable substitutes for the infringing Apple iPhones even if Apple cannot redesign the infringing features relatively quickly. For the most part, the rationale for the recommendations was consistent with Staff's except with respect to infringement. (*See* SPBr. at 107; SBr. at 25-27.).

B. Three of the Four Public Interest Factors Weigh in Favor of Qualcomm's Arguments and the Evidence

1. An Exclusion Order Would Not Have Adverse Effects on the Public Health and Welfare

Apple makes an attenuated cause and effect argument that an exclusion order might have on the public health and welfare. (RPBr. at 159; RBr. at 160.). Neither Apple nor Qualcomm's witnesses offered concrete evidence that there would be a direct, negative effect on the public health and welfare if an exclusion order issued. (*Accord*, SBr. at 36-37.). Apple's sole argument is premised on the *assumption* that if Intel leaves the U.S. baseband chipset market, thereby leaving Qualcomm as the primary supplier of baseband chips in the United States, technological innovation and quality would suffer, including 5G development, which in turn would affect

health care technology. (*Id.*).

Apple's discussion of the effects of a LEO or CDO on public health and welfare is based, in part, on the generalized, anticipated applications that 5G will have on a massive scale on future digital applications. If the projected capabilities and scope of 5G are correct, future wireless transmissions will have exponential effects for rapid cellular communications for streaming voice and data that go well beyond the current wireless 4G LTE architecture that is the current standard for wireless communications.²⁷

Intel's Mr. Bowers made the most explicit statement about the impact of potential remedial orders on health and welfare in a deposition statement. His statement was nonetheless vague with respect to cause and effect. He testified that "[w]ith lower latency and greater connectivity densities that are enabled by 5G technologies..." with applications as autonomous vehicles or smart cities, wearables and that sort of thing. For the first time we can talk about applications on a massive industrial scale that can have broad implications for human health or human safety." (*See* RBr. (citing Dep. Tr. (Bowers) RX-0476 at 62:17-23).). Mr. Bowers also predicted that 5G technology "will have direct impact on health, safety, and welfare, whether it has to do with autonomous vehicles making split-second decisions based on an amalgam of a massive amount of data...a robust 5G specification benefits everybody, the ecosystem, the consumers and so forth." (*Id.* at 206:13-207:22.).

Beyond such general prognostications about the importance of 5G in revolutionizing wireless capabilities, even if true, neither Qualcomm nor Apple nor Intel provided *direct*

²⁷ Staff's Pre-Hearing and Post-Hearing Briefs provide an extensive explanation of the development of 1G, 2G, 3G and 4G wireless communications and standards including the "Long Term Evolution" or 4G LTE technology that is the current standard for wireless communications today. (*See* SPBr. at 97-104; SBr. at 33-37; CX-5119 (Mulhern Op. Report) at ¶¶ 45, 46.). Similarly, Staff discusses the competition for leadership in 5G development and the United States interest in retaining leadership in that space, especially given the competition from China.

evidence on the cause and effect relationship between exclusionary orders and the public health or welfare regardless of whether the market is defined as the *United States baseband chipset market* (Apple's positions) or the *worldwide smartphone market* (Qualcomm's position.).

As Qualcomm noted, the accused Apple iPhones "are common consumer goods for voice calling, texting, internet browsing, and using applications which is why both the Commission and Apple have consistently stated that mobile devices do not present public, health, safety or welfare concerns." (CBr. at 124.).

Although her testimony also was geared toward an ultimate factual and legal conclusion, Qualcomm's economic expert, Ms. Mulhern, testified that given the lack of direct evidence, that no public health, safety or welfare considerations weigh against a remedy. (Tr. (Mulhern) at 1171:1-9.). Even Apple's economics expert, Dr. Scott Morton, testified unequivocally and without contradiction that any alleged health and welfare functions that the infringing Apple iPhones perform can be performed by substitute devices. (Tr. (Mulhern) at 1176:25-1177:40; *id.* (Scott Morton) at 1563:7-12.).

Moreover, both Staff and Qualcomm have noted that in previous Commission investigations, even Apple has represented to the Commission that electronic mobile devices "do not have any specialized public health, safety or welfare applications welfare applications, nor are they the types of products that affect public health and welfare." *Certain Electronic Digital Media Devices and Components Thereof*, Inv. No. 337-TA-796, Compl. Apple Inc.'s Submission on Remedy, Bond, & Public Interest (June 11, 2013) at 19; *see also Certain Personal Data and Mobile Communications Devices and Related Software*, Inv. No. 337-TA-710, Apple Public Interest Statement (Aug. 25, 2011)) at 2 ("the infringing HTC products [smartphones] do not implicate any particular public health, safety, or welfare concerns."). Notwithstanding Apple's

new arguments in this Investigation, there is no reason to reach a different result than that which Apple has argued for previously with respect to smartphones and similar devices. Clearly, the quality and the features of smartphones and similar devices have been considerably enhanced even since 2011.

Given the lack of direct, concrete evidence that would explain how the public health and welfare in the United States specifically would be negatively affected or even compromised by a LEO, I find that neither the issuance of a LEO nor a CDO would have an adverse effect on or even compromise the public health and welfare. This finding comports both factually and legally with recent Commission opinion. *See Certain Table Saws Incorporating Active Injury Mitigation Technology and Components Thereof*, Inv. No. 337-TA-965, Comm’n Op. at 11 (Jan. 27, 2017) (“The Commission typically finds that this factor does not weigh against granting a remedy when the relevant articles are all produced abroad.”).

2. An Exclusion Order Could Have Adverse Effects on Certain Aspects of Competitive Conditions Depending Upon Whether the “Market” is defined as a Domestic “Merchant Market” for Chipsets or as a Global Market for Smartphones

a) In a Global Market for Smartphones Qualcomm Has the Capacity to Supply Apple iPhones with Chips

The closest question with respect to the four (4) public interest factors lies with the second factor: competitive conditions in the United States economy. Qualcomm and Apple diverge most strongly on the evidence, and their interpretations and importance of the evidence, pertaining to this factor. Apple argues that this is the most significant of the four public interest factors. The outcome to their dispute may in part be determined by how the scope of the “market” affected is defined. As Staff notes, the competitive conditions in the United States economy as a whole involve *both* iPhones, that is the larger smartphone market both in the U.S.

and worldwide, *and* for this factor only, the *chip or chipset* market. (SPBr. at 106-107; SBr. at 43-44.). Qualcomm has the stronger argument overall. None of the experts dispute that the smartphone, and even to a certain extent, the chipset market is a global market.

Qualcomm argues that the correct market to consider is the market for infringing *smartphones*, that is the market for mobile electronic devices. (CPBr. at 131 (citing *Certain Electronic Digital Media Devices and Components Thereof*, 337-TA-796, Comm’n Op. at 120 (Sept. 6, 2013)). According to this view, there is a *worldwide* market in which Apple’s iPhones compete. According to that view, the public interest focus should be on that market, and not more narrowly on the non-infringing components of Apple’s devices, the Intel chips. (CPBr. at 131; 132; CBr. at 123-128).

According to Ms. Mulhern, an exclusion order would not harm competitive conditions in the United State economy if consumers chose to replace the accused iPhones with non-infringing products. Instead, or so one of Qualcomm’s experts argued, competition would be increased. (Tr. (Mulhern) at 1177:15-24.). As Qualcomm also argued, using Apple’s witness testimony given by Mr. Blevins, that the *smartphone* industry is “very competitive” and Apple is “confronted by aggressive competition in all areas of its business” because the market includes “many large and well-funded and experienced participants” to substantiate its views. (See CBr. at 129 (citing Tr. (Blevins) at 1391:18-1392:5; *see also* SBr. at 108-109.).

According to Ms. Mulhern, there are numerous examples of smartphones sold in the United States that could substitute for the infringing iPhones. These include: the Samsung Galaxy S8, S8 Plus, S8 Active, S9, and S9 Plus; Samsung Note 8; Google Pixel 2 and 2XL; LG V30, V30+, V35 ThinQ; and HTC U11, U11 Life, and U12+, among others, all of which are comparable to or even contain “superior” features to the infringing iPhones. (Tr. (Mulhern) at

1173:19–1176:8; *accord* SBr. at 108, 109). These smartphone providers, as noted above, include LG, Lenovo (formerly Motorola) and Samsung. (*Id.*).

Moreover, according to testimony, given that smartphone brands other than the most recent Samsung phones tend to be less expensive than newer model Apple iPhones, arguably the average prices in the smartphone market would go down if consumers were forced to select smartphones other than infringing iPhones. Many of these phones have features similar to those in iPhones, which Apple did not genuinely dispute. (*See* CPBr. at 138 (citing CX-5119C.50-59; CX-2396; CX-5330C at 39:13-17; CX-2397; CX-2555; CX-3113 (other citations omitted).). To the extent that there are interoperability problems between Apple's iOS operating system and Android systems, it is noteworthy that Android devices permit interoperability across Android and iOS systems, while the reverse is not possible. (*See* CPBr. at 139 (citing CX-5530C at 363:6-23; 370:21-371:5; 372:3-14; 373:21-374:3-374:4-17).).

Apple's own earlier model, non-accused iPhones could be used as well, that is the iPhones 6 and 6s and 6s Plus (and even earlier models) to the extent these and other inventories of these models are available. Apple did not provide those numbers. (*See* CX-5119C.33-38; CX-5476C.77-78; CX-5530C at 37:22-38:17.). Additionally, Best Buy and Amazon also hold Apple smartphone inventory although the quantities are not known at this time. (*See* Tr. (Mulhern) at 1171:19-1173:14.). According to certain production evidence, within the time it would take Apple's inventory to be exhausted, as of the end of discovery in this Investigation, Apple's contract manufacturers could increase their production of non-infringing smartphones in a sufficient quantity to meet the demand for iPhones in the United States. (*See* Tr. (Thompson) at 200:14-202:17; *see also* CX-5562C; SBr. at 39-40.).

There also is evidence that Qualcomm would be able to produce the necessary chips for

the non-infringing iPhones since its manufacturing plants, both in the United States and elsewhere, are able to produce _____ per year. (Tr. (Thompson) Tr. 200:14-202:17 (Thompson); CX-5562C.). By comparison, Apple's 2018 global sales of *all* iPhone 7, 7 Plus, 8, 8 Plus, and X devices are projected to sell a total of _____ units worldwide. (Tr. (Mulhern) at 1216:15-22.). As Staff noted, it is apparent that even with an exclusion order, Qualcomm could at least satisfy Apple's worldwide needs to meet the production of non-infringing iPhones, even if these models are not the latest 2018 iPhone models. (*See* SBr. at 40.).

b) In a "Merchant Market" Comprised of Only Baseband Chips, There Are Only Two Dominant Players and Competition is a Problem

Apple argues forcefully that the focus of the second public interest factor should be on the "premium baseband" chip market or what it also calls the "merchant" market. (RPBr. at 12; RBr. at 117-118; *see also* Tr. (Blevins) at 1262:18-1263:1; *id.* (Thompson) at 276:7-10; *id.* (Mulhern) at 1164:1-6; 1205:1-20; 1206:18-21; *id.* (Scott Morton) at 1536:3-1537:7; *id.* (Evans) at 1418:8-22; 1065 ID, at 190.). That is the market in which "an OEM can go and just purchase a chip, and that would be distinct from a *vertically integrated* firm that makes a handset but also makes a chip and self-supplies." (RBr. at 119 n.30 (citing Tr. (Scott Morton) at 1536:6-13).).

Apple used certain Qualcomm witness testimony and certain documents to support its argument that the "premium" baseband chipset market in the United States and word-wide is a "well-defined" market comprised of "premium tier" chipsets with "new and advanced features" that are introduced into any market first, and manufactured with the latest technology. (*See* RBr. at 119 citing (Thompson) at 273:25:274-11; *id.* at 193:24-195:5).). Notwithstanding Qualcomm's arguments that no "merchant market" or "premium baseband chip market exists, *per se*, Qualcomm documents suggest something comes close to Apple's argument. (*See*, e.g.

RX-442C at

"); *see also* RX-790C [] at 2 (internal Qualcomm document depicting) (other citations omitted).). Similarly, Qualcomm reflects that there are for chipsets, that is (See, e.g., RX-598C () at 14, 24.). As Intel's Ms. Evans and Qualcomm's Dr. Thompson both noted, each new generation of smartphones generally accompanied by improvements in corresponding baseband chipsets in features and sophistication. (See Tr. (Evans) at 2000:19-2001:3; *id.* (Thompson) at 2059:13-2060:11.).

If Apple's market definition is accepted at face value, then it appears there are currently only two (2) dominant competitors in the United States who make and manufacture "premium" chips in the United States: Qualcomm and Intel. (Tr. (Blevins) at 1262:18-1263; *id.* (Thompson) at 276:7-10; *id.* (Mulhern) at 1164:1-6; 1205:1-20; 1206:18-21; *id.* (Scott Morton) at 1536:3-1537:7; *id.* (Evans) at 1418:8-22; 1065 ID, at 190.).

There is near agreement that in the global market outside of the United States, there are only two (2) other suppliers of premium-tier LTE chipsets: Korea's Samsung through its subsidiary System LSI, and China's Huawei through its subsidiary HiSilicon. (Tr. (Scott Morton) at 1536:3-5, 1562:25-1563:1; *id.* (Mulhern) at 1963:13-15 (Mulhern); *id.* (Eisenach) at 2032:9-13.). Apparently, HiSilicon does not sell on the open market and System LSI sells primarily to Samsung. System LSI is a relatively new supplier for "premium" baseband chipsets for the European and Asian smartphones, although according to testimony, for years, no smartphones sold in the United States contained System LSI chipsets. (Tr. (Scott Morton) at 1536:3-5, 1562:22-24; *id.* (Mulhern) at 1199:15-22.).

MediaTek, headquartered in Taiwan, is apparently building a successful chipset market

presence but the volume of smart devices sold in the United States that use MediTek chipsets is not yet significant. (Tr. (Blevins) at 1353:25–1354:7; *id.* (Thompson) at 2053:5–10.).

According to some opinion, mostly on the Qualcomm side, MediaTek baseband modems are more advanced than anyone's except Qualcomm's and Samsung's and is a possible competitor to both Intel and Qualcomm. (Tr. (Thompson) at 200:4–13, 195:6–10, 286:23–287:1; *id.* (Mulhern) at 1199:15–22; *id.* (Eisenach) at 2020:5–10; *see generally* RBr. at 139-143.).

Qualcomm also points out that, Samsung's smartphone division, Apple's chief rival in the smart device market, routinely does what Apple says it cannot do. Samsung uses one chipset supplier for high-end U.S. smartphones while it uses another chipset supplier for the same models of smartphones sold outside the United States. (*See* CBr. at 149 (citing Tr. (Thompson) at 2052:23–2053:4; *id.* (Eisenach) at 2015:6-10 (Eisenach); Dep. Tr. (Kressin) RX-0457C at 24:11–25:6, 53:3–14).). As Qualcomm notes, Apple itself has typically

... (CBr. at 149 (citing Tr. (Blevins) at 1–14 (Blevins); *id.* (Scott Morton) at 1570:13–16.).

Nonetheless, Apple and Intel argue that if an exclusion order issues, Intel would be forced to leave the chipset market. (RBr. at 135; Tr. (Evans) at 1440:9-25; 1441:19-1442:12; 1443:8-1444:3 1451:23-1452:2; 1514:21-1515:5; *id.* (Scott Morton) at 1542:1-11; 1543:4-9; *id.* (Eisenach) at 1989:15-1990:9.).

Apple relied extensively on the testimony of Intel's Ms. Evans and Mr. Bowers for its arguments with respect to the effect an exclusion order might have on the likelihood that Intel would leave the chipset market or abandon its development of 5G technology. (RBr. at 135-145.). Without minimizing either scope, nuances and quality of Ms. Evans' or Mr. Bowers' testimony or the other Apple experts' arguments based on their testimony, the arguments can be

narrowed to four (4) key points: (1) Ms. Evans declared she was “[N]early certain” that Intel would leave the U.S. baseband chipset market if an exclusion order issued (Tr. (Evans) at 1451:23-1452:2;²⁸ (2) Intel would do so because it would lose so much revenue from the loss of its sales of chipsets to Apple that it could not afford to continue to compete in the chipset market and sustain continuing losses; (3) if it left the U.S. chipset market, it would lose access to the U.S. “ecosystem” (currently mostly 4G) in which new technology innovates and competes; and (4) if Intel lost its presence in the current 4G market, then Intel would also lose its financial capacity to continue to invest billions of dollars in research and development of 5G (Tr. (Evans) at 1435:18-1436:17; *id.* (Eisenach) at 2002:5-2003.). (*See generally* RBr. at 134-137; *see also* Dep. Tr. (Bowers) RX-1294C at 380:8-13 (it is a “widely understood view... among managers, including very senior managers .”).

Dr. Scott Morton, Apple’s expert, testified that it “makes perfect sense” from an economic perspective that Intel would leave the market if it loses Apple business. (Tr. (Scott Morton) at 1542:3-1543:11.). This was echoed by another of Apple’s experts, Dr. Jeffrey Eisenach, who testified that “I don’t see any way that Intel... could possibly reach a rational conclusion to remain in the business” without Apple. (Tr. (Eisenach) at 1995:10-22; 1065 ID at 191.).

As credible and even powerful as this testimony was collectively, and while the *risks* that each of the problems Intel and Apple’s witnesses forecast *might* occur if an exclusion order issue raise serious concerns, as Staff observed and concluded:

²⁸ As a witness, I found Ms. Evans to be knowledgeable, credible and very articulate. The same was true of Mr. Bowers, Dr. Scott Morton, Dr. Eisenach, Ms. Mulhern and Dr. Thompson. However, their opinions were not always borne out by documentary evidence.

other than the testimony at trial, there is little to no documentary support from Intel that the immediate effect of an exclusion order likely would be a crippling financial blow for Intel. A shift in profits or market shares, however, does not necessarily constitute harm to overall competitive conditions in the U.S. economy. Moreover, as discussed below, a remedy that is tailored to preserve Intel's ability to sell 5G thin modems, would reduce the future harm to Intel of an exclusion order, and thereby increase the likelihood that Intel would remain as a competitor to Qualcomm.

(SBr. at 58.).

Moreover, Apple's and Intel's failures to produce *any* planning documents or analyses about the impacts on Intel's modem and 5G development that might result from an exclusion order stands in stark contrast to the type of planning information Intel's managers provide to its Board of Directors for other product development and risks. Indeed, Intel represented that it has no documents that discuss the potential effects of an exclusion order, a fact that that Intel witnesses have confirmed. (CX-5204C; CX-4413C at 48:9-51:14; CX5530C at 62:2-17.).

Similarly, Intel did not offer an analysis or calculations with respect to the effects of remedial orders on its business sustainability, its chipset sales, its revenue or costs. (*See* CPBr. at 139 (citing CX-4411C at 178:19-23; 179:3-17; 180:10-21; 189: 1-10; 189:25-190:8; 199:25-200:7; *see also* CX-5530C at 65:2-8; 150:9-15 (other citations omitted).).

As Dr. Chevalier pointed out, a compelling contrast can be found in a planning or "modeling" document to which Ms. Evans testified that was provided to Intel's Board of Directors about Intel's (See Tr. (Evans) at 1439:18-1440; 25 referencing RX-1267C).). That modeling document reflects a (*Id.*). It is difficult to reconcile the absence of any planning records from Intel or Qualcomm in the event of an exclusion order.

Qualcomm marshalled evidence that placed in perspective and suggested that many of the

risks to Intel were not as formidable, dire or even as likely as Apple and Intel described. As the next Sections suggest, Qualcomm provided countervailing evidence and arguments that diminished, even if they did not completely negate, the concerns raised by both Apple's and Intel's arguments. Neither Apple nor Intel produced evidence that Intel's exit from the premium baseband chipset market would preclude Intel: (1) from developing and selling its chips and garnering massive revenues for its chipsets for devices other than Apple's infringing smartphones; or (2) from continuing to sell its chips in the *worldwide market*, including in otherwise infringing Apple iPhones sold outside the United States.

Finally, it is debatable whether there is a United States market only in baseband chipsets.

As Qualcomm's expert, Ms. Mulhern, explained:

[T]here is no U.S. market for baseband chipsets. All the experts agree in this case that it's a global market, competition occurs worldwide. It's the same baseband chipsets that are sold in all countries. Baseband chipset suppliers don't know where their chipsets end up for the most part. So it's a global market.

(See Tr. (Mulhern) at 1964:12-18 (Mulhern); *see also id.* (Thompson) at 204:6-8 ("talking about the U.S. as a market in itself, in the context of [this] industry" simply "doesn't make sense").

Even Apple's expert agreed:

Q. Now, your proposed premium chipset market is a global market, fair to say?

A. Yes, currently that's true, yes.

Id. at 2012:20-22 (Eisenach).

c) Intel Could Continue to Generate Revenues from Sales of Both Apple iPhones Outside the United States and from Other Chipset Sales

During the Hearing, Intel's revenue problem that Intel has experienced during the life of its wireless business was given great emphasis. The Intel division that sells the baseband chipsets to Apple has invested more than in development as standards have moved

from 1G to 4G. During the same timeframe, Intel has sustained some in losses. (Tr. (Mulhern) at 1210:18-1214:15 (discussing RDX30.5; RPX-541C (IMC P&L Stmt.); RPX-516C; see also Tr. (Evans) at 1437:18-1437:9).). Equally emphasized was the that Intel could experience if

.. (Tr. (Evans) at 1450: 9.).

Unquestionably, Intel relies upon . (Tr. (Evans) at 1443:1-1444:3.).

However, from the revenue and sales information produced, as Qualcomm pointed out, Intel's chipset business benefits equally from foreign iPhone sales and U.S. iPhone sales. (CBr. at 130.). As Apple's own economic experts, Dr. Scott-Morton and Dr. Eisenach acknowledged, Intel

.. (Id.

(citing (Eisenach) at 2011:21-2012:2 (Eisenach); *id.* (Scott Morton) at 1568:15-17).).

Moreover, as Qualcomm also pointed out, when Intel sells a chipset to Apple, Intel

.. (Id. (citing Scott Morton) at 1568:11-14; *id.* Tr. (Eisenach) at 2012:11- 14.).

Additionally, Dr. Eisenach testified that Intel earns

.. (Tr.

(Eisenach) at 2012:15-19.). According to Apple's sales figures, some 2016 and

2017 iPhones, i.e. the iPhones 7, 7 Plus, 8, 8 Plus and X, or or some

chipsets, were sold outside the United States. Intel chipsets were used in some

iPhones. Of this figure, of the Intel chipsets were used in iPhones sold in the United

States, while , or some Intel chipsets were incorporated in iPhones sold outside

the United States. (RBr. at 130 (citing CS-5540C; CDX-5C.2; CX-5534C; CX-5535C; CX-5537C; CX-5538C; Tr. (Eisenach) at 2024:2-2025:10).). The future could be even brighter depending upon *choices* Apple and Intel make.

Intel planning documents reflect estimates of future, non-U.S. iPhone sales . (RBr. at 131 (citing Tr. (Evans) at 1462:11-14; CX-1289C).). Also, as Qualcomm pointed out, the logic from that same supporting testimony, Intel would be better off (volume and revenue) selling 100% chipsets for the 2018 iPhone foreign sales than it was when Intel was sharing chipsets sales to Apple with Qualcomm as it did for the 2015-2017 model iPhones. Even with an exclusion order, Apple *could* continue to sell all models of the infringing iPhones containing Intel chipsets outside the United States unless Apple itself imposes unnecessary restrictions on its purchase of Intel chipsets.

Moreover, Intel's sales to Apple are . In addition to , Intel is selling . (CBr. at 131 n.17 (citing CX-413C (Dep. Tr. Bowers) at 184:10-12; 185:3-20; 18720-24; 189:2-11.)). Intel can also sell its chipsets to manufactures other than Apple and for devices other than smartphones. (CBr. at 131-133).

According to unrebutted testimony, LTE chipsets of the standalone or "thin" modems that Intel sells to Apple can be used in, and Intel plans to sell them for PCs, automobiles, and the Internet of Things ("IoT"). (CBr. at 132 (citing Tr. (Evans) Tr. 1444:4-11, 1472:24-1473:20 (Evans); CX-4412C at 99:7-19 (Bowers); CX-4413C at 194:17-195:6, 209:5- 210:20 (Bowers); CX-5543C at 20:7-23:1, 108:17-109:3, 144:8-11 (Constantine)). As Intel's Mr. Bowers testified, these types of uses will increase as 5G is commercialized. Intel is planning to continue to expand its chipset sales accordingly. (CBr. at 132 (citing Dep. Tr. (Bowers at CX-4412C at

133:1–11, 133:22–134:11, 135:12–136:1; CX-4413C at 107:22–108:4, 109:2–13, 113:24–114:22; Tr. (Evans) 1472:11–23–1473:21–24; CX-1359C.10; CX-1360C.9; CX-1864C.38; CX-1291C.8; CX-1372C.52–54; (other citations omitted.).

Apple may be the largest buyer of standalone modems but there are other manufacturers who also use standalone modems in smartphones. Intel can compete for that business and according to some evidence, apparently is already doing so. (CBr. at 133 (citing Dep. Tr. (Bowers) at CX-4412C at 152:7–15).).

There is some evidence that Intel has reached an agreement with Spreadtrum, a large Chinese chipset maker, to sell it 5G standalone modems, which Spreadtrum would use with a Spreadtrum- designed application processor in smartphones designed for the Chinese market. (CBr. at 133 (citing CX- 2839; CX-1291C.8, 12; Dep. Tr. (Bowers) CX-4413C at 150:13–151:8; Tr. (Evans) at 1477:13–25; Tr. (Eisenach) at 2028:6–19).). According to certain testimony, Intel’s work with Spreadtrum would not *per se* deter U.S. network operators from working with Spreadtrum.²⁹ Apparently, there is some evidence that U.S. network operators have indicated they could sell smartphones resulting from this collaboration in the United States. (*Id.* (citing CX-1735C.2; Dep. Tr. (Bowers) at CX-4413C at 152:14–22, 153:6–154:10, 199:13–17).). In addition, other manufacturers have also expressed interest in purchasing Intel standalone chipsets, and Intel is trying to sell to at least some other manufacturers. (CBr. at 133–134 (citing Tr. (Mulhern) at 1217:21–1218:14, 1219:3–8; *id.* Tr. (Evans) at 1477:20–1478:3; *id.* Dep. Tr. (Bowers) at CX-4413C at 200:1–16, 202:8–15).).

Notwithstanding the potential for the availability of other high-end chipsets markets

²⁹ Although Spreadtrum is a Chinese firm, there was no evidence that Spreadtrum would be barred from installing its application processors in smart devices sold in the United States

worldwide, and that Intel has been developing other markets, Intel's manufacturing operations in the United States could . Intel has plans to invest approximately to produce

.. Intel expects to employ some additional workers in the United States for this operation. (See SBr. at 59-69; Tr. (Evans) at 1433:4-21; *see also* Dep. Tr. (Constantine) RX-0470C at 100:16103:12.).

The prospect that Intel is of some concern, a conclusion with which Staff also agrees. (SBr. at 65-66.). This risk could be offset by the fact that Apple can continue to sell infringing iPhones outside the United States with Intel chipsets if it so chooses. Moreover, as indicated below, Intel's chipsets for the 2016 and 2017 model iPhones (See Section B3 *infra*.).

d) Apple Could Continue to Sell iPhones with Intel Chips Outside the United States

Apple has argued that it could not

. (RBr. at 127.). Neither Apple nor Intel presented planning documents, analyses for this contingency, or even that there had been internal discussions about this possible result if a LEO issued against Apple for infringing iPhones. To support its point, Apple relied primarily upon Apple's head of procurement, Mr. Blevins:

Q.

?

A.

(*See* RBr. at 127-128 (citing Tr. (Blevins) at 1407:25-1408:5; *see also id.* at 1307:11-23, 1400:12-1402:12).).

No documentation was provided to support Mr. Blevins' statement. Moreover, neither Apple nor Intel produced unassailable rationales why this might be so. With respect to the current versions of the Apple iPhones, Mr. Blevins also testified to the exact opposite:

(*See* CBr. at 131 (citing Tr. (Blevins) at 1401:20-23; 1343:1-1).).

e) Mobile Chipset Development in the United States Is Not Necessary for the Development of Chipsets Sold Outside the United States

Apple's Post-Hearing Brief contains the unqualified statement that "global sales of iPhones hinge on design, development, and certification efforts in the United States." (RBr. at 128.). That is attorney argument that may not be wholly accurate. According to Apple and Intel arguments, U.S. cellular networks and network operators occupy such a unique leadership position in the development and testing of chipsets that using baseband chipsets in mobile devices sold in the United States is vital to chipset development. (Tr. (Evans) at 1445:16-18).). Apple and Intel used the words "vital" and "hinge on," not the words "necessary" or "required."

By contrast, Dr. Thompson, the head of Qualcomm's global engineering and development for 17 years, testified credibly and described in detail the five (5) phases of development chipset development process in detail. (*See* CDX-0014C.3.). Dr. Thompson testified with great specificity why none of the chipset development phases differs depending on the countries in which devices containing the chipset will be sold. He also explained why chipset development does not require that chipset development occur only in the United States, or that chips developed for sales in devices outside the U.S. depend upon chipset development

for U.S. networks and mobile devices first. (CBr. at 136-137 (citing Tr. (Thompson) at 212:16-19, 216:9-12, 217:17-22, 219:7-10, 219:23-220:1)).

Without replicating or quoting Dr. Thompson's extensive testimony verbatim, Dr. Thompson described how U.S. network operators such as Verizon or AT&T or Sprint are not unique in using specific cellular features on their networks. The key points that Dr. Thompson noted are that many of the features that may be incorporated into mobile devices often originate in cellular standards, such as LTE, that do not vary from country to country. (RBr. at 137 (citing Tr. (Thompson) at 192:23–193:7; 212:5-7; 213:15–22)). It makes sense, as Dr. Thompson described, that various network operators outside the United States are as sophisticated and as advanced as U.S. network operators and they also often develop features before U.S. operators. (Tr. (Thompson) at 215:6-24.). Moreover, it also makes sense, as Dr. Thompson testified, that given the global nature of the market for all smart devices, and not just smartphones, telecom equipment manufacturers ("TEMs"), wherever they are located in the world, try to sell the same features to network operators around the world. (Tr. (Thompson) at 219: 11-22.).

As Qualcomm pointed out, Apple's economics expert, Dr. Eisenach agreed with Dr. Thompson that chipset suppliers do not develop chipsets specifically for U.S. mobile devices, but rather develop them for mobile devices sold worldwide. (Tr. (Eisenach) at 2011:21–2012:2.). From an economies of scale perspective, and to be able to mass market, that also makes sense. As Qualcomm also pointed out, Intel's own documents reference a global set of operators, not simply U.S. operators, whether in the context of chipset development or 5G innovation. (RBr. at 138-139 (citing CX-1467C.34; CX-1536C.3; CX1548C.18, 22-23; CX-1842C.8-9, 27; CX-3967C.14; Tr. (Eisenach) at 2036:1–25.).

Consequently, Apple's argument that chipset suppliers *must* work with U.S. operators

first and U.S. standard and features first to develop competitive chipsets worldwide is not supported by the preponderance of documentary evidence or testimony.

Moreover, as Intel's Ms. Evans and Mr. Bowers, and Apple's Dr. Eisenach testified, Intel has its own network relationships with TEMs because Intel sells them components for network infrastructure equipment such as base stations. (*See* Tr. (Evans) at 1471:17; Dep. Tr. (Bowers) at CX-4413C at 101:5-17, 157:13-16, 158:1-3; Tr. (Eisenach) at 2034:19-2035:9). According to Dr. Eisenach, Intel's relationships would expand as 5G is introduced, and would continue even in the event of remedial orders. (Tr. (Eisenach) at 2034:23-25; Tr. (Evans) at 1470:6-8; 1471:3-1472: 10; 1500:17-25; CX-1548C.5; CX-1219C.3-4, 10.).

As Intel's and Apple's experts all conceded, no TEM has indicated that it would not work with Intel even if the Commission issues remedial orders. (CBr. at 139 (citing Dep. Tr. (Bowers) at CX4414C at 360:12-16; Tr. (Scott Morton) at 1575:15-18; Tr. (Blevins) at 1359:5-11).).

f) 5G Development Does Not Depend upon Intel Or upon Intel's Sales of Chipset to Apple

There is no dispute that 5G is critical cellular technology for the United States. There is equally no dispute that the United States wishes to retain leadership in the development and commercialization of 5G technology. Similarly, it is undisputed that maintaining U.S. leadership in the development and commercialization of 5G is considered to be a high priority of national interest. Intel has made its own significant investments in 5G technology. (*See infra.*). It surely is concerning that Intel would threaten to abandon 5G development if an exclusion order issues. However, it is questionable whether it would be the exclusion orders that were the problem for Intel, or Apple's choice to stop using Intel chips.

However, it is noteworthy and unrebutted that despite those oral warnings, Intel has acknowledged in witness testimony that it has not discussed publicly in securities filings,

financial statements, earnings calls, public statements or other third-party communications that it might withdraw from 5G development if it loses revenues from its sales to Apple. (See CPBr. at 140 (citing CX-4410C at 26:14-27:5; CX-4411C at 176:16-177:17; 183:6-21; 200:13-16; 352:17-21; 355:14; 356:3; CX-5462C; CX-5530C at 65:9-66:21).). For a publicly traded company with fiduciary obligations to shareholders and SEC reporting requirements, Intel's silence on this issue may be significant.³⁰

Moreover, the cause and effect relationship with 5G technology and an exclusion order issued against Apple are inchoate at best. The same is true if Intel were to leave the baseband chip market or to stop participating in the development of 5G technology. There are many other participants in the development of 5G in the United States that are deeply invested in the development of 5G technology. These include Qualcomm, Verizon, Sprint, AT&T, Corning, among others. (See CX-1804C.8.).

Finally, a preponderance of evidence from Intel's own witnesses suggest Intel is committed to its continuing development of 5G technology. Intel is currently investing in 5G baseband chipsets for applications in autonomous cars, the Internet of Things, drones, connected home appliances, industrial machinery, and personal computers. (See CX-1360C.9.). None of these applications would be subject to remedial orders issued as a result of this Investigation. Intel has estimated the net present value of its investment potential in 5G platforms as equal to _____, and that is an early estimate. (See CBr. at 151 (citing Tr. (Evans) at 1499:16-19; Dep. Tr. (Bowers) CX-4413C at 84:17-19).). What is the likelihood that Intel would abandon this source of revenue that will only grow? (See Dep. Tr. (Bowers) CX-4413C at

³⁰ Clearly, that argument cuts both ways. Any company might have a fiduciary obligation under the Financial Accounting Standards Board ("FASB") Standards may have an obligation not to broadcast possible losses if they are uncertain.

60:20-25; Dep. Tr. (Bowers) CX-4414C at 313:1-314-4; see also Tr. (Evans) at 1434:3–1435:13.). According to testimony from some of Intel’s witnesses, it is not likely that Intel will abandon its 5G strategy even if the Commission issues remedial orders, and even if Intel decides to leave the baseband chip market despite other testimony to the contrary. (*See* Tr. (Evans) at 1500:1–25, 1508:3–1509:12; Dep. Tr. (Bowers) CX-4414C at 313:8–314:25, 322:9–21.).

As Qualcomm points out, Intel is profitable overall and has the resources to invest in 5G with strong incentives to keep investing. (CBr. at 153 (citing Tr. (Evans at 1494:17-1951)). Intel also has a variety of 5G collaborations and partnerships without Apple’s involvement. For example, an Intel presentation identified

_____, and Intel has _____. (*Id.* (citing Dep. Tr. (Bowers) CX-4413C at 80:6–12; *see also* Tr. 2095:20–2096:17 (Chevalier)). Given the preponderance of evidence, it seems unlikely that Intel would be completely deterred from 5G development based upon Commission remedial orders directed at Apple.

3. An Exclusion Order Would Not Have Adverse Effects on the Production of Like or Directly Competitive Articles in the United States

Neither Qualcomm nor Apple offered direct or circumstantial evidence that the issuance of a LEO or CDO would have an adverse impact on the production of like or directly competitive mobile electronic devices in the United States. As has been noted above, the evidence is unequivocal that there are no smartphones, that is those products that compete with infringing Apple iPhones, manufactured in the United. States. (*Accord* SBr. at 41 (citing Tr. (Thompson) at 204:9-11.)).

While Apple argues strenuously that remedial orders would harm Intel’s manufacturing

, that may not be true. Intel baseband chips that are incorporated
, are made by
.. (See CX-5213C at 14:22:15:8.). While Intel manufactured its chipsets for the
2018 iPhones in , Intel apparently has decided that if its chipsets
, they also would be manufactured
.. (See CPBr. (citing CX-4411C at 384:25-385:6; 386:6-14; CX-4410C at 31:13-19).).
Currently,
.. (CX-4410C at 67:7-22.). Intel's manufacturing plants can turn out other types of
integrated circuits than baseband chips. As Qualcomm argues rightly, the loss of Apple's
business in its entirety would not affect Intel's other products, although the exact impact on
Intel's revenues was not disclosed. (See CPBr. at 153 (citing 5530C at 377:11-21).
By contrast to Intel,

.. (See CPBr. at 155.).

4. An Exclusion Order Would Have Minimal Effects If Any on U.S. Consumers

The preponderance of evidence suggests that a LEO, even if not tailored, would be unlikely to have adverse effects on consumers of baseband chipsets in the United States. There would likely be few effects on the more general, downstream consumers of smartphones

If U.S. consumers are defined as anyone who buys chipsets, then the only direct effects on retail customers for the Apple processors that have been found to infringe the '674 patent. The consumers of chips are Apple itself and other original equipment manufacturers ("OEMs") who would purchase Intel's or Qualcomm's chipsets or be competing for chipsets made by other competitors of those two companies who do sell and are able without prohibition to sell chips for

smartphones marketed in the United States.

As both Staff and Qualcomm argued effectively, remedial orders would have an almost negligible effect on the prices of LTE chipsets. First, as Intel's Ms. Evans testified, Qualcomm has considerable market power which has enabled it to charge higher prices for its chips than Intel. (*See Tr. (Evans)* 1277:15-1278:1; 1285:11-1286:16.). As Apple's economic expert Dr. Scott Morton testified, average prices for Qualcomm's LTE chips have been

. (*See Tr. (Scott Morton)* at 1569: 5-15.). Moreover, as technology has advanced and there is competition from other chip manufactures, even outside of the United States, prices have been dropping. (*Id.*).

Additionally, if Apple is viewed as a monopsonist, then there is merit to Staff's argument that Apple's enormous buying power would counter the leverage Qualcomm might have over Apple if Apple had to turn to Qualcomm for chipsets, even though the evidence was not entirely clear how that would work in terms of actual pricing in the market. (*See Tr. (Blevins)* at 1317:18-1318:3.).

In the larger, downstream consumption market for smartphones, there was some evidence on the price effects on iPhone consumers if Apple were to purchase most if not all its chips from Qualcomm for any of the infringing iPhone models that have not yet been manufactured. Even without tailoring, the weight of the testimony that was largely unrebutted testimony is that any such increases would be unlikely significantly to affect consumer demand if Apple's infringing iPhones were withdrawn or Apple had to replace the Intel chips with Qualcomm chips, despite Apple's claims.

For example, Qualcomm's witness, Mr. Blevins, testified that chipset price is a fraction

of the retail price of an iPhone. Mr. Blevins testified that the 2018 iPhone X, which sold for \$1,149.00 when Mr. Blevins testified, . (Tr. (Blevins) at 1374:18-23.). Dr. Scott Morton, Apple's economics expert concurred that the cost of chipsets by themselves would be unlikely to affect consumer demand. Dr. Scott Morton testified that

even if the cost of the increase were to be fully passed through to consumers. (Tr. (Scott Morton) at 1565:1-5.). Similarly, Ms. Mulhern, Qualcomm's expert suggested that an per unit. (Tr. (Mulhern) at 1167:12-16.). The impact of price increases on chipsets, regardless of whose chipsets Apple might buy, would be unlikely significantly to affect the cost of an iPhone significantly. That is a reasonable, supported and recommended finding.

With respect to *mobile device* substitutes, or other smartphones, Ms. Mulhern testified that consumers could choose the 2016 iPhone 7 and 7 Plus models, the iPhone 2017 iPhone 8 and 8Plus, and the November 2017 iPhone X with Qualcomm chipsets that remain on the market and for which contracts with Qualcomm remained in force. (Tr. (Mulhern) at 1165:9-24.). Ms. Mulhern described the 2018 iPhones as "very similar" to 2017 iPhones with only "evolutionary" differences. (*Id.* at 1168:3-14.). While Apple might not like that alternative or even agree with the description that features are "similar," clearly, the evolutionary differences between the earlier iPhone models and the 2018 iPhones may be somewhat subjective depending upon the technological desires and the depths of the pocketbooks of consumers.

Additionally, Qualcomm appears to have the better argument, supported by evidence, that in addition to the 2016 and 2017 iPhones, there are other "reasonable" third-party substitutes in the market that consumers would be able to choose in lieu of the latest model 2018 iPhones.

These include the Samsung Galaxy S8, S8 Plus, S8 Active, S9, and S9 Plus; the Samsung Note 8; Google Pixel 2 and 2XL; LG V30, V30+, V35 ThinQ; and HTC U11, U11 Life, and U12+ (as previously identified). (*See* Tr. (Mulhern) at 1165:1-8; 1167:19-22; 1168:15-24; 1173:19-1176-8.). These non-accused and third-party devices have similar appearances, features and functionalities to the infringing 2018 iPhones, and they are frequently less expensive than the 2018 Apple iPhones. (*Id.* (Mulhern) at 1165:25-1170:8; *id.* (Blevins) at 1390:18-25.).

C. The Weight of the Evidence Ultimately Favors Qualcomm's Arguments That the Public Interest Favors the Entry of Remedial Orders

When the totality of the weight of the evidence is evaluated without sentiment or speculation, it is more likely than not that Intel would not pull out of either 5G development or from its larger chipset manufacturing business. While these are concerns, as the previous sections suggest, there is a great deal of evidence that weighs against the likelihood of either outcome and no documentation that Intel and Apple have even prepared analyses that consider such a contingency. For these reasons, I am recommending the remedies described in the next section

II. RECOMMENDATION ON REMEDY AND BOND

A. Qualcomm Has Asked for An Exclusion Order and a Cease and Desist Order

1. Commission Precedent Permits A Tailored Exclusion Order and A Tailored Cease and Desist Order

Pursuant to Commission Rule 210.42, an administrative law judge must issue a recommended determination on: (1) an appropriate remedy if the Commission finds a violation of Section 337; and (2) an amount, if any, of the bond to be posted. 19 C.F.R. § 210.42(a)(1)(ii). When a Section 337 violation has been found, as here, "the Commission has the authority to enter an exclusion order, a cease and desist order, or both." *Certain Flash Memory Circuits and Prods. Containing the Same*, Inv. No. 337-TA-382, Comm'n Opinion on the Issues Under

Review and on Remedy, the Public Interest and Bonding, at 26 (June 9, 1997).

Cease and desist orders are generally issued, when “with respect to the imported infringing products, respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order.” *Certain Magnetic Data Storage Tapes and Cartridges Containing the Same*, Inv. No. 337-TA-1012, Comm’n Op. at 129 (Apr. 2, 2018) (“*Certain Magnetic Tapes*”) (other citations omitted). A complainant seeking a cease and desist order must demonstrate, based on the record, that such a remedy “is necessary to address the violation found in the investigation so as to not undercut the relief provided in the exclusion order.” *Certain Integrated Repeaters, Switches, Transceivers, and Products Containing Same*, Inv. No. 337-TA-435, USITC Pub. No. 3547 (Oct. 2002), Comm’n Op. at 27 (Aug. 16, 2002).

Qualcomm and Apple have stipulated to Apple’s inventory in the United States. (*Id.*). According to the Parties’ stipulation, as of March 31, 2018, Apple maintained in the United States an inventory of (See Importation and Inventory Stipulation, ID Doc. No. 645294 (May 24, 2018.) which is designated JX-0010C.20) (“Import Stipulation”). Those inventories had values of (Id.). Apple does not dispute that its inventories in the United States as of March 31, 2018 were significant. (*Id.* at 2-3.).

This was a point in time inventory that was not updated before the close of discovery. Similarly, inventories for the 2018 iPhones (XS, XR and XS Max) (“the 2018 iPhones”) that Apple released on or about September 21, 2018, were not made available. (See Tr. (Blevins) at

1286:17-22, confirming 2018 iPhone release and beginning of shipments).

The March 31, 2018 inventories do not differentiate between those of the iPhones 7, 7Plus, 8 and 8 Plus that have incorporated Qualcomm chips and those that have incorporated Intel chips. Clearly, as part of any remedy the Commission may issue, Apple should be required to update its inventories, including for the 2018 iPhones. As part of a certification provision, Apple should be able to distinguish iPhones that incorporate Qualcomm chips from those that incorporate Intel chips.

2. A Tailored, Time-Limited Exclusion Order and A Tailored, Time-Limited Cease and Desist Order Would Mitigate the Effects on Intel of Apple's Infringement While Protecting Qualcomm's Interests

Commission precedent provides for tailored remedies to mitigate the effects of its remedies on the public interest. *See Certain Personal Data and Mobile Communications Devices and Related Software*, Inv. No. 337-TA-710, USITC Pub. No. 4331, Comm'n Op. at 83 (June 2012) (articles subject to exclusion were delayed by four months to minimize impacts on third parties); *Certain Baseband Processor Chips and Chipsets, Transmitter and Receiver (Radio) Chips, Power Control Chips, and Products Containing Same, Including Cellular Telephone Handsets*, Inv. No. 337-TA-543, USITC Pub. No. 4258, Comm'n Op. at 151-53 (Oct 2011) (applying a grandfather provision to allow continued importation of infringing products already being imported), *rev'd on other grounds, Kyocera Wireless Corp. v. International Trade Comm'n*, 545 F.3d 1340 (Fed. Cir. 2008.).

In this case, Qualcomm has requested that in the event of a finding of violation of Section 337, that the Commission issue a permanent, limited exclusion order ("LEO") and a permanent cease and desist ("CDO") order against Apple's mobile electronic devices, that is the iPhones 7, Plus, 8, 8Plus and the 2018 iPhones, that contain the infringing A10, A11 or A12 processors that

incorporate *Intel* baseband chips. (JX-9 at ¶¶ 2, 4; CPBr. at 124, 125; CBR at 117; Compl. at ¶ 109; Complainant's Initial Statement on the Public Interest at 1-3; *id.*, Compl. at ¶ 33.)). These Accused Products are designed for use on legacy WCDMA/GSM carriers such as AT&T and T-Mobile. (See SBr. at 32 (citing Tr. (Foty) at 624:14-15; SBr. at 106 (citing RX-0487 (Morton Op. Rpt.) at ¶ 28)).).

The products that Qualcomm *does not seek* to exclude are Apple iPhones 7, 7 Plus, 8, 8Plus, and Apple iPhone X that contain infringing Apple A10, A11 or A12 processors, but that contain *Qualcomm* chips. The Apple iPhones that contain Qualcomm chips can be used on *any* carrier network, including Verizon and Sprint, because they are compatible with GSM and DCMA networks. (SBr. at 32 (citing Tr. (Thompson) at 249:7-25; Tr. (Blevins) at 1263:7-22; Tr. (Scott Morton) at 1529:9-19; SBr. at 108 (citing RX-0487 (Morton Op. Rpt.) at 52)).). Consequently, it makes sense to ensure that the iPhones with Qualcomm chips continue to be offered for sale in the United States.

Apple argued in its Pre-Hearing Brief that if an exclusion order and a cease and desist order issue, each should be tailored to permit Apple to service, repair, and replace existing products for its existing customers. (See RPBr. at 174; *Certain Mobile Devices, Associated Software, and Components Thereof*, Notice of Commission Final Determination at 3 (May 18, 2012) (provided an exception for "service, repair or replacement articles for use in servicing, repairing or replacing mobile devices under warranty or insurance contract"); *Certain Combination Motor and Transmission Sys. and Devices Used Therein, and Prods. Containing the Same*, Inv. No. 337-TA-561, Final Initial and Recommended Determinations at 193 (Feb. 13, 2007) (USITC Pub. No. 4130 (any limited exclusion order should not reach third-party customers who had already purchased the accused hybrid vehicles and exempted components for

use in repair and replacement of previously purchased vehicles.).

Additionally, Apple argued for a certification provision in a cease and desist order in which Apple can certify that certain of the imported products are not subject to exclusion. (RPBr. at 177; *see also* JX-0009 (Stipulation Regarding Scope of Remedy)).

The recommendation here is that the Commission balance the need to protect Qualcomm's intellectual property against the possible harm to a significant corporate player in the United States economy, i.e. Intel. As Staff points out, this is not a binary choice, a particularly apt word to use in the world of cellular, digital technology. (*See* SBr. at 69.).

Even if there were a *de minimis* risk that Apple would stop buying Intel chips even for the markets outside the United States, a tailored limited exclusion order and certification provision would mitigate those risks. (*Accord*, SPBr. at 129.).

An exclusion order and a cease and desist order issue with the following tailoring are recommended:

First, that a cease and desist order be tailored to permit Apple to continue to make warranty repairs and replacements on the infringing Apple iPhones that have been imported and sold in the United States previously. (SBr. at 70, 71; *see also* CX-0293C.xlsx; CX-0171C.xlsx; CX-0240C.xlsx.). There is ample Commission precedent that permits such a tailored remedy. *Certain Magnetic Data Storage Tapes and Cartridges Containing the Same*, Inv. No. 337-TA-1012, Comm'n Op. at 127 (Apr. 2, 2018); *Certain Mobile Devices, Associated Software, and Components Thereof*, Inv. No. 337-TA-744, USITC Pub. No. 4384, Comm'n Op. at 21-22 (Mar. 2013) (granting exemption for components used in the service, repair, or replacement of damaged smartphone devices); *Certain Sleep-Disordered Breathing Treatment Systems and Components Thereof*, Inv. No. 337-TA-890, Comm'n Op. at 47 (Dec. 23, 2014) (exclusion order

exempting infringing parts imported for service and repair); *Certain Liquid Crystal Display Devices*, Inv. No. 337-TA-631, USITC Pub. No. 4186, Comm’n Op. at 27 (Dec. 2010). In *Certain Air Mattress Systems*, for example, the Commission issued a limited exclusion order but declined to issue a cease-and-desist order, despite the finding of a violation, so that the respondent’s products in inventory in the United States could continue to be used as replacements in the health care industry. The Commission held that due to the existence of significant certification requirements for therapeutic air mattresses, a lack of readily available alternatives to the respondent’s products “could harm the health and welfare of the U.S. public if a CDO directed against Sizewise is issued because replacement products are unlikely to become available within the remaining life of the patent[.]” *See Certain Air Mattress Systems, Components Thereof, and Methods of Using the Same*, Inv. No. 337-TA-971, Comm’n Op. at 60 (June 20, 2017) (“*Certain Air Mattresses*”).

Second, that an exclusion order be tailored to include a certification provision that would permit Apple to continue importing the infringing Apple iPhones that contain Intel 3G and 4G chip technology, but only in an amount necessary for testing purposes. However, unlike Staff’s recommendation, the recommendation here is for a time-limited period of four (4) months past the Presidential Review Period. (*See* SBr. at 71-74.). Apple could provide Customs and Border Protection (“CBP”) with a certification with respect to these imported items.

There is no reason that Qualcomm should suffer from Apple’s infringing components even for testing purposes. None of Apple’s infringing iPhones that contain Qualcomm chips should be excluded. Moreover, as noted above, iPhones using Qualcomm chips can be used more wireless networks than those containing Intel chips. (*Supra.*). Staff’s analysis of the evidence and his reasoning on this point are generally aligned with the recommendations made

here. (See SBr. at 29, 33, 34, 70-75.). As the Commission knows, there are many examples of exclusion orders with certification provisions that allow imports of even infringing products to continue. See, e.g., *Certain Dental Implants*, Inv. No. 337-TA-934, Comm'n Op. at 49 (May 11, 2016); *Certain Marine Sonar Imaging Devices, Including Downscan and Sidescan Devices, Products Containing the Same*, Inv. No. 337-TA-921, Comm'n Op. at 80 (Jan. 6, 2016); *Certain Semiconductor Chips with Minimized Chip Package Size and Products Containing Same*, Inv. No. 337-TA-605, USITC Pub. No. 4282, Comm'n Op. at 72 (Nov. 2011); *Certain Curable Fluoroelastomer Compositions and Precursors Thereof*, Inv. No. 337-TA-364, USITC Pub. No. 2890, Comm'n Op. at 4 (May 1995).

United States Companies have already invested more than \$380 billion in developing and deploying next generation networks (including 3G, 4G and 5G), with more than \$275 billion more to be invested as 5G development continues. (See SPBr. at 105; SBr. at 33 (citing 1065 ID at 164); see *id.*, SBr. at 34.). The necessity of continuing 5G development in the United States was persuasively presented during the Hearing as important for many reasons. These included the role that 5G technology will play in high speed mobile and wireless broadband service; enhanced video and virtual reality capabilities; reliable low latency communications; artificial intelligence; faster speeds and connectivity for the "Internet of Things;" autonomous vehicles; and the defense and national interest. (See Tr. (Thompson) at 224: 16-226:2; 1065 ID at 164; Tr. (Evans) at 1434:1-1436:15; Tr. (Eisenach) at 2004:2-2005:11; RBr. at 153-162; SBr. at 33-40; CBr. at 125-128.).

If Intel were to discontinue its investment in 5G development if the iPhones containing Intel 4G LTE chipsets are completely banned from importation into the United States (4G is used in the development of 5G) then *some* mitigation to forestall that possibility may be necessary,

even if for a very limited period. Even though competitive pressures in the development of 5G in the United States involves companies such as Verizon, AT & T, T-Mobile and Sprint among others, Intel's contribution, past and continuing, has been important and significant. As Dr. Eisenach noted, 5G is going to be a "control technology" that will control autonomous vehicles, drones, gas pipelines, the electric grid, robotics and more than 100 billion "internet of things" devices in time. (Tr. (Eisenach) at 2004: 15, 22.). The future world is almost impossible to comprehend given what is now envisioned. Again, this should be for a time-limited period of no more than four (4) months past the Presidential Review Period.

The suggested tailoring should not apply to 2019 or 2020 iPhones that may use Intel chips. Apple will have had enough time to design around the infringing features of its A10, A11 or A12 processors, as applicable.

The recommended tailored remedies are supported by practical considerations. As noted previously and restated here, by the time the Commission issues its decision in this Investigation and the Presidential Review Period ends, Apple would have had at least one year of sales of the infringing Apple 2018 iPhones that were released on or about September 21, 2018, i.e. the XR XS and XS Max. Apple will have had some two (2) years of sales of the Apple iPhone 8, 8Plus and X; and some three (3) years of sales of the Apple iPhones 7 and 7 Plus. Apple introduced the iPhone 7 and 7Plus for sale in the United States on or about September 16, 2016, while Apple introduced the iPhones 8 and 8 plus in the United States on or about September 12, 2017. The iPhone X, Apple's 10-year anniversary iPhone, was also released the same day as the iPhone 8 and 8 Plus. While there are non-Accused iPhones 7, 7 plus, 8, 8 plus and X that contain Qualcomm chips, they are indistinguishable from the Apple iPhones that contain the Intel chips. (See CX-5119 (Mulhern Op. Rpt.) at ¶¶ 64-137; *id.* at 68 (citing Dep. Tr. (Casanova) at 190-

191).).

As Staff notes, by the end of the Presidential Review Period, it is possible that Intel will have a 5G chip available for Apple's 2020 iPhones and other devices since by the time the Hearing in this Investigation ended, Intel had been . (Tr. (Blevins at 1303:25-1304: 17.).

If this decision's finding that Apple products (containing the Apple A10, A11 and A12 processors) infringe were upheld on appeal, then Intel would have every incentive with a tailored exclusion order to work with Apple to develop a redesign for the infringing Apple processors. Theoretically, both Intel and Apple could benefit, particularly if Apple is as committed as its arguments suggest that two (2) or more companies in the U.S. baseband chipset market are better than one.

B. A Bond Is Neither Warranted nor Recommended

In the event a violation of Section 337 is found, importation of the infringing articles is permitted under bond in an amount determined by the Commission to be sufficient to protect the complainant from any injury during the Presidential review period. *See* 19 U.S.C. § 1337(j)(3).

The Commission typically sets the bond based on the differential in the sales price between the domestic industry product and the accused product, or on a reasonable royalty rate. *See, e.g., Certain Microsphere Adhesives, Processes for Making Same, and Products Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 24 (Jan. 1996) (setting bond based on price differentials); *Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315, Comm'n Op. at 45 (Nov. 1992) (setting the bond based on a reasonable royalty). Complainant bears the burden of establishing the need for a bond. *Certain Rubber Antidegradants, Components Thereof, and Prods. Containing Same*, Inv. No. 337-TA-

533, Comm'n Op. at 39, 40 (July 21, 2006); *see also Certain Laser Imageable Printing Plates*, Inv. No. 337-TA-636, Comm'n Op. at 9 (November 30, 2009).

Because Qualcomm does not manufacture mobile electronic devices or the infringing processors of the type used in the Apple iPhones at issue, Qualcomm does not compete with Apple's infringing iPhones. Accordingly, Qualcomm did not request a bond. (CPBr. at 125; CBr. at 118.).

III. ORDER

This Recommendation on the Public Interest and on Remedy and Bond is certified to the Commission. All orders and documents, filed with the Secretary, including the exhibit lists enumerating the exhibits received into evidence in this Investigation, that are part of the record, as defined in 19 C.F.R. § 210.38(a), are not certified, since they are already in the Commission's possession in accordance with Commission Rules. *See* 19 C.F.R. § 210.38(a). In accordance with 19 C.F.R. § 210.39(c), all material found to be confidential under 19 C.F.R. § 210.5 is to be given *in camera* treatment.

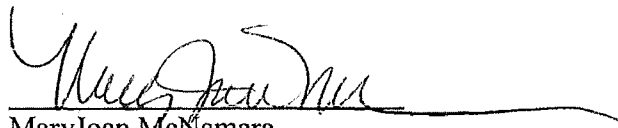
After the Parties have provided proposed redactions of confidential business information ("CBI") that have been evaluated and accepted, the Secretary shall serve a public version of this ID upon all parties of record. The Secretary shall serve a confidential version upon counsel who are signatories to the Protective Order (Order No. 1) issued in this Investigation.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

Within fourteen (14) days of the date of this document, the Parties shall submit to the

Office of Administrative Law Judges a joint statement whether or not they seek to have any portion of this document deleted from the public version. The Parties' submission shall be made by hard copy and must include a copy of this ID with yellow highlighting, with or without red brackets, indicating any portion asserted to contain CBI to be deleted from the public version. The Parties' submission shall also include a chart that: (i) contains the page number of each proposed redaction; and (ii) states (next to each page number) every sentence or phrase, listed separately, that the party proposes be redacted; and (iii) for each such sentence or phrase that the party proposes be redacted, a citation to case law with an explanation as to why each proposed redaction constitutes CBI consistent with case law. Any proposed redaction that is not explained may not be redacted after a review. The Parties' submission concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.



MaryJoan McNamara
Administrative Law Judge

EXHIBIT A

ABBREVIATIONS

The following shorthand references to the parties and related U.S. agencies are used in this Initial Determination:

Complainant or Qualcomm	Complainant Qualcomm Incorporated
Respondent or Apple	Respondent Apple, Inc.
Staff	Commission Investigative Staff, Office of Unfair Import Investigations
CBP	U.S. Customs and Border Protection
PTO	U.S. Patent and Trademark Office

The following abbreviations for pleadings, exhibits, briefs, transcripts, and Orders are used in this Initial Determination:

Compl.	Complaint
Resp.	Response of Apple to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
CX	Qualcomm exhibit
CDX	Qualcomm demonstrative exhibit
CPX	Qualcomm physical exhibit
CPBr.	Qualcomm's Pre-Hearing Brief
CBr.	Qualcomm's Initial Post-Hearing Brief
CRBr.	Qualcomm's Post-Hearing Reply Brief
CPSt.	Qualcomm's Amended Pre-Hearing Statement
JX	Joint exhibit

RX	Apple exhibit
RDX	Apple demonstrative exhibit
RPX	Apple physical exhibit
RPBr.	Apple's Pre-Hearing Brief
RBr.	Apple's Initial Post-Hearing Brief
RRBr.	Apple's Post-Hearing Reply Brief
RPSt.	Apple's Pre-Hearing Statement
SPBr.	Staff's Pre-Hearing Brief
SX	Staff exhibit
SBr.	Staff's Initial Post-Hearing Brief
SRBr.	Staff's Post-Hearing Reply Brief
SPSt.	Staff's Pre-Hearing Statement
Tr.	Evidentiary hearing transcript ¹
Dep. Tr.	Deposition transcript
CMBr.	Qualcomm's <i>Markman</i> Brief
RMBr.	Apple's <i>Markman</i> Brief
SMBr.	Staff's <i>Markman</i> Brief
Markman Order	Order No. 38 (Aug. 28, 2018)

¹ In this ID, citations to the evidentiary hearing transcript refer to the *original* transcripts filed (official received date) on EDIS September 19-21, 24-26, 2018, and not the "revised and corrected" transcripts filed on EDIS October 24, 26, 31, 2018. (Doc. ID Nos. 656115 (Sept. 19, 2018); 656113 (Sept. 19, 2018); 656195 (Sept. 19, 2018); 656194 (Sept. 19, 2018); 656298 (Sept. 20, 2018); 656299 (Sept. 20, 2018); 656475 (Sept. 21, 2018); 656474 (Sept. 21, 2018); 656621 (Sept. 24, 2018); 656618 (Sept. 24, 2018); 656714 (Sept. 25, 2018); 656715 (Sept. 25, 2018); 656886 (Sept. 26, 2018); 565902 (Sept. 26, 2018)).

Markman Tr. *Markman* hearing transcript

The following abbreviations for technical terms are used in this Initial Determination:

LNA	Low noise amplifier
IoT	Internet of Things
IEEE	Institute of Electrical and Electronics Engineers
LTE	Long-Term Evolution (4G) communications standard
N-MOS	N-channel metal oxide semiconductor
P-MOS	P-channel metal oxide semiconductor
RF	radio frequency
CDMA	Code Division Multiple Access
WiFi	wireless local area networking based on the IEEE 802.11 standards
MTP	Qualcomm Mobile Test Platform
WTR	Qualcomm RF wireless transceiver
Bus	a common pathway through which information flows from one circuit component to another

The following shorthand references to certain products and patents at issue are used in this Initial Determination:

'356 patent	U.S. Patent No. 9,154,356
'336 patent	U.S. Patent No. 9,473,336
'674 patent	U.S. Patent No. 8,063,674

Asserted Patents	'356, '336, and '674 patents, collectively
Accused 356 Devices	Apple iPhone 2018 models (; or iPhone XS, iPhone XS Max, and iPhone XR)
Accused 356 Chip	Intel SMARTi RF transceiver
Accused 336 Devices	Apple iPhone 2018 models ; or iPhone XS, iPhone XS Max, and iPhone XR)
Accused 336 Chips	Skyworks , Skyworks , and Intel SMARTi RF transceiver
Accused 674 Devices	Apple iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X, and iPhone 2018 models (; or iPhone XS, iPhone XS Max, and iPhone XR)
Accused 674 Apple Processors	Apple A10, A11 and A12 application processors
Accused Devices	Accused 356 Devices, Accused 336 Devices, and Accused 674 Devices, collectively
356 DI Chips	Qualcomm WTR1625, WTR1625L, WTR1626L, WFR1620, WTR3925, WTR3120, WTR3900, WTR3925L, and WTR5975
336 DI Platforms	Qualcomm MTP9650 and MTP9x55
674 DI Chips	Qualcomm WCN1314, RTR8600, RTR8601, RTR8605, QTR8200, QTR8201, QTR8600, QTR8600L, QTR8615, SDR660, SDR661, SDR660G, WTR6955, SDR845, WFR1620, WTR1605, WTR1605L, WTR1608L, WTR1625, WTR1625L, WTR1626L, WTR2605, WTR2655, WTR2955, WTR2965, WTR3900, WTR3925, WTR3925L, WTR3915, WTR3905, WTR3605, WTR3950, WTR4205, WTR4305, WTR4605, WTR4905, WTR4900, WTR4904, WTR4905L, WTR5975
DI Products	356 DI Chips, 336 DI Platforms, and 674 DI Chips, collectively

**CERTAIN MOBILE ELECTRONIC DEVICES AND RADIO
FREQUENCY AND PROCESSING COMPONENTS
THEREOF**

Inv. No. 337-TA-1093

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ANALYSIS AND FINDINGS WITH RESPECT TO THE PUBLIC INTEREST, AND RECOMMENDATION ON REMEDY AND BOND** has been served by hand upon the Commission Investigative Attorney, **Paul Gennari, Esq.** and the following parties as indicated, on **May 7, 2019**.



Lisa R. Barton, Secretary
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