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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

FEDERAL TRADE COMMISSION,

Plaintiff,

v.

QUALCOMM INCORPORATED, a Delaware corporation,

Defendant.

Case No. 5:17-cv-00220-LHK-NMC

PLAINTIFF FEDERAL TRADE COMMISSION'S PRETRIAL PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

PUBLIC REDACTED VERSION

Courtroom: 8, 4th Floor
Judge: Hon. Lucy H. Koh

CONTENTS

Plaintiff Federal Trade Commission hereby submits its pretrial proposed findings of fact and conclusions of law.

PRETRIAL PROPOSED FINDINGS OF FACT

1 Background

1.1 Qualcomm background

1. QUALCOMM Incorporated ("Qualcomm") is headquartered in San Diego, California.

2. Since at least 1989, Qualcomm has been, and is now, a corporation.

3. Since at least 1989, Qualcomm has been, and is now, engaged in interstate and international commerce.

4. Qualcomm's operating segment relating to its chip and software business is called Qualcomm CDMA Technologies ("QCT").

5. Qualcomm's operating segment relating to the licensing of its patents is called Qualcomm Technology Licensing ("QTL").

6. In 2012, Qualcomm created Qualcomm Technologies, Inc. ("QTI"), a wholly owned subsidiary of Qualcomm. QTI operates substantially all of Qualcomm's products and services businesses, including QCT, as well as substantially all of Qualcomm's engineering, research and development functions. Qualcomm continues to operate QTL.

7. Qualcomm CDMA Technologies Asia-Pacific Pte. Ltd. ("QCTAP"), a Singapore company, is a wholly owned indirect subsidiary of Qualcomm.

1.2 Cellular networks

8. Cellular communications depend on widely distributed networks implementing standardized protocols.

9. Since the introduction of commercial cellular handsets, there have been four "generations" of cellular communication standards.

10. First-generation ("1G") standards, introduced in the 1980s, support analog transmission of voice calls.

11. Second-generation ("2G") standards, first deployed in the early 1990s, support digital transmission of voice calls.

12. The leading 2G standards families are the Global System for Mobile communications ("GSM") and cdmaOne ("2G-CDMA," also sometimes called "TIA/EIA/IS-95" or "IS-95").

13. GSM uses time division multiple access ("TDMA") technology.

14. cdmaOne uses code division multiple access ("CDMA") technology.

15. Third-generation ("3G") standards, first deployed in the late 1990s and early 2000s, support higher data-transmission speeds.

16. The leading 3G standards families are the Universal Mobile Telecommunications System ("UMTS," also commonly referred to as "WCDMA") and CDMA2000 ("3G-CDMA").

17. Wireless carriers that deployed 2G GSM networks transitioned to 3G UMTS networks.

18. Wireless carriers that deployed 2G-CDMA networks transitioned to 3G-CDMA networks.

19. Fourth-generation ("4G") standards were first deployed in late 2009 and the early 2010s.

20. 4G standards support substantially higher data-transmission speeds than 3G standards.

21. The leading 4G standard today is Long-Term Evolution ("LTE").

22. LTE uses orthogonal frequency division multiple access ("OFDMA") technology for downlink transmissions and single-carrier frequency division multiple access ("SC-FDMA") technology for uplink transmissions.

23. In the United States, AT&T and T-Mobile have operated UMTS (WCDMA) networks. Verizon and Sprint have operated CDMA2000 networks.

24. All four major U.S. carriers, including Verizon, AT&T, T-Mobile, and Sprint, have deployed LTE as their 4G standard (which also encompasses the LTE Advanced, or "LTE-A" standard).

25. For carriers that have deployed LTE networks, 3G standards remain important for purposes of backward compatibility.

1.3 Cellular handsets

26. Consumer products that communicate with cellular networks ("cellular handsets") include feature phones; smartphones; and cellular-enabled tablets.

27. While feature phones offer only voice and text-messaging capability, smartphones, which emerged in the late 2000s, offer many other features, including cameras, high-resolution touch-screen displays, powerful applications and graphics processors, and enhanced memory and storage.

28. Among cellular standards, LTE functionality is particularly important for modern smartphones, as consumers increasingly use smartphones to transmit large volumes of data. Cellular data traffic has grown exponentially in recent years, while the volume of cellular voice traffic has remained nearly flat.

29. Cellular handsets are designed, marketed, and sold by original equipment manufacturers ("OEMs") such as Apple, Samsung, Huawei, Apple, Lenovo/Motorola Mobility, and LG.

30. Over time, competition among OEMs has developed across several handset tiers, including premium, high, mid, and low tiers.

31. Premium-tier handsets have become increasingly important for OEMs. Premium handsets tend to have higher prices than lower-tier handsets and are important for branding.

1.4 Modem chips

32. Modem chips are integrated circuits (sometimes referred to as "chips," "chipsets," "modems," "basebands," or "baseband processors") within cellular handsets.

33. An integrated circuit that combines a modem chip together with an applications processor on a single substrate is commonly referred to as an integrated "System on a Chip" ("SoC"). The term "thin modem" is commonly used to refer to a stand-alone modem chip that is not combined on a single substrate with an applications processor.

34. To communicate with a carrier's network, a cellular handset must contain a modem chip that complies with cellular communications standards that the network supports.

35. OEMs and their customers often require that cellular handsets and the modem chips they contain comply with multiple standards.

36. Cellular handsets that comply with a later-generation standards must generally be "backward compatible" with prior generations of standards in order to achieve full functionality and/or geographic coverage.

37. To enter the supply of modem chips, a supplier must make substantial initial R&D investments, and it must continuously make further significant R&D investments in the development of new products to maintain its position.

38. As cellular technology and standards have evolved, communication speeds have increased, and other technological features (such as power usage and chip size) have improved.

39. Because of the rapid evolution of cellular technology, modem chip suppliers generally need to introduce a new product at regular and frequent intervals to remain competitive.

40. Modem development takes two to three years, and a modem chip supplier must therefore have multiple modems under development at a time. Modem chip suppliers maintain long-term product roadmaps.

41. When a modem chip supplier implements a new technology, there is an extended process of testing and fixing bugs before the modem chip achieves a stable state of "modem maturity."

42. Commercial engagement with OEMs aids modem chip suppliers in the process of fixing bugs and reaching modem maturity.

43. To justify the required continuing investment in R&D, modem chip suppliers must make sales at sufficient scale and at sufficient margins to generate an adequate return.

1.5 Standard-setting organizations

44. Cellular communications standards are adopted by standard-setting organizations ("SSOs"), sometimes referred to as standards-development organizations.

45. The Telecommunications Industry Association ("TIA") is the U.S. SSO that adopted the 2G-CDMA family of standards.

46. Third Generation Partnership Project ("3GPP") and the Third Generation Partnership Project 2 ("3GPP2") are global collaborative partnerships of SSOs and other industry participants that develop technical specifications for cellular standards.

47. 3GPP developed the UMTS and LTE families of standards, and 3GPP2 developed the 3G-CDMA family of standards.

48. Once 3GPP or 3GPP2 develops a standard, 3GPP's or 3GPP2's "organizational partners" will transpose that technical standard into their own standards.

49. The Alliance for Telecommunications Industry Solutions ("ATIS") is the U.S. organizational partner of 3GPP, and TIA is the U.S. organizational partner of 3GPP2. The European Telecommunications Standards Institute ("ETSI") is the European organizational partner of 3GPP.

1.6 Standard essential patents and FRAND commitments

50. A patent containing one or more claims that cover technology that is essential to complying with a standard is known as a "standard essential patent" ("SEP").

51. A large number of companies involved in the cellular communications industry, including Qualcomm, have made patented contributions to 2G, 3G, and 4G cellular communication technologies.

52. Before incorporating a technology into a standard, SSOs often require patent holders to disclose their patents and commit to license their SEPs on fair, reasonable, and non-discriminatory ("FRAND") terms.

53. The TIA, ATIS, and other relevant IPR policies require each party that participates in the standard-setting process to make licenses to its SEPs available to applicants on FRAND terms.

54. Qualcomm owns patents that it has declared essential to cellular standards, including 3G and 4G cellular standards.

55. The TIA and ATIS IPR policies require Qualcomm to make licenses to its SEPs available to modem-chip suppliers on FRAND terms.

56. Industrywide, patent holders, including Qualcomm, have declared hundreds of thousands of patents as potentially essential to cellular standards, including 3G and 4G cellular standards.

57. In a 2015 presentation, Qualcomm cited a number of studies of various companies' SEP positions in 4G LTE. A majority of these studies concluded that a firm other than Qualcomm held the leading SEP position in 4G LTE.

1.7 Qualcomm FRAND commitments

58. Qualcomm has made commitments to SSOs that it will license its cellular SEPs on FRAND terms.

59. Qualcomm has committed to TIA to license relevant SEPs pursuant to the current TIA IPR policy or to prior versions of the policy.

60. Qualcomm's commitments to TIA apply to each of its licenses in effect from 2006 to 2016 involving patents declared essential to cellular standards (including 2G and 3G CDMA), to the extent such licenses are granted to licensees for the practice of any or all portions of the relevant standard.

61. Qualcomm has sent ATIS letters of assurance that Qualcomm will license relevant SEPs pursuant to the ATIS IPR policy.

62. Qualcomm's commitments to ATIS apply to each of its licenses in effect from 2006 to 2016 involving patents declared essential to cellular standards (including UMTS and LTE), to the extent such licenses are granted to licensees for the purpose of implementing the relevant standard.

2 Relevant Markets

2.1 CDMA modem chips

2.1.1 Non-CDMA modem chips are not a reasonable substitute for CDMA modem chips

2.1.1.1 Distinct uses of CDMA modem chips

63. Certain wireless carriers, including Verizon, Sprint, KDDI, and China Telecom, require that phones operating on their networks have CDMA capabilities.

64. CDMA capability is necessary for backward compatibility on the networks of wireless carriers that have added LTE networks to legacy CDMA networks.

65. OEMs need CDMA-capable modem chips to meet the demands of wireless carriers with CDMA networks, and do not regard abandoning CDMA networks as a realistic option.

66. OEMs do not consider CDMA modem chips and UMTS modem chips without CDMA capability to be substitutes when selecting chips to incorporate into their handsets.

2.1.1.2 Industry recognition of a CDMA modem chip market

67. Industry participants have recognized that the competitive conditions in the sale of CDMA modem chips differ from the competitive conditions in the sale of non-CDMA chips.

68. Qualcomm's business planning documents separately track its shares of CDMA and non-CDMA modem chip sales.

69. QCT Strategic Plans have segmented the addressable market by standard, including a market segment for CDMA modem chips and a market segment for UMTS modem chips.

2.1.2 Hypothetical monopolist test: CDMA

70. The hypothetical monopolist test is a standard tool used by economists to define relevant markets for antitrust purposes. The test has been in use for 40 years and has been adopted by both the Department of Justice and the Federal Trade Commission.

71. The test begins with a narrow set of products (the candidate market) and asks whether a hypothetical monopolist selling all of the products in the candidate market could impose a small but significant non-transitory increase in price ("SSNIP," taken to be 5% or more) without losing too many sales to make the price increase unprofitable. If the answer is yes, then the market is correctly defined. If not, the candidate market is too narrow because the relevant market includes other products.

72. The starting place for defining a relevant market is a reference product—a product or a set of products that is offered by the firm that engaged in the anticompetitive conduct. The selection of the candidate market does not, however, change the test or pre-determine the outcome.

73. Applying the hypothetical monopolist test, there is a relevant antitrust product market consisting of modem chips with CDMA 2G or 3G capability.

74. The prices of UMTS modem chips (without CDMA capability) provide an appropriate benchmark against which to evaluate the prices of CDMA modem chips.

75. Qualcomm has similar manufacturing processes and costs for CDMA and UMTS modem chips. Qualcomm has designed non-CDMA multimode chips by disabling the CDMA functionality on a UMTS/LTE multimode chip.

76. Both types of chips are sold to the same customers using similar procurement processes, and both types of chips are used as modems in cellular handsets..

77. The level of competition in the sale of CDMA modem chips has been different from the level of competition in the sale of UMTS modem chips, particularly from 2008 through 2014.

78. Qualcomm has been a leading supplier of modem chips with UMTS functionality, but other modem chip suppliers also made substantial sales between 2008 and 2014.

79. By contrast, from at least 2008 through 2014, the only supplier of CDMA modem chips other than Qualcomm was VIA Telecom.

80. VIA Telecom's CDMA modem chips were imperfect substitutes for Qualcomm's CDMA modem chips. VIA Telecom did not produce CDMA modem chips also compatible with 3G UMTS, 4G LTE, or any combination of these non-CDMA standards. VIA Telecom also trailed Qualcomm in CDMA capabilities, developing advanced CDMA features years after Qualcomm introduced modem chips with these features.

81. Qualcomm executives recognize that there is greater competition for the sale of UMTS modem chips than for the sale of CDMA modem chips.

82. Qualcomm's CDMA modem chips have higher profitability and higher prices compared to non-CDMA modem chips, due to comparatively less competition in the sale of CDMA modem chips.

83. Despite similarities in manufacturing processes and costs, Qualcomm's price for CDMA modem chips has been significantly above the benchmark price of modem chips without CDMA capability.

84. Specifically, Qualcomm's price for CDMA modem chips has been at least 5% above the benchmark price of UMTS modem chips.

85. That Qualcomm charges prices for CDMA modem chips that are more than 5% above the competitive benchmark established by UMTS modem chip prices (for reasons unrelated to cost differences) demonstrates that a hypothetical monopolist of CDMA modem chips would be able to impose a price increase of at least 5% above competitive levels.

86. Qualcomm projections related to MediaTek's recent expansion into CDMA modem chips further confirm that there is a relevant antitrust market for the sale of CDMA modem chips.

87. MediaTek began selling commercial quantities of CDMA modem chips in 2015.

88. When MediaTek began offering CDMA modem chips, Qualcomm projected that it would reduce the CDMA price premium it charges to customers in handset tiers most susceptible to MediaTek entry, principally the tiers below premium handsets and for sales in China.

89. In a May 2016 internal presentation, for example, Qualcomm proposed significantly to reduce the premium it charged for CDMA-capable modem chips to Chinese OEMs where MediaTek had had its earliest CDMA design wins. The same presentation proposed to hold Qualcomm's CDMA premium at accounts with a weaker MediaTek presence.

2.2 Premium LTE modem chips

2.2.1 No other chips are a reasonable substitute for premium LTE modem chips.

2.2.1.1 Distinct uses of premium LTE modem chips

90. Following LTE's commercial launch, wireless carriers have launched hundreds of LTE networks around the globe.

91. 3GPP Release 8, the first commercial release of the LTE standard, defined different handset or "user equipment" categories. Subsequent releases have defined additional user equipment categories. Handsets conforming to higher user equipment categories are capable of supporting higher peak downlink and uplink data rates and incorporate premium differentiating features, including advanced carrier aggregation and multiple in-multiple out.

92. When selecting modem chips for premium-tier handsets, OEMs want modem chips that support premium features corresponding to higher LTE user-equipment categories. Accordingly, Qualcomm and other modem-chip suppliers design premium LTE modem chips to offer functionality consistent with the expected functionality of a premium-tier handset that would be sold at the time that the modem chip would be used.

93. These premium LTE modem chips form an industry-recognized segment of the LTE modem chip business. The premium LTE modem chip market corresponds approximately to the LTE modem chips in premium handsets.

94. OEMs do not regard non-premium LTE modem chips as good substitutes for premium LTE modem chips at any given point in time.

95. OEMs require advanced features in the LTE modem chips that they use in their premium LTE handsets. A premium-tier handset that had a modem chip that lacked these features would not be a commercially viable product. Although modem chips with these features are significantly more expensive than modem chips without these features, OEMs producing premium handsets do not regard substitution to less capable modem chips as a realistic option.

96. Additionally, carriers sometimes explicitly or effectively require OEMs to offer handsets that support sufficiently advanced LTE standards and features.

2.2.1.2 Industry recognition of a premium LTE modem chip market

97. Industry participants have recognized that the competitive conditions in the sale of premium LTE modem chips differ from the competitive conditions in the sale of non-premium LTE chips.

98. There are different competitors, different margins, and different costs associated with premium LTE modem chips compared to lower-tier LTE modem chips.

99. Premium LTE modem chips are sold at higher prices than non-premium LTE modem chips.

100. Qualcomm internally recognizes a premium tier for modem chips, and Qualcomm uses tiers to track margins, competition, and R&D allocations.

a. Qualcomm's product roadmaps segment its modem chips into distinct tiers, including premium.

b. Qualcomm's strategic plans segment its modem chips into distinct tiers, including premium. These documents have identified separate markets for premium tier handsets and modem chips, and noted that Qualcomm faced different competitors and different differentiating factors when selling in premium tier versus other tiers.

c. Qualcomm executives recognize that there are distinct modem chip tiers, including premium, and that competitive conditions differ in the premium tier.

d. Qualcomm has separate business units for premium-tier and lower-tier modem chips.

e. Qualcomm executives recognize that Qualcomm's Snapdragon 800 series is an example of a premium-tier LTE modem chip.

101. Qualcomm separately tracks its share of premium tier SoCs, which it defines as those SoCs for use in premium-tier handsets.

102. Before 2013, Qualcomm defined premium handsets as those with a retail price of more than $300.

103. Since 2013, Qualcomm has defined premium handsets as those with a retail price of more than $400.

104. OEMs and Qualcomm's competitors likewise segment LTE modem chips into categories, including premium-tier LTE modem chips.

2.2.2 Hypothetical monopolist test: premium LTE

105. Applying the hypothetical monopolist test, a relevant antitrust product market exists for premium LTE modem chips, *i.e.*, chips with LTE capability used in premium-tier handsets, those handsets with a retail price of more than $300 before 2013 and more than $400 since 2013.

106. The candidate premium LTE modem chip market has become somewhat more competitive since 2015 as Samsung, Intel, and MediaTek increased their volumes of premium LTE modem chips. Qualcomm remains, however, the leading supplier of premium LTE modem chips.

107. A decrease in price of at least 5% following entry indicates that a hypothetical monopolist of premium LTE modem chips would profitably impose a price increase of at least 5% above the levels that would result from competition among suppliers of premium LTE modem chips. This implies that premium LTE modem chips constitute a relevant antitrust market under the hypothetical monopolist test.

108. Here, Qualcomm forecasts that it would reduce the prices of premium LTE modem chips by at least 5% in response to premium LTE modem chip offerings from Intel, Samsung, and MediaTek.

109. For example, a June 2016 Qualcomm strategy document projects downward pricing pressure in fiscal year 2017 on two premium LTE modem chips in response to competition from MediaTek and Samsung, with projected decreases between [redacted].

110. Such evidence indicates that a hypothetical monopolist of premium LTE modem chips would profitably impose a SSNIP above competitive price levels.

2.3 Geographic market

111. The relevant geographic market for CDMA modem chips and premium LTE modem chips is worldwide.

112. Modem chips are manufactured at facilities around the world.

113. Transportation costs are small relative to the price of a modem chip.

114. Many OEMs sell their handsets containing modem chips throughout the world.

3 Market and Monopoly Power

3.1 Qualcomm market and monopoly power in CDMA modem chips

115. Qualcomm possessed monopoly power in the market for CDMA modem chips from 2006 through 2016.

116. Qualcomm possessed market power in the market for CDMA modem chips from 2006 through 2016.

3.1.1 OEMs have lacked good alternatives to Qualcomm for CDMA modem chips

117. OEMs have lacked good alternatives to Qualcomm's CDMA modem chips.

118. OEMs have not regarded other suppliers' CDMA modem chips as good alternatives to Qualcomm's CDMA modem chips.

119. In 2008, Qualcomm recognized that it was Apple's only viable option for CDMA-capable modem chips.

120. In 2009, Qualcomm concluded that it was unlikely Apple would source CDMA chips from any manufacturer other than Qualcomm, given the lack of existing competition and Apple's time constraints.

121. For its launch in 2011 of the first CDMA iPhone, Apple believed it had no choice but to use Qualcomm CDMA modem chips, as Apple considered Qualcomm to be the only viable supplier of CDMA modem chips for the iPhone.

122. In June 2014, Qualcomm anticipated that even if Apple switched to another modem-chip supplier for non-CDMA-capable devices, Apple would continue to source modem chips from Qualcomm for Apple's CDMA-capable handsets.

123. In 2009, 99% of Samsung's CDMA modem chips were supplied by Qualcomm. VIA supplied the remaining 1% of CDMA modem chips.

124. BlackBerry purchased CDMA modem chips exclusively from Qualcomm during the time it manufactured cellular handsets, and did not believe it had any viable alternatives to Qualcomm for CDMA modem chip supply.

125. In 2013, Huawei would not have been able to find another supplier of CDMA chips had Qualcomm terminated supply.

126. From at least 2008 through 2014, the only supplier of CDMA modem chips other than Qualcomm was VIA Telecom.

127. OEMs did not regard VIA Telecom's CDMA modem chips as good alternatives for Qualcomm's CDMA modem chips. VIA Telecom did not produce CDMA modem chips that were also compatible with 3G UMTS, 4G LTE, or any combination of these non-CDMA standards. VIA Telecom also trailed Qualcomm in

CDMA capabilities, developing advanced CDMA features years after Qualcomm introduced modem chips with these features.

3.1.2 CDMA modem chip market share

128. Based on relevant data, Qualcomm had above an 80% share of the market for CDMA modem chips in each year from 2006 through 2015 and a 74% share in 2016 on a revenue basis. For calendar years 2006 through 2016, Qualcomm estimated that it had a greater than 88% CDMA modem chip market share. For its fiscal year 2018, QCT forecast it would have a 79% CDMA market share.

3.1.3 CDMA modem chip barriers to entry

129. There are substantial barriers to entry into the CDMA modem chip market, including the need to make substantial investment in research and development and the need to develop and maintain relationships with key OEM customers, including through product testing and validation.

130. Unlike 3GPP standards (UMTS and LTE), CDMA specifications are poorly documented.

131. The full value of CDMA is realized only with complementary multimode technology and backward compatibility. Developing these technologies is expensive and time consuming.

132. The Qualcomm practices at issue in this case have created an additional barrier to entry to the market for CDMA modem chips.

3.2 Qualcomm market and monopoly power in Premium LTE modem chips

133. Qualcomm possessed monopoly power in the market for premium LTE modem chips each year from 2011 to 2016.

134. Qualcomm possessed market power in the market for premium LTE modem chips each year from 2011 to 2016.

3.2.1 Few companies make premium LTE chips

135. Qualcomm enjoyed a significant first-mover advantage in the sale of LTE chips.

136. Qualcomm was the sole supplier of multimode premium LTE modem chips that included both UMTS and CDMA capability for most of the period from 2011 through 2016.

137. OEMs have lacked good alternatives to Qualcomm's premium LTE modem chips.

138. Qualcomm internal documents are consistent with OEMs' views on the lack of good alternatives to Qualcomm's premium LTE modem chips.

139. Samsung and Huawei have recently self-supplied some premium LTE modem chips through corporate affiliates, Samsung LSI and HiSilicon, respectively. These firms have imposed limited competitive constraints on Qualcomm outside of Samsung and Huawei, respectively.

140. MediaTek has achieved only limited success in the market for premium LTE modem chips, [redacted].

141. Aside from Apple, most OEMs prefer to source integrated SoCs, rather than thin modems.

142. Because Intel offers thin modems, rather than SoCs, its premium LTE modem chips offer a limited competitive constraint at OEMs other than Apple.

143. Before 2018, OEMs viewed Qualcomm as the only viable merchant supplier for premium LTE modem chips with CDMA capability.

144. The recent ability of Intel, Samsung, and HiSilicon to produce premium LTE modem chips has not eliminated Qualcomm's market power in premium LTE modem chips. Qualcomm has continued to possess substantial market power in the market for premium LTE modem chips.

3.2.2 Premium LTE modem chip market share

145. Qualcomm had above an 80% share of the premium LTE market each year from 2011 through 2015 and a 63% share in 2016 on a revenue basis.

146. Qualcomm's internal documents also report high premium LTE market shares.

147. For example, for Qualcomm's fiscal year 2015, Qualcomm estimated that it had a greater than 80% share of modem chips for premium tier handsets.

3.2.3 Premium LTE modem chip barriers to entry

148. There are a number of substantial barriers to entry into the market for premium LTE modem chips.

149. An entrant into the market for premium LTE modem chips would need to make a substantial investment in research and development.

150. An entrant into the market for premium LTE modem chips would need to work with OEMs to test and certify its products for incorporation into handsets, and to work with wireless carriers to test its products with infrastructure equipment.

151. An entrant into the market for premium LTE modem chips would need several years, in addition to large R&D expenditures, to develop viable products.

152. Qualcomm has discouraged entry into the market for premium LTE modem chips through the conduct at issue in this case.

153. An entrant into the market for premium LTE modem chips would be required to make significantly greater investments to compete effectively in premium LTE modem chips than to compete effectively in lower-tier modem chips.

4 Qualcomm's No License-No Chips Policy

4.1 Qualcomm will not sell modem chips unless the purchaser signs a separate license agreement

154. Qualcomm does not sell modem chips to OEMs that are not licensed to Qualcomm's relevant cellular SEPs.

155. Qualcomm's "no license-no chips" policy is effectuated through Qualcomm supply agreements and license agreements with OEMs, and supported by incentive funds and similar agreements Qualcomm has entered with OEMs.

156. QCT routinely refers prospective modem chip customers to QTL to obtain a license before engaging with the customer for the sale and support of modem chips.

157. Qualcomm's patent license agreements, which Qualcomm requires an OEM to sign before Qualcomm will supply modem chips, require OEMs to pay royalties to Qualcomm on the sale of handsets containing modem chips supplied by Qualcomm's competitors.

158. Qualcomm's policy of not selling modem chips to unlicensed OEMs is clearly embodied in Qualcomm's components supply agreements ("CSAs") for modem chips.

159. Qualcomm's CSAs with OEMs specify that Qualcomm may terminate the CSA if an OEM is in default under its license agreement.

160. Qualcomm's CSAs further specify that they convey no intellectual property rights, and prohibit OEMs from using Qualcomm modem chips in unlicensed handsets.

161. Qualcomm's policy of not selling modem chips to unlicensed OEMs is well known by OEMs and other industry participants.

162. Qualcomm has at times taken the position that the restrictions in Qualcomm's CSAs for modem chips implementing the no license-no chips policy are not technology-specific, meaning that, if an OEM were to fail to maintain a license or pay royalties on handsets implementing a given cellular standard, Qualcomm would be entitled to stop supplying all types of modem chips—including modem chips that do not implement that particular standard.

163. Qualcomm's licensing business model is unique among suppliers of components for cellular handsets.

164. Component suppliers other than Qualcomm do not require purchasers to separately take a license applying to handsets using competitors' products before they will sell commercial quantities of components.

165. Qualcomm's licensing business model for modem chips is also unique within Qualcomm. Qualcomm supplies other chips (such as Wi-Fi chips) without requiring a separate license; it sells those chips, with respect to which it does not have substantial market power, exhaustively.

4.2 Qualcomm routinely invokes its no license-no chips policy in licensing negotiations with OEMs

166. Qualcomm routinely communicates to OEMs during negotiations of license agreements, and over the course of the licensing and chip supply relationship, that the OEM must have a license from Qualcomm to purchase Qualcomm modem chips

and/or receive related technical support, and that failure to maintain licensed status could result in interruption of modem-chip supply.

167. Qualcomm's business development department typically told prospective licensees that they could not purchase Qualcomm modem chips, or receive related support, until the parties entered a license agreement on Qualcomm's terms.

168. Qualcomm communicated to Blackberry, Lenovo, Huawei, Nokia, Samsung, Sony, ZTE and other OEMs during license negotiations that they could not purchase Qualcomm modem chips if they became unlicensed.

169. Qualcomm executives including Steve Altman, Derek Aberle, Marvin Blecker, Eric Reifschneider, Jeff Altman, Cristiano Amon, Irwin Jacobs, and Paul Jacobs have communicated to OEMs that they had to take a license to purchase Qualcomm's modem chips.

170. Qualcomm has also threatened to restrict an OEM's ability to purchase chipsets from its competitors, including MediaTek, if the OEM did not sign a license with Qualcomm.

4.3 OEMs are vulnerable to coercion through Qualcomm's no license-no chips policy

171. Once an OEM selects a Qualcomm modem chip for its handset, the OEM is effectively "locked in" to that modem chip for that handset, and remains so over the commercial life of the handset.

172. The design cycle for a handset is long: modem chips are often selected for handsets well over a year before an OEM ships commercial quantities of the handset.

173. In order to design handsets, OEMs need information about Qualcomm modem chips, and other technical support, that Qualcomm generally provides only if an OEM is licensed.

174. Contract manufacturers ("CMs"), including Hon Hai Precision Industry Co. Ltd. and FIH Mobile Ltd. (collectively, "Foxconn"), Pegatron Corporation ("Pegatron"), Wistron Corporation ("Wistron"), and Compal Electronics, Inc. ("Compal"), which manufacture cellular handsets for a separate brand (like Apple), require licenses with Qualcomm in order to be able to source Qualcomm modem chips requested by the CMs' customers.

175. OEMs have been dependent on Qualcomm for supply of CDMA modem chips and premium LTE modem chips at the time they signed license agreements with Qualcomm, because they lacked viable alternatives to Qualcomm.

a. Huawei depended on Qualcomm's CDMA modem chips when it signed its 2013 license extension with Qualcomm.

b. Despite efforts to the contrary, to date Lenovo subsidiary Motorola has been unable to find a viable alternative to Qualcomm for premium LTE modem chips.

c. Lenovo's VP of Licensing Ira Blumberg understood that, at the time he was negotiating a 2013 Qualcomm license renewal, Lenovo depended on Qualcomm modem chips for premium handsets.

d. Qualcomm understood that Sony Mobile depended on Qualcomm chips at the time Sony Mobile was negotiating a patent license with Qualcomm in 2012.

e. Samsung depended on Qualcomm's CDMA modem chips at the time of the parties' 2008-2009 license negotiations.

f. BlackBerry depended on Qualcomm's CDMA modem chips at the time of the parties' 2009-2010 license negotiations.

g. In 2009, when Apple entered a Strategic Terms Agreement with Qualcomm, under which Apple's CMs were required to be Qualcomm licensees, Apple viewed Qualcomm as the only viable supplier of CDMA modem chips.

h. In 2011, at the time Apple entered a Transition Agreement with Qualcomm, Apple viewed Qualcomm as the only viable supplier of CDMA modem chips and was dependent upon Qualcomm for supply of CDMA modem chips.

i. In 2013, at the time Apple entered an amended Transition Agreement and a Business Cooperation and Patent Agreement with Qualcomm, Apple was dependent upon Qualcomm for supply of CDMA modem chips and premium LTE modem chips for certain of its upcoming iPhone models.

176. OEMs believed that if they lost access to Qualcomm modem chips they would be unable to sell viable CDMA or premium LTE handsets, and would lose out on the associated revenue and be unable to recoup sunk costs.

177. OEMs recognize that Qualcomm's modem chip supply and associated engineering support provide Qualcomm with leverage that Qualcomm would not otherwise have in licensing negotiations.

178. Qualcomm recognizes its customers' vulnerability to its "no license-no chips" policy.

179. Through agreements with other modem chip suppliers that required those suppliers to restrict sales to Qualcomm licensees, Qualcomm extended the no license-no chips policy to licensees' purchases of non-Qualcomm modem chips and has restricted the ability of competitors to sell modem chips to unlicensed OEMs.

180. Qualcomm has repeatedly used its track record of securing licenses on its preferred royalty and other terms to establish benchmarks that it can exploit in future license negotiations, including with other prospective licensees.

4.4 Qualcomm's no license-no chips policy insulates it from the ordinary constraints of FRAND commitments, including the threat of litigation

181. In any license negotiation, the parties negotiate based on how the prospective license terms compare to their alternatives.

182. Ordinarily, if a patent holder and a potential licensee can neither agree on license terms nor agree to submit those terms to binding arbitration, the patent holder initiates a patent infringement suit in which a court resolves issues of patent validity and infringement and, if the court deems a patent valid and infringed, determines and awards reasonable royalties. In a patent suit involving SEPs, both parties may address arguments to the court on how the SEP holder's FRAND commitments should affect the court's determination of reasonable royalties.

183. A potential SEP licensee may also initiate a declaratory judgment action addressing the same issues, including whether a SEP holder's license offer is consistent with its FRAND obligations.

184. Qualcomm and other industry participants understand that the FRAND licensing commitment operates as at least a partial constraint on royalties by limiting a patent holder's power to withhold technology if a licensee does not agree on terms.

185. OEMs that regard Qualcomm's royalties as unreasonable would ordinarily have the ability and incentive to challenge Qualcomm's royalty demands in court without the threat of interrupting their business.

186. Instead of the typical situation where a licensee's alternatives to accepting a proposed license are accepting the risk of patent infringement litigation or filing a declaratory judgment action, Qualcomm's no license-no chips policy has added the loss of Qualcomm modem chips—and therefore interruption of licensees' businesses—as a consequence.

187. OEMs cannot negotiate with Qualcomm against the backdrop of patent infringement litigation because Qualcomm will not sell OEMs modem chips without a license.

188. OEMs cannot negotiate with Qualcomm against the backdrop of a declaratory judgment action against Qualcomm, including as to enforcement of FRAND contract rights, because they fear losing access to Qualcomm's modem chips.

189. OEMs regard licensing negotiations with Qualcomm as atypical compared to other SEP licensors like Ericsson and Nokia; there is a meaningful negotiation with other licensors and not with Qualcomm. With licensors other than Qualcomm, there is a give-and-take on key terms like royalties.

190. Other licensors in the cellular industry, apart from Qualcomm, take into account the value of cross-licenses received when setting royalties for their cellular SEPs.

191. Typically, when one company attempts to collect royalties from another, the prospective licensee will seek justification for the royalties requested in the form of information establishing infringement, validity, and value of the asserted patents. It is standard licensing practice to engage in such a process through the exchange and review of claim charts for all—or for the strongest—patents at issue.

192. Qualcomm typically will not negotiate running royalty rates with licensee but demands the same high rate from every licensee, despite receiving, from some licensees, valuable patent rights for its modem chip business.

193. Most other major cellular SEP holders have been required to litigate the value of their patents when license negotiations fail.

4.5 Qualcomm's no license-no chips policy results in elevated royalties

194. OEMs have long viewed Qualcomm's royalties as excessive and non-FRAND.

195. OEMs have long viewed Qualcomm's insistence on uncompensated grantbacks of their patents for Qualcomm's modem chips as additional compensation that they must pay Qualcomm for a license.

196. Qualcomm did not reduce its royalties over time despite changes in its patent portfolio, changes in the features of handsets and the relative importance of a cellular connection to the handset, and changes in the treatment of SEPs by courts over time.

197. Internal Qualcomm analyses establish that Qualcomm believed that its no license-no chips policy had the effect of increasing Qualcomm's royalties.

198. Qualcomm strategic planning documents reflect Qualcomm's assessment that its no license-no chips policy and related conduct inflates its royalties.

199. Qualcomm has periodically evaluated whether to split QCT from QTL. In the two most recent evaluations—Project Berlin and Project Phoenix—Qualcomm's assessment of the impact of QCT's modem chips on QTL's royalty revenue factored into the decision to keep the company intact.

200. In 2007 and 2008, Qualcomm analyzed whether to split QCT from QTL, an exercise that it named "Project Berlin."

201. Qualcomm determined not to separate the company at that time due, in part, to the higher royalties that QTL would receive due to its CDMA modem chip market power.

202. In 2015, Qualcomm again considered separating its chip and licensing businesses, which it called "Project Phoenix."

203. Qualcomm again decided against separating its chip and licensing businesses. During the process of coming to this decision, Qualcomm determined that as a separate company the licensing division would not be able to leverage market power in modem chips to maintain the level of its royalties.

4.5.1 OEM and rival testimony and documents

204. OEM and rival testimony and analyses establish that Qualcomm's no license-no chips policy inflated Qualcomm's royalties.

205. OEMs do not regard Qualcomm's royalties and other license terms as fair compensation for a license to Qualcomm's patents.

206. Testimony from Lenovo, Apple, Huawei, BlackBerry, and Samsung witnesses establishes that the OEMs did not consider Qualcomm's royalties to reflect the fair value of Qualcomm's patents.

207. Despite OEMs' assessment that Qualcomm's license terms are not fair value for access to Qualcomm's patents, OEMs have signed license agreements with Qualcomm that they would not have otherwise signed to gain access to Qualcomm's modem chips.

208. Some OEMs signed license agreements only after Qualcomm threatened to terminate their supply of Qualcomm modem chips.

4.5.2 Qualcomm obtains royalty-free cross-licenses from OEMs that it considers valuable

209. In addition to the running royalties that Qualcomm licensees pay Qualcomm, Qualcomm has also obtained valuable royalty-free cross-licenses from OEMs.

210. Qualcomm has obtained cross-licenses to benefit its modem chip business (i.e., demands that licensees grant back their patents to Qualcomm at the modem chip level, with exhaustive pass-through rights), even though Qualcomm refuses to license its own patents at the modem chip level.

211. As a reflection of the value of the cross-licenses it obtains, Qualcomm has provided modem chip customers with a "Third Party IP Rights" white paper that describes the "substantial economic benefits" that accrue to Qualcomm's modem chip customers by virtue of the cross-licenses Qualcomm has obtained from its licensees.

5 Qualcomm's Use of Incentive Funds

5.1 Qualcomm has used incentive funds to induce OEMs to accept its license terms

212. Qualcomm has offered financial compensation ("incentive funds") to induce OEMs to accept license terms.

213. The forms of incentive funds offered by Qualcomm to induce OEMs to accept licensing terms include:

a. strategic funds and market development funds;

b. modem chip discounts;

c. indemnity agreements; and

d. other monetary payments, including non-recurring engineering payments.

214. Qualcomm has conditioned the availability of incentive funds on OEMs' acceptance of license terms.

215. OEMs have viewed incentive funds as compensation to OEMs for what OEMs viewed as excessive royalties.

216. Qualcomm executives acknowledge that incentive funds influenced OEM decisions to resolve royalty disputes.

217. Examples of instances in which Qualcomm offered an OEM substantial incentive funds as compensation to induce the OEM to accept Qualcomm licensing terms that it considered to be excessive include BlackBerry (2010), Lenovo (2014-16), Sony Mobile (2012), and LG Electronics (2007, 2010, 2016).

5.2 Incentive funds are funded by QTL

218. Qualcomm has had a number of substantial incentive funds that have been partially or entirely funded by QTL.

219. Qualcomm accounting memoranda regularly treat incentive funds and related licenses as a "single arrangement" for accounting purposes, as "they were negotiated as a package and executed at or near the same time."

220. Qualcomm attributes a number of its incentive funds used to secure licensing agreements with modem chip customers to the QTL business unit for accounting purposes.

5.3 Incentive funds accrue on chip purchases

221. Many of Qualcomm's incentive fund agreements that are funded by QTL and used to resolve royalty disputes accrue based on OEM purchases of Qualcomm modem chips, and do not accrue with respect to sales of cellular handsets that incorporate non-Qualcomm modem chips.

222. OEMs would have preferred that Qualcomm reduce its royalty rate instead of offering an incentive fund that accrued on the purchase of Qualcomm modem chips, because with a reduced royalty rate the OEM would have received cost savings whether it used Qualcomm modem chips or another supplier's modem chips.

5.4 Incentive funds have closed the gap on licensing terms

223. Qualcomm extended or withdrew incentive funds based on licensing negotiation outcomes. A key objective of incentive funds was to close the gap between Qualcomm's royalty demands and some OEMs' requests for lower royalties.

224. Qualcomm executives understood that other benefits received from OEMs in exchange for incentive funds were "secondary" to obtaining favorable licensing terms for Qualcomm.

6 Qualcomm's Refusal to License Rival Modem Chip Suppliers

6.1 Qualcomm will not license rivals

6.1.1 Qualcomm's current policy is to not make licenses available to modem chip suppliers

225. Qualcomm has a policy of not making exhaustive licenses for its cellular SEPs available to competing modem chip suppliers.

226. Other modem chip suppliers understand that Qualcomm's standard business practice is to not provide licenses to modem chip suppliers.

6.1.2 Modem chip suppliers have requested licenses, and Qualcomm has rebuffed them

227. Modem chip suppliers have requested licenses from Qualcomm, but Qualcomm has refused requests for exhaustive licenses.

228. ***MediaTek.*** Before 2008, MediaTek sold 2G, but not 3G, modem chips.

229. In 2008, as it looked to expand into 3G modem chips, MediaTek sought a license from Qualcomm to Qualcomm's cellular SEPs.

230. Qualcomm refused MediaTek's 2008 request for a license.

231. Instead of a license, in 2009 MediaTek and Qualcomm signed two non-exhaustive agreements that Qualcomm would not assert its patents against MediaTek.

232. The 2009 agreements required that MediaTek sell only to OEMs that were licensed by Qualcomm.

233. In 2012, MediaTek asked Qualcomm to propose terms on a FRAND basis for an exhaustive license to Qualcomm's cellular SEPs.

234. Qualcomm refused MediaTek's 2012 request for a license.

235. Instead of entering a license, in 2013 MediaTek and Qualcomm amended and suspended the 2009 agreements.

236. ***Intel.*** In 2009, as it was considering purchasing a modem chip supplier, Intel requested an exhaustive license from Qualcomm to Qualcomm's cellular SEPs.

237. Qualcomm refused Intel's request for an exhaustive license, and the parties did not execute such a license.

238. ***Broadcom.*** Broadcom supplied modem chips, and requested an exhaustive license from Qualcomm to Qualcomm's cellular SEPs.

239. Qualcomm refused Broadcom's request for an exhaustive license.

240. Instead of a license, in 2009 the parties signed a non-exhaustive agreement that Qualcomm would not assert its patents against Broadcom.

241. The 2009 agreement allowed Qualcomm to terminate Broadcom's right to sell to any third party that claimed the agreement exhausted any of Qualcomm's patent rights.

242. ***Samsung.*** In 2011, as it considered entering the market for modem chips, Samsung requested an exhaustive license applicable to modem chips from Qualcomm to Qualcomm's cellular SEPs.

243. Qualcomm refused Samsung's request for an exhaustive license applicable to modem chips, and the parties did not execute such a license.

244. In 2017, Samsung again requested an exhaustive license applicable to modem chips from Qualcomm to Qualcomm's cellular SEPs.

245. Qualcomm refused Samsung's request for an exhaustive license applicable to modem chips.

246. Instead, in 2018 the parties executed an agreement applicable to modem chips that did not provide Samsung any rights under Qualcomm's cellular SEPs.

247. ***"Dragonfly" Joint Venture.*** "Project Dragonfly" was a code name for a proposed joint venture between Samsung, NTT DoCoMo, and other companies to develop, manufacture, and sell a modem chip.

248. A license from Qualcomm was a condition precedent to the first closing for funding of the Dragonfly joint venture.

249. NTT DoCoMo tried to get a modem chip license from Qualcomm but was unsuccessful.

250. The Dragonfly joint venture fell through when NTT DoCoMo failed to obtain a modem chip license from Qualcomm.

251. ***Texas Instruments.*** Texas Instruments supplied modem chips, and requested an exhaustive license from Qualcomm to Qualcomm's cellular SEPs.

252. Qualcomm refused Texas Instruments' request for an exhaustive license.

253. Instead, Qualcomm and Texas Instruments executed a non-exhaustive agreement.

6.1.3 Qualcomm's historical ASIC agreements were not licenses.

254. Prior to 2008, Qualcomm offered competing modem-chip suppliers agreements called "ASIC Patent License Agreements" (APLAs). Although APLAs granted competing modem chip suppliers rights to make their own modem chips (ASICs), they purported to limit those suppliers' sales of modem chips to "Authorized Purchasers"—namely, OEMs that had themselves entered into a license with Qualcomm.

255. Under the APLAs' terms, licensed modem chip suppliers could not themselves use or pass on to others the right to use the supplier's modem chips to make, operate, or sell handsets or any other product. For example, under Qualcomm's agreement with VIA Telecom, VIA was not permitted to supply an OEM that had not itself signed a license with Qualcomm.

256. Qualcomm's APLAs were not licenses to Qualcomm's cellular SEPs.

6.2 Modem-chip level licensing (or multi-level licensing) is practicable

257. It is possible and practical to license component-level patents to component manufacturers, while simultaneously licensing any device-level patents owned to device manufacturers.

258. Qualcomm itself, as a modem chip supplier, is the recipient of a number of component-level licenses.

259. For example, in 1999, Ericsson and Qualcomm entered into a Multi-Product Licensing Agreement ("MPLA") pursuant to which Qualcomm obtained an exhaustive chip-level license to Ericsson's 3G SEPs.

6.3 Intended effect

260. Qualcomm's refusal to license rival modem chip suppliers was intended to thwart competition.

7 Qualcomm's Agreements with Apple

261. Apple has negotiated with Qualcomm in an effort to reduce the Qualcomm patent royalty burden that Apple bears. As a result of these negotiations, Apple entered into agreements with Qualcomm in 2007, 2011, and 2013.

262. Apple does not manufacture iPhones and iPads itself, but instead uses third-party CMs to manufacture those products.

263. The CMs that currently manufacture iPhones and/or iPads for Apple include: (i) Foxconn, (ii) Pegatron, (iii) Wistron, and (iv) Compal.

7.1 Marketing Incentive Agreement (2007)

264. Under a 2007 Marketing Incentive Agreement ("MIA"), Qualcomm agreed to rebate to Apple royalties that Qualcomm received from Apple's contract manufacturers in excess of a specified per-handset cap. Qualcomm's payment obligations were conditioned upon, among other things, Apple not selling or licensing a handset implementing the WiMAX standard, a prospective 4G cellular standard.

7.1.1 Apple's initial iPhones

265. Apple had designed the first iPhone to use GSM technology as required for AT&T's network, as AT&T contracted with Apple for exclusive U.S. distribution rights to the iPhone.

266. Apple's initial iPhone models did not incorporate Qualcomm modem chips. Apple instead used Infineon modem chips.

267. Apple believed that it needed to enter some form of direct or indirect licensing arrangement with Qualcomm because, absent agreement with Qualcomm, it could face the prospect of an injunction or be forced to pay royalties under Qualcomm's licenses with Apple's CMs at rates that Apple considered to be excessive.

268. Because of its concerns with the standard license terms required by Qualcomm (which included a requirement that Apple cross-license its intellectual property to Qualcomm), Apple concluded that it could not become a direct licensee of Qualcomm, and instead elected to use an indirect licensing arrangement with Qualcomm through Apple's CMs.

7.1.2 Qualcomm's concerns about WiMAX

269. In 2007, the WiMAX standard was a prospective next-generation cellular standard, with a low-cost royalty model, championed by Intel and opposed by Qualcomm.

270. In 2007, Qualcomm was behind in developing WiMAX modem chips.

271. Qualcomm wanted the industry to know that Apple would not pursue WiMAX, and negotiated specifically for Apple to take a public position against WiMAX.

7.1.3 MIA terms

272. In January 2007, Apple and Qualcomm entered into a Marketing Incentive Agreement dated as of January 8, 2007 ("MIA").

273. The MIA provided Apple with royalty reductions conditioned on Apple disclaiming WiMAX.

274. Under the MIA and subsequent arrangements between Apple and Qualcomm, Apple has not been a direct licensee of Qualcomm. Rather, Qualcomm has charged Apple's CMs royalties at 5% calculated against the CM selling price to Apple (a lower amount than Apple's selling price to consumers), and Apple has provided funds to its CMs for payment of monies to Qualcomm. Apple then received separate rebates from Qualcomm to reduce its royalty burden.

275. Under the MIA, Qualcomm agreed, among other things, to make payments to Apple equal to the amount by which the CMs' royalty payments to Qualcomm exceeded a reference amount of $7.50 per handset.

276. The $7.50 reference amount was agreed upon by top executives of Apple and Qualcomm, and intended to approximate the average absolute royalty amount then being paid by Qualcomm's other licensees.

277. Under the MIA, Apple agreed, among other things, not to sell or license products implementing the WiMAX standard, and to publicly announce that it had chosen GSM technology rather than WiMAX.

278. Qualcomm could terminate the MIA, and Qualcomm's payments to Apple under the MIA would be forfeited, if Apple sold or licensed commercial quantities of phones implementing the WiMAX standard.

279. Following its entry into the MIA, Apple terminated further evaluation of WiMAX solutions.

7.2 Transition Agreements (2011 and 2013)

280. Qualcomm and Apple entered into a Transition Agreement in 2011 ("TA") and First Amendment to Transition Agreement in 2013 ("FATA," and together with the TA, the "Transition Agreements"). Under the Transition Agreements, Qualcomm provided Apple large payments that constituted partial relief from Qualcomm royalties. Qualcomm conditioned this relief on Apple's exclusive use of Qualcomm modem chips in new iPhone and iPad models.

7.2.1 2011 Transition Agreement (TA)

281. Under Qualcomm's 2011 agreement with Apple, Qualcomm agreed to make substantial incentive payments from 2011 through 2016, explicitly conditioned upon Apple using Qualcomm modem chips exclusively in all new iPhone and iPad

models. If, during this period, Apple launched a new handset with a non-Qualcomm modem chip, it would forfeit all future payments and, depending on when a handset launched, could be required to refund to Qualcomm payments Apple had already received.

282. Following the release of the initial iPhone models on the AT&T network, Apple decided to expand the availability of the iPhone to additional consumers by supporting other carriers that operated on a CDMA network such as Verizon, one of the largest carriers in the United States.

283. As part of these efforts, Apple formulated plans to release an iPhone on the Verizon network, which required CDMA-compatible handsets.

284. In order to manufacture iPhones that would function on the Verizon network, Apple needed to procure CDMA modem chips.

285. Apple believed it had no choice but to use Qualcomm CDMA modem chips, as Apple considered Qualcomm to be the only viable supplier of CDMA modem chips for the iPhone.

286. For the iPhone 4 GSM/UMTS (launched in 2010 on the AT&T network) and for its earlier iPhones, Apple procured modem chips from Infineon. For the iPhone 4 CDMA (launched in February 2011 on Verizon), the 3G multimode (CDMA/UMTS) iPhone 4S (launched in October 2011), and every new iPhone launched thereafter through March of 2016, Apple procured multimode CDMA/UMTS modem chips from Qualcomm.

287. Apple repeatedly sought further relief from its substantial Qualcomm royalty burden, both in general and as related to iPads and CDMA products in particular.

288. Apple originally believed that the MIA (including the $7.50 reference amount and related payments) would apply to both CDMA and UMTS devices, and to

both iPads and iPhones, but Apple subsequently became aware of Qualcomm's position that the 2007 MIA—and the royalty rebates provided thereunder—did not apply to CDMA products or to iPads.

289. In 2010, Qualcomm believed that it could mitigate competitive threats to its modem business if it could prevent competitors from winning Apple's business.

290. Due to Qualcomm's position that the MIA—and the royalty rebates provided thereunder—did not apply to CDMA products or to iPads, in late 2010 Apple and Qualcomm negotiated in parallel regarding CDMA and UMTS modem chip pricing and the potential extension of the MIA royalty rebate program to CDMA devices.

291. Rather than simply extending the MIA rebates to CDMA devices, however, Qualcomm offered CDMA royalty relief in the form of up to $1 billion in conditional payments from Qualcomm to Apple conditioned upon Apple purchasing modem chips exclusively from Qualcomm for its new products.

292. In February 2011, Apple, Qualcomm, and Qualcomm CDMA Technologies Asia-Pacific Pte. Ltd. ("QCTAP") entered into the TA, effective as of February 11, 2011.

293. The TA effectively provided Apple with partial royalty relief by extending to CDMA handsets the MIA's royalty-based rebates for UMTS handsets (rebating to Apple royalties above $7.50 paid by its Contract Manufacturers), in exchange for Apple's commitment to launch new devices using exclusively Qualcomm modem chips.

294. Under the TA, Qualcomm agreed, among other things, to provide Apple: (1) a $250 million "Transition Fund" to be paid in two installments, in March 2012 and 2013, conditioned on Apple purchasing more than 3 million modem chips per quarter from Qualcomm in 2011, purchasing more than 5 million UMTS modem chips per

quarter in 2012, and launching at least one UMTS phone with a Qualcomm modem chip on multiple carrier networks by March 31, 2012; (2) a $150 million "Marketing and Development Fund" to be paid in six quarterly installments beginning in the third quarter of 2011, conditioned on Apple's commercial launch of a product with a UMTS carrier that incorporates a Qualcomm UMTS modem chip by December 31, 2012; and (3) a $600 million "Variable Incentive Fund" paid by Qualcomm to Apple over four years (2012-2015), with a maximum of $200 million to be paid per year based on Apple's modem chip purchases exceeding certain volume thresholds.

295. The TA permitted Qualcomm to immediately terminate the agreement and make no further payments if Apple were to sell commercial quantities (*i.e.*, more than 1,000) of any new product after October 1, 2011 incorporating a non-Qualcomm modem chip.

296. The TA further provided that Apple's sale during 2013 of commercial quantities (*i.e.*, more than 1,000) of any new product incorporating a non-Qualcomm modem chip would require Apple to refund to Qualcomm a $125-million installment of the Transition Fund and any 2013 Variable Incentive Fund payments (up to $200 million).

7.2.2 2013 First Amendment to Transition Agreement (FATA) and Business Cooperation and Patent Agreement (BCPA)

297. The 2013 First Amendment to Transition Agreement ("FATA") and Business Cooperation and Patent Agreement ("BCPA") between Qualcomm and Apple modified and extended the exclusivity and conditional royalty relief arrangements set forth in the 2007 MIA and 2011 TA.

298. In 2012, Apple continued to be dependent upon Qualcomm for chip supply, both because Qualcomm remained the only viable supplier of CDMA modem

chips, and because Qualcomm had developed a lead in premium LTE modem chips that Apple required for iPhones under development for 2013.

299. The MIA term expired at the end of 2012. Because the MIA was nearing expiration, Apple sought in 2012 to negotiate an agreement with Qualcomm to continue and extend the partial royalty relief provided by the MIA's rebate arrangement.

300. In 2012, Qualcomm viewed Intel as a key potential future competitor for supply of modem chips used in high-end cellular handsets.

301. Qualcomm recognized that gaining business at Apple would strengthen Intel as a competitor to Qualcomm.

302. Qualcomm executives were confident that Qualcomm was the only option for Apple's premium-tier business in 2014, because only Qualcomm offered CDMA as well as advanced LTE features.

303. In late 2012, Apple conveyed to Qualcomm that it was considering using Intel as a second supplier for some of Apple's 2014 products.

304. In late 2012 and early 2013, Apple and Qualcomm negotiated a set of agreements that extended and modified the effective royalty relief that Qualcomm had previously provided to Apple under the MIA and the TA conditioned upon Apple's agreement not to bring a FRAND challenge against Qualcomm and to extend the exclusive supply arrangement for new models begun under the TA.

305. On February 28, 2013, Apple and Qualcomm entered into the BCPA, dated as of January 1, 2013.

306. Also on February 28, 2013, Apple, Qualcomm, and QCTAP entered into the FATA, effective as of January 1, 2013.

307. On February 28, 2013, Apple and Qualcomm entered into a Statement of Work for Qualcomm Chipsets for Mav 7/8, Mav 10, and Mav 13 ("Mav7/8, Mav10, and

Mav13 SOW," and together with the BCPA and the FATA, the "2013 Agreements"). The Mav7/8, Mav10, and Mav13 SOW relates to the supply of Qualcomm modem chips, including those incorporated into Apple's iPhone 5C, iPhone 5S, iPhone 6, iPhone 6 Plus, iPhone 6S, and iPhone 6S Plus.

308. The 2013 Agreements were negotiated and signed as a package deal covering both licensing and modem chip supply terms.

309. Like the MIA, the BCPA provided that Qualcomm would, among other things, make payments to Apple equal to the amount by which the CMs' royalty payments to Qualcomm exceeded a reference amount per handset. Under the BCPA, the reference amount increased from the prior $7.50 (under the MIA) to $10.00 for iPhones and $9.00 for iPads.

310. Qualcomm's obligation to make BCPA rebate payments was subject to, among other terms, a condition that Apple neither initiate nor induce others to initiate litigation claiming that Qualcomm had failed to offer a license on FRAND terms. Under the BCPA, Apple further agreed to extend certain patent rights to Qualcomm.

311. The balance of the royalty relief provided to Apple under the 2013 Agreements came in the form of substantial incentive payments under the FATA in 2013, 2014, 2015, and 2016, linked to Apple's purchases of Qualcomm modem chips and explicitly conditioned on Apple sourcing modem chips for new iPad and iPhone models exclusively from Qualcomm. The FATA established a "Marketing Fund" pursuant to which Qualcomm rebated an additional $2.50 to Apple for each Apple handset ($1.50 for iPads) incorporating a Qualcomm modem chip. In addition to the Marketing Fund, the FATA also provided for up to $400 million in new Variable Incentive Fund payments during 2015 and 2016.

312. By increasing the royalty rebate reference amount from $7.50 (under the MIA) to $10.00 (under the BCPA), and adding a $2.50 per unit modem chip rebate only on Qualcomm chips, the 2013 Agreements effectively increased the cost to Apple of purchasing a chip from any of Qualcomm's competitors.

313. The FATA further provided that Qualcomm may immediately terminate the agreement, make no further payments, and "clawback" certain past incentive payments if Apple were to sell commercial quantities (*i.e.*, more than 1,000) of any new product incorporating a non-Qualcomm modem chip.

314. Billions of dollars were potentially at risk if Apple were to launch a new product using modem chips from a Qualcomm rival during the term of the FATA. For example, Apple forecast that any use of a non-Qualcomm modem chip in 2015 would result in return or forfeiture of over $1 billion in rebates associated with design wins already awarded to Qualcomm.

315. Qualcomm concluded that the 2013 Agreements were strategically justified because they would keep Intel from developing as a competitor and avoid a royalty fight with Apple.

316. Qualcomm also perceived strategic value in avoiding a FRAND challenge brought by Apple.

7.3 The 2011 and 2013 agreements prevented Apple from working with other modem chip suppliers

317. In all, Qualcomm's 2011 and 2013 agreements with Apple provided for billions of dollars in conditional rebates from Qualcomm to Apple for modem chip sales from 2011 to 2016. These conditional rebates effectively penalized Apple's use of any modem chips supplied by Qualcomm's competitors.

318. The large penalties that Apple would face under its agreements with Qualcomm in the event that it sourced modem chips from another modem chip supplier dis-incentivized Apple from engaging with and using alternative suppliers during the effective exclusivity period under these agreements.

319. As a result of the exclusivity terms in its agreements with Qualcomm, Apple sourced modem chips exclusively from Qualcomm for all new iPad and iPhone products that it launched over the five-year period from October 2011 until September 2016.

320. Qualcomm intended its agreements with Apple to foreclose Qualcomm's competitors from gaining modem chip business at Apple.

7.3.1.1 The 2013 Agreements caused Apple to suspend its engineering engagement with Intel and delayed Intel's entry at Apple

321. Apple was intensively engaged with Intel during 2012 to develop modem chips for possible use in Apple products in 2014 and/or 2015, but Apple suspended that engagement in early 2013 as a result of its entry into the 2013 Agreements with Qualcomm.

322. Apple had an interest in developing and working with additional suppliers of modem chips, and fostering competition in the modem chip market.

323. As early as March of 2012, Apple began considering Intel as a modem chip supplier for a 2014 iPad. Throughout 2012, Apple engaged with Intel regarding possible use of Intel modem chips in upcoming 2014 and 2015 iPad or iPhone products.

324. In the fall of 2012, Apple concluded that it was economically advantageous to use Intel as a second supplier of modem chips for a 2014 iPad product

due to Intel's price terms despite forfeiting amounts that would have otherwise been due under the TA if Apple remained exclusive.

325. An advantage perceived by Apple of starting Intel in an iPad was that it would "de-risk" subsequent use of Intel modem chips in 2015 iPhones. Following introduction of an Intel modem chip in a lower-risk 2014 iPad, Apple would have greater engineering confidence in Intel's execution and performance for broader use in 2015.

326. Apple's modem chip acquisition decisions were made by a collaborative process involving representatives of Apple's hardware engineering, software engineering, silicon, and business operations groups.

327. Apple's engineering engagement with Intel during 2012 was undertaken at the behest of Apple's commercial operations group, with the objective of bringing up an alternate supplier to Qualcomm, improving costs, and enhancing leverage with Qualcomm.

328. In early 2013, Apple suspended its engagement with Intel as a potential modem chip supplier as a result of the 2013 Agreements.

329. For 2015 as well as 2014, Apple considered the penalties under the FATA to economically preclude a low-volume entry by Intel through an iPad or low tier device.

330. Apple did not send out an RFP for 2015 iPhones and only considered Qualcomm.

331. The penalties under the FATA for Apple using non-Qualcomm modem chips in 2016 were substantially less than for 2015, and in 2014 Apple reengaged with Intel in preparation for possible use of Intel in 2016.

332. In preparation for using Intel in 2016, Apple's engineering team wanted to use an Intel modem chip in a 2015 iPad.

333. Apple did not engage Intel for a 2015 iPad as a result of the penalties that would be incurred under the FATA.

8 Harm to Competition

8.1 Generally

334. Qualcomm's no license-no chips policy, its refusal to make licenses available to competing modem chip suppliers, its practice of offering incentive funds to induce customers to agree to license terms, and its agreements with Apple, taken as a whole, have tended to hamper competition in markets for CDMA and premium LTE modem chips.

8.2 Qualcomm's royalties are unreasonably high

335. The royalties that Qualcomm is able to obtain for its SEPs exceed by a wide margin any range of royalties that may be considered fair and reasonable, and are disproportionate to the royalties charged by other licensors of cellular SEPs.

336. Qualcomm's internal documents acknowledge that its licensing revenue far outpaces that of other licensors.

337. Analyses considered by Qualcomm's Board of Directors during Qualcomm's 2015 "Project Phoenix" corporate structure assessment predicted that QTL would earn substantially less in royalties if it separated from QCT.

338. Qualcomm's royalties far exceed the range of fair and reasonable royalties calculated using reliable methodologies, along with studies and measures that Qualcomm has itself used in the ordinary course to compare the strength of Qualcomm's SEP portfolio to the SEP portfolios of other licensors.

8.3 Qualcomm's no license-no chips policy has raised the cost to OEMs of using modem chips supplied by Qualcomm's competitors

339. Through its no license-no chips policy, Qualcomm has brought to bear bargaining leverage based on its monopoly power in relevant markets for modem chips on its patent licensing negotiations with OEMs.

340. This leverage has allowed Qualcomm to induce OEMs to agree to pay a surcharge in the form of royalties higher than the OEMs would otherwise have been willing to accept on all handsets they sell, regardless of whether those handsets use modem chips supplied by Qualcomm's competitors.

341. These unreasonably high royalties have harmed competition in relevant markets for CDMA and Premium LTE modem chips and harmed consumers.

342. When evaluating handset designs, OEMs consider the all-in price of a modem chip, which includes both (i) the nominal price of the modem chip, and (ii) any associated patent royalties that the OEM must pay to use that modem chip in a cellular handset.

343. By using bargaining leverage based on its CDMA and Premium LTE modem-chip monopoly power to extract unreasonably high royalties (in excess of a FRAND rate) on every handset that OEMs sell, Qualcomm has effectively raised the latter component of modem chips' all-in price by an added increment that does not reflect the value of Qualcomm's SEPs, but rather reflects Qualcomm's market power over modem chips.

344. As a result of Qualcomm's no license-no chips policy, the all-in price of any modem chip includes (i) the nominal price of the modem chip itself, which the OEM must pay the modem-chip manufacturer; (ii) a reasonable royalty, which the OEM must pay to Qualcomm to practice Qualcomm's patents; and (iii) an added surcharge, which

the OEM must pay to Qualcomm to ensure continued access to Qualcomm's modem-chip supply, regardless of whether the modem chip at issue is supplied by Qualcomm or one of Qualcomm's competitors.

345. Incentive funds offered by Qualcomm to OEM customers have induced customers to accept unreasonably high royalties and other license terms, and thus contributed to Qualcomm's maintenance of a surcharge that raises the cost of using competitors' modem chips. To the extent that these incentive funds have been linked to OEMs' purchases of Qualcomm's modem chips, they have created a further disincentive for OEMs to purchase modem chips supplied by Qualcomm's competitors.

346. The surcharge that OEMs must pay to maintain access to Qualcomm modem chips even when they purchase a modem chip from one of Qualcomm's competitors puts Qualcomm's competitors at a competitive disadvantage.

347. Though Qualcomm imposes a nominal surcharge on sales of its own modem chips as well, that surcharge does not impose any additional cost on transactions that take place between OEMs and Qualcomm. This is because Qualcomm—a party to these transactions—receives the surcharge in question.

348. As applied to Qualcomm's own modem chips, the surcharge does not represent an additional cost, but additional profits—a component of the all-in price that OEMs must pay Qualcomm to use its modem chips.

8.4 By imposing a surcharge that OEMs pay regardless of whether OEMs use Qualcomm chips or rivals' chips, Qualcomm's no license-no chips policy weakens rivals

349. By imposing an unreasonable cost on Qualcomm's competitors' sales, the surcharge reduces demand for competitors' modem chips, reduces competitors' sales, and diminishes competitors' ability and incentive to invest and innovate.

350. Suppliers of CDMA and premium LTE modem chips must ship substantial volumes of chips and earn significant margins on those shipments to sustain the research and development required to maintain a viable business.

351. By lowering volume available to modem chip competitors, through higher effective costs associated with using their modem chips, Qualcomm's surcharge has hampered those competitors in their attempts to obtain benefits of scale.

352. By reducing competing suppliers' sales, Qualcomm's surcharge diminishes competitors' abilities and incentives to invest and innovate.

353. Qualcomm's no license-no chips policy reduces competitors' abilities to invest and innovate in next-generation technologies.

354. A number of Qualcomm's former modem-chip competitors have shuttered their businesses, citing inadequate sales and margins.

355. Qualcomm's remaining modem-chip competitors operate at margins lower than the industry benchmarks for maintaining viable businesses.

8.5 Harm to consumers

356. The Qualcomm surcharge raises the cost to an OEM of using competitors' modem chips, compared to the but-for world in which Qualcomm did not impose a surcharge.

357. The surcharge weakens the competitive constraints that competitors would otherwise impose on Qualcomm's own pricing decisions, compared to the but-for world in which Qualcomm did not impose a surcharge.

358. OEMs predictably pass through to final consumers in the form of higher prices for handsets at least some portion of the surcharge OEMs pay in the form of royalties, and any supra-competitive price OEMs pay for modem chips as a result of Qualcomm's rivals' reduced ability to compete.

8.6 Qualcomm's agreements with Apple foreclosed an important and substantial portion of the premium LTE modem chip market

359. Qualcomm's Transition Agreements with Apple foreclosed Qualcomm's competitors, including Intel, from a substantial and important share of the market for premium LTE modem chips.

360. Qualcomm's Transition Agreements with Apple in 2011 and 2013 were a significant factor in Intel's failure to win business at Apple in 2014 or 2015.

361. Apple worked extensively with Intel in 2012 to evaluate the prospect of using Intel's modem chips for its 2014 products.

362. During the term of the Transition Agreements, Apple desired a second source for its products, apart from Qualcomm.

363. During 2012, Apple was closely engaged with Intel in an effort to use Intel modem chips in potential 2014 and 2015 Apple products.

364. In January 2013, as a result of its decision to enter the FATA, Apple suspended its engineering engagement with Intel, and informed Intel that it would not be considered as a potential supplier for modem chips for Apple products released in 2014 and 2015.

365. Absent the FATA, Apple had an interest in maintaining multiple sources of modem chips, and had the incentive and ability to create new product models, adjust performance requirements, and modify launch schedules to facilitate entry of a new modem chip supplier.

366. Intel did not secure a design win from Apple until it secured a design win for certain models of the iPhone 7, released in late 2016.

367. Qualcomm's agreements with Apple foreclosed a substantial share of the market share for premium LTE modem chips, between 48% and 50% for each year from 2012 through 2014.

368. Apple is a strategically important customer for modem chip suppliers. Apple sells large volumes of premium handsets that require premium LTE modem chips, which command higher prices than lower-tier modem chips.

369. Winning an Apple design would provide a modem chip manufacturer increased scale.

370. Increased scale allows modem chip manufacturers to spread research and development costs over a greater number of units.

371. Winning an Apple design would provide modem chip manufacturers with a number of competitive benefits apart from increased scale.

372. Modem chip suppliers must secure certification of their modems from wireless carriers and infrastructure vendors.

373. Working with Apple allows a modem chip manufacturer to field-test modems on a worldwide basis.

374. Extensive field-testing is the only way modem chip manufacturers can ensure that a modem chip will work as expected in a wide range of real-world conditions.

375. Wireless carriers and infrastructure vendors would be more likely to work with modem chip suppliers that have won an Apple design.

376. Being an incumbent supplier at a given OEM makes it easier to obtain future business at that OEM.

377. If Intel had won an Apple design before the 2016 iPhone, it would have enjoyed some or all of the competitive benefits discussed above during the relevant time period.

378. Intel's belief that it was not being considered for 2014 or 2015 Apple products negatively affected Intel's modem chip design efforts in that time period, including decisions on which features to support and modem release timetables.

379. Intel won modem chip business with Apple beginning with certain models of the iPhone 7. Intel has benefitted from its status as a modem chip supplier to Apple since late 2016.

380. If Intel had won an Apple design earlier, it could have been a stronger competitor to Qualcomm today.

381. Currently, if Intel were to lose Apple's business for a single design cycle, it would likely cause Intel's exit from the modem chip market.

382. As a result of Broadcom's loss of an Apple design win, Broadcom exited the modem chip market.

383. Broadcom's loss prevented it from achieving the high-margin premium modem chip sales it needs to be profitable.

8.7 Refusal to license rivals

384. Qualcomm's refusal to make SEP licenses available to competing modem chip suppliers has contributed to Qualcomm's maintenance of a surcharge, in the form of excess royalties OEMs agree to pay regardless of whether the modem chip at issue is supplied by Qualcomm or one of Qualcomm's competitors.

385. Unlike OEMs, Qualcomm's competitors do not depend on Qualcomm for modem chip supply. If Qualcomm licensed modem chip suppliers, its ability to use its

modem chip market power to extract unreasonably high royalties paid on cellular products that include non-Qualcomm modem chips would be significantly reduced.

386. During the relevant time period, Qualcomm's refusal to make licenses available to competing modem chip suppliers deterred entry and investment in relevant modem chip markets.

387. During the relevant time period, Qualcomm's refusal to make licenses available to competing modem chip suppliers impaired the competitiveness of Qualcomm's existing modem chip rivals.

388. Qualcomm's non-exhaustive agreements with modem chip suppliers contained onerous restrictions that impaired Qualcomm's modem chip rivals from making sales to handset OEMs.

389. Qualcomm's non-exhaustive agreements with modem chip suppliers, including MediaTek and Via Telecom, restricted rival suppliers from selling modem chips to OEMs that were unlicensed, enhancing Qualcomm's leverage in royalty and licensing negotiations with OEMs.

8.8 The market reflects the tendency of Qualcomm's conduct to exclude competition

390. During the relevant time period, expected competition did not materialize in the CDMA and premium LTE modem chip markets.

391. During the relevant time period, expected competition was deterred from entering the CDMA and premium LTE modem chip markets in part by Qualcomm's anticompetitive conduct.

392. During the relevant time period, existing competition exited the CDMA and premium LTE modem chip markets in part due to Qualcomm's anticompetitive conduct.

393. The CDMA and premium LTE modem chip markets are highly concentrated.

9 Remedy

9.1 Qualcomm's conduct is ongoing, and absent injunctive relief the resulting competitive harm is likely to continue and recur

394. Qualcomm's no license-no chips policy, its refusal to make licenses available to competing modem chip suppliers, and its practice of offering incentive funds to induce customers to agree to license terms are ongoing, and absent injunctive relief the resulting competitive harm is likely to continue and recur.

395. Qualcomm has not voluntarily ceased the challenged conduct despite known antitrust risk, OEM complaints, foreign antitrust enforcement actions, and the present action.

396. Hundreds of Qualcomm licenses, secured through Qualcomm's no license-no chips policy, remain in effect.

397. Qualcomm has historically recognized the antitrust risk inherent in its no license-no chips policy, but has persisted with the conduct, defending against any antitrust and related claims and continuing to maintain the ability to cease modem chip supply where necessary.

398. Qualcomm's practice of not making SEP licenses available to rival modem chip suppliers remains in effect.

399. Qualcomm's practice of agreeing to incentive funds or other payments to OEMs contemporaneously with OEMs agreeing to patent license terms continued in 2018.

400. Qualcomm continues to engage in the challenged conduct despite recent investigations, fines, and injunctions by foreign competition authorities, including the Korea Fair Trade Commission.

401. There is a substantial likelihood that Qualcomm will have market power in market(s) for 5G modem chips.

402. When Qualcomm was considering whether to separate its licensing and chip businesses in 2015 (and deciding not to), Qualcomm executives explicitly recognized that QCT modem chip leadership in the transition to 5G would benefit QTL's royalty rates.

403. Qualcomm has been the leading modem chip supplier for many years, particularly as to premium and leading-edge modem chips.

404. Qualcomm's business model has historically given it a time-to-market advantage at times of technological transition, and Qualcomm expects to lead the transition to 5G.

405. Qualcomm business planning documents indicate that the time-to-market advantage arising from Qualcomm's SSO participation is strongest at the outset of a new standard and translates into additional chip margins and higher royalties.

406. OEMs and rival modem chip suppliers believe that Qualcomm will have a lead in 5G modem chip supply similar to the lead Qualcomm has had in premium LTE.

407. Qualcomm has publicly stated that it has a significant lead—of at least 12-24 months—over its merchant competitors in bringing 5G chips to market; that all OEMs and carriers working to bring 5G to market are working with Qualcomm; that no other company comes close to Qualcomm on 4G LTE Advanced or on 5G; that it

anticipates a large 5G market share; and that it anticipates emerging from the transition to 5G as a larger and even better-positioned company.

408. Market power in 5G modem chips, taken together with the ongoing nature of the challenged business practices, would allow Qualcomm—absent injunctive relief—to continue to extract unreasonably high royalties and other anticompetitive licensing and modem chip sale terms from OEMs.

9.2 The forms of injunctive relief sought by the FTC are practicable and consistent with normal industry practice

409. Qualcomm's current licenses are fundamentally infected by Qualcomm's decades-long course of anticompetitive conduct.

410. Going forward, Qualcomm's current licenses cannot serve as relevant benchmarks for determining whether license terms and conditions are fair and reasonable.

411. Qualcomm is able to—and has touted its ability to—modestly reform and adjust its licensing practices as required by regulatory risks or mandates.

412. Modem-chip-level licensing and multi-level licensing, if necessary, are practicable.

413. Qualcomm's own business practices with respect to non-WAN (Wi-Fi) chips demonstrate that exhaustive sales of components implementing standardized technologies are practicable.

414. Other suppliers of standard-compliant cellular components routinely sell components on an exhaustive basis.

415. Multi-level licensing, if necessary, facilitates efficient negotiations by enabling the parsing of information about where relevant patents apply in the value chain.

PRETRIAL PROPOSED CONCLUSIONS OF LAW

1. Qualcomm Incorporated ("Qualcomm") is a "corporation" within the meaning of Section 4 of the Federal Trade Commission Act ("FTC Act"), 15 U.S.C. § 44.

2. Qualcomm has engaged, and continues to engage, in "commerce" and activities affecting commerce as that term is defined by Section 4 of the FTC Act, 15 U.S.C. § 44.

3. This Court has subject matter jurisdiction over this action pursuant to 15 U.S.C. §§ 45(a) and 53(b), and 28 U.S.C. §§ 1331, 1337(a), and 1345.

4. Section 5 of the Federal Trade Commission Act prohibits "[u]nfair methods of competition." 15 U.S.C. § 45(a); Order Granting FTC's Motion for Partial Summary Judgment, ECF No. 931 ("SJ Order"), at 10.

5. "Unfair methods of competition" under the FTC Act include violations of the Sherman Act. *FTC v. Ind. Fed'n of Dentists*, 476 U.S. 447, 454-55 (1986); *FTC v. Cement Inst.*, 333 U.S. 683, 694 (1948); SJ Order, at 10.

6. "Unfair methods of competition" under the FTC Act also include conduct that, although not a violation of the letter of the Sherman Act, conflicts with the basic policies of the Sherman Act. *FTC v. Brown Shoe Co.*, 384 U.S. 316, 321 (1966); *E.I. du Pont de Nemours & Co. v. FTC*, 729 F.2d 128, 136-37 (2d Cir. 1984); SJ Order, at 10.

7. Conduct may be an "unfair method of competition" if it is "collusive, coercive, predatory or exclusionary in character" or possesses other "indicia of oppressiveness." *E.I. du Pont de Nemours*, 729 F.2d at 138-40; SJ Order, at 11.

8. Under Section 2 of the Sherman Act, it is unlawful for a firm to "monopolize" a relevant market. 15 U.S.C. § 2; *United States v. Microsoft Corp.*, 253

F.3d 34, 50 (D.C. Cir. 2001) (en banc) (per curiam); Order Denying Motion to Dismiss, ECF No. 134 ("MTD Order"), at 18.

9. A monopolization offense has two elements: (1) the possession of monopoly power in the relevant market and (2) anticompetitive conduct—"the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 481 (1992); *Microsoft*, 253 F.3d at 50; MTD Order, at 18.

10. Section 1 of the Sherman Act prohibits "[e]very contract, combination … or conspiracy, in restraint of trade or commerce." 15 U.S.C. § 1; *Allied Orthopedic Appliances, Inc. v. Tyco Health Care Grp. LP*, 592 F.3d 991, 996 (9th Cir. 2010); MTD Order, at 18.

11. To show a violation of Section 1, a plaintiff must establish (1) the existence of an agreement, *i.e.*, concerted action; and (2) that the agreement was an unreasonable restraint of trade. *See Aerotec Int'l, Inc. v. Honeywell Int'l, Inc.*, 836 F.3d 1171, 1178 (9th Cir. 2016) (citing *Am. Needle, Inc. v. Nat'l Football League*, 560 U.S. 183, 189-90 (2010)).

12. Under Section 1, a plaintiff may establish a *prima facie* case that an agreement is unreasonable by showing (1) that a defendant has market power in the relevant market; and (2) that the agreement tends to harm competition. *See Bhan v. NME Hospitals, Inc.*, 929 F.2d 1404, 1413 (9th Cir. 1991); *Realcomp II, Ltd. v. FTC*, 635 F.3d 815, 827 (6th Cir. 2010).

13. Monopoly power is "the power to control prices or exclude competition." *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S. 377, 391 (1956).

14. Market or monopoly power may be established through circumstantial evidence, namely "a firm's possession of a dominant share of a relevant market that is protected by entry barriers." *Microsoft*, 253 F.3d at 51 (citing *Rebel Oil Co. v. Atl. Richfield Co.*, 51 F.3d 1421, 1434 (9th Cir. 1995)); *see also Forsyth v. Humana, Inc.*, 114 F.3d 1467, 1475-76 (9th Cir. 1997), *overruled on other grounds by Lacey v. Maricopa Cty.*, 693 F.3d 896 (9th Cir. 2012).

15. "Unlike Section 2 claims, Section 1 restraint of trade claims need not establish the threshold showing of monopoly control over a relevant market." *Amarel v. Connell*, 102 F.3d 1494, 1522 (9th Cir. 1996); MTD Order, at 18. A lesser showing is required to establish market power for Section 1 purposes than to establish monopoly power for Section 2 purposes. *See Eastman Kodak Co. v. Image Technical Servs., Inc.*, 504 U.S. 451, 481 (1992).

16. An antitrust market is comprised of a relevant geographic market and a relevant product market. *See Brown Shoe Co. v. United States*, 370 U.S. 294, 324 (1962).

17. The relevant geographic market in this case is worldwide.

18. The hypothetical monopolist test is a widely accepted methodology to define relevant antitrust markets. It is derived from Supreme Court precedent, adopted by the U.S. Department of Justice and the Federal Trade Commission in the Horizontal Merger Guidelines, and routinely applied by courts and economists in both merger and non-merger cases across many industries. *See Saint Alphonsus Medical Center-Nampa Inc. v. St. Luke's Health Sys., Ltd.*, 778 F.3d 775, 784 (9th Cir. 2015); *Theme Promotions, Inc. v. News Am. Mktg. FSI*, 546 F.3d 991, 1002 (9th Cir. 2008); U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 4.1.2 (2010).

19. The hypothetical monopolist test is a method of identifying reasonable substitutes for the product(s) in question. *See Theme Promotions*, 546 F.3d at 1002; *Hynix Semiconductor Inc. v. Rambus Inc.*, No. CV-00-20905 RMW, 2008 WL 73689, at *3 (N.D. Cal. Jan. 5, 2008).

20. The hypothetical monopolist test asks whether a hypothetical monopolist of all products within a proposed market could profitably impose a small but significant non-transitory increase in price ("SSNIP") in the proposed market. If enough purchasers would respond to a SSNIP by purchasing a product from outside the proposed market, making the SSNIP unprofitable, the proposed market definition is too narrow. *See Saint Alphonsus Medical Center*, 778 F.3d at 784; *Hynix Semiconductor*, 2008 WL 73689, at *3.

21. Applying the hypothetical monopolist test, a relevant antitrust product market for purposes of assessing Qualcomm's conduct is modem chips with CDMA 2G or 3G capability. Modem chips without CDMA capability are not reasonable substitutes for CDMA modem chips and a hypothetical monopolist of all CDMA modem chips could profitably impose a SSNIP above competitive levels.

22. Applying the hypothetical monopolist test, a relevant antitrust product market for purposes of assessing Qualcomm's conduct is premium LTE modem chips, *i.e.*, chips with LTE capability deployed in premium-tier handsets. Non-premium LTE modem chips are not reasonable substitutes for premium LTE modem chips and a hypothetical monopolist of all premium LTE modem chips could profitably impose a SSNIP above competitive levels.

23. There is some overlap between the CDMA and premium LTE modem chip markets, but this overlap does not affect their treatment as separate antitrust markets.

24. Qualcomm possessed monopoly power in the worldwide market for CDMA modem chips each year from 2006 through 2016.

25. Qualcomm possessed monopoly power in the worldwide market for premium LTE modem chips each year from 2011 through 2016.

26. Qualcomm possessed market power in the worldwide market for CDMA modem chips each year from 2006 through 2016.

27. Qualcomm possessed market power in the worldwide market for premium LTE modem chips each year from 2011 through 2016.

28. Qualcomm's "no license-no chips" policy is effectuated through Qualcomm chip supply and patent license agreements with OEMs and supported by incentive funds and similar agreements Qualcomm has entered with OEMs. These agreements are concerted action under Section 1 of the Sherman Act. *See, e.g., ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 277 (3d Cir. 2012) (contracts with anticompetitive terms "essentially forced" by the defendant); *MCM Partners v. Andrews-Bartlett & Assocs*., 62 F.3d 967, 973-75 (7th Cir. 1995).

29. Qualcomm's 2011 and 2013 agreements with Apple are concerted action under Section 1 of the Sherman Act. *See Allied Orthopedic Appliances,* 592 F.3d at 996; *ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 270, 277 (3d Cir. 2012).

30. Under the Sherman Act, conduct that "harm[s] the competitive *process* and thereby harm[s] consumers" is anticompetitive. *McWane, Inc. v. FTC*, 783 F.3d 814, 835-36 (11th Cir. 2015) (quoting *Microsoft*, 253 F.3d at 58); MTD Order, at 30.

31. When a defendant has engaged in multiple acts or practices that may be anticompetitive, a court must consider their interactions and combined effects. *Free FreeHand Corp. v. Adobe Sys., Inc.*, 852 F. Supp. 2d 1171, 1180 (N.D. Cal. 2012)

(citing *City of Anaheim v. S. Cal. Edison Co.*, 955 F.2d 1373, 1376, 1378 (9th Cir. 1992)); MTD Order, at 31.

32. A government plaintiff seeking injunctive relief in an antitrust case need not "reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct," but instead must show that the "defendant has engaged in anticompetitive conduct that 'reasonably appear[s] capable of making a significant contribution to … maintaining monopoly power." *Microsoft*, 253 F.3d at 79 (quoting 3 Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶ 651c, at 78 (1996 ed.)); *accord McWane,* 783 F.3d at 833; *United States v. Dentsply Int'l, Inc.*, 399 F.3d 181, 187 (3d Cir. 2005).

33. Conduct that raises a competitor's costs or otherwise tends to impair the opportunities of competitors and either does not further competition on the merits or does so in an unnecessarily restrictive way is anticompetitive under the Sherman Act. *See Cascade Health Solns. v. PeaceHealth*, 515 F.3d 883, 894 (9th Cir. 2008) (citing *Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 605 n. 32 (1985)); MTD Order, at 30.

34. Imposing a surcharge that raises the cost of using competitors' products may be anticompetitive under the Sherman Act. *See United Shoe Mach. Corp. v. United States*, 258 U.S. 451, 456-57 (1922); *Premier Elec. Constr. Co. v. Nat'l Elec. Contractors Ass'n*, 814 F.2d 358, 368 (7th Cir. 1987); *Caldera, Inc. v. Microsoft Corp.*, 87 F. Supp. 2d 1244, 1249-50 (D. Utah 1999); MTD order, at 33-35.

35. A firm with market or monopoly power may impair the opportunities of competitors by imposing costs on the competitors' customers or by imposing costs directly on the competitors themselves. *See* N. Gregory Mankiw, Principles of Microeconomics 125, 156 (7th ed. 2014).

36. Qualcomm's maintenance of a no license-no chips policy is anticompetitive conduct.

37. Qualcomm's use of incentive funds to induce customers to agree to patent license terms is anticompetitive conduct.

38. Through its FRAND commitments to U.S.-based standard-setting organizations, Qualcomm has a pre-existing contractual duty to make SEP licenses available on FRAND terms to competing modem chip suppliers. SJ Order, at 25.

39. By refusing requests for licenses from modem chip suppliers, Qualcomm has breached its pre-existing contractual duty to make SEP licenses available on FRAND terms to competing modem chip suppliers.

40. Qualcomm's refusal to make SEP licenses available to competitors in breach of its voluntary commitments to standard-setting organizations is anticompetitive conduct. By failing to comply with its FRAND commitments, it has altered a voluntary course of dealing with anticompetitive malice. *See Aspen Skiing Co. v. Aspen Highlands Skiing Corp.*, 472 U.S. 585, 610 (1985); *MetroNet Services Corp. v. Qwest Corp*, 383 F.3d 1124, 1131 (9th Cir. 2004); MTD Order, at 41.

41. A contract that conditions discounts or rebates on a promise of exclusivity may be analyzed as a *de facto* exclusive dealing contract if its "practical effect" is "to prevent a … buyer from using the products of a competitor of the … seller." *Tampa Elec. Co. v. Nashville Coal Co.*, 365 U.S. 320, 326 (1961); *ZF Meritor, LLC v. Eaton Corp.*, 696 F.3d 254, 270 (3d Cir. 2012); *Pro Search Plus, LLC v. VFM Leonardo, Inc.*, 2013 WL 6229141, at *5 (C.D. Cal. Dec. 2, 2013); MTD Order, at 47.

42. Qualcomm's 2011 and 2013 agreements with Apple are appropriately analyzed as *de facto* exclusive dealing agreements because their practical effect was to

prevent Apple from using premium LTE modem chips supplied by Qualcomm's competitors.

43. An express or *de facto* exclusive dealing contract violates Section 1 of the Sherman Act when its "'probable effect' is to substantially lessen competition in the relevant market." *ZF Meritor*, 696 F.3d at 268-69 (quoting *Tampa Elec.*, 365 U.S. at 327-29); *Pro Search Plus*, 2013 WL 6229141, at *5.

44. Whether an exclusive dealing contract has the probable effect of substantially lessening competition rests on a number of factors, including in particular whether the contract "foreclose[s] competition in a substantial share" of the relevant market. Courts have generally considered 40% to 50% of the relevant market a "substantial share." *Microsoft*, 253 F.3d at 70; MTD Order, at 47.

45. Exclusive dealing by a monopolist may violate Section 2 of the Sherman Act even though the relevant contracts foreclose less than roughly 40% to 50% of the relevant market if those contracts "severely limit … competition for the most important customers" that potential entrants "need[] to gain a foothold for effective competition." *E.I. du Pont de Nemours & Co. v. Kolon Indus.*, 637 F.3d 435, 452 (4th Cir. 2011); *Microsoft*, 253 F.3d at 70; MTD Order, at 47.

46. Through its 2011 and 2013 agreements with Apple, Qualcomm engaged in anticompetitive conduct.

47. Qualcomm's no license-no chips policy, its refusal to make licenses available to competing modem chip suppliers, its use of incentive funds to induce customers to agree to patent license terms, and its exclusive dealing with Apple, taken as a whole, have tended to harm competition and maintain a monopoly in markets for CDMA and premium LTE modem chips.

48. Qualcomm has engaged in anticompetitive conduct that reasonably appears capable of making a significant contribution to maintaining its market and monopoly power and harming competition in markets for CDMA and premium LTE modem chips.

49. Qualcomm's no license-no chips policy, its refusal to make licenses available to competing modem chip suppliers, its use of incentive funds to induce customers to agree to patent license terms, and its exclusive dealing with Apple are collusive, coercive, predatory, exclusionary, and oppressive in character.

50. Under Section 1 or Section 2 of the Sherman Act, or Section 5 of the FTC Act, if a plaintiff shows that the restraint or conduct challenged has or reasonably appears capable of having anticompetitive effects, then "the defendant must offer evidence of pro-competitive effects" resulting from the restraint or conduct. *Bhan*, 929 F.2d at 1413; *see also Microsoft*, 253 F.3d at 59; *Polygram Holding, Inc. v. FTC*, 416 F.3d 29, 36 (D.C. Cir. 2005).

51. Even if a cognizable pro-competitive justification exists, if a plaintiff shows that the restraint or conduct in question is not reasonably necessary to achieve the pro-competitive objective, then the justification does not save the restraint or conduct from condemnation. *See Bhan*, 929 F.2d at 1413; Phillip E. Areeda & Herbert Hovenkamp, Antitrust Law ¶ 1502, Wolter Kluwer (database updated Sept. 2018).

52. Even if a cognizable pro-competitive justification exists, if anticompetitive effects from the restraint or conduct in question outweigh any procompetitive benefits, then the restraint or conduct is condemned under the antitrust laws. *See Bhan*, 929 F.2d at 1413; *Microsoft*, 253 F.3d at 59.

53. Qualcomm's no license-no chips policy, its refusal to make SEP licenses available to competing modem chip suppliers, its use of incentive funds to induce

customers to agree to patent license terms, and its exclusive dealing with Apple are not justified by any pro-competitive efficiency.

54. Qualcomm's no license-no chips policy, its refusal to make SEP licenses available to competing modem chip suppliers, its use of incentive funds to induce customers to agree to patent license terms, and its exclusive dealing with Apple are not reasonably necessary to achieve any procompetitive efficiency.

55. The anticompetitive effects from Qualcomm's no license-no chips policy, its refusal to make SEP licenses available to competing modem chip suppliers, its use of incentive funds to induce customers to agree to patent license terms, and its exclusive dealing with Apple outweigh any putative efficiencies proffered by Qualcomm.

56. Section 13(b) of the FTC Act, 15 U.S.C. § 53(b), authorizes the Court to issue a permanent injunction and other equitable relief. *FTC v. Evans Prods. Co.*, 775 F.2d 1084, 1087 (9th Cir. 1985).

57. A permanent injunction is warranted where a defendant's unlawful conduct is ongoing or there is a "cognizable danger of recurrent violation." *United States v. W.T. Grant Co.*, 345 U.S. 629, 633 (1953); *see also Evans Prods. Co.*, 775 F.2d at 1087.

58. Past unlawful conduct is "highly suggestive of the likelihood of future violations." *CFTC v. Yu*, No. 12-CV-3921-YGR, 2012 WL 3283430, at *4 (N.D. Cal. Aug. 10, 2012) (quoting *CFTC v. Hunt*, 591 F.2d 1211, 1220 (7th Cir. 1979)).

59. Qualcomm's policies of not supplying chips to customers that do not have a patent license, not making SEP licenses available to competing modem chip suppliers, and its use of incentive funds to induce customers to agree to license terms are ongoing.

60. There is a "cognizable danger of recurrent violation." Qualcomm engaged in anticompetitive conduct in the past and is well-positioned to engage in similar conduct in the future.

61. "The Supreme Court has explained that a remedies decree in an antitrust case must seek to 'unfetter a market from anticompetitive conduct,' to 'terminate the illegal monopoly, deny to the defendant the fruits of its statutory violation, and ensure that there remain no practices likely to result in monopolization in the future.'" *Microsoft*, 253 F.3d at 103 (quoting *Ford Motor Co.*, 405 U.S. 562, 577 (1972) and *United States v. United Shoe Mach. Corp.*, 391 U.S. 244, 250 (1968)).

62. A permanent injunction in a government antitrust case is not limited to "a simple proscription against the precise conduct previously pursued." *Nat'l Soc'y of Prof'l Eng'rs v. United States*, 435 U.S. 679, 698 (1978);

63. "[T]hose 'caught violating' the FTC Act 'must expect some fencing in.'" *FTC v. Grant Connect, LLC*, 763 F.3d 1094, 1105 (9th Cir. 2014) (quoting *FTC v. Nat'l Lead Co.*, 352 U.S. 419, 431 (1957)).

64. In a government antitrust case, "all doubts as to the remedy are to be resolved in [the government's] favor." *United States v. E.I. du Pont de Nemours & Co.*, 366 U.S. 316, 334 (1961).

65. A permanent injunction and other equitable relief is necessary and appropriate to remedy the violations of law found to exist in this case.

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Respectfully submitted,

FEDERAL TRADE COMMISSION,

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