



Section 57 of the Competition Act (Cap. 50B)

Grounds of Decision issued by the Competition and Consumer Commission of Singapore

In relation to the joint notification for decision on the proposed acquisition by SK hynix Inc. of Intel Corporation's NAND and Solid State Drive business

Date: 21 July 2021

Case number: 400-140-2021-002

<p>Confidential information in the original version of this Decision has been redacted from the published version on the public register. Redacted confidential information in the text of the published version of the Decision is denoted by [X].</p>

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I. Introduction

1. On 15 April 2021, the Competition and Consumer Commission of Singapore (“**CCCS**”) accepted a joint application, pursuant to section 57 of the Competition Act (Cap. 50B)(the “**Act**”) for a decision by CCCS as to whether the proposed acquisition by SK hynix Inc. (“**SK hynix**”) of Intel Corporation’s (“**Intel**”) (collectively, the “**Parties**”) NAND¹ and Solid State Drive (“**SSD**”)² business (the “**Target Business**”) (the “**Proposed Transaction**”) will infringe section 54 of the Act, if carried into effect.
2. In reviewing the Proposed Transaction, CCCS conducted a public consultation, which included obtaining feedback from the Parties’ competitors and customers. CCCS contacted seven (7) competitors³, and eleven (11) customers⁴ who purchase NAND flash memory or SSDs from either of the Parties (collectively referred to as “**Third Parties**”). Nine (9) Third Parties responded and indicated that they have no competition concerns, were neutral about the Proposed Transaction, or even considered that the Proposed Transaction could be pro-competitive.
3. At the end of the consultation process and after evaluating all the information including the Parties’ submissions and feedback from Third Parties, CCCS concludes that the Proposed Transaction, if carried into effect, will not infringe section 54 of the Act.

II. The Parties

SK hynix

4. SK hynix is a publicly traded company, listed on the Korea Stock Exchange since 1996.⁵ It is a multinational company, headquartered in South Korea, active in (i) memory semiconductors, such as NAND flash memory and Dynamic Random Access Memory (“**DRAM**”), (ii) storage solutions such as SSDs, and (iii) system semiconductors, such as Complementary Metal Oxide Semiconductor image sensors.⁶ SK hynix has production sites in Korea (Incheon and Cheongju) and China (Wuxi and Chongqing), as well as research and development centres and sales offices across the world.⁷
5. SK hynix has one registered entity in Singapore, SK hynix Asia Pte. Ltd. (“**SK hynix Asia**”), which is a wholly owned subsidiary of SK hynix.⁸ SK hynix Asia conducts marketing and sales activities and supports multinational enterprise customers in

¹ NAND stands for “Not AND” gate. NAND is a type of flash memory where cells are connected in series.

² More specifically, SSD business refers to NAND-based SSD business in the Proposed Transaction.

³ Competitors: [3]

⁴ Customers: [3]

⁵ Paragraph 7.1 of Form M1.

⁶ Paragraph 10.5 of Form M1.

⁷ Paragraph 10.5 of Form M1.

⁸ Paragraph 10.1 of Form M1.

Southeast and Southwest Asia. It does not have manufacturing plants in Singapore, and trades under the “SK hynix” name and brand.⁹

Intel

6. Intel is a public company listed on NASDAQ and headquartered in Santa Clara, California, USA. Intel has a broad product portfolio comprising (i) platform products such as central processing unit and chipset, System on a Chip (“SoC”)¹⁰, or multichip packages, and (ii) adjacent products¹¹ that can be combined with platform products to form comprehensive platform solutions to meet customer needs.¹²
7. The list of entities within the Intel group that are registered in Singapore¹³ are as follows:
 - a. Intel Mobile Communications South East Asia Pte. Ltd.;
 - b. Intel Singapore Holding Pte. Ltd.;
 - c. Intel Technology Asia Pte Ltd; and
 - d. Lantiq Asia Pacific Pte. Ltd.
8. In Singapore, Intel primarily trades under the “Intel” name and brand.¹⁴ Intel’s subsidiaries in Singapore mainly conduct sales and marketing activities, providing sales and support at the original equipment manufacturer, developer and end-user levels in Singapore and Southeast Asia.
9. The Target Business is active in developing, designing, manufacturing, assembling, testing, marketing and selling products utilizing NAND flash memory technology.¹⁵ The Target Business is also active in developing, designing, manufacturing, assembling, testing, marketing and selling SSDs that utilise NAND flash memory, i.e. NAND-based SSDs (SSDs in the rest of this decision refer to NAND-based SSDs).¹⁶

⁹ Paragraph 10.12; Paragraph 15.1 of Form M1.

¹⁰ An integrated circuit that takes a single platform and integrates an entire electronic or computer system onto it.

¹¹ (i) Accelerators – Silicon products that can operate alone or accompany Intel’s processors in a system, such as field-programmable gate array, vision processing units and Mobileye EyeQ* SoC; (ii) Boards and systems – Server boards and small form factor systems such as Intel NUCs; (iii) Connectivity products – Cellular modems, Ethernet controllers, silicon photonics, Wi-Fi and Bluetooth; (iv) Memory and storage products – SSD, persistent memory, and memory components.

¹² Paragraph 14.3 of Form M1.

¹³ Paragraph 10.2 of Form M1.

¹⁴ Paragraph 10.4 of Form M1.

¹⁵ Paragraph 10.7 of Form M1.

¹⁶ Intel will retain its ability to produce SSDs utilising its proprietary 3D XPoint technology (developed jointly with Micron – however, Micron has ceased development of 3D XPoint. <https://investors.micron.com/news-releases/news-release-details/micron-updates-data-center-portfolio-strategy-address-growing>); [3<].

10. Aside from the supply of NAND flash memory and SSDs, the Target Business is not active in any other businesses globally.¹⁷ The Target Business has no physical presence in Singapore, save for Intel's office in Singapore that conducts sales and marketing activities, and provides sales and support services in Singapore and South East Asia for the entire Intel portfolio.¹⁸
11. The Proposed Transaction involves only the acquisition of the Target Business and has no impact on Intel's ownership structure.¹⁹

III. The Proposed Transaction

Nature of the Proposed Transaction

12. The Proposed Transaction relates to the anticipated acquisition of sole control by SK hynix over the Target Business.²⁰ The Proposed Transaction is a single integrated transaction covered by a Master Purchase Agreement ("MPA")²¹, and will be completed in two (2) steps (in late 2021, and on or after 15 March 2025).²²

Merger under Section 54 of the Act

13. CCCS considers that the Proposed Transaction constitutes a merger pursuant to sub-sections 54(2)(b) and (c) of the Act. SK hynix will substantially replace Intel in the NAND and SSD business and Intel will have no independent market facing roles with respect to these businesses as a result of the Proposed Transaction.

IV. Competition Issues

14. The Parties submitted that SK hynix and the Target Business overlap in in the supply of the following products globally²³:
 - a. NAND flash memory;
 - b. Enterprise SSDs; and
 - c. Client SSDs.

¹⁷ Paragraph 10.11 of Form M1.

¹⁸ Paragraph 10.13 of Form M1; Paragraph 6.3 of the Parties' 2 June 2021 response to CCCS's 22 April 2021 Request For Information ("RFI").

¹⁹ Paragraph 8.2 of Form M1.

²⁰ Paragraph 11.1 of Form M1.

²¹ Paragraph 11.3 of Form M1.

²² Paragraph 11.8 of Form M1; Paragraph 7.10 of the Parties' 2 June 2021 response to CCCS's 22 April 2021 RFI.

²³ Paragraph 15.1 of Form M1.

15. SK hynix supplies the abovementioned products to Singapore. While the Target Business does not supply NAND flash memory to Singapore²⁴, it supplies enterprise SSDs and client SSDs to Singapore²⁵.
16. In assessing the Proposed Transaction, CCCS considered whether the Proposed Transaction will lead to non-coordinated, coordinated and vertical effects that would result in a substantial lessening of competition (“SLC”) in Singapore.
17. For completeness, the Parties submitted that SK hynix purchased a convertible bond issued by one of the shareholders of Toshiba Memory Corporation (“TMC”), subsequently renamed Kioxia Holdings Corporation (“Kioxia”) – a competitor, as well as made a [X] investment in a limited partnership managed by Bain Capital Private Equity, which in turn made investments in other shareholder entities in TMC.²⁶ [X].²⁷ SK hynix’s interest in the partnership is a [X].²⁸ The convertible bond [X].²⁹ [X].³⁰
18. Having considered the Parties’ submission, CCCS considers that [X] and that Kioxia is an independent competitor to the Parties for the purpose of this merger assessment.

V. Counterfactual

19. CCCS considers that absent the Proposed Transaction, the relevant counterfactual would be the status quo (i.e. SK hynix and Intel would continue operating independently as competitors). There is no evidence to suggest that the market structure or competitive dynamics in the counterfactual would differ from the status quo.

VI. Relevant Markets

20. Based on the Parties’ submission and Third Party feedback, CCCS considers that the relevant markets for the purpose of this merger assessment are the global supply of:
 - a. NAND flash memory;
 - b. Enterprise SSDs; and
 - c. Client SSDs.

²⁴ Paragraph 15.2 of Form M1.

²⁵ Paragraph 7.2 of the Parties’ 15 June 2021 response to CCCS’s 7 June 2021 RFI.

²⁶ Footnote 14 of Form M1.

²⁷ Paragraph 60.2 of the Parties’ 2 June 2021 response to CCCS’s 22 April 2021 RFI.

²⁸ Paragraph 60.2 of the Parties’ 2 June 2021 response to CCCS’s 22 April 2021 RFI.

²⁹ Paragraph 60.3 of the Parties’ 2 June 2021 response to CCCS’s 22 April 2021 RFI.

³⁰ Paragraph 60.4 of the Parties’ 2 June 2021 response to CCCS’s 22 April 2021 RFI.

VII. CCCS's Assessment

(a) Market Shares and market concentration

21. The combined market share (by value) of SK hynix and the Target Business in 2019 were [10 – 20] % (CR3 of [70 – 80] %), [20 – 30]% (CR3 of [70 – 80]%) and [10 – 20]% (CR3 of [60 – 70]%) for the global supply of NAND flash memory, enterprise SSDs and client SSDs respectively. The combined market shares (by value) of SK hynix and the Target Business in 2017 and 2018 were lower than in 2019.
22. While the market share and CR3 for enterprise SSDs crosses CCCS's indicative thresholds in the *CCCS Guidelines on the Substantive Assessment of Mergers 2016*³¹, CCCS notes that the incremental market share and incremental CR3 arising from the merger are both low at [0 – 10]% for this market. Further, for all the relevant markets, the merged entity will not be the largest player and there are suppliers with comparable market shares.

(b) Barriers to Entry and Expansion

23. Based on the Parties' submission and Third Parties' feedback, CCCS assesses that while the barriers to entry are significant for greenfield entrants, barriers to expansion for existing suppliers of NAND flash memory are relatively lower. In addition, there does not appear to be any significant barriers for existing suppliers to supply customers in Singapore.
24. CCCS assesses that the barriers to entry for the supply of enterprise and client SSDs are relatively lower compared to NAND flash memory and are moderate. Existing suppliers also appear to be able to increase supply of enterprise and client SSDs fairly easily. Similar to NAND flash memory, there does not appear to be any significant barriers for existing suppliers of enterprise and client SSDs to supply to customers in Singapore.

(c) Countervailing Buyer Power

25. The significance of customers to the Parties' sales in NAND flash memory differs between SK hynix and the Target Business, [X]. For enterprise and client SSDs, the largest customers make up [X] proportions of the Parties' sales. Additionally, for all the relevant markets, there is mixed feedback on whether customers are able to self-supply.
26. Based on the above information, on balance, CCCS is of the view that while some large customers of NAND flash memory, enterprise SSDs or client SSDs may have countervailing buyer power, it does not appear to apply to all or the majority of customers.

³¹ Paragraph 5.15 of the *CCCS Guidelines on the Substantive Assessment of Mergers 2016*.

(d) Non-coordinated effects

27. Based on the information received, CCCS assesses that the Proposed Transaction will not give rise to non-coordinated effects for the following reasons:
- a. There is a high degree of competition and the Parties are not each other's closest competitors in the relevant markets. The Parties will continue to face competitive constraints from several other strong suppliers in the relevant markets;
 - b. While the barriers to entry for NAND flash memory are significant for greenfield entrants, barriers to expansion for existing suppliers of NAND flash memory are relatively lower. Barriers to entry for SSDs are lower than NAND flash memory and are moderate, and existing suppliers of SSDs appear to be able to increase supply fairly easily. Furthermore, there does not appear to be any significant barriers for existing suppliers of NAND flash memory or SSDs to supply to customers in Singapore;
 - c. Some large customers of NAND flash memory and SSDs may have the ability to enter the market and self-supply. This suggests that such customers have countervailing buyer power, although this does not appear to apply to all or majority of customers; and
 - d. Customers typically multi-source and qualify multiple suppliers for NAND flash memory and SSDs. Hence, switching to those pre-qualified suppliers is not difficult.

(e) Coordinated effects

28. Based on the information received, CCCS assesses that the Proposed Transaction will not give rise to coordinated effects for the following reasons:
- a. The Proposed Transaction will not significantly increase concentration in the relevant markets and the incremental market shares of the merged entity in the relevant markets are not high. There is also feedback indicating that there are unlikely to be significant changes in the levels of competition in the relevant markets arising from the Proposed Transaction;
 - b. The relevant markets are relatively opaque in view of the procurement process and confidential negotiation between each customer and its supplier; and
 - c. Some customers have adopted a strategy of self-supplying their own enterprise or client SSDs, suggesting certain customers are able to disrupt any coordination among suppliers.

(f) Vertical effects

29. The Parties submitted that [REDACTED].³² [REDACTED]³³, and DRAM is incorporated into SSDs as cache memory.
30. Based on the information received, CCCS assesses that the Proposed Transaction will not give rise to vertical effects. The merged entity is unlikely to have the ability to foreclose suppliers of NAND flash memory and DRAM upstream, or to foreclose suppliers of SSDs downstream. This is in view of the combined market shares of SK hynix and the Target Business in the supply of NAND flash memory and DRAM upstream and the supply of SSDs downstream, as well as the existence of other competitors in these markets that will constrain the merged entity.

(g) Conclusion on competition assessment

31. Given that the Proposed Transaction will not give rise to co-ordinated, non-coordinated and vertical effects, if carried into effect, CCCS concludes that the Proposed Transaction will not result in an SLC in Singapore.

VIII. Efficiencies

32. Given that the Proposed Transaction is unlikely to lead to an SLC, it is not necessary for CCCS to make an assessment on the claimed efficiencies by the Parties.

IX. Ancillary Restrictions

33. Paragraph 10 of the Third Schedule to the Act states that that “[t]he section 34 prohibition and the section 47 prohibition shall not apply to any agreement or conduct that is directly related and necessary to the implementation of a merger” (the “**Ancillary Restriction Exclusion**”). In order to benefit from the Ancillary Restriction Exclusion, a restriction must be (i) directly related, and (ii) necessary, to the implementation of the merger.³⁴
34. The Parties has submitted clause [REDACTED] of the MPA as non-compete restrictions (“**Non-compete Clause**”) and clause [REDACTED] of the MPA as non-solicitation restrictions (“**Non-solicitation Clause**”) and that these constitute ancillary restrictions to the Proposed Transaction.

³² Paragraph 36.1 of Form M1.

³³ Paragraph 36.2 of Form M1.

³⁴ Paragraph 9.6 of CCCS *Guidelines on the Substantive Assessment of Merger 2016*.

Non-compete Clause

35. CCCS considers that a three-year duration for a non-compete restriction is generally sufficient to ensure that an acquirer obtains the full benefit from the goodwill and know-how acquired as part of a transaction. With respect to the [X].³⁵ [X].³⁶ In this respect, CCCS considers that a [X] duration for the non-compete restriction in relation to the [X] is sufficient and appropriate to ensure that SK hynix obtains the full benefit of goodwill and know-how acquired with the [X].
36. With respect to the [X]. Hence, a [X] duration for the non-compete restriction in relation to the [X] is reasonable and properly limited for SK hynix to obtain the full benefit of goodwill and know-how acquired with the [X].

Non-solicitation Clause

37. CCCS accepts that clauses [X], are directly related to and necessary for the implementation of the Proposed Transaction, as [X] is necessary for SK hynix to receive the full benefits of its acquisition and sustain the acquired businesses. The scope and duration of the restrictions are also proportionate to the requirements of the Proposed Transaction.
38. CCCS, however, considers that clauses [X] are not ancillary restrictions. Restrictions which are directly related to a merger are economically related to the merger and intended to allow a smooth transition to the changed company structure after the merger. However, CCCS notes that clauses [X] are only applicable if the MPA is terminated. Accordingly, CCCS assesses that these provisions are not directly related and necessary to the implementation of the Proposed Transaction.

CCCS's conclusion on ancillary restrictions

39. In view of the above, CCCS concludes that the following constitute ancillary restrictions which benefit from the Ancillary Restriction Exclusion under the Act, insofar as they relate to Singapore:
- a. Clause [X] of the MPA, [X]; and
 - b. Clauses [X] of the MPA.

³⁵ Paragraph 2.6 of the Parties' 16 July 2021 response to CCCS's 2 July 2021 RFI.

³⁶ Paragraph 19.33 of Form M1.

X. Conclusion

40. For the reasons above and based on the information available, CCCS has assessed that the Proposed Transaction, if carried out into effect, will not lead to an SLC and consequently, will not infringe the section 54 prohibition.
41. In accordance with section 57(7) of the Act, this decision shall be valid for a period of one (1) year from the date of this decision.



Sia Aik Kor
Chief Executive
Competition and Consumer Commission of Singapore