



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

Grounds of Decision issued by the Competition Commission of Singapore

In relation to the notification for decision of the proposed acquisition by Micron Technology Inc. of Elpida Memory Inc. pursuant to section 57 of the Competition Act

30 January 2013

Case number: CCS 400/009/12

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]

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I. Introduction

1. On 30 November 2012, Micron Technology, Inc. (“Micron”) and Elpida Memory, Inc. (“Elpida”) (collectively, “the Parties”) filed a joint notification pursuant to section 57 of the Competition Act, Chapter 50B (the “Act”), applying for a decision by the Competition Commission of Singapore (“CCS”) as to whether the acquisition by Micron of 100% of the ordinary share capital of Elpida (the “Transaction”) will infringe the section 54 prohibition of the Act, if carried into effect. CCS had also received submissions of further information by the Parties.¹
2. CCS also consulted customers and competitors to seek their views on the likely impact of the Transaction on competition. In total, CCS contacted five competitors and 14 customers of the Parties, and sent them questionnaires focusing on the Parties’ dealings with respect to the DRAM market. CCS received six responses all of which are from customers.
3. The Parties have informed CCS that the Transaction has also been notified to competition regulators in the People’s Republic of China (“China”), the Czech Republic, Japan, South Korea, Chinese Taipei, and the United States of America (“United States”). The Transaction has been cleared in the Czech Republic, South Korea, and the United States.²
4. At the end of the consultation process and after evaluating all the evidence, CCS has concluded that the Transaction, if carried into effect, will not infringe section 54 of the Act.

II. The Parties Involved in the Transaction

Micron Technology, Inc. (Micron)

5. Micron is the ultimate parent company of 48 principal subsidiaries involved in the manufacturing and marketing of semiconductor devices principally Dynamic Random Access Memory (“DRAM”), NAND Flash and NOR Flash memory, memory technologies, packaging solutions, semiconductor systems, and semiconductor components for Complementary Metal–Oxide–Semiconductor (“CMOS”) image sensors and other semiconductor products.³

¹ Submissions of further information by Parties were received on 12, 14, 18, 20, 21, 24, 27, 28, 29 December 2012 and 7 January 2013.

² Paragraph 5.1 of Form M1

³ Paragraph 7.1 of Form M1

6. Micron has wafer fabrication facilities in the United States, Israel, Italy and Singapore; assembly and test operations in the United States, China, Malaysia, and Singapore; and memory module assembly operations in the United States, Puerto Rico and Singapore.⁴ Micron markets its products through its internal sales force, independent sales representatives and distributors primarily to Original Equipment Manufacturers (“OEMs”) and retailers located around the world.⁵
7. With regards to the Singapore market, Micron supplies DRAM, NAND Flash memory, NOR Flash memory, imager and other products.⁶ Micron’s DRAM products are supplied to Singapore under the Micron, Crucial™, SpecTek® and Numonyx® brand names and private labels.⁷
8. Micron has the following facilities in Singapore:⁸
 - (i) 300mm DRAM manufacturing facilities;
 - (ii) 300mm NAND manufacturing facilities;
 - (iii) 200mm NOR manufacturing facilities; and
 - (iv) assembly and test facilities.
9. In addition, Micron Semiconductor Asia Pte. Ltd., a subsidiary of Micron registered in Singapore, has a sales and marketing office that offers all Micron memory products to regional customers.⁹

Elpida Memory Inc. (Elpida)

10. Elpida is the ultimate parent company of 13 principal subsidiaries and two affiliated companies, all of which are involved in the manufacturing of DRAM integrated circuits.¹⁰
11. Elpida's portfolio features products with characteristics such as high-density, high-speed, low power and small packaging profiles. Elpida provides DRAM solutions across a wide range of applications, including personal computers, servers, mobile devices and digital consumer electronics.¹¹

⁴ Paragraph 10.6 of Form M1

⁵ Paragraph 10.5 of Form M1

⁶ Paragraph 10.9 of Form M1

⁷ Paragraphs 2.1 of the Annex to the Parties’ submission dated 12 December 2012

⁸ Paragraph 10.09 of Form M1

⁹ Paragraphs 1.1 of the Annex to the Parties’ submission dated 12 December 2012

¹⁰ Paragraph 7.2 of Form M1

¹¹ Paragraph 10.7 of Form M1

12. Elpida's assets include a 300mm DRAM fabrication facility located in Hiroshima, Japan; an approximate 65% ownership interest in Rexchip Electronics Corporation ("Rexchip"), whose assets include a 300mm DRAM fabrication facility located in Chinese Taipei; and an assembly and test facility located in Akita, Japan.¹²
13. Elpida Memory (Singapore) Pte. Ltd. was a sales office for Elpida's DRAM integrated circuits in Singapore but is currently undergoing liquidation, and has stopped its business activities.¹³ Elpida's DRAM products are supplied in Singapore under the brand name of "Elpida".¹⁴

III. The Transaction

14. The Transaction involves Micron acquiring 100% of the outstanding voting securities, and consequently, sole control of Elpida.¹⁵
15. Pursuant to a bankruptcy proceeding in Japan and a Definitive Sponsor Agreement (the "Agreement") dated as of 2 July 2012, Micron will acquire 100% of the outstanding voting securities of Elpida. A consideration of JPY 200 billion (approximately USD 2.5 billion), less certain reorganisation proceeding expenses, will be used to satisfy the reorganisation claims of Elpida's secured and unsecured creditors. Micron will acquire 100% of the equity of Elpida for JPY 60 billion (approximately USD 750 million) to be paid in cash at closing. In addition, JPY 140 billion Yen (approximately USD 1.75 billion) in future annual installment payments through 2019 will be paid from cash flow generated from Micron's payment for foundry services provided by Elpida, as a Micron subsidiary. As a result of these payments, all pre-petition debt obligations of Elpida will be fully discharged under the corporate reorganisation proceedings.¹⁶
16. In a related transaction, Micron will acquire a 24% interest in Rexchip from Powerchip Technology Corporation ("Powerchip"), a corporation in Chinese Taipei, and certain of its affiliates, for approximately NTD 10 billion (approximately US\$334 million). Elpida has a 64.7% direct and indirect interest in Rexchip.¹⁷ The Parties submitted that if the Transaction is

¹² Paragraph 10.8 of Form M1

¹³ Paragraph 10.10 of Form M1

¹⁴ Paragraph 10.4 of Form M1

¹⁵ Paragraph 11.1 of Form M1

¹⁶ Paragraph 11.3 of Form M1

¹⁷ Paragraph 11.4 of Form M1

approved, Micron would hold an overall direct and indirect interest of 88.7% in Rexchip.¹⁸

17. Due to scale limitations, the Parties focus on limited, largely non-overlapping segments of the DRAM market. Micron is focused on providing solutions for server and networking (customers in data processing electronics such as computer and wired communications) and automotive electronics segments. On the other hand, Elpida is focused on mobile phones (i.e. customers in the wireless communications segments). The Parties submitted that combining the complementary product portfolios would allow the combined company to offer a more comprehensive set of products to customers.¹⁹
18. Due to lack of scale on a standalone basis, Micron is generally unable to expand its DRAM production in a cost-effective way. The Parties submitted that the Transaction would enable Micron to provide customers with a greater number of high-quality solutions. The fabrication assets of Elpida and Rexchip together would represent an approximate 50% increase in Micron's current manufacturing capacity.²⁰
19. With respect to Elpida, the Parties submitted that the Transaction would provide a clear advantage to Elpida's customers by making available a more comprehensive set of memory solutions as well as enabling stable payment of creditor claims and helping to streamline approval of the reorganisation plan by the creditors and the Tokyo District Court ("Court").²¹
20. Based on the Parties' submission that this Transaction is an acquisition of sole control²², this Transaction constitutes a merger pursuant to section 54(2)(b) of the Act.²³

IV. Competition Issues

21. The Parties submitted that the area of overlapping business between Micron and Elpida in Singapore is the supply of DRAM integrated circuits.²⁴

¹⁸ Paragraphs 4.1 of the Annex to the Parties' submission dated 12 December 2012

¹⁹ Paragraph 12.4 of Form M1

²⁰ Paragraph 12.5 of Form M1

²¹ Paragraph 12.6 of Form M1

²² Paragraph 11.1 of Form M1

²³ Section 54(2)(b) of the Act provides that a merger occurs if one or more persons or other undertakings acquire direct or indirect control of the whole or part of one or more other undertakings.

²⁴ Paragraph 17.1 of Form M1

22. The Parties submitted that the Transaction would not result in a substantial lessening of competition because of factors including (i) the highly competitive market due to the similarity of products produced by competitors and rapid technological evolution of products, (ii) multitude of existing and potential competitors, (iii) and low barriers of entry into the DRAM market, and (iv) the presence of major OEMs with very strong bargaining power.²⁵

V. Counterfactuals

23. As stated in paragraph 4.6 of the *CCS Guidelines on Substantive Assessment of Mergers*, CCS will, in assessing mergers and applying the substantial lessening of competition (“SLC”) test, evaluate the prospects for competition in the future with and without the merger. The competitive situation without the merger is referred to as the “counterfactual”. The SLC test will be applied prospectively, that is, future competition will be assessed with and without the merger.
24. The *CCS Guidelines on Substantive Assessment of Mergers* also states that in most cases, the best guide to the appropriate counterfactual will be prevailing conditions of competition, as this may provide a reliable indicator of future competition without the merger. However, CCS may need to take into account likely and imminent changes in the structure of competition in order to reflect as accurately as possible the nature of rivalry without the merger. For instance, in cases where one of the parties is genuinely failing, pre-merger conditions of competition might not prevail even if the merger were prohibited.²⁶

Parties’ Submission

25. In the absence of the acquisition, the Parties submitted that the most realistic scenario is that of Elpida exiting the market if it is not able to otherwise restructure its debts.²⁷
26. The Parties claimed that Elpida faces structural issues which make it difficult to overcome its short-term financial problems.²⁸ To remain competitive, DRAM producers must constantly improve the technical aspects of their products (e.g. maximising the number of chips per wafer and improving the process yield) while decreasing the prices of such products (e.g. minimising

²⁵ Paragraphs 34 and 35 of Form M1

²⁶ Paragraph 4.7 of the *CCS Guidelines on Substantive Assessment of Mergers*

²⁷ Paragraph 23.2 of Form M1

²⁸ Paragraph 23.4 of Form M1

production costs and minimising process complexity). This improvement requires large investments in research and development (“R&D”) to develop innovative products and in equipment to manufacture such products. As R&D requirements are high, DRAM companies must have sufficient scale to generate enough revenue to cover these costs.²⁹ However, the cash generated by a firm the size of Elpida, which is also a single product firm, cannot cover such development costs.³⁰ In addition, these costs are relatively fixed and cannot be reduced to accommodate firms such as Elpida which have smaller revenues.

27. According to the Parties, Elpida is unlikely to survive in the DRAM market without a financial sponsor. Being a single product firm producing DRAM, Elpida has been struggling for survival since inception.³¹ Elpida only produces DRAM, whereas its competitors are better able to weather volatile business cycles because they have a more diversified portfolio.³² Over the past few years, Elpida has been experiencing financial troubles. In June 2009, Elpida was bailed out by the Japanese government; financing was provided which enabled Elpida to be restructured. However, the restructured Elpida continued to struggle. This is because of (i) the decline and commoditisation of PC DRAM, (ii) Elpida’s inability to leverage R&D over sufficient scale, (iii) its single product focus versus broader spectrum competitors, and (iv) Elpida’s inability to attract capital investment.³³
28. Elpida has not been able to overcome its short-term financial difficulties. It had more than [X] Yen in loans, bonds and other debts coming due immediately. [X]. As a result, Elpida had to petition for bankruptcy on 27 February 2012 in the Court.³⁴
29. As part of the bankruptcy proceedings where an auction was conducted under the supervision of the Court, the Parties submitted that [X]^{35 36}
30. In addition, the Parties have also submitted that Micron is the most suitable buyer. This is because if Elpida is not acquired, its capacity will most likely exit the DRAM market (based on a similar exit by Qimonda from the market and the fact that current market conditions do not warrant the entry of another competitor). If Elpida is acquired by an entity smaller in scale as

²⁹ Paragraph 12.3 of Form M1

³⁰ Paragraph 12.5 of Form M1

³¹ Paragraph 23.6 of Form M1

³² Paragraph 23.1 of the Annex to Parties’ submission dated 12 December 2012

³³ Paragraph 23.6 of Form M1

³⁴ Paragraph 23.7 of Form M1

³⁵ The [X] entities that provided initial expressions of interest were [X]

³⁶ Paragraph 23.8 of Form M1

compared to Micron, the transaction will not bring about sufficient scale and synergies for the post-transaction entity to compete effectively. Furthermore, the Parties do not think that this scenario is a realistic possibility. If Elpida is acquired by an entity larger in scale than Micron (either Samsung Electronics or Hynix), the transaction will only strengthen the market leaders' positions.³⁷

CCS' Assessment

31. The Parties are not making a claim of the failing firm defence even though they are of the view that Elpida will likely exit the industry without financial sponsorship.³⁸ As such, CCS will not assess the merger based on the failing firm defence test. As noted above, given that Elpida has filed for bankruptcy protection under the Court and the likelihood of an exit is high, CCS will need to take into account this development to determine the appropriate counterfactual.

Elpida is likely to genuinely fail under current ownership

32. CCS notes the financial difficulties faced by Elpida prior to its bankruptcy proceeding. According to third parties, the DRAM industry is inherently volatile. Recent market conditions have been characterised by weak demand and excess supply, factors leading to depressed DRAM prices. [X].³⁹ Being a single product firm, Elpida is particularly vulnerable to any adverse business downturn in the DRAM industry. Coupled with a high indebtedness, Elpida was unable to weather through the recent industry downturn and meet its debt obligations and had to file for bankruptcy protection.⁴⁰

All refinancing options has been explored and exhausted by Elpida

33. CCS further notes that Elpida has not been able to refinance its debt. Elpida's creditors had rejected any possibility of debt refinancing which led Elpida to file for bankruptcy protection. In addition, Elpida had explored the possibility of a bailout but had not been successful in securing a second bailout by the Japanese government.⁴¹ A reorganisation plan submitted by some of Elpida's

³⁷ Paragraph 23.9 of Form M1

³⁸ Paragraph 2 of the Parties' cover letter dated 28 December 2012

³⁹ Forecast Analysis: DRAM, Worldwide, 2011-2016, 1Q12 Update, Gartner, 29 March 2012

⁴⁰ At the time Elpida filed for bankruptcy on 27 February 2012, it had cash, notes receivable and accounts receivable of less than Yen 80 billion, but current liabilities of Yen 448 billion. It also had more than Yen 140 billion in loans, bonds, and other debts coming due immediately (between 22 March 2012 and 2 April 2012). See paragraph 8.1 of the Annex to the Parties' submission dated 20 December 2012.

⁴¹ "Elpida memory wants another bailout", The Asahi Shimbun, 29 December 2011 (<http://ajw.asahi.com/article/economy/business/AJ201112290041>);

creditors has also been rejected by the Courts. The reasons for doing so is because the plan did not take into account (i) the past financial difficulties that led to the bankruptcy petition, (ii) the continuous operating losses after the filing, (iii) unstable business environment surrounding the current DRAM markets and (iv) ongoing needs of R&D and capital expenditure.⁴²

Lack of realistic alternative buyer for Elpida

34. The auction process implemented by the Courts to find a suitable buyer for Elpida was conducted over two rounds: first, an initial non-binding expression of interest, and second, a final bid with a legally binding offer for sponsorship.⁴³ [X]^{44 45}
35. If no buyer apart from Micron were to emerge, there exists the possibility that Elpida would have gone into bankruptcy and its assets would have to be liquidated. However, the DRAM industry is currently in the midst of a downturn with many producers suffering operating losses. As such, the scenario of Elpida's assets remaining in the market is unlikely to be realistic as market conditions do not warrant new entry. Particularly, CCS notes that a similar event had occurred in the 2009 economic downturn: Qimonda, a German DRAM player of similar size as Elpida, became bankrupt and its assets also eventually exited the DRAM industry. Even if Elpida's assets were to be successfully sold off, the assets might not remain in the DRAM business. [X]⁴⁶
36. In view of the above, CCS is of the opinion that absent the Transaction, Elpida and its assets exiting the market would be the most realistic scenario. As such, CCS will proceed to assess the Transaction and apply the SLC test using this scenario as the counterfactual.

"Elpida faces crunch of 160 bln yen in looming maturities", Reuters , 10 February 2012 (<http://www.reuters.com/article/2012/02/10/markets-credit-idUSL2E8DA11520120210>);

"Elpida files for protection in biggest Japanese bankruptcy for two years", Bloomberg, 27 February 2012 (<http://www.bloomberg.com/news/2012-02-27/elpida-files-for-bankruptcy-protection-set-to-hold-press-conference-today.html>)

⁴² Paragraph 28.7 of the Annex to the Parties' submission dated 12 December 2012

⁴³ Paragraph 25.3 of the Annex to the Parties' submission dated 12 December 2012

⁴⁴ Paragraph 26.3 of the Annex to the Parties' submission dated 14 December 2012

⁴⁵ Paragraph 7.1 of the Annex to the Parties' submission dated 20 December 2012

⁴⁶ Paragraph 2.3 of the Annex to the Parties' submission dated 21 December 2012

VI. Relevant Markets

(a) Product Markets

37. The Parties are of the view that the relevant product market affected by the notified Transaction is the market for the manufacture and supply of DRAM integrated circuits.⁴⁷
38. DRAMs are semiconductors used for storage of binary data used mainly in computer hardware.⁴⁸ DRAM products are high-density, low-cost-per-bit random access memory devices that provide high-speed data storage and retrieval. DRAM products vary in terms of performance, pricing and other characteristics.⁴⁹ The ultimate end customers of DRAM integrated circuits are customers who purchase personal computing, consumer electronics, networking and server, mobile devices, automotive and industrial application products.⁵⁰
39. Types of DRAM would include commonly used DDR3 and DDR2 products as well as specialty DRAM memory products including Mobile Low Power DRAM (“LPDRAM”), DDR, SDRAM, Reduced Latency DRAM (“RLDRAM”) and Pseudo-static DRAM (“PSRAM”).⁵¹
40. DDR3 and DDR2 are standardised, high-density, high-volume DRAM products that are sold for use as main system memory in computers and servers. DDR3 and DDR2 products offer high speed and high bandwidth at a relatively low cost compared to other DRAM products.⁵² Specialty DRAM products include DDR and DDR2 Mobile LPDRAM, DDR, SDRAM, RLDRAM and PSRAM in densities ranging from 64 Mb to 2 Gb. LPDRAM products are used primarily in laptop computers, tablets, and other consumer devices that require low power consumption. Other specialty DRAM products are used primarily in networking devices, servers, consumer electronics, communications equipment and computer peripherals as well as computer memory upgrades.⁵³
41. The Parties hold the view that a single market for DRAM exists. The Parties recognised that there are meaningful differences with respect to different DRAMs, producers and application characteristics. That said, the Parties

⁴⁷ Section (iv) of Form M1, Part 5

⁴⁸ Paragraph 18.1 of Form M1

⁴⁹ Paragraph 19.1 of Form M1

⁵⁰ Paragraph 18.4 of Form M1

⁵¹ Paragraph 19.1 of Form M1

⁵² Paragraph 19.2 of Form M1

⁵³ Paragraph 19.3 of Form M1

referred to an European Commission (“EC”) decision in *Case No. Comp/jv.44 – Hitachi/NEC-DRAM/JV*, wherein there was no differentiation made between different types of DRAMs.⁵⁴

42. From the demand-side perspective, the EC noted that DRAMs are commodity products with specifications standardised by the Joint Electron Device Engineering Council (“JEDEC”). The same type of DRAM could be supplied by various suppliers around the world.⁵⁵ When customers are designing their products, they have an ability to design-in any type of DRAM that will provide sufficient functionality for their product. For example, for personal computer and consumer electronics products, DRAM customers often design-in one or more chipsets which enable transitions from one generation of DRAM to another or from one type of DRAM to another. Therefore, even after the design phase, customers can generally ensure they will have a supply of DRAMs and would be able to easily substitute different types of DRAMs when manufacturing their products.⁵⁶
43. From the supply-side perspective, the Parties submitted that it is generally not difficult for a producer to switch production between different types of DRAMs.⁵⁷ Equipment used to manufacture DRAM can be used to make most product type.⁵⁸ Hence, as long as a supplier is qualified by the customer for a product, a supplier can relatively easily switch from manufacturing one type of DRAM to another simply by adjusting its internal operations, and suppliers often ramp production from one type of DRAM to another depending on customer needs. The qualification process usually takes only four to six months, after which the supplier can ramp its production accordingly. Micron can switch between DRAM products (i.e. design IDs), which also captures movements between market segments (PC to mobile as an example), typically within [X].⁵⁹

CCS’ assessment

44. CCS notes that there had been a previous decision by the EC involving DRAM that had considered the existence of different sub-categories according to size, applications and end-products, but ultimately the EC did not find it necessary to further delineate the DRAM market.⁶⁰

⁵⁴ Paragraph 20.1 of Form M1

⁵⁵ Paragraph 19.10 of Form M1

⁵⁶ Paragraph 20.2 of Form M1

⁵⁷ Paragraph 20.3 of Form M1

⁵⁸ Paragraph 19.11 of Form M1

⁵⁹ Paragraph 20.3 of Form M1

⁶⁰ Case No. Comp/jv.44 – Hitachi/NEC-DRAM/JV

45. From its market inquiry, CCS observed that customers can generally switch between different types of DRAM. According to customers, the main DRAM technology currently available today is DDR3 and DDR2.⁶¹ Such DRAMs are widely used in most end products particularly for PC related applications. According to an industry analyst, DDR3 and DDR2 accounted for approximately [70-80]% and [20-30]% of the DRAM market in 2011 respectively.⁶² The wide spread adoption of such DRAM product was supported by the setting of common specifications by JEDEC.
46. The ease of switching would depend on whether the customer had enabled the use of different types of DRAM at the design stage. According to [X], to switch DRAM could require a design change to its server using the DRAM. The difficulty varies based on the design. In the same vein, [X] noted that if a DRAM had not been qualified for use by its module, it may need a long time to conduct the qualification process. That said, [X] opined it will be easy to switch between DRAMs which they had already qualified.
47. CCS had also enquired whether DRAM can be easily substituted with other memory products such as SRAM, EPROM and ASIC. On the whole, customers are of the view that there is no close substitute of DRAM. [X] noted that there is no standalone product which can be considered as a substitute. Other memory products have significantly different functionality and price point.
48. In light of the above, CCS will consider the entire DRAM market as the relevant product market for the purpose of this assessment. Whether DRAM should be broken down further by end use or other technical characteristics, CCS is of the view that further segregation is not necessary as it does not affect the eventual competition assessment.

(b) Geographic Market

49. The Parties submitted that the relevant geographic market is worldwide in scope.⁶³ Customers of DRAM products are generally large OEMs which are dispersed on a worldwide scale. Similarly, manufacturers of DRAMs are also international entities that operate on a global scale. For instance, Micron has manufacturing plants located in the United States, China, Israel, Italy,

⁶¹ Feedback from [X] to Question 4 of CCS Questionnaire to customers.

⁶² Gartner, August 2012. This information was provided by the Parties in their letter dated 18 December 2012.

⁶³ Paragraph 20.4 of Form M1

Malaysia, Puerto Rico, Chinese Taipei, Japan, and Singapore, whereas Elpida's production facilities are in Japan.⁶⁴ Moreover, transportation and distribution costs across geographical borders are low and trade barriers are marginal.⁶⁵

CCS' assessment

50. Inquiries by CCS yielded findings that supported the Parties view. Feedback from third parties has shown that the locations of suppliers are not a matter of concern for them, and customers generally source from different suppliers without any geographical constraints. For instance, [X] stated that their strategy is to have suppliers with manufacturing lines in different geographies. As such, CCS is of the view that the DRAM market is worldwide in scope for the purpose of this assessment.

VII. Market Structure

(a) Market shares and market concentration

51. The Parties submitted that the market shares of DRAM manufacturers are as follows:⁶⁶

Table 1: 2011 Market Shares of DRAM Manufacturers

DRAM Manufacturers	Market Share by Sales Revenue
Samsung	[40-50]%
Hynix	[20-30]%
Elpida	[10-20]%
Micron	[10-20]%
Nanya	[0-10]%
Others ⁶⁷	[0-10]%
CR 3 Pre-Transaction	[70-80]%
CR 3 Post-Transaction ⁶⁸	[80-90]%

Note: Market share figures are from iSuppli

⁶⁴ Paragraph 19.19 of Form M1

⁶⁵ Paragraph 28.1 of Form M1

⁶⁶ Annex 9 of M1 form; source is from iSuppli

⁶⁷ For the ease of reference, CCS has consolidated the market shares of eight other smaller DRAM players and other unnamed DRAM players in the report provided by the Parties under the category "Others". In the original submission under Annex 9 of the M1 form, "others" excluding the ten other smaller DRAM players constitutes 0.2% of the entire DRAM market share.

⁶⁸ CR3 Post-Transaction does not include the market share of Rexchip. In any case, the size of Rexchip [X]. According to paragraph 4.2 of the Annex to their 12 December 2012 letter, the Parties estimates the market share of Rexchip to be [0-10]%.

52. Based on information provided by the Parties, the combined market share of Elpida and Micron is [20-30]%. CCS notes that the market share estimates in Table 1 is aligned with market share figures provided by third parties.⁶⁹
53. As set out in the *CCS Guidelines on the Substantive Assessment of Mergers*, CCS is generally of the view that competition concerns are unlikely to arise in a merger situation unless the merger entity will have a market share of 40% or more, or the merged entity will have a market share of between 20% and 40% with the post-merger CR3 at 70% or more.⁷⁰ The market shares of the Parties have exceeded the latter thresholds, with a combined market share of [20-30]% and a CR 3 Post-Transaction share of [80-90]%. However, as highlighted in the *CCS Guidelines on the Substantive Assessment of Mergers*, these thresholds are simply indicators of potential competition concerns. They do not give rise to a presumption that the merger will lessen competition substantially.⁷¹ Other factors (such as the entry of new competitors, the expansion of existing competitors, countervailing buyer power, among others) should be considered to determine whether the Transaction would result in a substantially lessening of competition.⁷²

Barriers to entry and expansion

54. New entry and the threat of entry can represent important competitive constraints on the behaviour of the merged entity. For new entry (actual or potential) to be considered a sufficient competitive constraint on the merged entity it must be timely and sustainable, likely and sufficient in scope.⁷³
55. The Parties submitted that due to the low barriers of entry and low applicable transport costs, any manufacturer in the world can enter the market for DRAM. However, the Parties recognise that a new entrant will be faced with high initial set-up and capital costs to develop and license the intellectual property rights to produce DRAMs. It may take up to 18 to 24 months for a new facility to be constructed and start producing wafer.⁷⁴ In addition, the Parties noted that there have been no new entrants or any potential entrant for the past five years.⁷⁵ The whole DRAM industry has witnessed a price dip

⁶⁹ Market shares provided by [X] and [X].

⁷⁰ Paragraph 5.15 of *CCS Guidelines on the Substantive Assessment of Mergers*. CR3 refers to the combined market shares of the three largest firms.

⁷¹ Paragraph 5.16 of *CCS Guidelines on the Substantive Assessment of Mergers*

⁷² Paragraph 7 of *CCS Guidelines on the Substantive Assessment of Mergers*

⁷³ Paragraphs 7.3 to 7.1 of *CCS Guidelines on Substantive Assessment of Mergers*

⁷⁴ Paragraph 30.1 of Form M1

⁷⁵ Paragraph 29.1 of Form M1

since 2007 due to an oversupply of the market, which may have reduced the incentives for new entrants to enter the market. That said, it also means that incumbent manufacturers are not likely to be able to exercise market power to increase prices.⁷⁶

56. The CCS notes that the production of DRAM is capital intensive. The amount of investment needed to build new capacity of sufficient scale, and the time taken to breakeven on its investments is substantial.⁷⁷ In addition, it would also need to take a considerable length of time (18 to 24 months) before a new entrant or an existing producer can bring the new capacity to the market. Given the above, CCS is of the view that, although there are no barriers such as in the form of regulations, the high capital investment costs indicate that the competitive constraint from new entrants may be relatively low in the short-term. This assessment is likely to be similar whether in the presence or absence of the Transaction.

Oversupply in the industry

57. CCS observes that the DRAM industry appears to be in a downturn and is experiencing oversupply condition. According to several industry analysts, the DRAM market has been suffering from weak demand and oversupply over the past few years which resulted in depressed average selling prices (“ASP”) of DRAM products.⁷⁸ For instance, ASP of DRAMs is estimated to have fallen by almost [X]% since 2007.⁷⁹ Analysts do not expect the outlook of the industry to improve with the oversupply condition likely to persist into 2013.⁸⁰

⁷⁶ Paragraph 30.2 of Form M1

⁷⁷ For instance, the Parties estimated that it would cost an established producer approximately USD [X] and a new entrant approximately USD [X] to invest in a new fabrication plant to gain a 5% market share. See Paragraph 26.3 of Form M1.

Assuming operating margins of 10%, the estimated breakeven for an established player and the new entrant is approximately [X] years and [X] years respectively. Paragraphs 43.2 and 43.3 of the Annex to the Parties’ response to dated 14 December 2012.

⁷⁸ “*Lack of Unified Production Cut Efforts from DRAM Industry’s Big Three May Cause Oversupply Situation to Extend to 2013*”, Trendforce, 13 September 2012; “*Global Memory Market*”, JP Morgan, 6 April 2012, “*Updating NAND/DRAM Supply and Demand Models*”, Susquehanna Financial Group, 10 June 2012

⁷⁹ DRAM Q1 2012 Market Tracker Data, iSuppli, Q12012

⁸⁰ Capacity utilisation rate is typically not used as an indicator of oversupply in the DRAM industry. Investing in a fabrication plant involves substantial fixed cost while the cost of producing an incremental unit of wafer is significantly small in comparison. According to industry analysts, in the face of such cost incentives, DRAM producers will tend to keep its plant running at full capacity so long as the cost of doing so exceeds variable cost.

58. The current state of the industry has also been echoed by several third parties. For instance, [X] commented that there is oversupply in the DRAM industry due to declining PC sales and overinvestment in the past.⁸¹ [X] mentioned that the industry is going through a severe down cycle with prices falling below cash costs for around three to four consecutive quarters.⁸²
59. As the merger will result in Elpida's productive capacity remaining in the market, CCS is of the view that the general trend of significant oversupply in the DRAM industry is likely to persist and that DRAM manufacturers are unlikely to be able to exercise any significant market power under such market conditions. Under the counterfactual, the oversupply situation would likely be alleviated given that Elpida is the third largest player in the DRAM market. As that it would take time for new capacity to enter the market, and existing producers might be able to exert greater pricing power in the short-term. This view is supported by feedback from third parties and industry analyst.⁸³

Countervailing buyer power

60. The Parties submitted that its top customers consist of major OEMs and account for a significant proportion of the Parties' revenues.⁸⁴ Such OEMs are sophisticated customers who generally source from a number of producers, to hedge against market uncertainties and to reduce over-reliance on any one producer. As a result, customers are able to exert significant pricing pressure on DRAM suppliers.⁸⁵
61. CCS notes that DRAMs are commodity products with specifications standardised by JEDEC. The Parties submitted that the same type of DRAM could be supplied by various suppliers around the world.⁸⁶ Response from customers corroborates the view that similar DRAM from different suppliers could act as substitutes, as DRAMs are produced under the JEDEC industry standard.⁸⁷ Therefore, customers tend to source from multiple suppliers to

⁸¹ Feedback from [X] to Question 1 of CCS Questionnaire to customers

⁸² Feedback from [X] to Question 3 of CCS Questionnaire to customers

⁸³ Feedback from [X] to Question 24 of CCS Questionnaire of customers;

"Elpida bankruptcy set to boost DRAM prices and revenue", iSuppli, March 2, 2012 <http://www.isuppli.com/Memory-and-Storage/News/Pages/Elpida-Bankruptcy-Set-to-Boost-DRAM-Prices-and-Revenue.aspx>

⁸⁴ Paragraph 34.17 of Form M1

⁸⁵ Paragraph 34.19 of Form M1

⁸⁶ Paragraph 19.10 of Form M1

⁸⁷ Feedback from [X] to Question 15 of CCS Questionnaire to customers

mitigate the risk of supply disruptions.⁸⁸ This reduces the customer's reliance on a particular DRAM manufacturer.

62. In addition, feedback from customers has shown that generally they are able to negotiate supply terms with DRAM suppliers and in the event that prices increase by 10%, they will most likely switch to other suppliers.⁸⁹ CCS understands that switching, however, is not seamless; customers will need a few months to qualify and review a new supplier.⁹⁰ As such, CCS concludes that DRAM buyers possess significant countervailing powers over suppliers due to the presence of alternative suppliers and the practice of customers to source from multiple suppliers to lower supply risk.
63. Comparing the counterfactual to the Transaction, CCS is of the view that customer's bargaining power may be reduced in the short-term as a decrease in the productive capacity of DRAM from the market would put existing producers in a better position to dictate prices and other terms of supply. For instance, [X].⁹¹

VIII. Competition Assessment

(a) Non-coordinated effects

64. Non-coordinated effects may arise where, as a result of the Transaction, the merged entity finds it profitable to raise prices (or reduce output or quality) because of the loss of competition between the merged entity.⁹²
65. Relative to the counterfactual, CCS is of the view that non-coordinated effects are unlikely to arise in the relevant market as a result of the Transaction. Given weak demand in the DRAM market and persistent excess supply, it is unlikely that the Parties would hold significant market power in the supply of DRAM products. This view is also supported by third parties who noted that the merged entity is unlikely to have the power to unilaterally increase prices.⁹³
66. In addition, DRAM customers in general are able to exert strong countervailing buyer power. Feedback shows that customers procure from multiple suppliers from multiple countries concurrently. Customers are

⁸⁸ Feedback from [X] to Questions 5 and 13 of CCS Questionnaire to customers

⁸⁹ Feedback from [X] to Question 10 of CCS Questionnaire to customers

⁹⁰ Feedback from [X] to Question 14 of CCS Questionnaire to customers

⁹¹ Feedback from [X] to questions 24 and 3 of CCS Questionnaire to customers

⁹² Paragraph 6.3 of *CCS Guidelines on the Substantive Assessment of Mergers*

⁹³ Feedback from [X] to Question 2 of CCS Questionnaire to customers

therefore able to procure globally and can exercise buyer power with the ability to switch to competitors should the Parties raise prices. Therefore, CCS is of the view that these factors will likely act as competitive constraints on the Parties in attempting to raise prices, reduce quality or reduce output post-merger.

(b) Coordinated effects

67. A merger may also lessen competition substantially by increasing the possibility that post-merger, firms in the same market may coordinate their behaviour to raise prices, or reduce quality or output. Given certain market conditions, and without any express agreement, tacit collusion may arise merely from an understanding that it will be in the firms' mutual interests to coordinate their decisions. Coordinated effects may also arise where a merger reduces competitive constraints in a market, thus increasing the probability that competitors will collude or strengthen a tendency to do so.⁹⁴
68. Similarly, CCS is of the view that the Transaction, relative to the counterfactual, is unlikely to give rise to coordinated effects in the relevant market. As noted above, the DRAM market has been in a state of oversupply for several years. Feedback from third parties further indicates the DRAM market is very competitive with manufacturers pricing DRAMs near and at times below cash cost.⁹⁵ Furthermore, coupled with the fact that DRAM manufacturers tend to operate at full capacity to leverage on economies of scales⁹⁶, competitors face strong incentives to compete on prices to capture market shares and thus making coordination unlikely. In fact, the Parties have submitted that producers of DRAM may continue producing even when prices are below average variable cost because there are significant costs associated with stopping and restarting a production line.⁹⁷
69. The Parties submitted that demand for DRAM tends to be lumpy, which makes coordination difficult.⁹⁸ CCS notes from the feedback provided by customers that the contracts undertaken between the DRAM suppliers and customers are of varying duration and prices are dependent on the contract terms negotiated, which reduces the transparency of DRAM prices charged by the different suppliers.

⁹⁴ Paragraph 6.7 of *CCS Guidelines on Substantive Assessment of Mergers*

⁹⁵ Feedback from [X] to Questions 3 and 22 of CCS Questionnaire to customers

⁹⁶ Paragraph 31.2 of the Annex to the Parties' submission dated 12 December 2012

⁹⁷ Paragraph 20.3 of the Annex to the Parties' submission dated 20 December 2012

⁹⁸ Paragraph 35.4 of From M1

70. Third-party feedback also indicates that pricing is not the only factor in customers' procurement decisions. Factors such as long-term supply availability, quality, payment terms, financial stability and delivery time are also important in customers' decision-making.⁹⁹ Differentiation therefore increases the difficulty for competitors to coordinate behavior.
71. On balance, CCS concludes that the presence of constraints such as oversupply in the DRAM market as well as differentiated services and contract terms would likely limit coordinated effects post-merger.

IX. Conclusion

72. For the reasons above and based on the information available, CCS assesses that the proposed Transaction will not infringe section 54 of the Act.
73. In accordance with section 57(7) of the Act, this decision shall be valid for a period of one year from the date of the decision.



Yena Lim
Chief Executive
Competition Commission of Singapore

⁹⁹ Feedback from [X] to Question 7 of CCS Questionnaire to customers