



# DETERMINATION OF MERGER NOTIFICATION M/19/027 APPLIED MATERIALS INC – KOKUSAI ELECTRIC CORPORATION

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## Section 21 of the Competition Act 2002

**Proposed acquisition by Applied Materials Inc. of sole control of Kokusai Electric Corporation.**

**Dated 11 October 2019**

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### **Introduction**

1. On 3 September 2019, in accordance with section 18(1)(a) of the Competition Act 2002, as amended (the “Act”), the Competition and Consumer Protection Commission (the “Commission”) received a notification of a proposed acquisition whereby Applied Materials, Inc. (“Applied Materials”) would acquire sole control of Kokusai Electric Corporation (“Kokusai”) (the “Proposed Transaction”).

### **The Proposed Transaction**

2. The Proposed Transaction will be implemented pursuant to a share purchase agreement dated 30 June 2019 between Applied Materials, Kokusai and KKR HKE Investment L.P., which owns and controls Kokusai. Following implementation of the Proposed Transaction, Applied Materials will have sole control of Kokusai.

### **The Undertakings Involved**

#### *The Acquirer – Applied Materials*

3. Applied Materials is based in Santa Clara, California in the United States of America and is quoted on the NASDAQ stock market.<sup>1</sup> Applied Materials operates in a number of

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<sup>1</sup> Further details of Applied Materials’ NASDAQ stock market listing are available from:

<https://www.nasdaq.com/market-activity/stocks/amat>



locations around the world including Europe, Japan, the United States of America, Israel, China, India, southeast Asia and Japan.

4. Applied Materials provides manufacturing equipment, services and software to the semiconductor, display and related industries. Applied Materials' semiconductor products include wafer fabrication equipment ("WFE") which is used to perform certain steps in the semiconductor fabrication process including non-furnace atomic level deposition ("ALD") and chemical vapour deposition ("CVD") as well as other processes.
5. Applied Materials does not manufacture any products in the State and its activities in the State are limited to the distribution, installation and maintenance of, and after-sales services.
6. For the financial year ending 31 December 2018, Applied Materials generated worldwide turnover of €[...]billion, of which approximately €[...] million was generated in the State.<sup>2</sup>

#### *The Target – Kokusai*

7. Kokusai is a privately-owned company and is based in Tokyo, Japan. Kokusai is wholly-owned by KKR HKE Investment L.P., which is indirectly controlled by KKR & Co. Inc./KKR Management LLC ("KKR"). KKR is a global asset manager which offers a broad range of alternative asset management services to public and private investors. KKR acquired Kokusai in 2017.
8. Kokusai supplies WFE tools, including furnace ALD and CVD tools used in the deposition of furnace oxidation/diffusion tools, representing over [...] % of its worldwide WFE sales. Kokusai also offers support services for its own tools, including parts, alterations and intellectual property licensing to suppliers.
9. In the State, Kokusai's activities are limited to the distribution, installation and maintenance of, and after sales service for furnace deposition tools.

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<sup>2</sup> In accordance with paragraphs 204 and 205 of the European Commission's Consolidated Jurisdictional Notice, the Parties calculated the turnover in the State on the basis of the average rate for the twelve months concerned (1 January 2018 – 31 December 2018) using the ECB website rates for the period (1.1810 USD = 1 EUR).



10. For the financial year ending 31 December 2018, Kokusai generated worldwide turnover of approximately €[...]billion, of which €[...]million was generated in the State.<sup>3</sup>

### **Rationale for the Proposed Transaction**

11. The Parties state in the notification:

*“The purpose of the Proposed Transaction is to enable [Applied Materials] to leverage [Kokusai’s] technologies products, and expertise to enhance innovation, accelerate R&D, and provide solutions for customers in a growing furnace tool market.”*

### **Third Party Submissions**

No submission was received.

### **Competitive Analysis**

#### *Horizontal overlap*

12. Globally, the Parties are both active in the supply of WFE tools. However, the Parties submit that, for the reasons set out below, the Proposed Transaction will not give rise to any horizontal overlaps in the supply of WFE tools either globally (with one exception) or in the State, since the Parties supply different WFE tools, which are not substitutable and do not compete.
13. Semiconductor chips are built on “wafers,” or thin slices of silicon, using hundreds of sequential steps and a variety of tools. WFE is an extremely broad industry category that includes a wide range of tools used for different applications during different steps of the semiconductor manufacturing process.
14. Those steps include depositing material on the wafer (“deposition”), removing material from the wafer (“etching”, “cleaning” and “stripping”), quickly heating and cooling the wafer (“rapid thermal processing”), and exposing the wafer to ionized gases such as

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<sup>3</sup> In accordance with paragraphs 204 and 205 of the European Commission’s Consolidated Jurisdictional Notice, the Parties calculated the turnover in the State on the basis of the average rate for the twelve months concerned (1 April 2017 – 31 March 2018) using the ECB website rates for the period (0.007716 EUR = 1 YEN).



nitrogen (“integrated plasma treatment”) and oxygen (“non-integrated plasma treatment”). After the wafer has been fabricated, it is packaged and cut into individual chips (“packaging” and “dicing”), which are then used in electronic devices.

15. There are different types of deposition tools used for different materials being deposited, the available thermal budget and the stage of the wafer fabrication process.
16. The Parties state that the deposition tools that each of the Parties offer are not substitutes for one another and do not compete with each other:
  - The only kind of deposition tool Kokusai offers is the furnace CVD and ALD tool. Furnace CVD and ALD tools perform chemical vapor deposition and atomic layer deposition in a large chamber on up to 50-150 wafers simultaneously. Each wafer is treated by the same precursor at the same time in the same chamber.
  - Applied Materials does not offer any furnace deposition tools or in particular, furnace CVD and ALD tools, and focuses exclusively on non-furnace CVD and ALD tools, which treat wafers individually.
17. Table 1 below shows the area of overlap in the WFE tools supplied by the Parties and the global revenue generated from each WFE product. Table 1 shows there is one area of overlap at global level, i.e. Rapid Thermal Processing (RTP).



**Table 1: Parties' 2018 Wafer Fabrication Equipment Revenue by Segment**

WFE segment	2018 Revenue (\$M) <sup>4</sup>	
	Applied Materials	Kokusai
<i>Deposition</i>		
Furnace (CVD) and (ALD) Tools	X	[...]
Non-Furnace CVD and ALD Tools	[...]	X
Epitaxy Tools	[...]	X
Physical Vapor Deposition (PVD) Tools	[...]	X
Electro-Chemical Deposition (ECD) Tools	[...]	X
<i>Thermal Processing</i>		
RTP	[...]	[...]
Furnace Oxidation/Diffusion	X	[...]
<i>Plasma Treatment</i>		
Non-Integrated Plasma Treatment Tools	X	[...]
Integrated Plasma Treatment Tools	[...]	X
<i>Material Removal and Cleaning</i>		
Dry Etch	[...]	X

<sup>4</sup> Gartner (2018) (calendar year data). Gartner, Inc. is a research and advisory firm providing information, advice, and tools for businesses in IT, finance, HR, customer service and support.



WFE segment	2018 Revenue (\$M) <sup>4</sup>	
	Applied Materials	Kokusai
Chemical Mechanical Planarization (CMP) and Post-CMP Clean	[...]	X
Dry Strip	X	[...]
<i>Process Control</i>		
Process Control	[...]	X
<i>Other</i>		
Lithography	[...]	X
Doping Equipment	[...]	X
Manufacturing Automation and Control	[...]	X
<i>Total</i>		
Total Wafer Fabrication Equipment	[...]	[...]

Source: Gartner Calendar Year 2018 Data

### *Competitive Assessment*

18. The Commission defines markets to the extent necessary depending on the particular circumstances of a given case. In this case, it is not necessary for the Commission to conclude on the relevant product markets in respect of WFE tools, as regardless of whether the potential product markets are narrower (CVD and ALD tools) or broader (all WFE tools), the Proposed Transaction is unlikely to raise any competition concerns.
19. Similarly, with respect to the geographic market, the Commission accepts that for the purposes of this determination, it is not necessary for the Commission to conclude on the relevant geographic market, as regardless of whether the potential geographic



market is narrower (i.e., the State), or broader (i.e., worldwide), the Proposed Transaction is unlikely to raise any competition concerns.

20. The Parties are both active in the supply of WFE tools globally but they state that their products are not substitutable. Furnace and non-furnace CVD and ALD tools are different in various aspects:
  - Furnace tools are relatively cheap (from \$[...] to \$[...]) and can process many wafers at a time (typically 100 to 175 in a single chamber) at relatively high temperatures (~800°C).
  - Non-furnace tools are generally more expensive (\$[...] to \$[...]) on a per wafer pass basis and process only a few wafers at a time (one to two in a single chamber for single-wafer tools and up to six in a single chamber for spatial tools) at relatively low temperatures (~400°C).
21. As shown in Table 1, globally, Kokusai only supplies furnace CVD and ALD tools. In contrast, globally, Applied Materials supplies a number of different types of deposition tools, including non-furnace CVD and ALD tools. Applied Materials does not supply any furnace CVD and ALD tools to customers in the State.
22. Applied Materials supplies [...] in the State and Kokusai supplies [...] to [...] in the State.
23. While Applied Materials supplies [...] in the State, Kokusai does not supply these products in the State.
24. There is a *de minimis* overlap (c. [...] % increment to combined shares) globally in the supply of RTP tools.
25. In light of the above, the Commission considers that the Proposed Transaction does not raise any horizontal competition concerns with respect to the supply of WFE tools either globally or in the State.

#### *Vertical overlap*



26. The Parties have stated in the notification that there is no vertical relationship between Applied Materials and Kokusai. The Commission has not identified any vertical relationship between the Parties. On this basis, the Commission considers that the Proposed Transaction does not raise any vertical competition concerns in the State.

#### **Conclusion**

27. In light of the above, the Commission considers that the Proposed Transaction will not substantially lessen competition in any market for goods or services in the State.

#### **Ancillary Restraints**

28. No ancillary restraints were notified.





### **Determination**

The Competition and Consumer Protection Commission, in accordance with section 21(2)(a) of the Competition Act 2002, as amended, has determined that, in its opinion, the result of the proposed acquisition whereby Applied Materials, Inc. would acquire sole control of Kokusai Electric Corporation, will not be to substantially lessen competition in any market for goods or services in the State, and, accordingly, that the acquisition may be put into effect.

For the Competition and Consumer Protection Commission

**Brian McHugh**  
**Member**  
**Competition and Consumer Protection Commission**