

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD

Petitioner

v.

DSS TECHNOLOGY MANAGEMENT, INC.

Patent Owner

U.S. Patent No. 5,652,084

Title: METHOD FOR REDUCED PITCH LITHOGRAPHY

Inter Partes Review No. IPR2014-_____

DECLARATION OF BRUCE SMITH, Ph.D.
UNDER 37 C.F.R. § 1.68

I, Bruce Smith, do hereby declare:

I. INTRODUCTION

1. I am making this declaration at the request of Samsung Electronics Co., Ltd. in the matter of the *Inter Partes* Review of U.S. Patent No 5,652,084 (“the 084 Patent”) to James M. Cleaves.

2. In the preparation of this declaration, I have reviewed the following:

- (a) The 084 Patent (Samsung-1001);
- (b) The prosecution history of the 084 Patent (Samsung-1002);
- (c) IBM Technical Disclosure, volume 32, number 8A (January 1990) (Disclosure 1) (Samsung-1003)
- (d) U.S. Patent No. 5,710,061 (the “061 Patent”) (Samsung-1004);
- (e) Certified translation of Japanese Patent App. No. 04-71222 (“Jinbo”) (Samsung-1005);
- (f) U.S. Patent No. 5,667,940 (“Hsue”) (Samsung-1006);
- (g) U.S. Patent No. 4,931,351 (“McColgin”) (Samsung-1007);
- (h) U.S. Patent No. 4,548,688 (“Matthews”) (Samsung-1008); and
- (i) U.S. Patent No. 5,158,910 (“Cooper”) (Samsung-1009).
- (j) W.H.-L. Ma., Plasma Resist Image Stabilization Technique (PRIST), IEEE Electron Devices Meeting, 1980 International, vol. 26, pp. 574-75, 1980 (Samsung-1010).

3. Additionally, I have reviewed the Petition for *Inter Partes Review* of the 084 Patent filed by TSMC, and the Declaration of Richard Blanchard. To avoid unnecessary complexity, certain parts of this declaration are substantially similar to Dr. Blanchard’s declaration. In certain instances, I note where Dr. Blanchard and I have reached the same or similar conclusions.

4. In forming the opinions expressed below, I have considered:

- (a) The documents listed above, and
- (b) My knowledge and experience based upon my work in this area as described below.

5. The application that led to the issuance of the 084 Patent was a continuation of an application filed on December 22, 1994. I am familiar with the technology at issue and am aware of the state of the art around this time. Based on the technologies disclosed in the 084 Patent, I agree with Dr. Blanchard's opinion that a person of ordinary skill in the art ("POSITA") would include someone who has a B.S. degree in Electrical Engineering, Material Science, or Physics, or equivalent training, as well as 3-5 years of experience in the field of integrated circuit (IC) fabrication¹ and lithographic fabrication techniques. In addition, a POSITA would also include someone who has an M.A. degree in any of these disciplines as well as 1-3 years experience in this field. My analyses and opinions below are given from the perspective of POSITA in these technologies in this timeframe, unless stated otherwise.

¹ Note that Dr. Blanchard's opinion also includes the field of "integrated circuit (IC) design." I believe the subject matter of the 084 Patent is more closely related to the field of IC fabrication and, more specifically, lithographic fabrication techniques.

II. QUALIFICATIONS AND COMPENSATION

6. I am currently the Director of the Microsystems Engineering Ph.D Program at Rochester Institute of Technology (“RIT”). I am also Director of RIT’s Center for Nanolithography Research, and President of Lithographic Technology Corp/Amphibian Systems. In addition, I have co-authored a leading text on optical lithography, the relevant field of technology for the 084 patent.²

7. I began working with the relevant technology in the commercial industry in 1983, when I worked at Gould AMI Semiconductor in the Process Development Group. I moved to Digital Equipment Corp. in 1986. I became a professor in RIT’s Microelectronic Engineering Department of the Kate Gleason College of Engineering in 1988. I have taught at RIT up to and including the present.

8. While teaching at RIT, I became Intel Professor of Research and Technology from 2000-2007. From 2001 until 2004, I served as Associate Dean of Graduate Programs for the Kate Gleason College of Engineering. In 2008, I became Director of the Microsystems Engineering Ph.D Program.

² See Microolithography: Science and Technology, 2nd Edition, K. Suzuki and B.W. Smith, ed., CRC Press, Taylor and Francis: New York, 2007.

9. During my tenure in academia, I have continued to be involved in the industrial side of photolithographic technology. Since 1998, I have been President of Lithographic Technology Corp/Amphibian Systems.

10. I have written about and studied the photolithography field extensively for decades. I have a Ph.D. in Imaging Science. I have published over 100 articles relating to this field. I also am a named inventor on dozens of patents in the photolithography field. A copy of my curriculum vitae is attached as Samsung-1012, which includes additional information regarding my education, publications, and patents.

11. Additionally, I have been asked to present on optical lithography at conferences and symposiums around the world. I have continually given presentations on this technology every year since joining RIT in 1988.

12. I have received numerous awards for my work in this field, including being named a Fellow at SPIE, a professional organization for photo-optical engineers dating back to 1955 under the original name Society of Photographic Instrumentation Engineers. I am also a Fellow of the Optical Society of America. My curriculum vitae includes additional information regarding my awards and professional memberships. *See* Samsung-1012.

13. I am being compensated at a rate of \$475.00 per hour, with reimbursement for actual expenses for my work related to this matter. My

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