# UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

REALTEK SEMICONDUCTOR CORP., Petitioner,

v.

ATI TECHNOLOGIES ULC Patent Owner.

Case No. IPR2023-00922 U.S. Patent No. 8,760,454

### DECLARATION OF DR. WILLIAM MANGIONE-SMITH REGARDING U.S. PATENT NO. 8,760,454

I declare under penalty of perjury under the laws of the United States of America that the following is true and correct.

September 6, 2023

Respectfully Submitted)

Dr. William Mangione-Smith

### **TABLE OF CONTENTS**

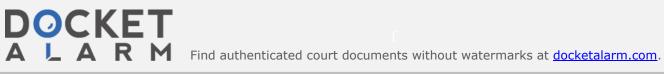
			Page			
I.	INT	RODUCTION	1			
II.	SUN	SUMMARY OF CONCLUSIONS				
	A.	Summary of Conclusions Regarding Reduction to Practice, Conception, and Diligence	2			
	В.	Summary of Conclusions Regarding Validity				
III.	EXP	PERT QUALIFICATIONS	3			
IV.	HIGH LEVEL GRAPHICS PROCESSING OVERVIEW7					
	<ul><li>A.</li><li>B.</li><li>C.</li></ul>	Graphics Processors Use Vertex and Pixel Data to Create Display Images	10			
V.	OVERVIEW OF THE '454 PATENT14					
	A. B.	The '454 Patent's Unified Shader  The Unified Shader Can Simultaneously Execute Vertex And Pixel Threads And Switch Quickly Between Threads At	14			
	C.	Various Degrees Of Completion				
	D.	Process By Evaluating Dynamic Storage Capacity  The Invention Of The '454 Patent Triggers Execution By Transmitting Data Rather Than Instructions				
	E.	<ol> <li>The '454 Patent's Challenged Claims</li></ol>	1919 ations19 cessor ponse			
VI.	REL	LEVANT LEGAL STANDARDS	21			
	A. B. C.	Conception and Reduction to Practice	23			



VII.	GEN	ERAL	DESIGN AND DEVELOPMENT PROCESS AT AMD $\dots$	25
VIII.	CON	CEPT]	ION	29
	A.	'454 1.	PatentClaim 1	
		2.	Claim 2	42
		3.	Claim 3	59
		4.	Claim 4	66
		5.	Claim 5	
		6.	Claim 6	84
		7.	Claim 7	86
		8.	Claim 8	91
		9.	Claim 9	94
		10.	Claim 10	98
		11.	Claim 11	101
IX.	DILI	GENC	E IN REDUCING TO PRACTICE	108
X.	CON	STRU	CTIVE REDUCTION TO PRACTICE	152
	A.	'454	Patent	153
		1.	Claim 1	
		2.	Claim 2	159
		3.	Claim 3	170
		4.	Claim 4	180
		5.	Claim 5	190
		6.	Claim 6	195
		7.	Claim 7	197
		8.	Claim 8	198
		9.	Claim 9	199
		10.	Claim 10	200
		11.	Claim 11	201
XI.			DONMENT, SUPPRESSION, OR CONCEALMENT OF	207
XII.	ASSE	ERTEI	O PRIOR ART	208
	A. Lindholm '685			
	В.		natides	
	C. Selzer			
VIII	EVA	ΙΙΙΛΤ	ION OF DETITIONED'S DDODOSED CDOLINDS	214



	A.	Grou	nd 1: Lindholm '685 and Lindholm '913 Do Not Render	
		the '4	54 Patent Obvious	214
		1.	No Unified Shader, Because No Ability to Switch Between	
			Unfinished Vertex And Pixel Threads (All Claims)	
		2.	No Determination of Data to Process Based On Evaluation	
			Data Storage Space (Claims 1, 3-11)	
		3.	No Execution of Instructions "In Response to" Receiving	215
		<i>J</i> .	Selected Data (Claim 2)	217
	B.	Groun	nd 2: Amanatides and Kohn Do Not Render the '454	21/
	Б.		t Obvious	210
		1.	No Unified Shader, Because No Ability to Switch Between	
			Unfinished Vertex And Pixel Threads (All Claims)	219
		2.	No Determination of Data to Process Based on Evaluation of	of
			Data Storage Space (Claims 1, 3-11)	220
		3.	No "Selected Data" (Claims 2, 5)	222
	C.	Grou	nd 3: Selzer and Fiske Do Not Render the '454 Patent	
		Obvio	ous	223
		1.	No Unified Shader, Because No Ability to Switch Between	
			Unfinished Vertex And Pixel Threads (All Claims)	
		2.	No Determination of Data to Process Based On Evaluation	
		2.	Data Storage Space (Claims 1, 3-11)	
		3.		220
		٥.	No Execution of Instructions "In Response to" Receiving	227
			Selected Data (Claim 2)	227
XIV	CON	CLUS	ION	228



## **TABLE OF ABBREVIATIONS**

Abbreviation	Full Description
AMD	Advanced Micro Devices, Inc.
ATI	ATI Technologies, ULC
GPU	Graphics processing unit



# DOCKET A L A R M

# Explore Litigation Insights



Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

# **Real-Time Litigation Alerts**



Keep your litigation team up-to-date with **real-time** alerts and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

# **Advanced Docket Research**



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## **Analytics At Your Fingertips**



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

#### API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

#### **LAW FIRMS**

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

#### **FINANCIAL INSTITUTIONS**

Litigation and bankruptcy checks for companies and debtors.

#### **E-DISCOVERY AND LEGAL VENDORS**

Sync your system to PACER to automate legal marketing.

