## UNITED STATES PATENT AND TRADEMARK OFFICE

## BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASML NETHERLANDS B.V., EXCELITAS TECHNOLOGIES CORP., AND QIOPTIQ PHOTONICS GMBH & Co. KG,

Petitioners

V.

ENERGETIQ TECHNOLOGY, INC., Patent Owner.

Case IPR2016-00583

DECLARATION OF J. GARY EDEN, PH.D. REGARDING U.S. PATENT NO. 7,435,982 CLAIMS 2, 5-9, 12-15, 20, 22, 28, 29, 35, AND 36



## **TABLE OF CONTENTS**

				<u>Page</u>			
I.	BACKGROUND						
II.	LEG	AL I	AL PRINCIPLES				
III.	PER	SON	OF ORDINARY SKILL IN THE ART	8			
IV.	OVE	ERVI	EW OF THE '982 PATENT	8			
	A.	Summary Of The Prosecution History					
V.	CLAIM CONSTRUCTION						
	A. "Light source"						
	B.	"H	igh brightness light"	13			
VI.		Laser Sustained Plasma Light Sources Were Known Long Before the Priority Date of the '982 Patent16					
VII.	GROUNDS FOR FINDING THE CHALLENGED CLAIMS INVALID.						
	A.	Cla	nims From Which The Challenged Claims Depend	17			
		1.	Claim 1 is Anticipated by Gärtner	18			
		2.	Claim 3 is Anticipated by Gärtner	21			
		3.	Claim 4 is Anticipated by Gärtner	22			
		4.	Claim 26 is Obvious over Gärtner	22			
		5.	Claim 30 is Anticipated by Gärtner	25			
	B.	Ground 1: Claims 8, 22, 35, And 36 Are Anticipated By Gärtner					
		1.	Claim 8 – "wherein the chamber comprises an ultraviolet transparent region"	27			
		2.	Claim 22 - "wherein the at least one laser is selected from t group consisting of an IR laser, a diode laser, a fiber laser, ytterbium laser, a $CO_2$ laser, a $YAG$ laser, and a gas dischalaser"	an rge			
		3.	Claim 35 – "delivering the high brightness light emitted by ionized medium to a tool"				
		4.	Claim 36 – "wherein the tool is selected from the group consisting of a wafer inspection tool, a microscope, a metro tool, a lithography tool, and an endoscopic tool"	logy 29			



C.	Ground 2: Claims 5, 9, 12, 14, 15, 28, And 29 Are Obvious Over Gärtner				
	1.	Claim 5 - "wherein the optical element is a lens selected from a group consisting of an aplanatic lens, an achromatic lens, a single element lens, and a fresnel lens"			
	2.	Claim 9 - "wherein the chamber or a window in the chamber comprises a material selected from the group consisting of qua Suprasil quartz, sapphire, $MgF_2$ , diamond, and $CaF_2$ "			
	3.	Claim 12 - "wherein the chamber comprises a dielectric material"	33		
	4.	Claim 14 - "wherein the dielectric material is quartz"	33		
	5.	Claim 15 - "wherein the chamber is an ultraviolet transparent dielectric chamber"	34		
	6.	Claim 28 - "wherein the optical element is configured to delive the electromagnetic radiation emitted by the ionized gas to a tool"			
	7.	Claim 29 - "wherein the tool is selected from the group consist of a wafer inspection tool, a microscope, a metrology tool, a lithography tool, and an endoscopic tool"	C		
D.	Ground 3: Claim 6 Is Obvious Over Gärtner In View Of Ito				
	1.	Claim 6 - "wherein the optical element is a mirror selected from the group consisting of a coated mirror, a dielectric coated mirror, a narrow band mirror, and an ultraviolet transparent infrared reflecting mirror"	m 37		
E.		ound 4: Claims 2, 7, And 20 Are Obvious Over Gärtner In	.45		
	1.	Claims 2, 7, 20	.45		
F.		ound 5: Claim 13 Is Obvious Over Gärtner In View of Sato			
	1.	Claim 13 – "wherein the chamber is a glass bulb"	.51		
		SE TO ARGUMENTS RAISED BY PATENT OWNER IN ITS			
A.	Pat	tent Owner's Arguments Regarding "High Brightness Light"	56		
B.		tent Owner's Arguments Regarding Objective Indicia of on-Obviousness	.61		



VIII.

## 



- I, J. Gary Eden, Ph.D., declare as follows:
- 1. My name is J. Gary Eden.

### I. BACKGROUND

- 2. I am the Gilmore Family Professor of Electrical and Computer Engineering and Director of the Laboratory for Optical Physics and Engineering at the University of Illinois in Urbana, Illinois.
- 3. I received a B.S. in Electrical Engineering (High Honors) from the University of Maryland, College Park in 1972 and an M.S. and Ph.D. in Electrical Engineering from the University of Illinois in 1973 and 1976, respectively.
- 4. After receiving my doctorate, I served as a National Research Council Postdoctoral Research Associate at the United States Naval Research Laboratory ("NRL"), Optical Sciences Division, in Washington, DC from 1975 to 1976. As a research physicist in the Laser Physics Branch (Optical Sciences Division) from 1976 to 1979, I made several contributions to the visible and ultraviolet lasers and laser spectroscopy field, including the co-discovery of the KrCl rare gas-halide excimer laser and the proton beam pumped laser (Ar-N<sub>2</sub>, XeF). In 1979, I received a Research Publication Award for this work at the NRL.
- 5. In 1979, I was appointed assistant professor in the Department of Electrical and Computer Engineering at the University of Illinois. In 1981, I became associate professor in this same department, and in 1983, I became



# DOCKET

# 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.

