IPR2020-01265 U.S. Patent No. 7,110,444 Patent Owner's Response

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
Intel Corporation
Petitioner
v.

Patent Owner

ParkerVision, Inc.

U.S. Patent No. 7,110,444

Issue Date: September 19, 2006
Title: WIRELESS LOCAL AREA NETWORK
(WLAN) USING UNIVERSAL FREQUENCY
TRANSLATION TECHNOLOGY INCLUDING
MULTI-PHASE EMBODIMENTS AND
CIRCUIT IMPLEMENTATIONS

Inter Partes Review No. IPR2020-01265

DECLARATION OF DR. MICHAEL STEER



Table of Contents

I.	BAC	KGROUND1						
II.	PRO	FESSIONAL QUALIFICATIONS1						
III.	MAT	TERIA	ERIAL CONSIDERED3					
IV.	LEG	LEGAL STANDARDS						
	A.	Obvi	iousness	5				
	B.	"Me	ans-plus-function" claim elements	6				
V.	LEV	EL OF	EL OF ORDINARY SKILL IN THE ART					
VI.	GENERAL OVERVIEW OF THE TECHONOLOGY							
	A.	Wire	ed communications	9				
	B.	Wire	eless communications	10				
	C.	Frequency.						
	D.	Up-conversion						
	E.	Down-conversion						
VII.	DETAILED TECHNOLOGY BACKGROUND13							
	A.	Radio frequency1						
	B.	Basic circuit concepts.						
	C.	Integrated circuits						
	D.	Circuit diagrams						
	E.	Circu	uit components	23				
		1.	Transistors	23				
		2.	Capacitors	24				
		3.	Resistor	27				



		4. Di	fferential amplifier	28	
	F.	Electrical load, high impedance loads and low impedance loads			
	G.	Signals; time domain and frequency domain representations of a signal.			
	H.	Baseband signals, carrier signals, modulation and up-conversion			
	I.	I/Q Modulation.			
	J.	Demodulation			
	K.	Transceiver.			
	L.	Direct conversion and intermediate frequencies			
	M.	History o	of RF receivers.	41	
		1. He	eterodyne receivers	42	
		2. Mi	ixers	44	
		3. Sa	mple-and-hold (voltage sampling)	47	
		4. En	nergy Sampling	54	
VIII.	ENE	RGY SAM	IPLING V. VOLTAGE SAMPLING	61	
IX.	U.S.	U.S. PATENT NO. 7,110,444			
	A.	Overview		62	
	B.	The patent discloses two fundamental different and competing systems for down-conversion.			
		1. En	nergy transfer (energy sampling)	72	
		2. Sa	mple-and-hold (voltage sampling)	77	
	C.	Prosecution history of the '444 patent			
X.	CLAIM CONSTRUCTION				
	A.	"storage element" (claim 3)			



	B.	"frequency down-conversion module" (claim 3)	85			
	C.	"subtractor module" (claim 3)	85			
XI.	SECONDARY CONSIDERATIONS					
	A.	Long-felt need.	86			
	B.	Others tried and failed.	87			
	C.	Unexpected results.	87			
	D.	Praise by others.	90			
	E.	Copying and commercial success.	91			
XII.	INTE	INTEL'S PRIOR ART REFERENCES				
	A.	U.S. Patent No. 6,230,000 to Tayloe ("Tayloe").	92			
	B.	Texas Instruments Datasheet for SN74CBT3253 DUAL 1-OF-4 FE MULTIPLEXER/DEMULTIPLEXER ("TI Datasheet")				
	C.	U.S. Patent No. 4,985,647 to Kawada ("Kawada")	110			
XIII.	VALIDITY OF THE '444 PATENT					
	A.	Tayloe does not render claim 3 invalid	111			
	B.	The TI Datasheet and Kawada do not resolve the deficiencies with Tayloe.	113			
XIV.	SUPPLEMENTATION1					



I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, would testify under oath as follows:

I. BACKGROUND

- 1. I have been retained as an expert on behalf of ParkerVision, Inc. ("ParkerVision") in the above-captioned matter (IPR2020-01265).
- 2. I have been asked by ParkerVision to provide my expert opinion regarding the validity of claim 3 of U.S. Patent No. 7,110,444 ("the '444 patent"). For the reasons set forth below, it is my opinion that claim 3 of the '444 patent is valid.

II. PROFESSIONAL QUALIFICATIONS

- 3. I am the Lampe Distinguished Professor of Electrical and Computer Engineering at North Carolina State University.
- 4. I received my Bachelor of Engineering with Honors (B.E. Hons) and Ph.D. in Electrical Engineering from the University of Queensland, Brisbane, Australia, in 1976 and 1983 respectively.
- 5. I was a pioneer in the modeling and simulation of nonlinear radio frequency and microwave circuits. To put this in perspective, the first commercial cellular phone became available in 1983, and in that same year, I began teaching classes in radio frequency circuit design. Specifically, I joined the Electrical Engineering Department at North Carolina State University, Raleigh, North



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.

