IPR2021-00990 U.S. Patent No. 7,110,444 Patent Owner's Response

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
TCL Industries Holdings Co., Ltd. and Hisense Co., Ltd., Petitioners

ParkerVision, Inc.
Patent Owner

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. IPR2021-00990

PATENT OWNER'S UPDATED EXHIBIT LIST



Exhibit	Description
2001	Complaint, ParkerVision, Inc. v. TCL Technology Group Corp. et al,
	Case No. 5:20-cv-01030 (CDCA)
2002	Proof of Service, ParkerVision, Inc. v. TCL Technology Group Corp. et
	al, Case No. 5:20-cv-01030 (CDCA)
2003	Complaint, ParkerVision, Inc. v. TCL Industries Holdings Co., Ltd. et
	al., Case No. 6:20-cv-00945 (WDTX)
2004	Complaint, ParkerVision, Inc. v. Hisense Co., Ltd. et al., Case No. 6:20-
	cv-00870 (WDTX)
2005	Scheduling Order, ParkerVision, Inc. v. TCL Industries Holdings Co.,
	Ltd. et al., Case No. 6:20-cv-00945 (WDTX)
2006	Scheduling Order, ParkerVision, Inc. v. Hisense Co., Ltd. et al., Case
• • • •	No. 6:20-cv-00870 (WDTX)
2007	Relevant Excerpts of Defendant's Preliminary Invalidity Contentions,
	filed in ParkerVision, Inc. v. TCL Industries Holdings Co., Ltd. et al.,
2000	Case No. 6:20-cv-00945 (WDTX)
2008	Relevant Excerpts of Defendant's Preliminary Invalidity Contentions,
	filed in ParkerVision, Inc. v. Hisense Co., Ltd. et al., Case No. 6:20-cv-
2000	00870 (WDTX)
2009	Published Interview of Judge Albright, IAM (Apr. 7, 2020)
2010	Hearing Transcript from <i>ParkerVision, Inc. v. Intel Corp.</i> , Case No.
2011	6:20-cv-00108 (W.D. Texas, Sept. 2, 2020)
2011	Docket Order, Kerr Machine Co. d/b/a Kerr Pumps v. Vulcan Industrial
2012	Holdings, LLC, No. 6:20-cv-00200 (W.D. Tex. Aug. 2, 2020)
2012	Petition from <i>Intel Corp. v. ParkerVision, Inc.</i> , Case No. IPR2020-01265 (PTAB)
2013	
2013	Institution Decision from <i>Intel Corp. v. ParkerVision, Inc.</i> , Case No. IPR2020-01265 (PTAB)
2014	Email dated July, 8, 2021 from Robert Earle (WDTX clerk) to Ron
2014	Daignault (counsel to ParkerVision Inc.), (Subject: "Trial date –
	ParkerVision Inc. v. Intel Corp., Case No. 6:20-cv-00108).
2015	Relevant Excerpts of Defendant's Preliminary Invalidity Contentions,
	filed in <i>ParkerVision</i> , <i>Inc.</i> v. <i>Intel Corp.</i> , Case No. 6:20-cv-00108
	(WDTX)
2016	Final Written Decision, Intel Corp. v. ParkerVision, Inc., IPR2020-
	01265 (Jan. 21, 2022)
2017	Claim Construction Order, ParkerVision, Inc. v. Intel Corp., No. 6:20-
	cv-00108-ADA (W.D. Tex.)



cv-00562-ADA (W.D. Tex.) Amended Claim Construction Order, ParkerVision, Inc. v. Intel Corp., No. 6:20-cv-00562-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA 2022 "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		
Amended Claim Construction Order, ParkerVision, Inc. v. Intel Corp., No. 6:20-cv-00562-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA 2022 "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Oct. 7, 1998 2033 Qualcomm Email dated Feb. 2, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2018	Claim Construction Order, ParkerVision, Inc. v. Intel Corp., No. 6:20-
No. 6:20-cv-00562-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA 2022 "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Aug. 11, 1998 2033 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012)		cv-00562-ADA (W.D. Tex.)
Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.) Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA 2022 "Transistor," The American Heritage College Dictionary (3rd ed. 1997) Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) Richard C. Jaeger, Microelectronic Circuit Design (1997) Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012)	2019	Amended Claim Construction Order, ParkerVision, Inc. v. Intel Corp.,
Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.)2021Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA2022"Transistor," The American Heritage College Dictionary (3rd ed. 1997)2023Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996)2024Richard C. Jaeger, Microelectronic Circuit Design (1997)2025Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999)2026J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 19952027A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 19962028B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 19962029U.S. Patent No. 6,061,5512030B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 19992031Qualcomm Email dated Aug. 11, 19982032Qualcomm Email dated Feb. 2, 19992033Qualcomm Email dated Feb. 4, 19992035Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997)2036Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995)2036Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995)2037SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997)2038Decl		No. 6:20-cv-00562-ADA (W.D. Tex.)
Special Master's Recommended Claim Constructions, ParkerVision, Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Oct. 7, 1998 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012)	2020	Special Master's Recommended Claim Constructions, ParkerVision,
Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		Inc. v. Hisense Co., Ltd. et al., No. 6:20-cv-00870-ADA (W.D. Tex.)
 2022 "Transistor," The American Heritage College Dictionary (3rd ed. 1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2021	Special Master's Recommended Claim Constructions, ParkerVision,
1997) 2023 Donald Christiansen, Electronics Engineers' Handbook (4th ed. 1996) 2024 Richard C. Jaeger, Microelectronic Circuit Design (1997) 2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 2, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		Inc. v. TCL Industries Holdings Co., No. 6:20-cv-00945-ADA
 Richard C. Jaeger, Microelectronic Circuit Design (1997) Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2022	"Transistor," The American Heritage College Dictionary (3rd ed. 1997)
2025 Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999) 2026 J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 2027 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 2028 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2023	Donald Christiansen, <i>Electronics Engineers' Handbook</i> (4 th ed. 1996)
J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer, IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2024	Richard C. Jaeger, Microelectronic Circuit Design (1997)
IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995 A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2025	Rudolf Graf, Modern Dictionary of Electronics (7th ed. 1999)
A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2026	J. Crols, "A 1.5 GHz Highly Linear CMOS Downconversion Mixer,
CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver," IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		IEEE J. Solid-State Circuits, Vol. 30, No.7, pp. 736-742, July 1995
IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996 B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Feb. 4, 1999 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2027	A. Rofougaran, J. Chang, M. Rofougaran, and A. Abidi, "A 1 GHz
B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Feb. 4, 1999 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		CMOS RF Front-End IC for a Direct-Conversion Wireless Receiver,"
Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996 2029 U.S. Patent No. 6,061,551 2030 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Oct. 7, 1998 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, <i>Principles of Electric Circuits</i> (5th ed. 1997) 2036 Martin Hartley Jones, <i>A practical introduction to electronic circuits</i> (3th ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, <i>ParkerVision, Inc. v. LG Elecs., Inc.</i> , No.		IEEE J. Solid-State Circuits, Vol. 31, No. 7, pp. 880-889, July 1996
 U.S. Patent No. 6,061,551 B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 Qual Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Oct. 7, 1998 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2028	B. Razavi, "Challenges in Portable RF Transceiver Design," IEEE
B. Razavi, "CMOS RF receiver design for wireless LAN applications," IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Oct. 7, 1998 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3th ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		Circuits and Devices, Vol. 12, No. 5, pp. 12-25, Sept. 1996
IEEE Radio and Wireless Conference, pp. 275-280, Aug. 1999 2031 Qualcomm Email dated Aug. 11, 1998 2032 Qualcomm Email dated Feb. 2, 1999 2033 Qualcomm Email dated Oct. 7, 1998 2034 Qualcomm Email dated Feb. 4, 1999 2035 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) 2036 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2029	
 Qualcomm Email dated Aug. 11, 1998 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Oct. 7, 1998 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2030	B. Razavi, "CMOS RF receiver design for wireless LAN applications,"
 Qualcomm Email dated Feb. 2, 1999 Qualcomm Email dated Oct. 7, 1998 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 		
 Qualcomm Email dated Oct. 7, 1998 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2031	Qualcomm Email dated Aug. 11, 1998
 Qualcomm Email dated Feb. 4, 1999 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3td ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2032	Qualcomm Email dated Feb. 2, 1999
 Thomas L. Floyd, Principles of Electric Circuits (5th ed. 1997) Martin Hartley Jones, A practical introduction to electronic circuits (3td ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2033	Qualcomm Email dated Oct. 7, 1998
 Martin Hartley Jones, A practical introduction to electronic circuits (3rd ed. 1995) SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2034	Qualcomm Email dated Feb. 4, 1999
ed. 1995) 2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2035	Thomas L. Floyd, <i>Principles of Electric Circuits</i> (5 th ed. 1997)
2037 SGS-THOMSON Microelectronics, "General Purpose Single Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, <i>ParkerVision, Inc. v. LG Elecs., Inc.</i> , No.	2036	Martin Hartley Jones, A practical introduction to electronic circuits (3 rd
Operational Amplifier UA741" (October 1997) 2038 Declaration of Dr. Michael Steer 2039 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) 2040 Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.		ed. 1995)
 Declaration of Dr. Michael Steer Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 	2037	SGS-THOMSON Microelectronics, "General Purpose Single
 Kevin McClaning, Wireless Receiver Design for Digital Communications (SciTech Publishing 2012) Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No. 		Operational Amplifier UA741" (October 1997)
Communications (SciTech Publishing 2012) 2040 Claim Construction Order, <i>ParkerVision, Inc. v. LG Elecs., Inc.</i> , No.	2038	Declaration of Dr. Michael Steer
Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.	2039	Kevin McClaning, Wireless Receiver Design for Digital
		Communications (SciTech Publishing 2012)
6.21-cy-00520-ADA (W.D. Tex.)	2040	Claim Construction Order, ParkerVision, Inc. v. LG Elecs., Inc., No.
0.21 ev 00320 11D11 (W.D. 1ex.)		6:21-cv-00520-ADA (W.D. Tex.)
2041 Patent Owner's Demonstratives for Oral Argument	2041	Patent Owner's Demonstratives for Oral Argument



Dated: August 31, 2022 Respectfully Submitted,

By: /Jason S. Charkow/
Jason S. Charkow (USPTO Reg. No. 46,418)*
Chandran B. Iyer (USPTO Reg. No. 48,434)
Stephanie R. Mandir (USPTO Reg. No. 72,930)
jcharkow@daignaultiyer.com
cbiyer@daignaultiyer.com
smandir@daignaultiyer.com
DAIGNAULT IYER LLP
8618 Westwood Center Drive - Suite 150
Vienna, VA 22182

*Not admitted in Virginia

Attorneys for ParkerVision, Inc.



CERTIFICATE OF SERVICE

The undersigned hereby certifies that copies of the foregoing Patent Owner's Updated Exhibit List along with Patent Owner's Demonstratives for Oral Argument (Exhibit 2041), were served in their entirety by filing these documents through the PTAB E2E System, as well as by email on the following counsel of record for Petitioner:

Kristopher L. Reed kreed@kilpatricktownsend.com Edward J. Mayle tmayle@kilpatricktownsend.com Kilpatrick Townsend & Stockton LLP 1400 Wewatta St. Suite 600 Denver, CO 80202

Matias Ferrario mferrario@kilpatricktownsend.com Kilpatrick Townsend & Stockton LLP 1001 West Fourth Street Winston-Salem, NC 27101-2400

Dated: August 31, 2022

Respectfully submitted,

By: /Jason S. Charkow/ Jason S. Charkow USPTO Reg. No. 46,418

