L20. 2015 **Sidley Austin LLP**
Case: Evolved Wireless, LLC v. Microsoft Corp, et al.
District of Delaware, Case No. 15-cv-546
Matter: Patent infringement, LTE
Project: Prior art and invalidity consulting

L21. 2015 **McKool Smith**
Case: Optis Wireless Technology, LLC and PanOptis Patent Management, LLC. v. ZTE Corporation and ZTE (USA) Inc.
Eastern district of Texas, Marshal division, Case No. 2:15-cv-300-JRG-RSP
Matter: Patent infringement, cellular messages and multimedia attachments
Project: Source code review, claim construction, declaration

L22. 2015 **Fish & Richardson, P.C.**
Case: Saint Lawrence Comm. LLC v. LG Elec., Inc. et al.
Eastern district of Texas, Marshal division, Case No. 2:14-cv-1055-JRG
Matter: Patent infringement, speech compression, coding and decoding
Project: Invalidity expert report

L23. 2015 **Finnegan Henderson Farabow Garrett & Dunner LLP**
Case: LG Electronics, Inc. v. Cellular Communications Equipment LLC
IPR2016-00178
Matter: *Inter Partes* Review, LTE
Project: Declaration to support IPR petition

L24. 2015 **McKool Smith**
Case: AT&T, et al. v. Cox Communication, Inc., et al.
District of Delaware, Case No. 14-1106-GMS
Matter: Patent infringement, cable networks
Project: Claim construction, declaration

L25. 2015 **McKool Smith**
Case: Ericsson Inc., et al. v. TCL Communication, et al.
Eastern district of Texas, Marshal division, Case No. 2:15-cv-00011-RSP
Matter: Patent infringement, wireless devices and systems
Project: Source code review, claim construction, declaration, infringement expert report, validity expert report, two-day depositions

L26. 2015 **Foley & Lardner LLP**
Case: Kyocera Communications, Inc. v. Cellular Communications Equipment LLC
IPR2015-01559, IPR2015-01564
Matter: *Inter Partes* Review, LTE

Project: Two declarations to support two IPR petitions

L27. 2015 **Fish & Richardson, P.C.**
Case: Fairfield Industries Inc. v. Wireless Seismic, Inc.
Southern district of Texas, Case No. 4:14-cv-02972-KPE
Matter: Patent infringement, wireless sensor networks
Project: Non-infringement expert report

L28. 2015 **Quinn Emanuel Urquhart & Sullivan, LLP**
Case: GENBAND US, LLC v. Metaswitch Networks Ltd, et al.
Eastern district of Texas, Marshal division, Case No. 2:14-cv-33-JRG-RSP
Matter: Patent infringement, Internet protocols and VoIP
Project: Expert report regarding essentiality, non-infringement expert report, rebuttal expert report regarding non-practice, supplemental rebuttal expert report, three-day depositions, jury trial testimony

L29. 2015 **Foley & Lardner LLP; Duane Morris LLP**
Case: Mobile Telecommunications Technologies, LLC v. Leap Wireless International, Cricket Communications, Inc.
Eastern district of Texas, Marshal division, Case No. 2:13-cv-00885-RSP
Matter: Patent infringement, OFDM and MIMO
Project: Non-infringement expert report, deposition

L30. 2015 **Hogan Lovells US LLP; Kenyon & Kenyon LLP**
Case: One-E-Way v. Beats Electronics, LLC, Sony Corporation, et al.
In the Matter of Certain Wireless Headsets, ITC Investigation No. 337-TA-943
Matter: Patent infringement, wireless communication
Project: Claim construction, declaration

L31. 2015 **McKool Smith**
Case: Solocron Media, LLC v. AT&T Inc., et al.
Eastern district of Texas, Marshal division, Case No. 2:13-cv-1059-JRG
Matter: Patent infringement, ringtone download
Project: Claim construction, claim invalidity expert report

L32. 2015 **EIP US LLP**
Case: Good Technology Software, Inc. v. Mobile Iron, Inc.
IPR2015-00833, IPR2015-00836, IPR2015-01090
Matter: *Inter Partes* Review, software management in wireless devices
Project: Three declarations to support three IPR petitions

L33. 2015 **McKool Smith**
Case: AirWatch LLC v. Good Technology Corp
Northern district of Georgia, Case No. 1:14-cv-02281-SCJ
Matter: Patent infringement, software management in wireless devices
Project: Claim construction, declaration

L34. 2015 **Simpson Thacher & Bartlett LLP**
Case: IXI Mobile (R&D) Ltd. et al. v. Apple Inc.
Southern district of New York, Case No. 14-cv-7594-RJS
Matter: Patent infringement, PDA and Bluetooth
Project: Invalidity consulting

L35. 2014 **Bragalone Conroy PC**
Case: Global Tel*Link Corporation v. Securus Technologies, Inc.
IPR2014-00785, IPR2014-00810, IPR2014-00824, IPR2014-00825, IPR2014-01278, IPR2014-01282, IPR2014-01283
Matter: *Inter Partes* Review, VoIP call monitoring and recording, allocating telecommunication resources and information systems
Project: Seven declarations to support seven Patent Owner's responses, five depositions

L36. 2014 **Orrick, Herrington & Sutcliffe LLP**
Case: Shopkick, Inc. v. Novitaz, Inc.
IPR2015-00277, IPR2015-00278
Matter: *Inter Partes* Review, wireless customer service management
Project: Two declarations to support two IPR petitions

L37. 2014 **Paul Hastings LLP**
Case: Cellular Communications Equipment LLC v. AT&T, et al.
Eastern district of Texas, Tyler division, Case No. 6:13-cv-507-LED (Lead Case for Consolidation)
Matter: Patent infringement, 3G cellular communication
Project: Claim construction, declaration

L38. 2014 **Baker Botts LLP**
Case: Orlando Communications LLC v. AT&T, et al.
M.D. Florida, Case No. 6:14-cv-01021
Matter: Patent infringement, 3G/4G cellular communication
Project: Non-infringement and claim construction consulting

L39. 2014 **EIP US LLP**
Case: Good Technology Software, Inc. v. AirWatch, LLC
IPR2015-00248, IPR2015-00875
Matter: *Inter Partes* Review, software management in wireless devices
Project: Two declarations to support two IPR petitions

L40. 2014 **Bragalone Conroy PC**
Case: Securus Technologies, Inc. v. Global Tel*Link Corporation
IPR2015-00153, IPR2015-00155, IPR2015-00156
Matter: *Inter Partes* Review, VoIP call monitoring and recording
Project: Three declarations to support three IPR petitions, two depositions

L41. 2014 **Andrews Kurth LLP**
Case: Sony Mobile Communications (USA) v. Adaptix Inc.
IPR2014-01524, IPR2014-01525
Matter: *Inter Partes* Review, subcarrier selection in LTE
Project: Two declarations to support two IPR petitions, deposition

L42. 2014 **Steptoe & Johnson LLP, Baker & McKenzie LLP**
Case: VTech Communications, Inc. and Uniden America Corporations v. Spherix Incorporated
IPR2014-01432
Matter: *Inter Partes* Review, IP telephony
Project: Declaration to support IPR petition, deposition, reply declaration, deposition

L43. 2014 **Steptoe & Johnson LLP, Baker & McKenzie LLP**
Case: Spherix Inc. v. VTech Telecommunications Ltd., et al.
Spherix Inc. v. Uniden Corp, et al.
Northern district of Texas, Dallas Division, Case No. 3:13-cv-3494 and 3:13-cv-3496
Matter: Patent infringement, IP telephony
Project: Claim construction, declaration, deposition

L44. 2014 **McKool Smith**
Case: Good Technology Corp. v. MobileIron, Inc.
Northern district of California, Case No. 5:12-cv-05826-PSG
Matter: Patent infringement, software management in wireless devices
Project: Claim construction, three declarations, claim invalidity expert report, non-infringement expert report, deposition, jury trial testimony

L45. 2014 **Lee & Hayes**
Case: Broadcom Corp. v. Ericsson, Inc.
IPR2013-00601, IPR2013-00602, and IPR2013-00636
Matter: *Inter Partes* Review, ARQ protocols
Project: Three declarations to support Patent Owner's Response, two declarations to support Patent Owner's Motion to Amend, deposition, two reply declarations

L46. 2014 **Sidley Austin LLP**
Case: Adaptix, Inc. v. Huawei Technologies Co., et al.
Eastern district of Texas, Case No. 6:13-cv-00438, 439, 440 and 441

Matter: Patent infringement, subcarrier selection in LTE
Project: Non-infringement consulting, source code review

L47. 2014 **Finnegan Henderson Farabow Garrett & Dunner LLP**
Case: Cell and Network Selection LLC v. Huawei Technologies Co., et al.
Eastern district of Texas, Case No. 6:13-cv-00404-LED-JDL
Matter: Patent infringement, base station selection in LTE
Project: Non-infringement consulting

L48. 2014 **Feinberg Day Alberti & Thompson LLP**
Case: DSS Technology Management, Inc. v. Apple Inc.
Eastern district of Texas, Tyler division, Case No. 6:13-cv-00919-JDL
Matter: Patent infringement, PDA and Bluetooth
Project: Claim construction and invalidity consulting

L49. 2014 **Sheppard Mullin Richter & Hampton LLP**
Case: Digcom Inc. v. ZTE (USA), Inc.
District of Nevada, Case No. 3:13-cv-00178-RCJ-WGC
Matter: Patent infringement, cellular communication
Project: Claim construction consulting

L50. 2014 **Lott & Fischer**
Case: Zenith Electronics, LLC, et al. v. Craig Electronics, Inc.
Southern district of Florida, Case No. 9:13-cv-80567-DMM/DLB
Matter: Patent infringement, HDTV transmission and reception
Project: Opening expert report regarding nonessentiality

L51. 2013 **McKool Smith**
Case: Zenith Electronics, LLC, et al. v. Curtis International Ltd.
Southern district of Florida, Case No. 9:13-cv-80568-DMM/DLB
Matter: Patent infringement, HDTV transmission and reception
Project: Claim construction, declaration, deposition

L52. 2013 **Gibson Dunn**
Case: Straight Path IP Group v. Sharp Corp. and Sharp Electronics Corp.
In the Matter of Certain Point-to-Point Network Communication Devices and Products Containing Same, ITC Investigation No. 337-TA-892
Matter: Patent infringement, point-to-point network communication
Project: Non-infringement consulting

L53. 2013 **Kilpatrick Townsend & Stockton LLP**
Case: Monec Holding AG v. Motorola Mobility LLC, et al.
District of Delaware, Case No. 1:11-cv-798-LPS-SRF
Matter: Patent infringement, displaying books on tablets
Project: Non-infringement expert report for Motorola, non-infringement expert

report for HTC, deposition

L54. 2013 **Gartman Law Group**
Case: Lone Star WiFi LLC v. Legacy Stonebriar Hotel, Ltd; et al.
Eastern Dist. Of Texas, Tyler, Case No. 6:12-cv-957
Matter: Patent infringement, levels of access in Wi-Fi networks
Project: Claim validity consulting

L55. 2013 **White & Case, LLP**
Case: Nokia Corp and Nokia, Inc. v. HTC Corp and HTC America, Inc.
In the Matter of Certain Portable Electronic Communication Devices, Including Mobile Phones and Components Thereof, ITC Investigation No. 337-TA-885
Matter: Patent infringement, App download and installation
Project: Non-infringement consulting

L56. 2013 **Heim, Payne & Chorush, LLP**
Case: Rembrandt Wireless v. Samsung Electronics Co., et al.
Eastern Dist. of Texas, Marshal, Case No. 2:13-cv-213-JRG-RSP
Matter: Patent infringement, Bluetooth
Project: Expert report regarding validity, deposition, jury trial

L57. 2013 **Davis Polk & Wardwell LLP; Baker Hostetler**
Case: Comcast v. Sprint; and Nextel Inc.
Eastern Dist. of Pennsylvania, Case No. 2:12-cv-00859-JD
Matter: Patent infringement, SMS/MMS in Cellular Networks
Project: Infringement expert report, validity expert report, reply expert report, declaration, two-day depositions, jury trial testimony

L58. 2013 **McKool Smith**
Case: Samsung Electronics America v. Ericsson Inc.
In the Matter of Certain Wireless Communications Equipment and Articles Therein, ITC Investigation No. 337-TA-866
Matter: Patent infringement, LTE uplink and downlink
Project: Prior art research, source code review, claim construction, claim invalidity expert report, non-infringement expert report, ITC hearing testimony

L59. 2012 **DLA Piper US LLP**
Case: CSR Technology Inc. v. Freescale Semiconductor, Inc.
USDC-San Francisco, Case No. 3:12-cv-02619-RS
Matter: Patent infringement, radio transceivers
Project: Claim construction, declaration

L60. 2012 **Fish & Richardson PC**
Case: GPNE Corp. v. Apple, Inc.; et al.

USDC-ND California, Case No. 5:12-cv-02885-LHK
Matter: Patent infringement, resource allocation in wireless networks
Project: Prior art research consulting

L61. 2012 **Polsinelli Shughart PC**
Case: Single Touch Interactive, Inc. v. Zoove Corporation
Northern district of California, Case No. 3:12-cv-00831-JSC
Matter: Patent infringement, abbreviated dialing, information delivery
Project: Claim construction, Markman hearing testimony, two declarations

L62. 2012 **K & L Gates**
Case: EON Corp. IP Holdings, LLC v. Novatel Wireless, Inc.; et al.
DC-Tyler, Texas, Case No. 6:11-cv-00015-LED-JDL
Matter: Patent infringement, wireless modem and 3G services
Project: Non-infringement expert report, deposition

L63. 2012 **Simpson Thacher & Bartlett LLP**
Case: CSR Technology, Inc. v. Bandspeed, Inc.
Western Dist. of Texas, Case No. 1:12-cv-297-LY
Matter: Patent infringement, packet identification in 2.4 GHz and 5 GHz
Project: Source code review, Markman hearing testimony, infringement expert report

L64. 2012 **Sheppard Mullin Richter & Hampton LLP**
Case: Wi-LAN v. HTC America, Inc., et al.
Eastern Dist. of Texas, Case No. 6:10-cv-521-LED
Matter: Patent infringement, CDMA, Orthogonal Codes
Project: Source code review, non-infringement expert report, deposition, jury trial testimony

L65. 2012 **Dechert LLP**
Case: Hitachi v. TPV and Vizio, Inc.; and Vizio v. Hitachi, LTD.
Eastern Dist. of Texas, Case No. 2:10-cv-260
Matter: Patent infringement, HD television transmission and reception
Project: Prior art research, claim invalidity consulting

L66. 2012 **Fish & Richardson PC**
Case: InterDigital Commc'n, LLC v. Huawei Tech. Co. LTD; LG Electronics, Inc.; Nokia, Inc.; and ZTE (USA) Inc.
Certain Wireless Devices With 3G Capabilities and Components Thereof, ITC Investigation No. 337-TA-800
Matter: Patent infringement, channel coding in UMTS, HSDPA
Project: Non-infringement consulting

L67. 2012 **Fish & Richardson PC**
Case: InterDigital Commc'n, LLC v. Huawei Tech. Co. LTD; LG Electronics, Inc.; Nokia, Inc.; and ZTE (USA) Inc.
Dist. of Delaware, Case No. 1:11-cv-00654-UNA
Matter: Patent infringement, channel coding in UMTS, HSDPA
Project: Non-infringement consulting

L68. 2011 **O'Melveny & Myers LLP**
Case: MobileMedia Ideas, LLC v. Apple, Inc.
Dist. of Delaware, Case No. 1:10-cv-00258-SLR-MPT
Matter: Patent infringement, voice control, call rejection in mobile phones
Project: Source code review, prior art research, declaration, claim invalidity expert report, non-infringement expert report, deposition, jury trial testimony

L69. 2011 **Wilmer Cutler Pickering Hale and Dorr**
Case: Apple, Inc. v. Samsung Electronics Co.
Northern Dist. of California, Case No. 5:11-cv-01846-LHK
Matter: Patent infringement, channel coding in CDMA, E-AGCH, TFCI
Project: Prior art research, claim construction consulting

L70. 2011 **Weil, Gotshal & Manges LLP**
Case: Vizio, Inc. v. Renesas Electronics America, Inc.
ITC Investigation No. 337-TA-789
Matter: Patent infringement, HD television transmission and reception
Project: Claim invalidity consulting

L71. 2011 **Shapiro Cohen**
Case: TenXc Wireless Inc. v. Andrew LLC
TenXc Wireless Inc. v. Mobi Antenna Technologies Ltd.
Matter: Patent infringement, antenna design, sectorized cellular network
Project: Claim validity consulting

L72. 2010 **Fish & Richardson PC**
Case: Vizio, Inc., v. LG Electronics, Inc.
ITC Investigation No. 337-TA-733
Matter: Patent infringement, HD television transmission and reception
Project: Claim charts, claim construction expert report, deposition

L73. 2010 **Fish & Richardson PC**
Case: Vizio, Inc., v. LG Electronics, Inc.
Dist. of Maryland, Case No. 1:09-cv-1481-BEL
Matter: Patent infringement, HD television transmission and reception
Project: Claim charts, claim construction expert report, deposition

L74. 2008 **Kaye Scholer LLP**
Case: eBay Inc. v. IDT.
Western Dist. of Arkansas, Case No. 4:08-cv-4015-HFB
Matter: Patent infringement, long distance communication using Internet
Project: Prior art research, claim construction consulting

L75. 2008 **Simpson Thacher & Bartlett LLP**
Case: Commil USA, LLC v. Cisco Systems, Inc.
Eastern Dist. of Texas, Case No. 2:07-cv-00341-DF-CE
Matter: Patent infringement, two-level wireless protocol
Project: Prior art research

L76. 2006 **Woodfill and Pressler**
Case: Charles Russell v. Interinsurance Exchange of the Auto Club
Harris County, Texas, Case No. 2005-19706
Matter: House fire and insurance claim
Project: Determining user location using cellular phone records, expert report, deposition, jury trial testimony

Consulting History

From: 1/2013 **Heim, Payne & Chorush, LLP**
To: 3/2013 Houston, TX
Duties: Analyze patents on wireless technologies.

From: 4/2007 **Collin County Sheriff's Office**
To: 5/2007 McKinney, TX
Duties: Analyzed cellular record data and determined user location in a double-homicide investigation.

From: 4/2004 **Allegiant Integrated Solutions**
To: 5/2004 Fort Worth, TX
Duties: Designed and developed an integrated set of tools for fast deployment of wireless networks. The tools optimize the placement of Access Points and determine their respective channel allocations to minimize interference and maximize capacity.

From: 3/2002 **Input/Output Incorporated**
To: 4/2002 New Orleans, LA
Duties: Designed and implemented an algorithm in MATLAB for optimizing the frequency selection process used by sonar for scanning the bottom of the ocean.

From: 6/1998 **Teleware Corporation**
To: 7/1998 Seoul, South Korea
Duties: Designed and developed a software package for analyzing the capacity

in a CDMA network to maximize the number of subscribers.

Employment History

From: 1/2015 **University of North Texas**
To: Present Denton, TX
Position: *Associate Chair of Graduate Studies Department of Computer Science and Engineering*
In charge of all administrative duties related to the Masters and PhD programs in the department.

From: 5/2008 **University of North Texas**
To: Present Denton, TX
Position: *Tenured Associate Professor Department of Computer Science and Engineering*
Conducting research on cellular networks and wireless sensor networks. Teaching wireless communication courses. Advising graduate and undergraduate students.

From: 9/2002 **University of North Texas**
To: 5/2008 Denton, TX
Position: *Assistant Professor Department of Computer Science and Engineering*
Conducting research on WCDMA/UMTS wireless networks. Teaching wireless communication and computer architecture courses. Advising graduate and undergraduate students.

From: 1/2002 **University of New Orleans**
To: 8/2002 New Orleans, LA
Position: *Assistant Professor Department of Electrical Engineering*
Designed and taught two new courses "Computer Systems Design I and II". Developed a Computer Engineering Curriculum with strong hardware-design emphasis. Formed a wireless research group. Advised graduate and undergraduate students.

From: 10/2000 **Comspace Corporation**
To: 12/2001 Coppell, TX
Position: *Senior Systems Engineer*
Designed, coded (in Matlab), and simulated Viterbi decoding, Turbo coding, trellis coded modulation (TCM), and Reed-Muller codes. Optimized soft decision parameters and interleavers for additive white Gaussian and Rayleigh faded channels. Extended the control and trunking of push-to-talk Logic Trunked Radio (LTR) to include one-to-one and one-to-many voice and data messaging.

From: 8/1996 **MinMax Corporation**
To: 8/2000 Saint Louis, MO

Position: *Research Associate*
Designed software packages that provide the tools to flexibly allocate capacity in a CDMA network and maximize the number of subscribers. Analyzed and simulated different audio compression schemes. Validated, simulated (logical and timing), and developed the hardware architecture for an ATM switch capable of channel group switching.

From: 8/1994 **Washington University**
To: 8/2000 Saint Louis, MO
Position: *Research and Teaching Assistant*
Taught, consulted, and graded Circuit Analysis at the undergraduate level and Network Design at the graduate level.

Publications

Conference Proceedings

C1. U. Sawant, **R. Akl**, "Evaluation of Adaptive and Non Adaptive LTE Fractional Frequency Reuse Mechanisms," *IEEE WOCC 2017 The 26th Annual Wireless and Optical Communications Conference*, April 2017, paper no. 1570341174, 6 pgs.

C2. U. Sawant, **R. Akl**, "A Novel Metric to Study the Performance of Sectorized Fractional Frequency Reuse Techniques in LTE," *IEEE WTS 2017 The 16th Annual Wireless Telecommunications Symposium*, April 2017, paper no. 1570338498, 7 pgs

C3. S. Alotaibi, **R. Akl**, "Dynamic Frequency Partitioning Scheme for LTE HetNet Networks Using Fractional Frequency Reuse," *IEEE WCNC '17 Wireless Communications and Networking Conference*, March 2017, paper no. 1570332420, 5 pgs.

C4. U. Sawant, **R. Akl**, "Performance Evaluation of Network Productivity for LTE Heterogenous Networks with Reward-Penalty Weights Assessment," *IEEE CCWC 2017 The 7th Annual Computing and Communication Workshop Conference*, January 2017, paper no. 1570328396, 6 pgs.

C5. S. Alotaibi, **R. Akl**, "Self-Adjustment Downlink Transmission Power for Femtocells in Co-Channel Deployment in Heterogeneous Networks," *IEEE CCWC 2017 The 7th Annual Computing and Communication Workshop Conference*, January 2017, paper no. 1570326815, 6 pgs.

C6. U. Sawant, **R. Akl**, "Performance Evaluation of Sectorized Fractional Frequency Reuse Techniques Using Novel Metric," *IEEE ISCC 2016 The Twenty-First IEEE Symposium on Computers and Communications*, June 2016, paper no. 1570275270, 7 pgs.

C7. R. Tidwell, S. Akumalla, S. Karlaputi, **R. Akl**, K. Kavi, and D. Struble, "Evaluating the Feasibility of EMG and Bend Sensors for Classifying Hand Gestures," *1st International Conference on Multimedia and Human Computer Interaction*, July 2013, paper no. 63, 8 pgs.

C8. **R. Akl**, K. Pasupathy, and M. Haidar, "Anchor Nodes Placement for Effective Passive Localization," *2011 IEEE International Conference on Selected Topics in Mobile and Wireless Networks (iCOST)*, October 2011, paper no. 1569490799, pp. 127 - 132.

C9. **R. Akl**, P. Kadiyala, and M. Haidar, "Non-Uniform Grid-Based Routing in Sensor Networks", *9th IEEE Malaysia International Conference on Communications*, December 2009, paper no. 1569243649, pp. 536 - 540.

C10. M. Haidar, M. Al-Rizzo, Y. Chan, **R. Akl**, M. Bouharras, "Throughput Validation of an Advanced Channel Assignment Algorithm in IEEE 802.11 WLAN", *ICCSN 2009 – International Conference on Communication Software and Networks*, February 2009, paper no. P385, pp. 801 - 806.

C11. **R. Akl** and D. Keathly, "Robocamp: Encouraging Young Women to Embrace STEM," 4th Annual TETC Best Practices Conference, February 2009, 13 pgs.

C12. M. Haidar, R. Ghimire, M. Al-Rizzo, **R. Akl**, Y. Chan, "Channel Assignment in an IEEE 802.11 WLAN Based on Signal-to-interference Ratio", *IEEE CCECE – Canadian Conference on Electrical and Computer Engineering: Communications and Networking*, May 2008, paper no. 1569092894, pp. 1169 - 1174.

C13. H. Al-Rizzo, M. Haidar, **R. Akl**, and Y. Chan, "Enhanced Channel Assignment and Load Distribution in IEEE 802.11 WLANs," *IEEE International Conference on Signal Processing and Communication*, November 2007, paper no. 1569042132, pp. 768 - 771.

C14. **R. Akl** and Y. Saravanos, "Hybrid Energy-Aware Synchronization Algorithm in Wireless Sensor Networks," *18th Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, September 2007, paper no 692, 5 pgs.

C15. M. Haidar, **R. Akl**, and H. Al-Rizzo, "Channel Assignment and Load Distribution in a Power-Managed WLAN," *18th Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, September 2007, paper no. 463, 5 pgs.

C16. D. Keathly and **R. Akl,** "Attracting and Retaining Women in Computer Science and Engineering: Evaluating the Results," *Proceedings of American Society for*

Engineering Education: ASEE Annual Conference, June 2007, paper no. AC 2007-1229, 10 pgs.

C17. M. Haidar, **R. Akl**, H. Al-Rizzo, Y. Chan, R. Adada, "Optimal Load Distribution in Large Scale WLAN Networks Utilizing a Power Management Algorithm," *Proceedings of IEEE Sarnoff Symposium*, May 2007, 5 pgs.

C18. R. Dantu, P. Kolan, **R. Akl,** and K. Loper, "Classification of Attributes and Behavior in Risk Management Using Bayesian Networks," *Proceedings of IEEE Intelligence and Security Informatics Conference*, May 2007, pp. 71-74.

C19. **R. Akl** and A. Arepally, "Dynamic Channel Assignment in IEEE 802.11 Networks," *Proceedings of IEEE Portable 2007: International Conference on Portable Information Devices*, March 2007, pp 309-313.

C20. **R. Akl** and U. Sawant, "Grid-based Coordinated Routing in Wireless Sensor Networks," *Proceedings of IEEE CCNC 2007: Consumer Communications and Networking Conference*, January 2007, pp. 860-864.

C21. **R. Akl** and A. Arepally, "Simulation of Throughput in UMTS Networks with Different Spreading Factors," *Proceedings of IEEE VTC Fall 2006: Vehicular Technology Conference,* September 2006, pp. C1-5.

C22. A. Alhabsi, H. Al-Rizzo, and **R. Akl,** "Parity Assisted Decision Making for QAM Modulation," *International Conference on Mobile Computing and Wireless Communications*, September 2006, paper no. 1568988776, 5 pgs.

C23. **R. Akl** and R. Garlick, "Retention and Recruitment of Women in Computer Engineering," *ICEE 2006: International Conference on Engineering Education,* July 2006, paper no. 3318, 5 pgs.

C24. R. Garlick and **R. Akl,** "Intra-Class Competitive Assignments in CS2: A One-Year Study," *ICEE 2006: International Conference on Engineering Education,* July 2006, paper no. 3325, 5 pgs.

C25. **R. Akl**, D. Tummala, and X. Li, "Indoor Propagation Modeling at 2.4 GHz for IEEE 802.11 Networks," *WNET 2006: Wireless Networks and Emerging Technologies,* July 2006, paper no. 510-014, 6 pgs.

C26. P. Chen, K. Kavi, and **R. Akl,** "Performance Enhancement by Eliminating Redundant Function Execution," *Proceedings of IEEE: 39th Annual Simulation Symposium*, April 2006, pp. 143-150.

C27. **R. Akl** and S. Nguyen, "Capacity Allocation in Multi-cell UMTS Networks for Different Spreading Factors with Perfect and Imperfect Power Control," *Proceedings of IEEE CCNC 2006: Consumer Communications and Networking*

Conference, January 2006, vol. 2, pp. 928-932.

C28. W. Li, K. Kavi, and **R. Akl**, "An Efficient Non-Preemptive Real-Time Scheduling," *18th International Conference on Parallel and Distributed Computing Systems*, Las Vegas, NV, September 2005, pp. 154-160.

C29. S. Nguyen and **R. Akl**, "Approximating User Distributions in WCDMA Networks Using 2-D Gaussian," *CCCC20T 05: International Conference on Computing, Communications, and Control Technologies*, July 2005, 5 pgs.

C30. **R. Akl** and S. Park, "Optimal Access Point Selection and Traffic Allocation in IEEE 802.11 Networks," *Proceedings of 9th World Multiconference on Systemics, Cybernetics and Informatics (WMSCI 2005): Communication and Network Systems, Technologies and Applications*, July 2005, vol. 8, pp. 75-79.

C31. **R. Akl**, M. Naraghi-Pour, M. Hegde, "Throughput Optimization in Multi-Cell CDMA Networks," *IEEE WCNC 2005 - Wireless Communications, and Networking Conference*, March 2005, vol. 3, pp. 1292-1297.

C32. **R. Akl**, "Subscriber Maximization in CDMA Cellular Networks," *Proceedings of CCCT 04: International Conference on Computing, Communications, and Control Technologies*, August 2004, vol. 3, pp. 234-239.

C33. **R. Akl** and A. Parvez, "Global versus Local Call Admission Control in CDMA Cellular Networks," *Proceedings of CITSA 04: Communications, Information and Control Systems, Technologies and Applications*, July 2004, vol. 2, pp. 283-288.

C34. **R. Akl** and A. Parvez, "Impact of Interference Model on Capacity in CDMA Cellular Networks," *Proceedings of SCI 04: Communication and Network Systems, Technologies and Applications*, July 2004, vol. 3, pp. 404-408. Selected as **best paper** of those presented in the session: Tele-Communication Systems, Technologies and Application II.

C35. **R.G. Akl**, M.V. Hegde, M. Naraghi-Pour, P.S. Min, "Call Admission Control Scheme for Arbitrary Traffic Distribution in CDMA Cellular Systems," *IEEE Wireless Communications and Networking Conference*, September 2000, vol. 1, pp. 465-470.

C36. **R.G. Akl**, M.V. Hegde, M. Naraghi-Pour, P.S. Min, "Cell Placement in a CDMA Network," *IEEE Wireless Communications and Networking Conference*, September 1999, vol. 2, pp. 903-907.

C37. **R.G. Akl**, M.V. Hegde, P.S. Min, "Effects of Call Arrival Rate and Mobility on Network Throughput in Multi-Cell CDMA," *IEEE International Conference on Communications*, June 1999, vol. 3, pp. 1763-1767.

C38. **R.G. Akl**, M.V. Hegde, M. Naraghi-Pour, P.S. Min, "Flexible Allocation of Capacity in Multi-Cell CDMA Networks," *IEEE Vehicular Technology Conference*, May 1999, vol. 2, pp. 1643-1647.

Journal Publications

J1. M. Haidar, H.M. Al-Rizzo, **R. Akl**, and Z. Elbazzal, "The Effect of an Enhanced Channel Assignment Algorithm in an IEEE 802.11 WLAN," *World Scientific and Engineering Academy and Society Transactions on Communications*, WSEAS, Vol. 8, Issue 12, December 2009.

J2. **R. Akl**, P. Kadiyala, and M. Haidar, "Non-Uniform Grid-Based Coordinated Routing in Wireless Sensor Networks", *Journal of Sensors*, article ID 491349, volume 2009, 11 pages.

J3. M. Haidar, M. Al-Rizzo, Y. Chan, **R. Akl**, "User-Based Channel Assignment Algorithm in a Load-Balanced IEEE 802.11 WLAN", *International Journal of Interdisciplinary Telecommunications & Networking (IJITN)*, April-June 2009, 1(2), pp. 66-81.

J4. **R. Akl**, D. Keathly, and R. Garlick, "Strategies for Retention and Recruitment of Women and Minorities in Computer Science and Engineering," *iNEER Special Volume: Innovations 2007- World Innovations in Engineering Education and Research*, 9 pgs., 2007.

J5. R. Garlick and **R. Akl**, "Motivating and Retaining CS2 Students with a Competitive Game Programming Project," *iNEER Special Volume: Innovations 2007- World Innovations in Engineering Education and Research*, 9 pgs., 2007.

J6. **R. Akl** and S. Nguyen, "UMTS Capacity and Throughput Maximization for Different Spreading Factors," *Journal of Networks*, July 2006, vol. 1, issue 3, pp. 40-49. ISSN: 1796-2056

J7. W. Li, K. Kavi, and **R. Akl**, "A Non-preemptive Scheduling Algorithm for Soft Real-time Systems," *Journal of Computer and Electrical Engineering*, 2006, vol. 32, 18 pgs. ISSN: 0045-7906

J8. **R. Akl**, A. Parvez, and S. Nguyen, "Effects of Interference on Capacity in Multi-Cell CDMA Networks," *Journal of Systemics, Cybernetics and Informatics*, 2006, vol. 3, no. 1, p825612, 7 pgs. ISSN: 1690-4524

J9. **R.G. Akl**, M. Hegde and M. Naraghi-Pour, "Mobility-based CAC Algorithm for Arbitrary Traffic Distribution in CDMA Cellular Systems," *IEEE Transactions on Vehicular Technology*, March 2005, vol. 54, no. 2, pp. 639-651.

J10. **R.G. Akl**, M.V. Hegde, M. Naraghi-Pour, P.S. Min, "Multi-Cell CDMA Network Design," *IEEE Transactions on Vehicular Technology*, May 2001, vol. 50, no. 3, pp. 711-722.

Technical Papers

T1. J. Williams, **R. Akl,** et al, "Flight Control Subsystem," *The Eagle Feather*, Special Section: Undergraduate Research Initiative in Engineering, University of North Texas, Vol. 7, 2010.

T2. **R.G. Akl**, M.V. Hegde, A. Chandra, P.S. Min, "CDMA Capacity Allocation and Planning," Technical Document, Washington University Department of Electrical Engineering WUEE-98, April 1998.

Book Chapters

B1. R. Akl, Y. Saravanos, and M. Haidar, "Chapter 18: Hybrid Approach for Energy-Aware Synchronization in Sensor Networks," *Sustainable Wireless Sensor Networks*, December 2010, pgs. 413-429, ISBN: 978-953-307-297-5.

B2. K. Kavi, **R. Akl** and A. Hurson, "Real-Time Systems: An Introduction and the State-of-the-Art," *Encyclopedia of Computer Science and Engineering*, John Wiley & Sons, Volume 4, January 2009, pgs. 2369-2377.

B3. **R. Akl** and K. Kavi, "Chapter 12: Modeling and Analysis using Computational Tools," *Introduction to Queuing Theory: Modeling and Analysis*, Birkhauser Boston, December 2008, pgs. 295-320.

Technical Presentations

P1. "Bio-Com Project," Raytheon, Richardson TX, May 2012, (invited).

P2. "Bio-Com Project," Net-Centric Software and Systems I/UCRC Meeting, Denton TX, December 2011, (invited).

P3. "Student Outreach Report: Robocamp," College of Engineering Advisory Board Meeting, Denton TX, May 2011, (invited).

P4. "Robocamp: Encouraging Young Women to Embrace STEM," 4th Annual TETC Best Practices Conference, Austin TX, February 2009, (invited).

P5. "Self-Configuring Wireless MEMS Network (demo)," Southern Methodist University, Dallas TX, January 2008, (invited).

P6. "Energy-aware Routing and Hybrid Synchronization in Sensor Networks," *Southern Methodist University*, Dallas TX, September 2007, (invited).

P7. "Retention and Recruitment of Women in Computer Engineering," *ICEE 2006: International Conference on Engineering Education*, Puerto Rico, July 2006, (refereed).

P8. "Capacity Allocation in Multi-cell UMTS Networks for Different Spreading Factors with Perfect and Imperfect Power Control," *IEEE CCNC 2006: Consumer Communications and Networking Conference*, Las Vegas, NV, January 2006, (refereed).

P9. "Research, Teaching, and Outreach," CSE Advisory Council Meeting, *UNT Research Park*, Denton, TX, December 2005, (invited).

P10. "WiFi and WCDMA Network Design," *University of Arkansas*, Little Rock, AR, April 2005, (invited).

P11. "WiFi and WCDMA Network Design," *Southern Methodist University*, Dallas, TX, March 2005, (invited).

P12. "Current Research in Wireless at UNT," *Nortel Networks*, Richardson, TX, October 2004, (invited).

P13. "Subscriber Maximization in CDMA Cellular Networks," *International Conference on Computing, Communications, and Control Technologies*, Austin, TX, August 2004, (refereed).

P14. "Global versus Local Call Admission Control in CDMA Cellular Networks," *International Conference on Cybernetics and Information Technologies, Systems and Applications*, Orlando, FL, July 2004, (refereed).

P15. "Impact of Interference Model on Capacity in CDMA Cellular Networks," *8th World Multi-Conference on Systemics, Cybernetics, and Informatics*, Orlando, FL, July 2004, (refereed).

P16. "CDMA Network Design," IEEE Communications Society – New Orleans Chapter, New Orleans, LA, May 2002, (invited).

P17. "Cell Design to Maximize Capacity in CDMA Networks," Louisiana State University, Baton Rouge, LA, April 2002, (invited).

P18. "Call Admission Control Scheme for Arbitrary Traffic Distribution in CDMA Cellular Systems," *IEEE Wireless Communications and Networking Conference*, Chicago, IL, September 2000, (refereed).

P19. "Cell Placement in a CDMA Network," *IEEE Wireless Communications and Networking Conference*, September 1999, (refereed).

P20. "Effects of Call Arrival Rate and Mobility on Network Throughput in Multi-Cell CDMA," *IEEE International Conference on Communications*, June 1999, (refereed).

P21. "Flexible Allocation of Capacity in Multi-Cell CDMA Networks," *IEEE Vehicular Technology Conference*, May 1999, (refereed).

P22. "CCAP: A Strategic Tool for Managing Capacity of CDMA Networks," Teleware Co. Ltd., Seoul, South Korea, 1998, (invited).

Courses Developed

- CSCE 5933: LTE Physical Layer Using MATLAB.
  Research issues in the design of LTE physical layer and simulate using MATLAB. Topics include modulation and coding, OFDM, channel modeling, MIMO, and link adaption.

- CSCE 6590: Advanced Topics in Wireless Communications & Networks: 4G/LTE.
  Research issues in the design of next generation wireless networks: cellular systems, medium access techniques, signaling, mobility management, control and management for mobile networks, wireless data networks, Internet mobility, quality-of-service for multimedia applications, caching for wireless web access, and ad hoc networks.

- CSCE 5933: Fundamentals of VoIP.
  Fundamentals of VoIP, with emphasis on network infrastructure implementation and security. Topics include IP protocol suite, SS7, speech-coding techniques, quality of service, session initiation protocol, and security issues.

- CSCE 5540: Introduction to Sensor Networks.
  Topics include: design implications of energy (hardware and software), and otherwise resource-constrained nodes; network self-configuration; services such as routing under network dynamics, localization, time-synchronization and calibration; distributed data management, in-network aggregation and collaborative signal processing, programming tools and language support.

- CSCE 5510. Wireless Communication.
  Point-to-point signal transmission through a wireless channel, channel capacity, channel encoding, and multi-user transmissions. First, second, and third generation cellular systems, and mobility management.

- CSCE 3510. Introduction to Wireless Communication.
  Fundamentals of wireless communications and networking, with emphasis on first, second, and third generation cellular systems. Topics include point-to-point signal

transmission through a wireless channel, cellular capacity, multi-user transmissions, and mobility management.

- CSCE 3020. Communications Systems.
  Introduction to the concepts of transmission of information via communication channels. Amplitude and angle modulation for the transmission of continuous-time signals. Analog-to-digital conversion and pulse code modulation. Transmission of digital data. Introduction to random signals and noise and their effects on communication. Optimum detection systems in the presence of noise.

- ENEE 3583. Computer Systems Design I (UNO).
  The design process of digital computer systems is studied from the instruction set level, system architecture level, and digital logic level. Topics include machine organization, register transfer notation, processor design, memory design, and input/output considerations. Includes semester project.

- ENEE 3584. Computer Systems Design II (UNO).
  The design and evaluation of contemporary computer systems are analyzed to compare the performance of different architectures. Topics include performance metrics, computer arithmetic, pipelining, memory hierarchies, and multiprocessor systems.

- ENEE 3514. Computer Architecture Laboratory (UNO).
  Selected experiments examining programmable logic, VHDL and logic synthesis, and including a final design project, to accompany and complement the lecture course ENEE 3584. Three hours of laboratory.

Courses Taught

Spring 2017
- CSCE 6950.743: Dissertation (no evaluation done)

Fall 2016
- CSCE 5933.3: LTE Physical Layer Using MATLAB (4.7 / 5.0)

Spring 2016
- CSCE 5950.743: Thesis (no evaluation done)
- CSCE 6950.743: Dissertation (no evaluation done)

Fall 2015
- CSCE 3010.1: Signals and Systems (5.7 / 7.0)

Spring 2015
- CSCE 5934.743: Directed Study (no evaluation done)

Fall 2014
- CSCE 3010.1: Signals and Systems (3.32 / 4.00)
- CSCE 6590.1: Advanced Topics in Wireless Communications & Networks: 4G/LTE (3.79 / 4.00)

Spring 2014

- CSCE 3510.1: Intro to Wireless Communication (808 – Highly Effective)
- CSCE 5510.1: Wireless Communications (808 – Highly Effective)

Fall 2013

- CSCE 6590.1: Advanced Topics in Wireless Communications & Networks: 4G/LTE (804 – Highly Effective)

Spring 2013

- CSCE 4890.743: Directed Study (no evaluation done)
- CSCE 6940.743: Individual Research (no evaluation done)

Fall 2012

- CSCE 3010.1: Signals and Systems (793 – Highly Effective)
- CSCE 5540.1: Intro to Sensor Networks (814 – Highly Effective)

Spring 2012

- CSCE 3020.1: Communication Systems (809 – Highly Effective)
- CSCE 3510.1: Intro to Wireless Communication (811 – Highly Effective)
- CSCE 5510.1: Wireless Communications (817 – Highly Effective)
- EENG 3810.1: Communication Systems (801 – Highly Effective)

Fall 2011

- CSCE 3010.1: Signals and Systems (793 – Highly Effective)
- CSCE 5540.1: Intro to Sensor Networks (824 – Highly Effective)

Spring 2011

- CSCE 3020.1: Communication Systems (820 – Highly Effective)
- CSCE 3510.1: Intro to Wireless Communication (812 – Highly Effective)
- CSCE 5510.1: Wireless Communications (812 – Highly Effective)
- EENG 3810.1: Communication Systems (826 – Highly Effective)

Fall 2010

- CSCE 3010.1: Signals and Systems (857 – Highly Effective)
- CSCE 5540.1: Intro to Sensor Networks (831 – Highly Effective)

Spring 2010

- CSCE 3020.1: Communication Systems (792 – Highly Effective)
- CSCE 3510.1: Intro to Wireless Communication (793 – Highly Effective)
- CSCE 5510.1: Wireless Communications (834 – Highly Effective)
- EENG 3810.1: Communication Systems (854 – Highly Effective)

Fall 2009

- CSCE 3010.1: Signals and Systems (4.40 / 5.00)
- CSCE 5540.1: Intro to Sensor Networks (4.70 / 5.00)
- EENG 2620.1: Signals and Systems (4.40 / 5.00)

Spring 2009

- CSCE 3020.1: Communication Systems (4.87 / 5.00)
- CSCE 3510.1: Intro to Wireless Communication (4.65 / 5.00)
- CSCE 5510.1: Wireless Communications (4.79 / 5.00)

Fall 2008

- CSCE 3010.1: Signals and Systems (4.91 / 5.00)
- CSCE 5540.2: Intro to Sensor Networks (4.10 / 5.00)
- EENG 2620.3: Signals and Systems (4.91 / 5.00)

Spring 2008
- CSCE 3020.1: Communication Systems (4.68 / 5.00)
- CSCE 3510.1: Intro to Wireless Communication (3.96 / 5.00)
- CSCE 5510.1: Wireless Communications (4.75 / 5.00)

Fall 2007
- CSCE 3010.1: Signals and Systems (4.57 / 5.00)
- CSCE 5540.2: Intro to Sensor Networks (4.01 /5.00)

Summer 2007
- CSCE 3020.1: Fund. of Communication Theory (no evaluation done)
- EENG 3810.1: Communication Systems (no evaluation done)

Spring 2007
- CSCE 5510.2: Wireless Communications (4.75 / 5.00)
- CSCE 5933.6: Fundamentals of VoIP (4.70 / 5.00)

Fall 2006
- CSCE 3010.1: Signals and Systems (4.58 / 5.00)
- CSCE 5540.1: Intro to Sensor Networks (4.70 / 5.00)
- EENG 2620.1: Signals and Systems (4.58 / 5.00)

Summer 2006
- CSCE 3020.1: Fund. of Communication Theory (no evaluation done)
- CSCE 3510.21: Intro to Wireless Communications (no evaluation done)
- CSCE 5510.21: Intro to Wireless Communications (no evaluation done)
- EENG 3810.1: Communication Systems (no evaluation done)

Spring 2006
- CSCE 2610.2: Computer Organization (3.69 / 5.00)
- CSCE 3010.1: Signals and Systems (4.41 / 5.00)
- EENG 2620.1: Signals and Systems (4.41 / 5.00)

Fall 2005
- CSCE 3510.1: Intro to Wireless Communications (4.52 / 5.00)
- CSCE 5510.1: Wireless Communications (4.46 / 5.00)
- CSCE 5933.6: Intro to Sensor Networks (4.60 / 5.00)

Summer 2005
- CSCE 3010.21: Signals and Systems (no evaluation done)
- CSCE 3510.21: Intro to Wireless Communications (no evaluation done)

Spring 2005
- CSCE 3510.02: Intro to Wireless Communications (4.46 / 5.00)
- CSCI 3100.02: Computer Organization (4.14 / 5.00)

Fall 2004
- CSCE 3510.01: Intro to Wireless Communications (4.15 / 5.00)
- CSCI 4510.01: Machine Structures (4.55 / 5.00)
- CSCI 5330.02: Intro to Wireless Communications (4.05 / 5.00)

Summer 2004
- CSCI 4330.22: Intro to Wireless Communications (no evaluation done)
- CSCI 4330.23: Intro to Wireless Communications (no evaluation done)
- CSCI 5330.22: Intro to Wireless Communications (no evaluation done)

Spring 2004
- CSCI 3100: Computer Organization (4.64 / 5.00)
- CSCI 4330: Intro to Wireless Communications (4.22 / 5.00)

Fall 2003
- CSCI 4510: Machine Structures (4.49 / 5.00)
- CSCI 5330: Intro to Wireless Communications (4.83 / 5.00)

Summer 2003
- CSCI 3100: Computer Organization (no evaluation done)

Spring 2003
- CSCI 3100: Computer Organization (3.84 / 5.00)

Fall 2002
- CSCI 4510: Machine Structures (4.38 / 5.00)

Funded Proposals

R1. "Robotics and App Design Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $11,727. Submitted 5/5/17. Robert Akl (PI), **awarded $11,727.**

R2. "UNT GenCyber Summer Program: Inspiring the Next Generation of Cyber Stars in North Texas," National Security Agency (NSA). Requested amount is $85,000. Submitted 11/4/2016. Robert Akl (co-PI), **awarded $85,000**.

R3. "App Design Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $12,900. Submitted 5/6/16. Robert Akl (PI), **awarded $12,900.**

R4. "Robotics, Game and App Programming Summer Camps" under Texas Workforce Commission: Summer Merit Program. Requested amount is $63,000. Submitted 11/16/15. Robert Akl (PI), **awarded $63,000**.

R5. "App Design Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $13,998. Submitted 5/1/15. Robert Akl (PI), **awarded $13,988**.

R6. "App Design Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $12,500. Submitted 5/2/14. Robert Akl (PI), **awarded $12,500**.

R7. "Robotics, Game and App Programming Summer Camps" under Texas Workforce Commission: Summer Merit Program. Requested amount is $63,000. Submitted 12/14/12. Robert Akl (PI), **awarded $63,000**.

R8. "Bio-Com Project," funded by Raytheon under Net-Centric Software and Systems I/UCRC 2nd year. Requested amount is $30,000. Submitted 5/12/12. Krishna Kavi (PI), Robert Akl (co-PI), **awarded $30,000.**

R9. "Bio-Com Project," funded by Raytheon under Net-Centric Software and Systems I/UCRC. Requested amount is $30,000. Submitted 5/12/11. Krishna Kavi (PI), Robert Akl (co-PI), **awarded $30,000.**

R10. "Game Programming for Xbox 360 Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $20,000. Submitted 3/21/11. Robert Akl (PI), **awarded $20,000**.

R11. "RoboCamps and Game Programming Summer Camps" under Texas Workforce Commission: Summer Merit Program. Requested amount is $63,000. Submitted 2/17/11. Robert Akl (PI), **awarded $63,000**.

R12. "Game Programming for Xbox 360 Summer Camp" under Texas Higher Education Coordinating Board: Engineering Summer Program. Requested amount is $13,000. Submitted 2/22/10. Robert Akl (PI), **awarded $18,000.**

R13. "Robotics and Game Programming Summer Camps" under Texas Workforce Commission: Summer Merit Program. Requested amount is $63,000. Submitted 10/16/09. Robert Akl (PI), **awarded $63,000**.

R14. "Micro Air Vehicle Design: A Collaborative Undergraduate Project for Electrical Engineering, Computer Engineering, and Computer Science Students," under UNT Undergraduate Research Initiative. Submitted 9/25/2009. Robert Akl (co-PI), **awarded $8,000**.

R15. "Summer Merit Program" under Texas Workforce Commission. Requested amount is $42,000. Submitted 3/20/09. Robert Akl (PI), **awarded $42,000**.

R16. "Robocamp at Stewpot" under Dallas Women's Foundation. Requested amount is $20,000. Submitted 2/23/09. Robert Akl (PI), **awarded $18,600**.

R17. "Robocamp Jump Start" under Motorola Foundation Innovation Generation Grant. Requested amount is $29,852. Submitted 2/12/09. Robert Akl (PI), **awarded $30,700**.

R18. "Engineering Summer Program" under Texas Higher Education Coordinating Board. Requested amount is $7,944. Submitted 2/13/09. Robert Akl (PI), **awarded $11,111**.

R19. "Texas Youth in Technology" under Texas Workforce Commission. Requested amount is $152,393. Submitted 11/10/08. Robert Akl (PI), **awarded $152,393**.

R20. "IUCRC Center Proposal: Net-Centric Software and Systems," under NSF-07-537: Industry/University Cooperative Research Centers. Requested amount is $349,482. Submitted 9/26/08. Krishna Kavi (PI), Robert Akl (co-PI), **awarded $60,000 per year for 5 years**.

R21. "Robocamp and Beyond" under Motorola Foundation Innovation Generation Grant. Requested amount is $30,000. Submitted 6/20/08. Robert Akl (PI), **awarded $30,000**.

R22. Texas Youth in Technology" under Texas Workforce Commission. Requested amount is $30,000. Submitted 2/27/08. Robert Akl (PI), **awarded $31,500**.

R23. "Robocamp Program for Young Women" under RGK foundation. Requested amount is $30,000. Submitted 11/5/07. Robert Akl (PI), **awarded $15,000**.

R24. "Texas Youth in Technology" under Texas Workforce Commission. Requested amount is $102,514. Submitted 10/22/07. Robert Akl (PI), **awarded $102,514**.

R25. "Women Art Technology" under Hispanic and Global Studies Initiatives Fund. Requested amount is $14,125. Submitted 9/30/07. Jennifer Way (PI), Robert Akl (co-PI), **awarded $12,785**.

R26. "Robocamp Mobile Unit" under Motorola Foundation Innovation Generation Grant. Requested amount is $35,000. Submitted 6/20/07. Robert Akl (PI), **awarded $30,000**.

R27. "ICER: UNT Engineering Challenge Camps" under NSF 0547299. Requested amount is $35,000. Submitted 4/27/07. Oscar Garcia (PI), Robert Akl (senior personnel), **awarded $32,792**.

R28. "IUCRC-Planning Proposal: UNT Research Site Proposal to join Embedded Systems I/UCRC," under NSF-01-116: Industry/University Cooperative Research Centers. Requested amount is $10,000. Submitted 3/31/07. Krishna Kavi (PI), Robert Akl (co-PI), **awarded $10,000**.

R29. "High-assurance NCCS: Ultra Dependability Integration Engineering," Department of Defense. Requested amount is $20,000. Submitted 3/12/07. Krishna Kavi (PI), Robert Akl (co-PI), **awarded $20,000**.

R30. "Recruiting and Retention Strategies for Computer Science at UNT" under Texas Technology Workforce Development Grant Program – 2005. Requested amount is $163,322. Submitted 3/17/05. Robert Akl (PI), **awarded $125,322**.

R31. UNT Faculty Research Grant for Fall 2003, Robert Akl (PI), $5,000, **awarded $4,000**.

R32. UNT Junior Faculty Summer Research Fellowship for Summer 2003, Robert Akl (PI), $5,000, **awarded $5,000**.

Professional Associations and Achievements

Membership in Professional Organizations

- Senior Member IEEE
- Member, Federation Council of North Texas Universities
- Member, Eta Kappa Nu Electrical Engineering Honor Society
- Member, Golden Key National Honor Society
- Member, Tau Beta Pi Engineering Honor Society

Offices and Committee Assignments in Professional Organizations

- Technical Program Committee Member, IEEE Wireless Communications and Networking Conference, IEEE WCNC
- Technical Program Committee Member, International Wireless Symposium, IWS
- Technical Program Committee Member, IEEE International Conference on Computational Science, IEEE ICCS
- Technical Program Committee Member, IASTED International Conference on Wireless Communications, WC
- Technical Program Committee Member, WTS Wireless Telecommunications Symposium
- Technical Program Committee Member, Mosharaka International Conference on Computer Science and Engineering, Amman
- Invitation to serve as an NSF reviewer/panelist for Engineering Research Centers (ERC) proposals
- Technical Program Committee Member, 18th IEEE International Symposium on Personal, Indoor and Mobile Radio Communication, Greece
- International Program Committee, IASTED International Conference on Wireless and Optical Communication, Canada
- Program Committee Member, Fifth Annual Wireless Telecommunications Symposium, CA
- Technical Publications Chair, IEEE Vehicular Technology Conference, Dallas TX
- Session Chair, International Conference on Computing, Commun. and Control Tech., Austin TX
- Session Chair, International Conference on Cybernetics and Information Technologies, Orlando FL
- Session Chair, 8th World Multi Conference on Systemics, Cybernetic, and Informatics, Orlando FL

Additional Responsibilities and Activities

- Reviewer, *Wireless Communications and Mobile Computing*, 2012 – present
- Reviewer, *Journal of Sensor and Actuator Networks*, 2012 – present
- Reviewer, *IEEE Transactions on Vehicular Technology*, 2011 – present
- Reviewer, *Elsevier Journal of Computers & Electrical Engineering*, 2008 – present
- Reviewer, *IEEE Globecom*, 2007 – present
- Reviewer, *IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS)*, 2008 – present
- Reviewer, *The International Wireless Communications and Mobile Computing Conference*, 2007 – present
- Reviewer, *Journal on Wireless Communications and Networking*, 2007 – present
- Reviewer, *IEEE Transactions on Communications*, 2007 - present
- Reviewer, *International Journal of Communication Systems*, 2007 – present
- Reviewer, *IEEE Communications Magazine*, 2005 – present
- Reviewer, *Journal of Wireless Networks*, 2004 – present
- Reviewer, *IEEE Transactions on Mobile Computing*, 2004 – present
- Reviewer, *IEEE Transactions on Wireless Communications*, 2004 – present
- Reviewer, *ACM Crossroads*, 2004 – present

Honors and Awards

- Who's Who in America, 2012 Edition
- Winner of Tech Titan of the Future – University Level Award for UNT Robocamps for Girls, Metroplex Technology Business Council, 2010 with **$15,000 cash prize**.
- IEEE Professionalism Award, Ft Worth Chapter, 2008
- UNT College of Engineering Outstanding Teacher Award, 2008
- Certificate of Appreciation: IEEE Vehicular Technology Conference, Dallas, TX, 2005
- Certificate of Appreciation: Denton County Boosting Engineering, Science and Technology (BEST) Robotics Competition, 2004
- Summa Cum Laude Graduate, Ranked First in Undergraduate Class
- The Computer Science Departmental Award for Academic Excellence, Washington University, 1993
- The Dual Degree Engineering Award for Outstanding Senior, Washington University, 1993
- The 1992 Technical Writing Competition Award, The Society for Technical Communication

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/013,809	Art Unit	: 3992
Patent No.	: 8,457,228	Examiner	: Scott Louis Weaver
Filed	: September 12, 2016	Conf. No.	: 7821
Customer No.	: 06449	Atty. No.	: 3277-114.RXM2

Title: SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS

DECLARATION OF GORDON BREMER

I, Gordon Bremer, declare:

1. From the years of 1974 to 2006 I was employed by Paradyne Corporation, which underwent name changes during that time, in Largo, Florida. From 1981 to 2006, I held various job titles, including Engineering Director. My job responsibilities as Engineering Director included leading a research and development team in the field of data communications.

2. I am the sole inventor of U.S. Patent No. 8,457,228 ("the '228 Patent").

3. The '228 Patent discloses a system in which network devices may communicate with other network devices according to a master/slave relationship using different types of modulation methods. *See* '228 Patent, Abstract.

4. The '228 Patent claims priority to U.S. Provisional Serial No. 60/067,562 ("the '562 Provisional").

5. In the Background section of the '562 Provisional (the priority document for the '228 Patent), I describe a system using a common modulation technique:

> In a simultaneous multiple access (SMA) DSL system, such as that provided by Pinnacle and disclosed via various Paradyne patent disclosures, a master communicates with one or more tribs over a single wire pair. Communication is polled multi-point: that is the master controls the initiation of its own transmission (outbound) and allows the transmission of each tribs (inbound). This polled communication may involve either half-duplex or full-duplex outbound and inbound. According to the prior art, all tribs must have a common modulation.

'562 Provisional at p. 3.

6. In the background section of the '562 Provisional, the term "Pinnacle" was an informal term used within Paradyne to reference a technology being developed by my team at Paradyne. The Pinnacle technology was originally named Hypermodem and was later renamed as ReachDSL™. The Broadband Tech Notes 017, 018, 021, 024, 025, 030, and 032 (attached as Appendices A-G, respectively) illustrate my work on and with the Hypermodem/Pinnacle technology in 1996. In September of 1996, I conceived of the half-duplex modulation protocol. *See* Appendix F. The Hypermodem/Pinnacle technology subsequently began using the half-duplex modulation protocol. The half-duplex modulation protocol used by the Hypermodem/Pinnacle technology enabled my subsequent embedded modulation invention, which is set forth in claim 21 of the '228 Patent. In particular, I first applied my embedded modulation invention to the particular half-duplex modulation protocol utilized by the Hypermodem/Pinnacle technology.

7. At the time of the filing of the '562 Provisional, I was employed at Paradyne. A project I was working on was simultaneous multiple access ("SMA") digital subscriber line ("DSL") systems. The systems that were developed under my supervision included, among others, a master device communicating via polled multi-point communication with one or more tributaries ("tribs") over a single wire pair. These systems required a single, common modulation scheme. I refer to these systems herein as "common modulation systems."

8. One such system is described U.S. Provisional Patent Serial No. 60/039,352, filed March 18, 1997, entitled "Interleaving Transmissions of Telephone Rings and Data" ("the '352 Provisional"), attached to this Declaration as Appendix H. I am listed as a sole inventor of the '352 Provisional.

9. The '352 Provisional describes methods "using the polled multipoint DSL concepts of the Paradyne Pinnacle/HyperModem technology." '352 Provisional at Abstract. The '352 Provisional discloses "a polled, half-duplex communications system" including a "(multipoint) master located at the telco central office" and "any number of tributaries." *Id.* at § 3. "The multipoint master controls all transmissions directly from the master (in response to either master data needed to be transmitted or a poll to be transmitted) or indirectly from the tributary (via a polled request for that tributary to transmit)." *Id.*

10. Another common modulation system is described in U.S. Provisional Patent Serial No. 60/039,265, filed February 28, 1997, entitled "Simultaneous Multiple Telephone-type Services on a Single Telephone Line" ("the '265 Provisional"), attached to this Declaration as Appendix I. I am listed as a co-inventor of the '265 Provisional.

11. The '265 Provisional states, in part:

> The HyperModem and/or Pinnacle technology concepts provide multiple simultaneous data sessions between one or more premises modems and a central office-located modem. The concept is polled half-duplex multipoint with the master at the central office. Data rates are typically 256 kpbs or higher. The concept also permits simultaneous POTS during half-duplex multipoint at reduced rates.

'265 Provisional at § 3 (describing my own work).

12. The system "provided by Pinnacle and disclosed in various Paradyne patent disclosures," to which I refer in the Background section of the '562 Provisional, is one example of the "common-modulation systems" described above.

13. I depicted the "common modulation systems" that I developed at Paradyne and the shortcomings of such systems in the figures and descriptions of both the '562 Provisional and the '228 Patent. Figure 1 of the '562 Provisional (reproduced below), and the corresponding

description at pages 2-3, corresponds to Figure 2 of the '228 Patent (reproduced below), and the corresponding description at col. 3:64-5:7 of the '228 Patent.

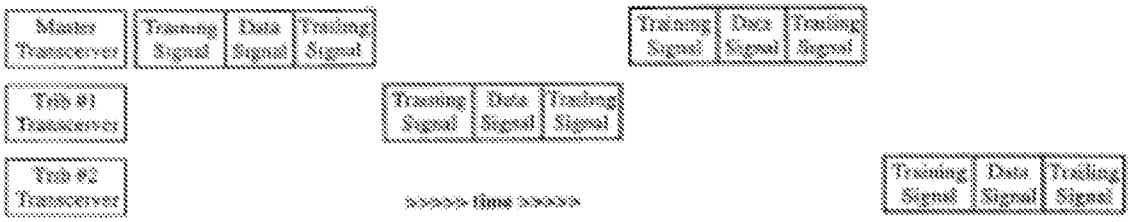


FIGURE 1: Prior Art Multipoint Signals (single modulation type for master and tribs)

'562 Provisional at Fig. 1.

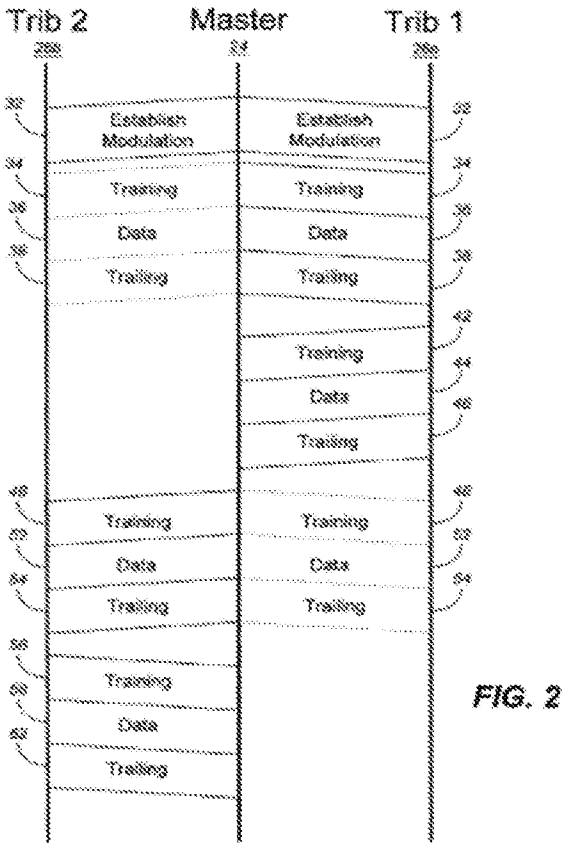


FIG. 2

'228 Patent at Fig. 2.

14. The common modulation systems to which I refer in Figures 1-2 and pages 2-3 of the '562 Provisional and Figs. 1-2, col. 2:27-34, col. 3:64-4:1, and col. 4:28-33 of the '228 Patent

are my own work and systems that were developed under my supervision during my employment at Paradyne. When I used the term "prior art" in the '562 Provisional, the '228 Patent, and my earlier descriptions of the invention, I was referring to my own prior work on common modulation systems and, in particular, to Paradyne's Hypermodem/Pinnacle technology.

15. Figures l and 2 of the '562 Provisional (and their respective descriptions) and Figures 1 and 2 of the '228 Patent (and their respective descriptions) refer to my foundational work product to present a problem that I had identified for which the '228 Patent provides a solution.

16. I hereby declare that all statements made in this declaration of my own personal knowledge are true and that all statements made on information and belief are believed to be true and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code.

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

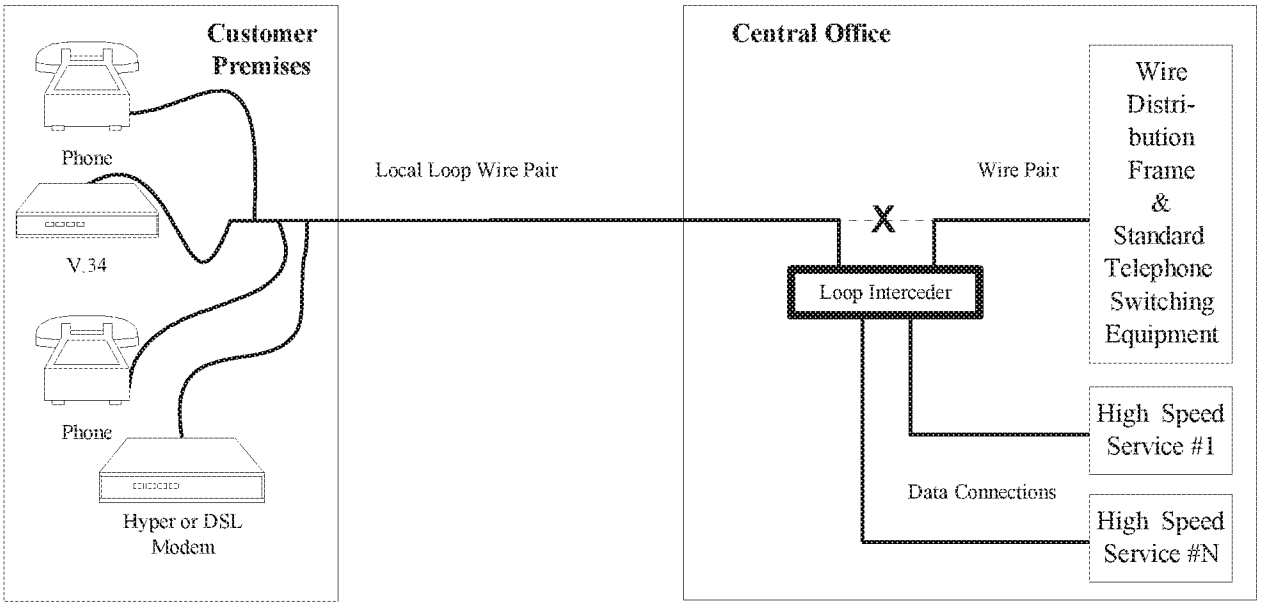
Date: 8-13-2017

Gordon Bremer

Appendix A
to the
Bremer Declaration

A Family of
Local Loop Interceders
for DSL and HyperModem Services

A Local Loop Interceder (LLI)
is a function inserted physically in the telephone local loop wire pair,
normally at the central office,
to provide the telephone customer with one or more
new non-PSTN multimedia communications services,
based on HyperModem or DSL technologies,
without requiring any change to the existing central office telephone equipments.



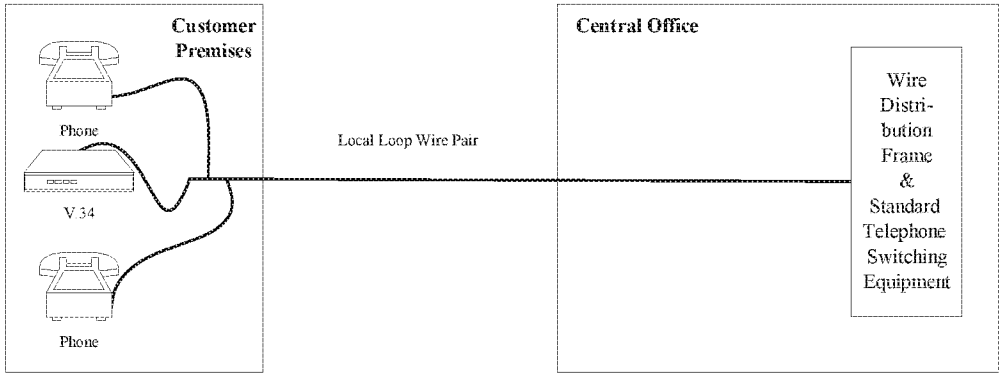


Figure 1: Conventional PSTN Service with V.34 Modem and Extension Phones

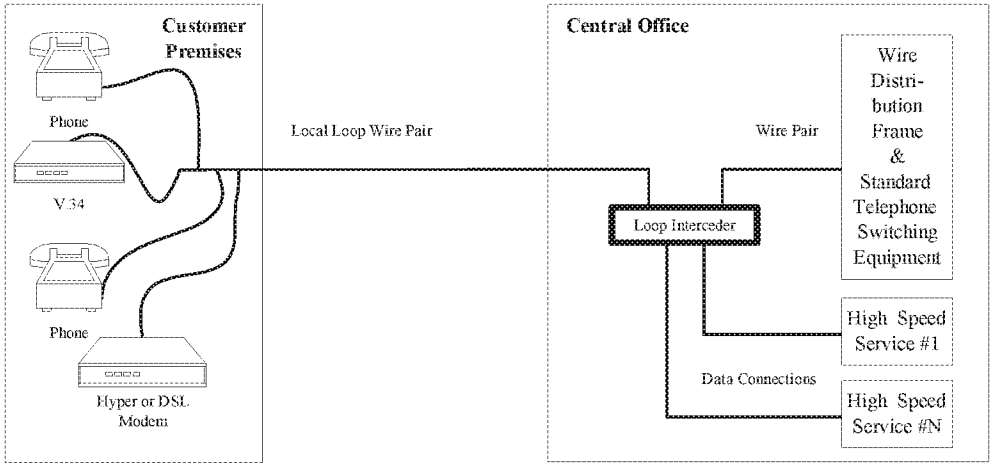


Figure 1: Conventional PSTN Service with V.34 Modem and Extension Phones

Appendix B
to the
Bremer Declaration

BROADBAND TECH NOTE 018

(09/04/96 1:59 PM)

Gordon Bremer
c:\projects\xdsl\bbtn018.doc

"HyperModem Presentation Documents"

This Tech Note contains two documents presented by Bremer in various meetings from July 23 through September 1, 1996.

The first was referred to as "HYPERM04.doc". It includes an interceder.
The second was referred to as "HYPERMa2.doc". It does not require an interceder.

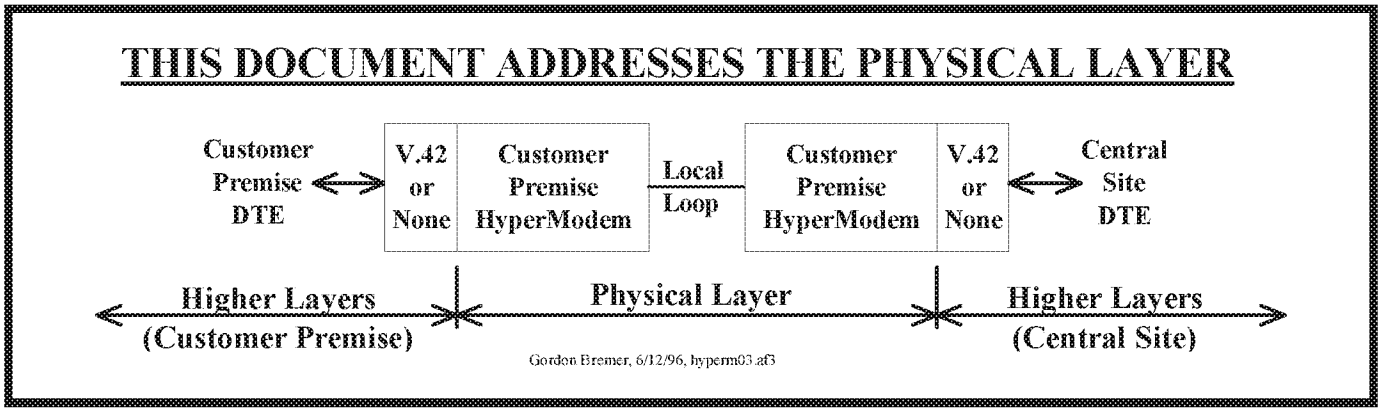
These may be outdated after these dates.

HyperModem
&
Local Loop Interceder

Alternate Voice/Data Internet & Remote LAN Access
with Concurrent Voice/Data Option

Physical Layer Description

- **Part 1: Overview Section**
- **Part 2: Details Section** (may not be included in this copy)



Part 1: Physical Layer Overview Section

This section does not address the interface circuitry between the CPE HyperModem and PC

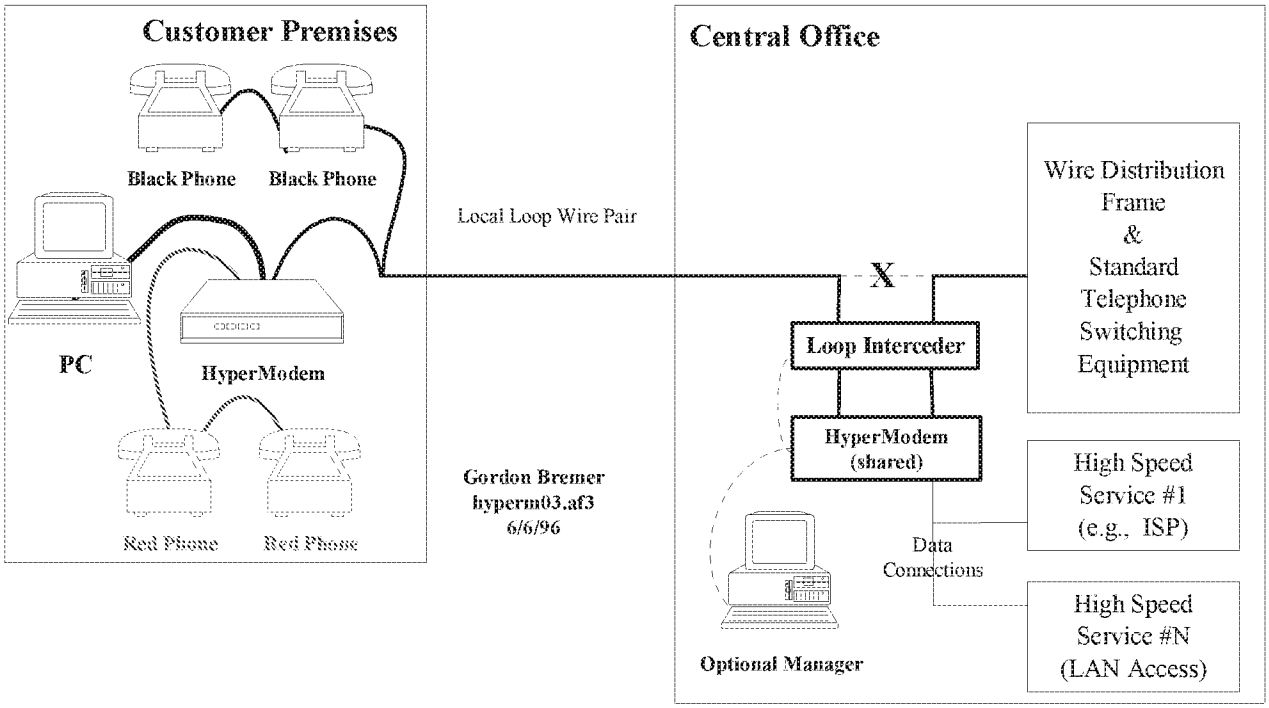
nor

the interface circuitry between the COE HyperModem and LAN, Router, etc.

"Costs" herein refer to the manufactured cost of the equipment, *not the price a customer may pay*.

HyperModem & Local Loop Interceder System

Alternating Voice/Data HyperService with Concurrent Voice/Data Option



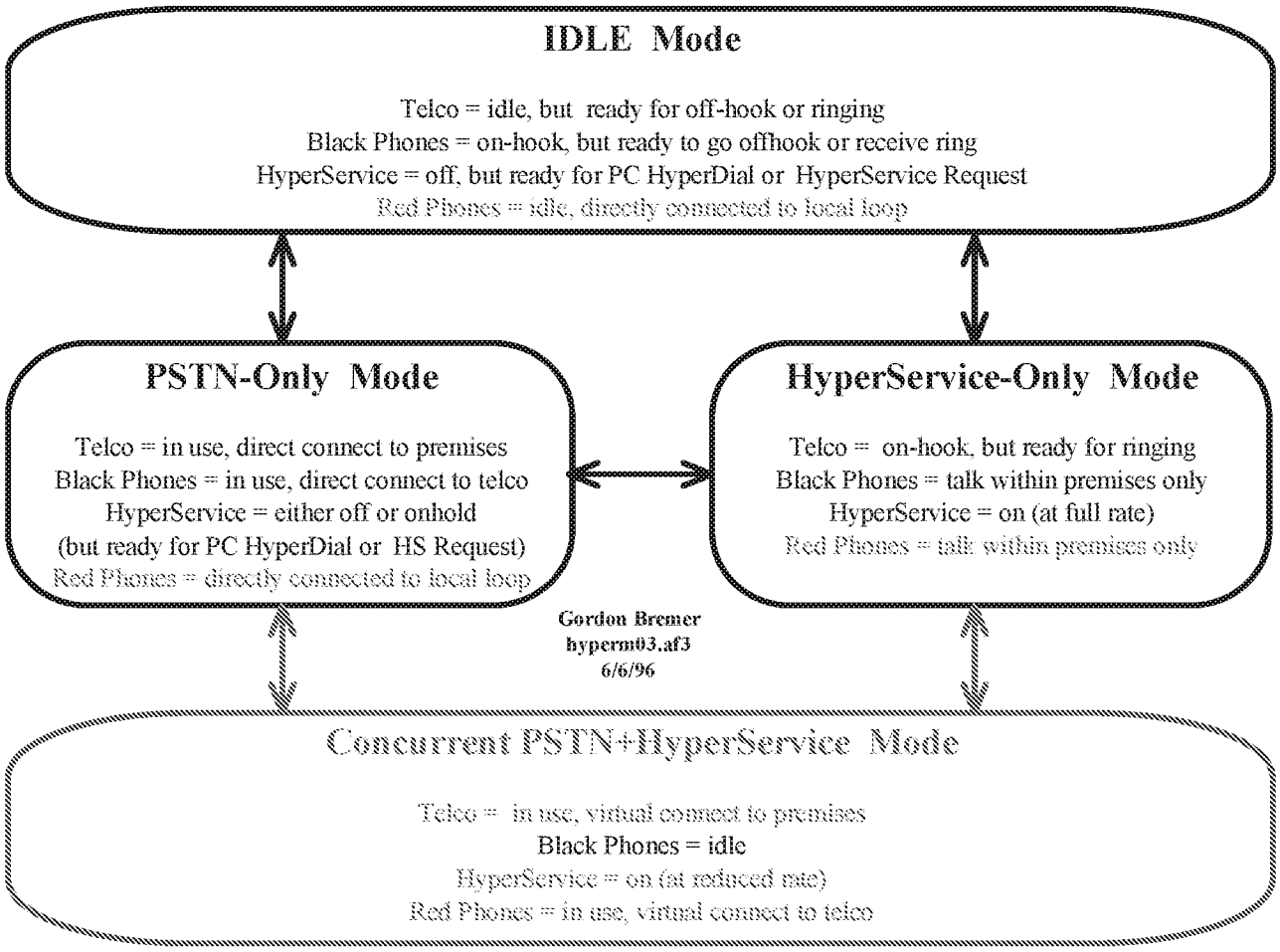
Customer Premises

- **Customer bears cost *difference* of HyperModem vs. V.34: ~$20 more**
- **Buy where you buy regular dial modems ... soon a feature inside PCs**
- **HyperModem includes and acts as a V.34 dial modem**
- **HyperModem has rates to 256 kbps ... higher in future ... Mocha also!**
- **No service install ... connect to any wall jack**
- **Use existing premise wiring, existing phones, faxes, answer machines**
- **Automatic alternate use of HyperService & normal PSTN**
  - **Non-interruptive incoming call notification**
  - **Approved outgoing calls do not drop HyperService**
- Optional Concurrent use of HyperService & normal PSTN
  - HyperModem-CVD cost is ~$15 more

Central Office (or SLIC)

- **Telco bears cost of Interceder and HyperModem: $15 + $120 = $135**
- **Insert Interceder in the local loop wire pair**
- **Connect HyperModem to Interceder and to data services ports**
- **Shared HyperModems can be provided to reduce costs**
- **No change or effect on present telco equipment or services**
- **Offer HyperServices**
- **Optional Manager is available for maintenance, billing, etc.**

HyperModem & Local Loop Interceder Modes



HyperModem & Loop Interceder Comparisons

HyperService differs from ADSL, HDSL and SDSL technologies in several respects

At the Customer Premises:

1. **The HyperModem is customer-purchased & customer installed.**
   - Same as a dial modem.
   - At first from dial modem suppliers ... later integral to new PCs
   - Telco need not be involved in purchase nor install.
2. **The HyperModem is the *only* customer premise equipment.**
   - No telco equipments such as POTS splitters.
3. **The HyperModem connects directly to the existing premises telephone line.**
   - Identical to a dial modem ... plug into any wall jack.
4. **The HyperModem includes and/or replaces a V.34 dial modem.**
   - No need for another modem.
   - It can include Mocha & V.34Q.
5. **The HyperModem provides adaptive data access rates between 64 kbps and at least 256 kbps.**
   - Reliable on existing premises and local loop wires.
   - Rates are ultimately limited to those that provide reliable performance and install.
   - Can automatically revert to V.34 if HyperService is unavailable.
6. **The HyperModem is portable ... use anywhere there is a phone jack**
   - HyperService when available ... otherwise V.34.

At the Central Site:

1. **A Local Loop Interceder replaces a POTS splitter.**
2. **Shared HyperModems are practical due to low bandwidth utilization.**

Physical Layer Costs:

1. **Telco has no customer premises equipment cost.**
2. **Telco has no customer premise installation cost.**
3. **Customer bears cost difference adder of ~$20 compared to V.34. ($15 more for CVD).**
4. **Telco per-line cost is ~$135. (HyperModem sharing can reduce costs significantly.)**
5. **Digital interface hardware costs at the PC and central office can be lower than xDSL.**

Comments & Definitions

Physical Layer: This document focuses on the *physical layer* aspects of a communication access technique. While higher layer features may be discussed, it is necessary to address data interfaces and higher layer issues at the PC and at the central office elsewhere. Note that higher layer requirements differ from DSL in one important respect: they have lower potential cost due to lower data rates.

General DSL? While this document uses "HyperModem" terminology, many principals may be applicable to general DSL, be it CAP, DMT, 2B1Q, etc. A key is that the modulation technique used must have reliable performance on existing customer premise wiring, existing premises phone-type equipments, in the Loop Interceder and in central office environments.

HyperModems: The HyperModem at the *customer premises only* has all the features of a standard V.34 dial modem plus the Hyper modulation modes that provide adaptive rates to at least 256 kbps. This CPE modem may also provide Mocha. Again, the key is that the Hyper modulation technique used must have reliable performance on existing customer premise wiring, existing premises phone-type equipments, in the Loop Interceder and in central office environments. 1997 cost target is V.34 + $20 = ~$120. The HyperModem at the central site is simpler: only the Hyper modulations modes are needed, for example, and interfaces are simpler. See cost target below.

HyperModem-CVD: This is a customer premises HyperModem with added capability to support attached phones that have concurrent voice operation during HyperService. Cost adder is perhaps $15. The feature set is similar to the DataPort 2001.

Loop Interceder: The Local Loop Interceder is a function inserted physically in the telephone local loop wire pair, normally at the central office, to provide the telephone customer with one or more new non-PSTN multimedia communications services, based on HyperModem or DSL technologies, without requiring any change to the existing central office telephone equipments. The loop interceder proposed herein is an active, intelligent function. Cost target is $15-20.

Shared HyperModem Concept: It has been suggested that each central office HyperModem can serve perhaps 5-10 local loops *on the average*. Each individual central office HyperModem target cost is V.34 + $10. Shared cost target (for 5:1) is thus $25.

HyperService: This term is used to denote access to the central site at rates exceeding V.34 and up to at least 256 kbps.

Black and Red Phones: Black phones are standard extension phones, fax and answering machines used for the standard alternating voice/data service. They are connected directly to the local loop via existing premises wiring.. Red phones are standard extension devices but connected only to the HyperModem either by new wire or by reconfiguration of existing premises wiring for the optional concurrent voice/data operation.

Per-Line 1997 Cost Targets: "Targets" are what is suggested to be realistic goals that Paradyne and its competitors should be assumed to be able to achieve. The following is a physical layer target per-line cost and does not include non-RS232 or non-PC Bus customer premise interface nor non-RS-232 central office interfaces. But note that these should cost less than DSL counterparts. "Costs" herein refer to the manufactured cost of the equipment, not the price a customer may pay.

Standard Alternating Voice/Data	Customer Cost	Telco Cost
HyperModem additional cost above standard V.34	$20*	
Loop Interceder		$15
HyperModem		$120
TOTAL	**$20**	**$135**
Cost adder for Concurrent Voice/Data	*$15*	*$5*

* Cost target of HyperModem with inclusive V.34 is ~$120.

View from the Home or Small Business

(Standard Alternating Voice/Data Service)

Provisioning and New Performance

- Buy a HyperModem ... anywhere you now buy modems
- Replace present modem with a HyperModem[1]
- Retain existing premise wiring
- Retain existing PSTN services[2]
- Retain existing telephone, answer machine and fax operations
- Run diagnostic performance-tuning PC software: HyperModem loop test.
- HyperModem has also full V.34 dial modem functionality ... as well as Mocha
- Subscribe to (one of several) HyperServices
- To use, select HyperService via PC as a modem call option
- HyperService data rates to 256 kbps ... even higher later

Standard Alternating Voice/Data Service

- HyperService can be initiated from PC or from central office
  - Whether PSTN is on-hook or off-hook
  - PC uses standard SW call procedure, but special HyperNumbers[3]
  - ISP switches Interceder via HyperService CPE address.
  - If HyperService is temporarily busy, auto fallback to V.34 is provided.
- When HyperService is *not* in use:
  - Place normal phone, modem, fax call from any extension[4]
  - Answer normal phone, modem, fax call from any extension
- When HyperService *is* in use:
  - Request normal phone, modem, fax outgoing call from any extension
    - ~ Extension goes off-hook
    - ~ HyperModem can be set to either accept or reject request
    - ~ If rejected, extension is temporarily idled: try again later
    - ~ If accepted, extension can place call
    - ~ HyperService is on temp hold
    - ~ Call completion (or notified time-out) restores HyperService
  - HyperModem indicates incoming PSTN call attempt & caller ID
    - ~ HyperService is not disrupted & extensions do not ring
    - ~ HyperModem can reject call answer: call goes unanswered
      - > Caller can optionally receive answer machine response
    - ~ HyperModem can allow call answer by any extension(s)
      - > HyperService is on temp hold

---

[1] There are likely variations on the electrical interface between modem and PC.

[2] Inline chokes may be required for some existing devises.

[3] If PSTN is onhook, go off-hook, send HS Request. ACK is loss of current due to relay switch.
If PSTN is offhook, Black Phone can pick and verbally request or HyperModem can signal request. HS Request is during offhook.

[4] Telco provides ring & current in this case.

> **Call completion (or notified time-out) restores HyperService**

View from the Home or Small Business

(Optional Concurrent Voice/Data Service)

The following is only an overview. Details and secondary events are explained elsewhere.

Provisioning and New Performance

- **Buy a HyperModem-CVD ... instead of standard model**
- **All is same as for alternating voice/data service, plus**
- **Connect one or more extension phones directly to HyperModem-CVD**

Optional Concurrent Voice/Data Service

- **All is same as for alternating voice/data service, plus**
- **When HyperService is *not* in use:**
  - **Red phones are connected to local loop**
  - **Request normal phone, modem, fax call from any Red phone**
- **When HyperService *is* in use:**
  - **Request normal phone, modem, fax call from any Red phone**
    - ~ **Red phone goes off-hook**
    - ~ **HyperModem can be set to either accept or reject request**
    - ~ **If rejected, Red phone is ignored: try again anytime**
    - ~ **If accepted, Red phone can place call normally (e.g., DTMF)**
    - ~ **HyperService rate drops by 32 kbps[5] during call**
    - ~ **Call completion (or notified time-out) restores full rate**
  - **HyperModem indicates incoming PSTN call attempt & caller ID**
    - ~ **HyperService is not disrupted**
    - ~ **HyperModem can reject call answer: call goes unanswered**
      - > **Caller can optionally receive answer machine response**
    - ~ **HyperModem can allow call answer: Red phones are rung[6]**
      - > **Red phones goes off-hook**
      - > **HyperService rate drops by 32 kbps[7] during call**
      - > **Call completion (or notified time-out) restores full rate**

[5] If there is undesirable data interruption, it is possible to always run 32 kbps less than max.

[6] In an alternative, lower cost version, this actual ringing can be omitted.

[7] If there is undesirable data interruption, it is possible to always run 32 kbps less than max.

View from the Central Office
(Standard Alternating Voice/Data Service)

The following is only an overview. Details and secondary events are explained elsewhere.

Provisioning and New Performance

- Install a Loop Interceder (insert it in the wire pair path)
- Install Hypermodem, attach to Loop Interceder
  - (Many physical variations for the Interceder/HyperModem)
  - Shared Hyperpool
- Offer (one of several) HyperServices
- Interceder/HyperModem management option is available

Standard Alternating Voice/Data Service

- Power fail or emergency fallback is to PSTN service[8]
- HyperService can be initiated from home PC or from a service provider
  - Whether PSTN is on-hook or off-hook ... with no PSTN interruption
- When HyperService is *not* in use:
  - All normal incoming/outgoing PSTN operations without change
  - Telco equipment is directly connected to local loop
- When HyperService *is* in use:
  - All normal incoming/outgoing PSTN operations without change
  - Telco equipment is indirectly connected to local loop
  - Incoming Black Phone call attempt will place HyperService on temp hold
    - ~ HyperService heartbeat will be maintained
    - ~ Call completion restores HyperService
  - Outgoing ring attempt will not disrupt HyperService
    - ~ Outgoing ring attempt may or may not be answered (as normal)
    - ~ Black Phone answer will place HyperService on temp hold
    - ~ Call completion restores HyperService

Management Option

- Control and monitor of Interceders is available from a PC or other device
  - Forced PSTN mode is available

[8] Telco has direct connection to premises. Interceder knows if PSTN is in service.

View from the Central Office
(Optional Concurrent Voice/Data Service)

The following is only an overview. Details and secondary events are explained elsewhere.

Provisioning and New Performance

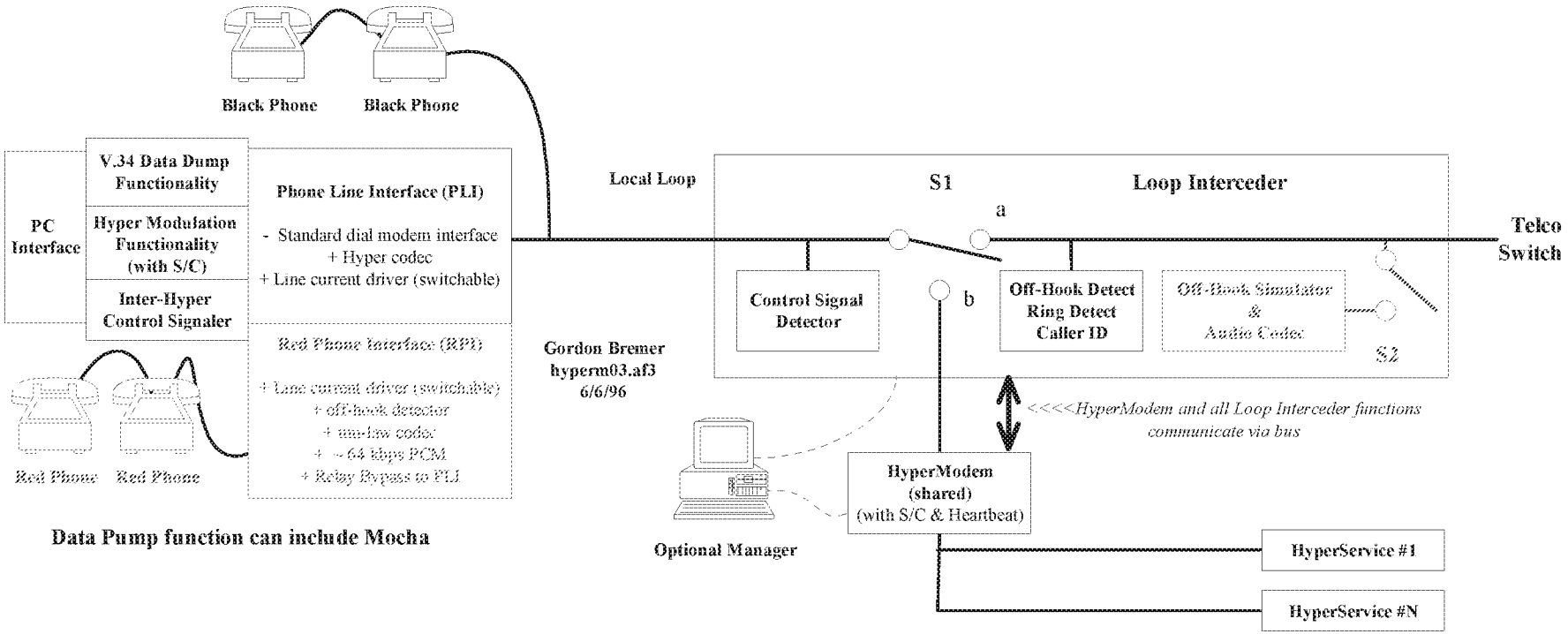
- **All is same as for alternating voice/data service, plus**

Optional Concurrent Voice/Data Service

- **All is same as for alternating voice/data service, plus**
- **When HyperService *is* in use:**
  - **Incoming Red phone call attempt will reduce HyperService rate by 32 kbps**
  - **Red phone answer will reduce HyperService rate by 32 kbps**
  - **Call completion restores full rate**

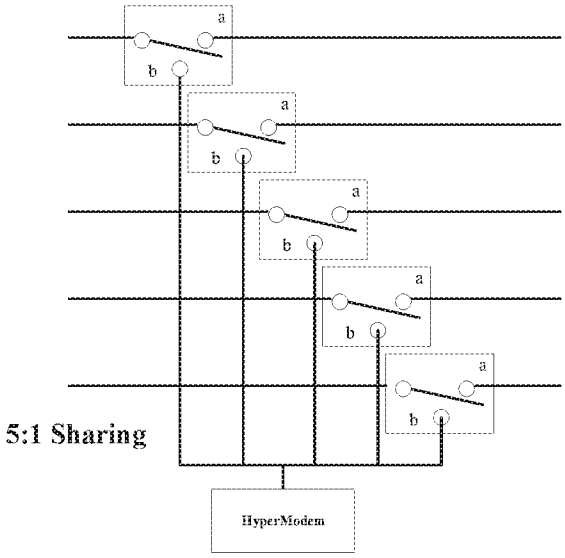
Part 2: Physical Layer Details Section

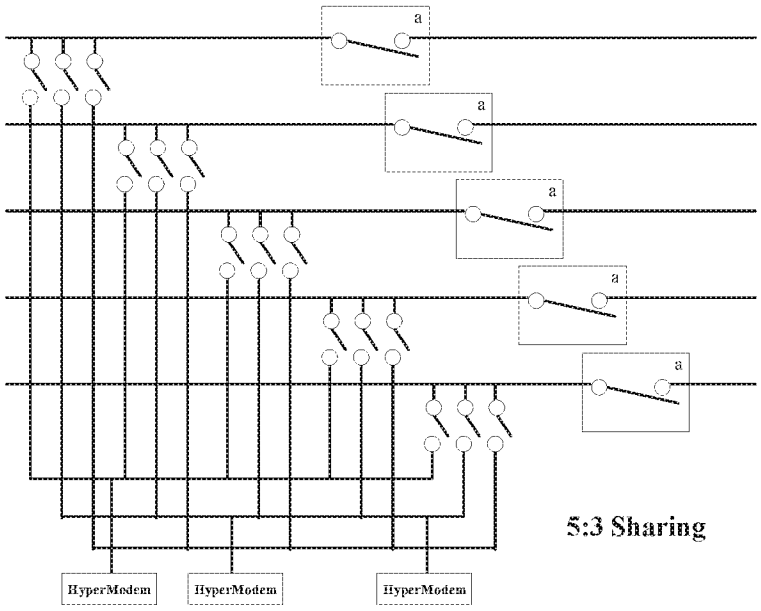
Overall Block Diagram & Description of HyperModem & Loop Interceder System



Shared HyperModem Concept Examples

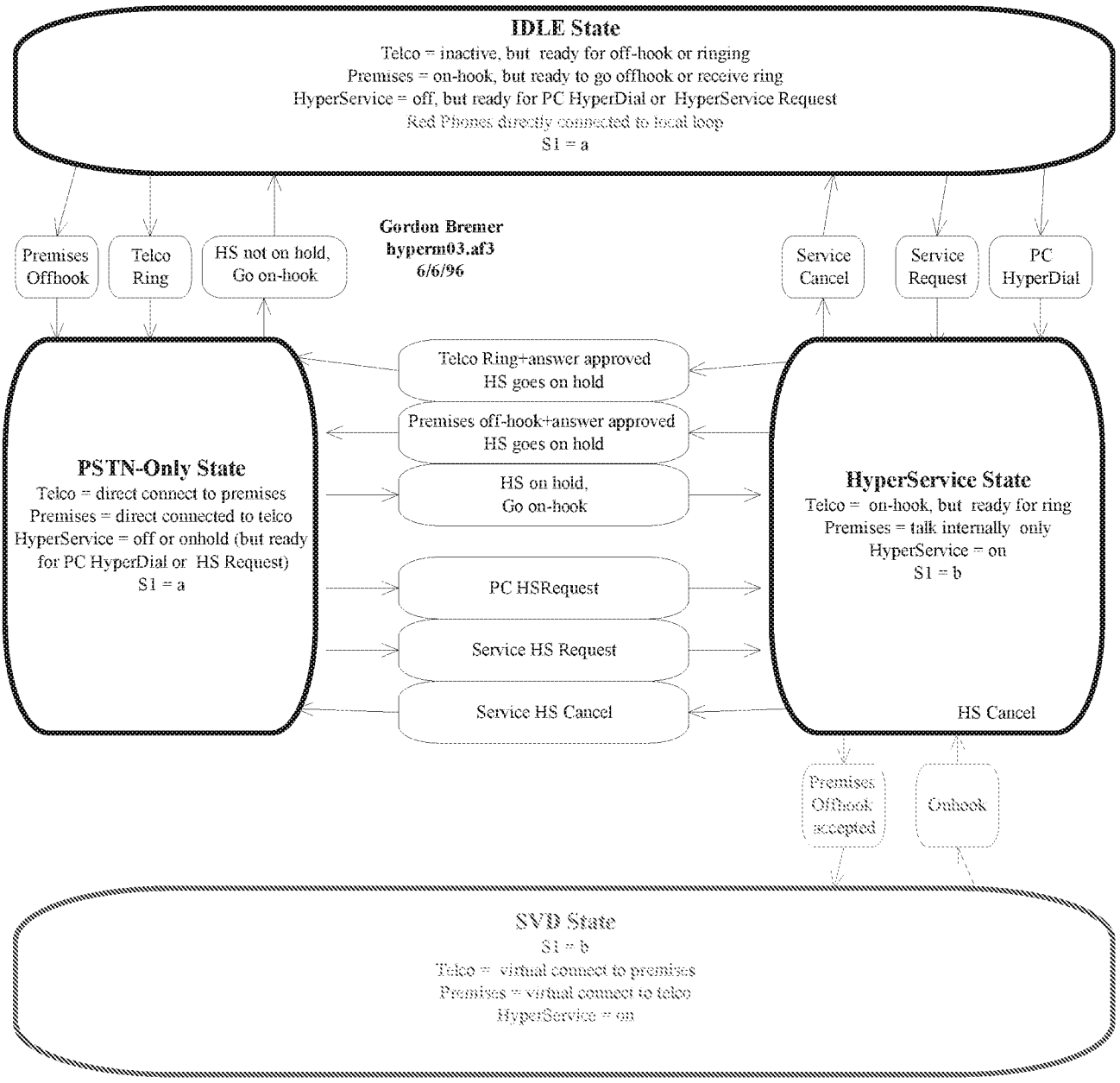
The eventual design of the multiple loop interceders and fewer shared HyperModems is dependent upon several factors: central office mechanical wiring constraints, customer demand for service, statistical use of HyperService and equipment cost. The methods below are thus but a few possibilities.



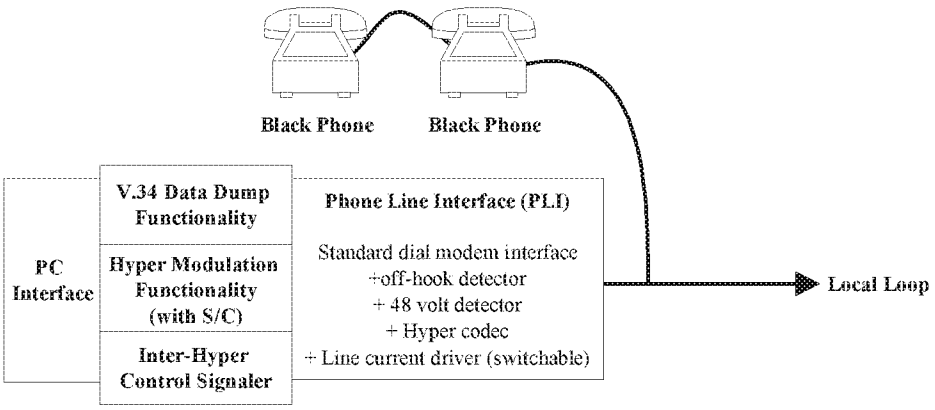


State Diagram & Description of Alternating Voice/Data Functionality

INCOMPLETE!!!!!!!!!!



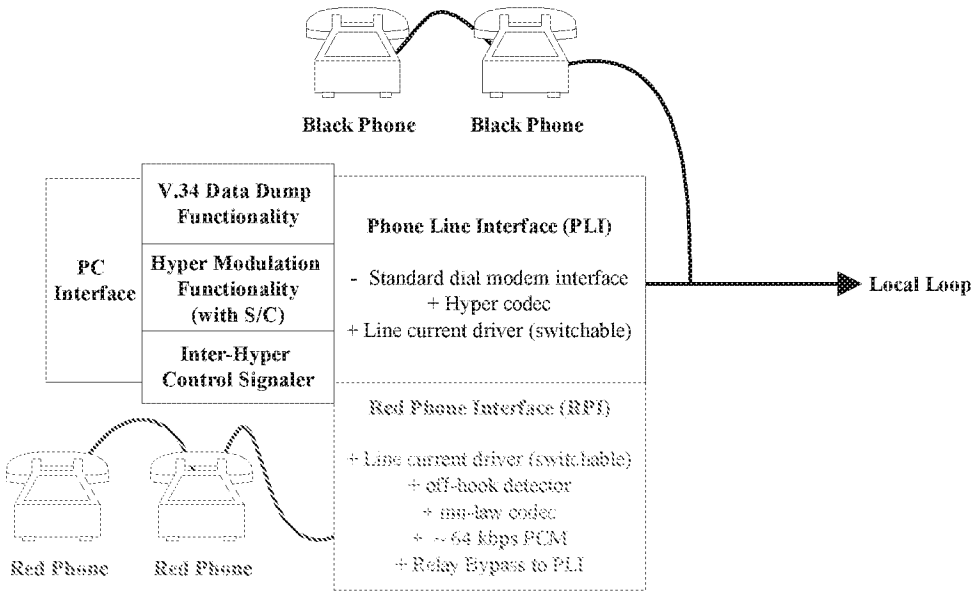
Block Diagram & Description of Standard Customer Premise HyperModem



1. Standard V.34 dial modem features are provided: V.34Q is an option, as well as Mocha.
2. PLI supports Hyper modulation.
3. Hyper modulation is provided ... with a very low rate secondary channel (1200 b/s?).
4. Control to/from central office HyperModem/Interceder is provided during HyperService via secondary channel. Uses are HS Requests, Ring Indicate, Caller ID, etc.
5. Very simple control signalling to/from central office Interceder is provided briefly during local loop on-hook or off-hook. Uses are HS Request and HS Cancel.
6. When PLI is on-hook, PLI can detect local loop +48 volts or +12 volts or near zero volts.
7. PLI can supply current to Black Phones when instructed and determine if one or more is off-hook. (This will be prohibited when +48 volts is present).
8. PC interface is not addressed here.

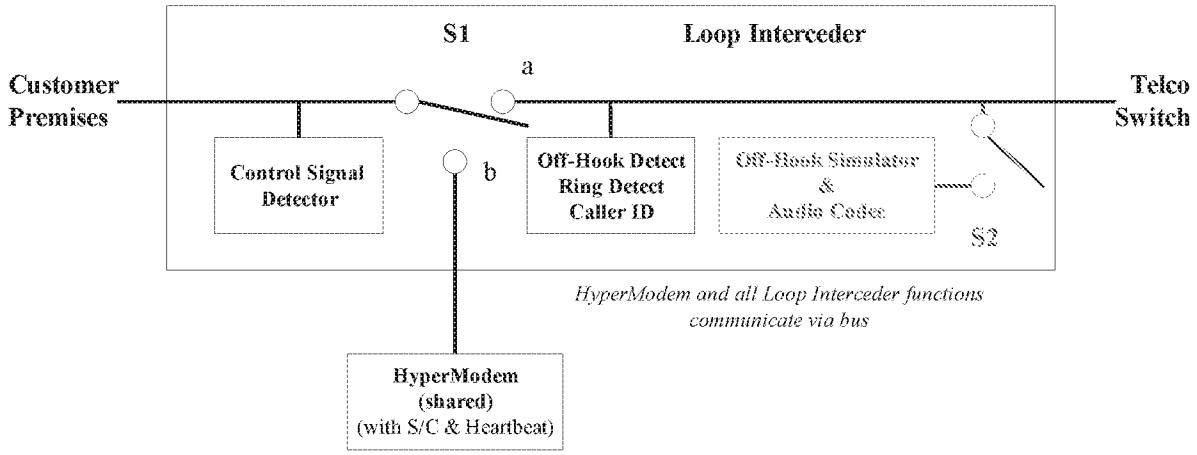
Block Diagram & Description of Customer Premise HyperModem-CVD

Differences to standard HyperModem are in Red



1. Standard V.34 dial modem features are provided: V.34Q is an standard. Mocha is option.
2. PLI supports Hyper modulation.
3. Hyper modulation is provided ... with a very low rate secondary channel (1200 b/s?).
4. Hyper modulation has ~ 64 kbps mode via TDM for Red Phone signals during CVD.
5. Control to/from central office HyperModem/Interceder is provided during HyperService via secondary channel. Uses are HS Requests, Ring Indicate, Caller ID, etc.
6. Very simple control signalling to/from central office Interceder is provided briefly during local loop on-hook or off-hook. Uses are HS Request and HS Cancel.
7. When PLI is on-hook, PLI can detect local loop +48 volts or +12 volts or near zero volts.
8. PLI can supply current to Black Phones when instructed and determine if one or more is off-hook. (This will be prohibited when +48 volts is present).
9. PC interface is not addressed here.
10. RPI bypasses Red Phones to local loop at power off or upon command.
11. RPI can supply current to Red Phones when instructed and determine if one or more is off-hook.
12. RPI can encode/decode phone signals with mu-law codec.

Block Diagram & Description of Loop Interceder and Shared HyperModem



1. Control Signal Detector detects HyperService Request and HyperService cancel signals.
2. HyperModem must signal HyperService Request, off-hooh, ring & caller ID via secondary Channel.
3. HyperModem provides heartbeat to Service during hold period.
4. During CVD, telco is provided with off-hook and audio signals are communicated via codec.

REVISION HISTORY

6/11/96: Brainstorming meeting on draft dated 6/11/96 8:46AM. Chapman, Scott, Bingel, Smith, Bremer. The following points were brought up and are addressed in next draft.

1. SLIC concentration points to pose a problem for getting data back to central office. This effects both DSL & Hyper.
2. Dual line modem bonding is suggested as another competitive solution.
3. HyperModem should have Mocha as option.
4. Bingel suggested a split-band CVD for consideration to alleviate potential issues with heartbeat spoofing.
5. When HyperService is busy, consider a auto default to PSTN modem use.
6. Rename SVD to Concurrent ... or Independent ... .
7. Add Hyper sharing to diagrams.
8. Show possible implementation of Interceder into SLIC card.
9. Need to address mechanical layer in detail to optimize sharing, etc.
10. Billing should be addressed.
11. Need to define "targets" more clearly.

6/12/96: Bremer consolidate hyperm02.doc and hyperm03.doc into one document: hyperm04.doc.

6/13/96: Winer said that 5:1 sharing is likely not acceptable. We agreed to de-emphasize sharing, note that it is possible.

September 4, 1996

AT&T PARADYNE
PROPRIETARY

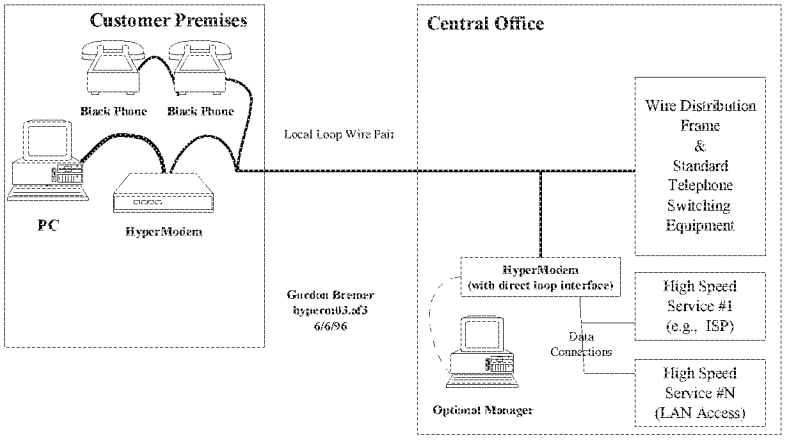
From: Gordon Bremer
Senior Scientist
813-530-8446, fax 532-5949 , mail LG131
Broadband: HYPERMA2.DOC

"HyperModem *without* Loop Interceder"

To: **Paul Floyd LG134**
Frank Wiener LG218

For Information: RK Smith LG131, Tom Bingel LG131, Jeff Davis LG134, Joe Chapman LG131, Lydia Runnels LG131, Keith Nauman LG131, Bob Scott LG131, Frank Emser LG134

THIS IS AN UPDATE OF THE JUNE 5 ORIGINAL MEMO



You are aware of the work done to date on "HyperModem with Local Loop Interceder", as documented presently in hyperm04.doc.

Bingel, Smith and I brainstormed **a subset version which has no Interceder at all**: the HyperModem simply bridges the local loop at the central site ... and can be located up to perhaps 1000 feet away. **This may greatly simplify central office provisioning.** While some of the features of the Interceder version are lost, **the subset version nevertheless has very useful functionality**. The option of Concurrent Voice/Data is lost and transitions between modes are disruptive and annoying.

Moreover, **this technique can also be used by V.34** instead of Hyper. You may ask why anyone would want to do so? Answer: to **free up the telco switch** from long Internet or LAN access connect times.

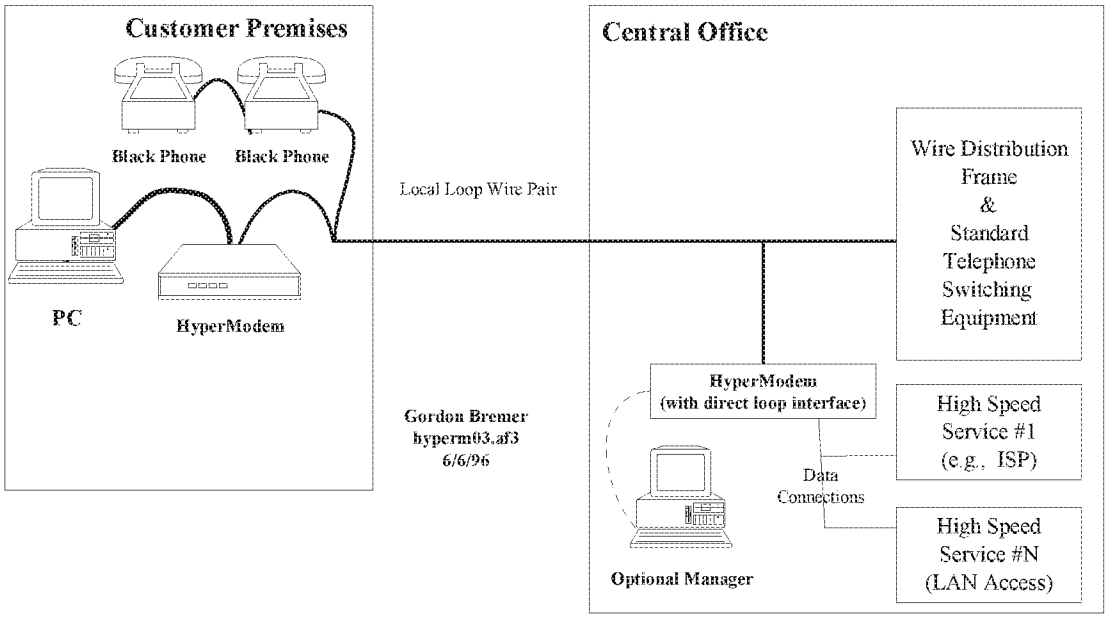
At this time we cannot ensure performance, but it is likely to still achieve rates up to 256 kbps. **Note that a customer premises HyperModem can be made to work with either an Interceder system or a non-Interceder system.**

I suggest that we should all consider this subset version, if for no other reason to know what a competitor may do. Another reason: we should seek patents.

The attached summarizes this approach and points out limitations compared to the "HyperModem with Local Loop Interceder".

This new approach may also warrant further work. Your thoughts are requested.

HyperModem without Local Loop Interceder



Assumptions:

1. The central office loop termination, when the loop is on hook, presents a suitable impedance over the HyperModem frequency range and does not generate unsuitable noise onto the loop. Preliminary measured results indicate this is very likely.

Highlights:

1. The customer premise HyperModem and existing wiring is the same as that used with an Interceder.
2. The Local Loop Interceder is not used: the loop remains connected to its usual termination.
3. The central office HyperModem interfaces directly to the local loop ... at any convenient point.
4. The central office HyperModem has a new direct loop interface[9] compared to the Interceder version.
5. Changes to Alternating Voice/Data HyperService:
   - Incoming rings disrupt HyperService, causing errors but not loss of service[10].
   - (HyperModem cannot accept/reject rings.)
   - Premises call attempts are similarly disruptive, but can be audibly discouraged.
   - HyperService can be requested during off-hook ... but by audibly notifying users to hang up.
6. Concurrent Voice/Data is not provided[11].

[9] It is protected against surges and rings. It detects ring and offhook. It has DC high impedance. It can transmit and receive HyperModem signals during loop on-hook. It immediately ceases transmit and receive at loop off-hook.
[10] Data transfer can continue at lower rate during ring. And it may be possible to program the telco switch to avoid rings!
[11] This may be overcome, but performance is as yet uincertain.

Appendix C
to the
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BROADBAND TECH NOTE 021

(BBTN021.DOC 09/06/96 5:56 PM)

Gordon Bremer
c:\projects\xdsl\bbtn021.doc

"HyperModem Status: End Point Product & Telco Product Key Feature Decisions"

Late on September 5, Beneke, Nauman, Scott & Bremer reviewed the results of numerous technical and business meetings to date and agreed on certain features that should become firm going forward. These covered Analog Access Products, not just "HyperModem".
Bremer's subsequent opinions are included in italics.

I suggest that these be agreed to as firm decisions that guide our further refinement of technical and business plans.

Note especially the following decisions:

1. Single line operation is mandatory. No need for second line for a regular V.34 or IVD.
2. Minimum initial rate is 128 kb/s.
3. V.34 is built-in, but perhaps not in first version shipped. This does not include other modulations.
4. Near-future version has IVD.

HyperModem Update

Business Vision Opinion: *Although "HyperModem" may well be the highlight and focus of both our retail endpoint and telco product offerings, I suggest that we must go beyond that to appropriately include other access technologies should/when they be demanded by the market. We should be viewed as the company that provides consumers with the most reliable, "always works", easy-to-use high speed Internet and LAN access ... with independant voice and data.*

Our Telco offering should accept other technologies that the Telco may anticipate a need for. We should allow for Brooktree, CAP, DMT, etc. Note that each alternative will not provide all the features of HyperModem, but (crucially) they are not excluded. I suggest that this is important to get Telco acceptance and should be announced to them immediately.

Our retail strategy should allow for other technologies as well. We should anticipate that another technology may be desired by customers and we should be prepared to meet that need with a new product. I suggest not announcing this at all, but let's not put all our eggs in the HyperBasket.

First Retail End Point HyperModem

- Modem is affordable to consumers: $300 max price
- HyperService is readily available and affordable
- Modem is familiar and easy to install: plug & play[2]
- Doesn't require 2nd dedicated line
- No premise rewiring needed: standard wall jacks
- *Maintain present extension phones, modems, fax*
- Minimum date rate of 128 kb/s, going to 400+ kb/s
- Basic V.34 built in[3]
- Near-future product has Independent Voice & Data[4]
- Future product has speakerphone, TAD, etc.

Telco Central Office and Remote Terminal

- Subscriber-driven market: many interested subscribers
- Affordable: $300 per line max[1]
- No subscriber premise provisioning or cost
- Simple to install, administer & maintain at telco
- *No change to present switch or present services*
- Off-load data calls from switch: both Hyper and V.34
- Two sources of revenue ... from one line
- Higher data rates to attract Internet access subscribers away from ISPs (which today are tying up the switch)
- Near-future upgrade has Independent Voice & Data
- First equipment is central office (with copper loops)
- Second equipment is remote terminal for SLC

[1] Includes all costs from loop termination to framed-relay network interface.
[2] Uses present PC softwares, for example.
[3] If not available initially, upgrade path to V.34 in future. Note that V.32bis, other modulations and certain "consumer features" are not inluded in this first product.
[4] At higher price

Appendix D
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BROADBAND TECH NOTE 024

(BBTN024.DOC 09/18/96 7:40 PM)

Gordon Bremer
m:\broadbnd\technote\BBTN024.DOC.doc

"HyperModem Proposal: Multiple Simultaneous Internet Access within the Home or Small Business"

I suggest that a very useful HyperModem feature would be for:

- **multiple devices/PCs ...**
- **on a single phone line to each ...**
- ***simultaneously* access the Internet ....**
- **at speeds of 256 kbps.**

This would be a major differentiator compared to V.34 or Mocha.
I suggest that this can perhaps be done with a cost reduction to HyperModem.

Bob Scott, Keith Nauman, Bill Betts and I have only briefly considered the following, but there seems to be significant merit.

The above would be accomplished via a half-duplex layer 1 multipoint with the central office HyperModem being the master and the premise HyperModems being polled. Note that training times are probably less than 20 msec and propagation delays are insignificant! Much of what we used in leased multipoint can be applied here. Since the duty cycle of access is relatively low, each user would typically achieve the full HyperModem data rate.

The HyperModem would become half duplex which could reduce cost very significantly: (1) no echo canceller and (2) TX and RX need not operate simultaneously.

For Internet access, this seems most practical. The half-duplex operation would seem to have little performance degradation compared to a single user with a full duplex HyperModem.

Are there applications that demand full duplex layer 1??

The upper layers need attention, so share your thoughts!! All data from the net could be broadcast via the CO Hyper directly to all premises Hypers with each device determining if it is expecting the data. The CO Hyper could otherwise poll each premise Hyper.

Appendix E
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BROADBAND TECH NOTE 025

(BBTN025.DOC 10/01/96 5:14 PM)

Gordon Bremer
m:\broadbnd\technote\BBTN025.DOC.doc

"(Tonga-Based) HyperModem Technical and Planning Proposal Responsibilities and Schedule"

As we discussed this morning, Development has been charged with presenting a convincing technical proposal and development plan for "HyperModem" within the next two weeks. This Technote addresses responsibilities and dates. (See Technote 026 for technical features).

Assignments:

1. Overall Technical Description document with summary presentation: Thoenes and Scott

This summarizes each technical aspect, "selling" the approach to an audience comprised of business management and system engineers. We must go beyong the past "ideas" or "proposals" to give a convincing solution. Features ... especially differentiating ones ... should be clear. There should be a viewgraph version, ideally supplemented by summary text suitable for prior review. The summary should include at least a (1) system-level view showing premises, wire centers, etc.; (2) the premise product(s) and the Tonga-based CO product; (3) the hardware platform indicating the block diagrams, costs, ASICs, etc.; (4) a summary of the modulation approach(es) (very high-level) and expected performance, (5) the "modem" block diagram and specs; (6) any shortcomings compared to previous HyperModem proposals that result from the Tonga constraint ... and how these may be overcome if necessary. (I suggest this last point is important ... we must not let the objective of a Tonga-based approach mask what we believe may be better approaches that we or competitors may provide.)

Appendix F
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BROADBAND TECH NOTE 030

(BBTN030.DOC 03/16/17 2:13 PM)

Gordon Bremer
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"HyperModem Modulation Thoughts"

Bill, these are some thoughts I had on the plane to Windsor 9/21/96

1. I believe we both agree that QAM is the way to go. CAP, as we know, is but a special case of QAM and has implementation simplicity in that the general QAM carrier rotations in the TX and RX are eliminated. Yet QAM can do this as well if certain relationships between carrier and symbol rate are used. Non-CAP QAMs can yield nearly identical low simplicity as well if carrier/sybol ratios are properly selected. I suggest considering the following cases:

Carrier = S/2 (1 + 1/16)

(All frequencies in KHz)

Symbol rate	Center frequency	Lower band edge	Upper band edge	Minimum sample rate
16	8.5	.5	16.5	34
24	12.75	.65	24.75	51
32	17	1	33	68
40	21.25	1.25	41.25	85
48	25.5	1.5	49.5	102

Carrier = S/2 (1 + 1/8)

(All frequencies in KHz)

Symbol rate	Center frequency	Lower band edge	Upper band edge	Minimum sample rate
16	9	1	17	36
24	13.5	1.5	25.5	54
32	18	2	34	72
40	22.5	2.5	42.5	90
48	27	3	51	108

2. For reasons of transferring the synchronous data onto T1, etc., there is merit in using symbol rates that are multiples of 8000 Hz. However, this is likely not too important as long as the data rate fits well into N x 8000. Perhaps symbol rates that are multiples of 4000 are fine.

3. The above case of Carrier = S/2 (1 + 1/8) allows shorter filters than Carrier = S/2 (1 + 1/16).

4. For reasons of low cost codecs, it seems reasonable to assume 12 bit accuracy. This would imply that the bits per symbol target should be 8, maybe stretchable to 9. For 256 kbps, the symbol rate would then be 32 KHz. But 40 KHz would be nice.

5. Rate adaption will be very important. I suggest not only bits/symbol, but also symbol rate so that we can have a lower cost client at some point. Perhaps symbol rates of either 16/32 or 20/40 KHz are good targets??

6. Half duplex I suggest will be crucial. Thus, timing lock is crucial. I suggest a simple timing tone is worth merit. For Carrier = S/2 (1 + 1/8), how about a tone at s/32 or s/64? This could always be the responsibility of the "master" to transmit to all tributaries (the master may well be negotiated).

7. A secondary channel has merit also. With half-duplex this could simply be in the header or trailer!!

Appendix G
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BROADBAND TECH NOTE 032

(BBTN032.DOC 10/11/96 10:29 AM)

Gordon Bremer
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"October 9 HyperModem Presentation"

The presentation by Bremer to Stensrud, et al, is attached.

HyperModem Technology Overview

October 9, 1996

- **A core technology applicable to "Residential DSL" products**
- **Or is it a V.34 modem enhancement?**
- **Brings unique ... complementary ... features to DSL**
  - **Existing premise wiring and equipments**
  - **Simple consumer install & use**
  - **Multiple Simultaneous Internet Access**
  - **Very low cost**
  - **Simultaneous POTS and Data (without splitter)**

What Is HyperModem Technology?

1. A subscriber loop access technology: physical & link layer

- Consider as low-end of the "DSL Family" ... extending CAP
- Targets "Residential DSL" (RDSL?)
- Complements "Commercial DSL"

2. Existing premise wiring and equipments (*ground rule*)

- No service calls
- Consumer-installed as a dial modem
- Retain existing phones, modems and faxes
- Rate-adaptive for optimum performance
- Ultimate speed limited only by this premise wiring constraint
- Wire-center equipment can be same as for other DSL

3. Multiple Simultaneous Internet Access up to 256 kb/s (*ground rule*)

- 8 users on a single line at the same time

4. Simultaneous POTS and Data (*ground rule*)

- Continue up to 128 kb/s data session(s) during voice call
- A "dial" DSL ... vs. "leased" ADSL

5. Single access up to 384 kb/s

- Ultimate speed limited only by premise wiring constraint

6. Very low cost ... equivalent to V.34 modem (*ground rule*)

- Oahu functionality at $80-90 MLO (1997 generation)
- Central site core at ~ $25 (1998 generation)

7. Can include a V.34 modem in same platform

- Inclusion within PCs in the future

8. Cost-effective for whole new line of future consumer products

What Is Multiple Simultaneous Internet Access with Simultaneous POTS and Data?

- Dial modems permit only one user at a time to access data (the Internet)
- Dial modems prohibit incoming calls during data sessions
- Dial modems prohibit outgoing calls without loss of data session
- ADSL POTS splitter permits calls

1. Multiple Simultaneous Access permits multiple devices to simultaneously access the Internet:
   - Access rates up to 256 kbps each
   - Much like multiple dial up PCs on one line
   - This concept appears unique to Paradyne thought! Is it compelling??

2. Simultaneous POTS and Data permits both outgoing and incoming calls
   - Data session(s) is retained during POTS

These features can pave the way for future a large DSL consumer products industry ...

One View: A Residential DSL Vision?

How Does HyperModem Technology Compare?

	V.34	Hyper	ADSL-DMT	ADSL-CAP	ISDN	Brooktree (Rockwell)
Single access data rates (down/up)	28.8 28.8	384 384	6000?? 736??	6000?? 640??	128 128	384 384
Multiple simultaneous endpoints	No	Yes (8)	No	No	No	No
Multiple access data rates	No	256/256	No	No	No	No
Existing premise wiring[1]	Yes	Yes	No	No	No	No
POTS splitter required for IVD	No	No	Yes	Yes	No	No
Service call required[2]	No	No	Yes	Yes	Yes	Yes[3]
Simultaneous POTS & data sessions	No	Yes	Yes	Yes	Yes	No
Rate adaptive	Yes	Yes	Yes	Yes	No	No?
"Oahu" MLO cost point	$70 - 80	$80 -90	$160?	$125?		$70 -80?
V.34 can be included	Yes	Yes	No	No	Yes	No?
Availability	Now	mid-97	Now	Now	Now	Now
Bandwidth Required	4 KHz	within BR-ISDN				> 200 KHz

---

[1] This refers to the possibility of one or more devices being plugged into existing residential wiring without need for a POTS splitter and without need to remove existing phones, modems, faxes, etc.

[2] This refers to need for a serviceman to either install or rewire at the premises or to substantially "tune the loop" after install of central office equiments.

[3] This is assumed. Brooktree is a faster version of 2B1Q.

Who Might Buy HyperModem Technology? Why?

1. CAP Chipset Licensees?

- Those who perceive need to address "residential" market
- Could be another software version of CAP
- A "why not" value-add, if priced right.
- BUT ... it is not known whether CAP devices can do Hyper?

2. Other DSL Chipset Providers?

- Those with "DSP solutions" are very likely candidates
- A software version for the "residential market"
- Opens path to compatible, lowest cost devices
- A "why not" value-add, if priced right.
- Opens potentially huge consumer market for DSL
- Those with "dedicated" LSI likely not candidates

3. General DSP Providers?

- Those *without* the very high speed technologies needed for ADSL
- Allows DSL entry for those with "common DSPs"

4. Traditional Modem Companies?

- Those that today buy the above general DSPs and program them

Technology Threats to ADSL?

1. Known "Residential DSL" Thrusts

- Need for lowest cost cited
- Traditional modem DSP providers will likely start here
- One competitor is targeting "existing premise wiring and equipments"
- Another is retaining POTS splitter, promoting in T1E1
- Major potential technology supplier has group dedicated to "Residential DSL"
- Above claims methods applicable to Remote Terminals as well

2. "56 KB/S Modems"

- Could delay interest in DSL
- No wire center provisioning
- No growth path beyond 56, though
- Needs to be proven ... presently much hype
- Paradyne Mocha had been ruled out for our products

3. Brooktree/Rockwell

- Poor performance & provisioning (speeded up ISDN 2B1Q)
- Product cost similar to V.34
- Features can't match Hyper

4. Basic Rate ISDN

- Limited to 128 kb/s,
- Provisioning
- Features don't match Hyper

Distribution: Bedingfield, Betts, Bingel, Bremer, Chapman, Coston, Floyd, Scott, Smith, Thoenes.

Considerations for a DSL Technology Strategy?

1. **Agree that DSL *producte* are very important to Paradyne's future**
2. **The present "Commercial DSL" compares to the leased modems**
3. **The imminent "Residential DSL" compares to dial modems**
4. **The modem market exploded as these "consumer dial modems" became available.**
   - **That took ~ 6 years to start and is growing more than ever after 12!**
5. **Several companies are readying early Residential DSL technologies.**
   - **At least one will be available to all Paradyne competitors.**
6. ***Given the above, establish these complementary Paradyne business/development teams:***
   a. ***one focused on Residential DSL***
   b. ***another one focused on Commercial DSL.***
7. **Paradyne must be an aware technology player and be flexible.**
   - **There will be several industry attempts at both Residential and Commercial DSL**
   - **Standards will be attempted ... and some will commercially succeed.**
   - **Within 15-18 months, a single off-the-shelf DSP will perform two or more QAM DSLs or two or more DMTs or 12 HyperModems. (Or two CAPs, if the specs were known).**
8. **GlobeSpan CAP may fade.**
   - **Commercial DSL competition will be heavy and CAP standardization is unlikely.**
   - **CAP may not handle Residential DSL or non-CAP DSLs.**
9. **As the most successful DSL product house, Paradyne should be the *recognized technology leader***
   - **In both Residential and Commercial DSL technologies.**
   - **Offer the *several technologies* that customers will expect: Especially at the central site.**

Distribution: Bedingfield, Betts, Bingel, Bremer, Chapman, Coston, Floyd, Scott, Smith, Thoenes.

Proposed Technology Strategy

"The recognized technology leader in Residential and Commercial DSL"

1. Appoint a focused business/development team to "Residential DSL"

- This is crucial!!!!
- Agree on MMP requirements for end-points, central site and remote terminal
- Set clear business objectives and schedules for 1997
- Set goals for 2nd generation central site in 1998

2. Align development goals with at least one large device leader

- We've identified one very promising partner ... devices now available
- Plan on these devices for Paradyne endpoints and central sites in mid 1997
- Take advantage of partner's devices and related technologies
- Incorporate Paradyne HyperModem technology onto this platform
- Drive for earliest time-to-market ... with high performance
- (DON'T count on partner's software!)

3. Charge team with "technology leadership in Residential DSL"

- Document HyperModem patents as high priority ... and continue
- Proactive in "Residential DSL" standards bodies
- Begin prototyping immediately

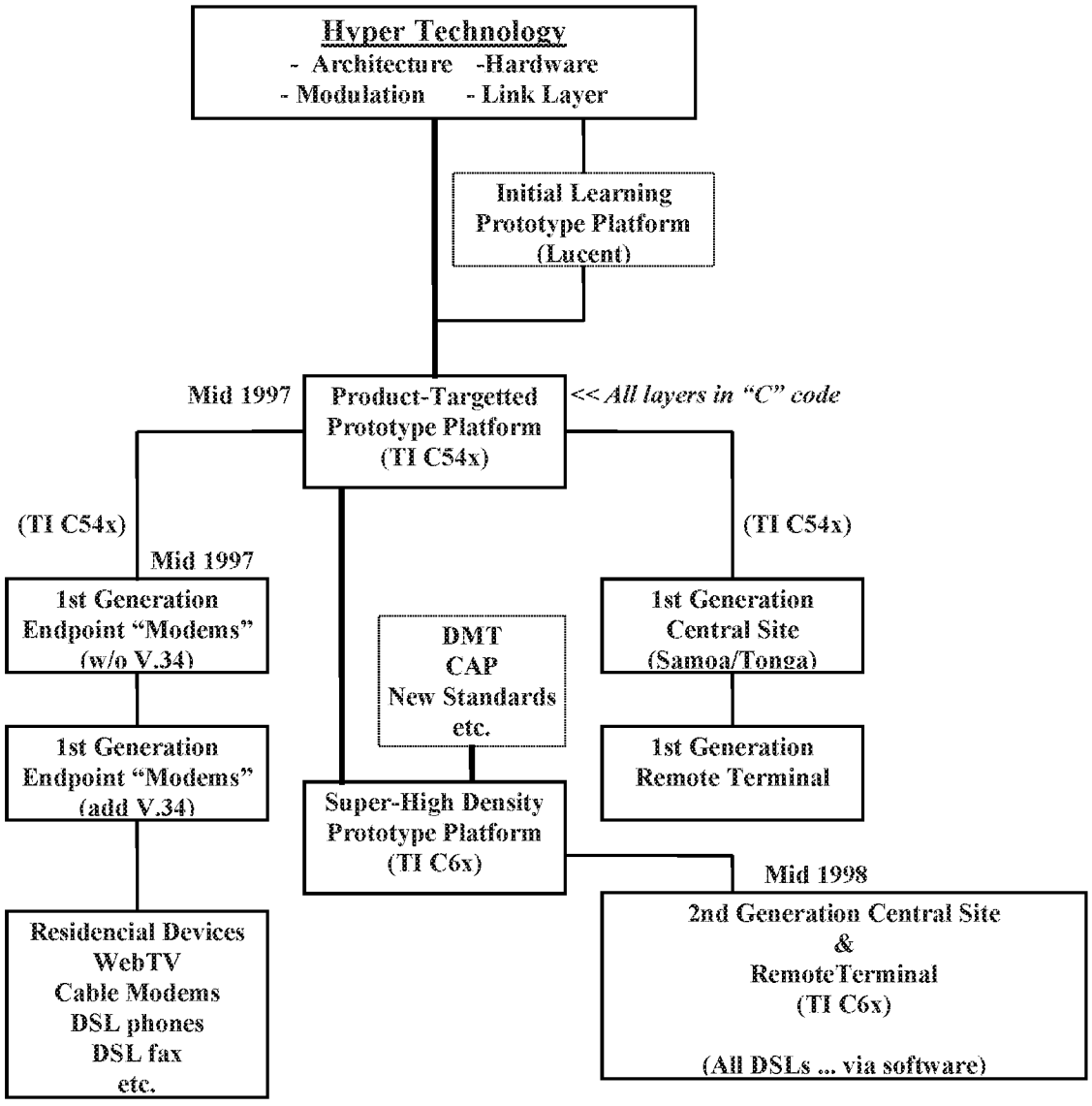
4. Establish "Internet Access Lab"

- Recognized technology leadership through continous testing and refinement
- The "ETC Model"

5. Win technology acceptance

- Recognized performance advantages: the ETC Model
- Unique features
- Align with key partners early
- Place it with "unusual" partners: (WebTV, DSL phones, DSL fax)
- Standards body leadership

An Example Technology Plan



END OF DOCUMENT

Appendix H
to the
Bremer Declaration

60/039352

MAIL ROOM MAR 18 1997 5 PAT. & TRADEMARK OFF.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(b)(2).

Docket No.: 61605-8480	Type (+) inside box [ ]

INVENTOR(S)/APPLICANT(S)

LAST NAME	FIRST NAME	MI	RESIDENCE (City and Either State or Foreign County)
Bremer	Gordon		1930 Cove Ave., Clearwater Florida 34624 FL

TITLE OF THE INVENTION (280 Characters)

Interleaving Transmissions of Telephone Rings and Data

CORRESPONDENCE ADDRESS

Scott A. Horstemeyer
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.
100 Galleria Parkway
Suite 1500
Atlanta, Georgia 30339
(770) 933-9500

ENCLOSED APPLICATION PARTS (*check all that apply*)

[X] Specification Number of Pages [4] [ ] Small Entity

[4] Drawings Number of Sheets [2] [ ] Other (specify):

METHOD OF PAYMENT (*check one*)

[ ] The Commissioner is Authorized to charge any additional fees or credit any overpayments to Deposit Account No. 16-0255 [X] The Commissioner is authorized to charge filing fees to **Deposit Account No. 16—0255**	PROVISIONAL FILING FEE AMOUNT ($)	$150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No.
[ ] Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE: Scott Horstemeyer DATE: 3/18/97

TYPE or PRINTED NAME: Scott A. Horstemeyer REGISTRATION NO.: 34,183

[ ] Additional inventors are being named on separately numbered sheets attached hereto.

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60/039352

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.

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March 18, 1997

Assistant Commissioner of Patents
Box Provisional Patent Application
Washington, D.C. 20231

Re: U.S. Provisional Patent Application
Title: Interleaving Transmissions of Telephone Rings and Data
Filed: March 18, 1997
Our File No.: 61605-8480

Sir:

The following documents are forwarded herewith for appropriate action by the U.S. Patent and Trademark Office:

1. Transmittal for Provisional Application;

2. 4 Pages of Specification;

3. 4 Drawings on 2 Sheets; and

4. Returned Postcard.

The Commissioner is hereby authorized to charge any fee deficiency, or credit any overpayment, to the Paradyne Corporation Deposit Account No. 16-0255. A duplicate of this letter is enclosed.

Very truly yours,

THOMAS, KAYDEN, HORSTEMEYER & RISLEY

Scott A. Horstemeyer

SAH/tw
Enclosures

PARADYNE PATENT DISCLOSURE FORM: 799-0059-2 REVISION P

60/039352

1 Abstract:

Write here a concise description of the invention. Attempt to identify unique aspects. Convey essential details. Do not defer to any attachment.

Two inventions are described that permit data communication and POTS communication to co-exist on a two-wire telephone local loop during periods of ringing signal cadence. (The methods are described using the polled multipoint DSL concepts of the Paradyne Pinnacle/HyperModem technology; however, they are not necessarily so restricted.)

A first invention provides for detection of a ring signal at a data transmitter, whether the ring is transmitted at that end of the loop or the other, and provides for immediate cessation of any data transmission in progress followed, at the cessation of that ring, by immediate re-transmission, such re-transmission identified as such so as to permit the remote receiver to discard the first erred data block and receive the second block. This second block may be sent in its entirely if the time length is such that it will completed before any subsequent ring or it can be partitioned to be of suitable length. Ring detection may be indirect via a ring signal detector or direct via notification from the ring generator or by the same signal that commands the ring generator.

A second invention provides for control and delay of ringing signals generated at the central office to permit completion of any data transmission in progress and the further hold on subsequent data transmissions and polls for such until an allowed ring is completed.

In both methods, data blocks are either short enough to be communicated between rings or are partitioned to be so.

2 Background, Present State-of-the-Art and Similar Designs:

Briefly describe the present state-of-the-art of the technology field to which the invention applies. List and describe similar or related designs of which you are aware. Do not defer to any attachment. It is NOT necessary for the inventor(s) to do patent searches to answer this question.

In data communication over a telephone local loop where simultaneous or alternating POTS service is present, the initiation of a ring signal(s) is unpredictable and will typically cause errors and disrupt data transmission from the beginning of the first ring, in-between rings, during each ring and at least for some duration after cessation of the ringing cadence. Moreover, such occurrence may cause loss of the data session due to the gross and long communication interruption. In some applications where telephone rings occur very often this may make any data operation impractical. While it is possible to attempt to make the data path and the simultaneous POTS path mutually independent, for example via POTS-splitter filters, this is often practically impossible due to the extremely large amplitude of the ring signals with respect to the data signals. Moreover, for alternating data and POTS, where data communication is interrupted from time to time by a ring signal request for POTS service, such mutual independence is not possible and both the data signal and the ring must contend ... with the inescapable conclusion that sustained data communication will not be possible.

The only known instance of data communication during ringing is in Caller ID, wherein a simplex data signal originating at the telephone central office is sent between rings to a premise receiver. This uses transmission that is coupled to known ringing cadences.

3 Summary Description:

Describe the invention in the general terms of the technology to which the invention pertains. If necessary, refer to included or attached diagrams and figures. This description should not exceed perhaps 10 pages.

Note that ring signal cadences are typically about one second of large ring signal followed by about three seconds of silence, such a cadence repeated as long as desired.

First invention: Data communication between rings.
Consider, as an example, a polled, half-duplex communication system operating over a subscriber loop with the (multipoint) master located at the telco central office. For simplicity, consider a single premise tributary modem ... although any number of tributaries can be accommodated. The multipoint master controls all transmissions: directly from the master (in response to either master data needed to be transmitted or a poll to be transmitted) or indirectly from the tributary (via a polled request for that tributary to transmit). At the master, ring detection is provided that nearly instantaneously indicates the occurrence of a ring signal on the loop. Similarly at the tributary, ring detection is provided that nearly instantaneously indicates the occurrence of a ring signal. Note that on the loop, both of these detectors can detect each ring at nearly the same time instant.

In the case where the master is not transmitting at the detection of a ring and has stopped any earlier transmission some short time before the ring, the master delays any desired transmissions until the ring has ceased and then ensures that the duration of next transmitted data is such, or will be made such, that it will be reliably communicated before a next ring. That is, data is transmitted only between ring occurrences. In this case, the tributary receives only data that is not corrupted by a ring.

In the case where the master is transmitting at the occurrence of a ring or where transmission has stopped at such a short time before the ring that it may be unreliable, transmission is stopped, the data to be transmitted is and has been stored and no further attempt is made until that ring ceases, at which time the stored data is re-transmitted with a header indicating that this is a re-transmission of the previous erred data. The tributary, having either denoted the erred data or ring detection, discards that erred data and anticipates a re-transmission, which it indeed receives, with indication after the ring has ceased.

In the case where the tributary is not transmitting at the occurrence of a ring and has stopped any earlier transmission some short time before the ring, the procedure of the second paragraph above is applied with the roles of the master and tributary reversed.

In the case where the tributary is transmitting at the occurrence of a ring, the procedure of the second paragraph above is applied with the roles of the master and tributary reversed.

Second Invention: Control of ring occurrences.
Consider, as an example, a polled, half-duplex communication system operating over a subscriber loop with the (multipoint) master located at the telco central office. For simplicity, consider a single premise tributary modem ... although any number of tributaries can be accommodated. The multipoint master controls all transmissions: directly from the master (in response to either master data needed to be transmitted or a poll to be transmitted) or indirectly from the tributary (via a polled request for that tributary to transmit). At the master, it is possible to intercede with (control) the normal signal controlling the generation of a ring signal and replace that signal with one determined by the master. An implementation example is a SLIC ringing function co-resident with the master.

In the case where the master is not transmitting at the occurrence of a ring request and has stopped any earlier transmission some short time before the ring, that ring request is permitted and the ring is generated. During this ring, any master data or poll normally requested to be transmitted is stored and transmitted after the ring has ceased. This disallows any ring from coinciding with data transmission from the master.

In the case where the master is transmitting at the occurrence of a ring request or where transmission has stopped at such a short time before the ring request that it may be unreliable if the ring were permitted, that ring request is inhibited until the transmission is successfully completed, at which time the ring is permitted and the usual full ringing cadence is continued.

In the case where the tributary is not transmitting at the occurrence of a ring request (at the central office, of course) and has stopped any earlier transmission some short time before the ring, the master receiver (having determined that the tributary has ceased transmission and cannot start transmission until polled to do so by the master) permits any ring request to proceed.

In the case where the tributary is transmitting at the occurrence of a ring request (at the central office, of course) or has not stopped any earlier transmission some short time before the ring, the master receiver (having determined that the tributary is in the process of transmission) inhibits any ring request until the data is reliably received, at which time the ring is permitted and the usual full ringing cadence is continued.

4 Summary Advancement and Uniqueness:

Identify here the unique advancement(s) achieved, perhaps by reference to a problem solved. This description should seek to clearly identify what may be claimed as unique in a patent. Do not defer to any attachment.

First Invention: This permits data communication and POTS communication to co-exist on a two-wire telephone local loop during periods of ringing signal cadence by permitting reliable communication only during the silence periods between rings. This provides for detection of a ring signal at a data transmitter, whether the ring is transmitted at that end of the loop or the other, and provides for immediate cessation of any data transmission in progress followed, at the cessation of that ring, by immediate re-transmission, such re-transmission identified as such so as to permit the remote receiver to discard the first erred data block and receive the second block.

Second Invention: This permits data communication and POTS communication to co-exist on a two-wire telephone local loop during periods of ringing signal cadence by controlling rings to be at times when data is not being communicated. This provides for control and delay of ringing signals generated at the central office to permit completion of any data transmission in progress and the further hold on subsequent data transmissions and polls for such until an allowed ring is completed.

5 Attach and/or Identify Documentation:

List and identify existing drawings, memos, listings, notebook entries or other which disclose the invention. If none exists, create and attach new sketches and new written description of the invention at a level of detail that fellow colleagues can understand. However, the volume of these attachments should be readable within a maximum of perhaps one-half hour. [redacted]

6 Inventors:

List all individuals who may have possibly contributed to this invention. [redacted]

Gordon Bremer [redacted]

7 First Conception:

What is the date the invention was first conceived, the background circumstances and where is this documented? (This could be as simple as an outline of the invention).

[redacted]

8 First Disclosed within Paradyne and to Whom:

What is the date the invention was disclosed to others outside the inventor group and the circumstances? Who are witnesses?

[redacted]

9 First Sketch:

What is the date of the first documented sketch of the invention and where is it documented?

[redacted]

10 First Written Description:

What is the date of the first written description and where is this documented?

[redacted]

11 Reduction to Practice:

Is the invention reduced to practice to demonstrate the invention? If so, give the completed date and circumstances. Who performed the construction, preparation or assembly? Where is this documented? Who performed tests which demonstrated the principles of the invention and when?

[redacted]

12 First Sale:

What is the known or expected date of first offering for sale of a product incorporating the invention, to whom, the product and the circumstances?

[redacted]

13 First Public Disclosure:

What is the first known or expected date of public disclosure, offer to sell, proposal, publication, etc. and to whom?

[redacted]

14 First Installation:

What is the first known or expected date of installation outside of Paradyne and circumstances?

[redacted]

15 Target Products:

List all Paradyne products or product lines which may or do incorporate this invention. Model numbers, if possible.

Pinnacle/HyperModem and any other Paradyne DSL products that may incur data interruptions due to telephone ringing ... whether or not POTS filters are employed in an attempt to isolate the problem.

End of Patent Disclosure Form

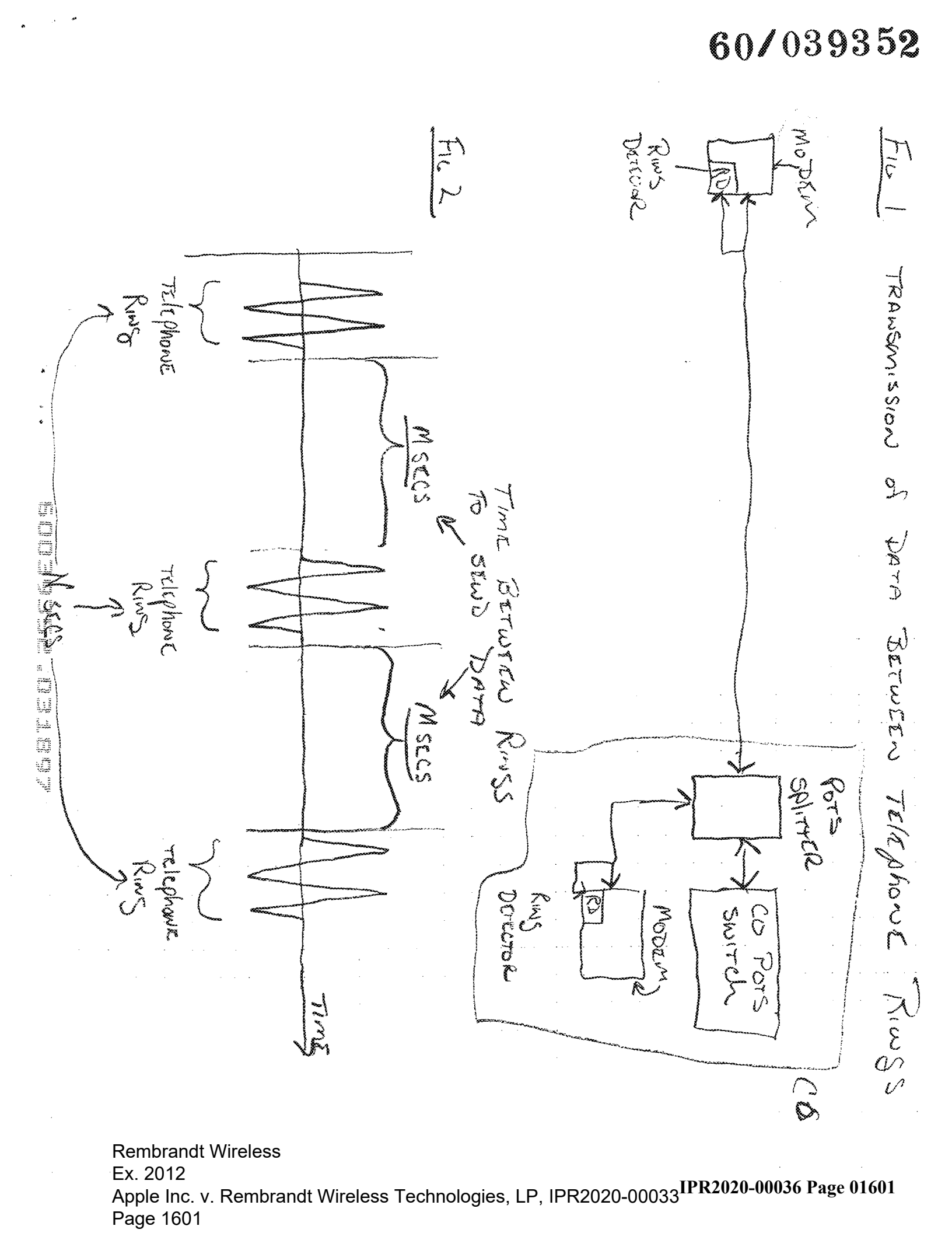


Fig 1
Transmission of Data Between Telephone Rings
Modem
Rings Detector
RD
CO
Pots Splitter
CO Pots Switch
Modem
RD
Rings Detector
Fig 2
Time Between Rings To Send Data
M secs
M secs
N secs
Telephone Rings
Telephone Rings
Telephone Rings
Time

FIG 3

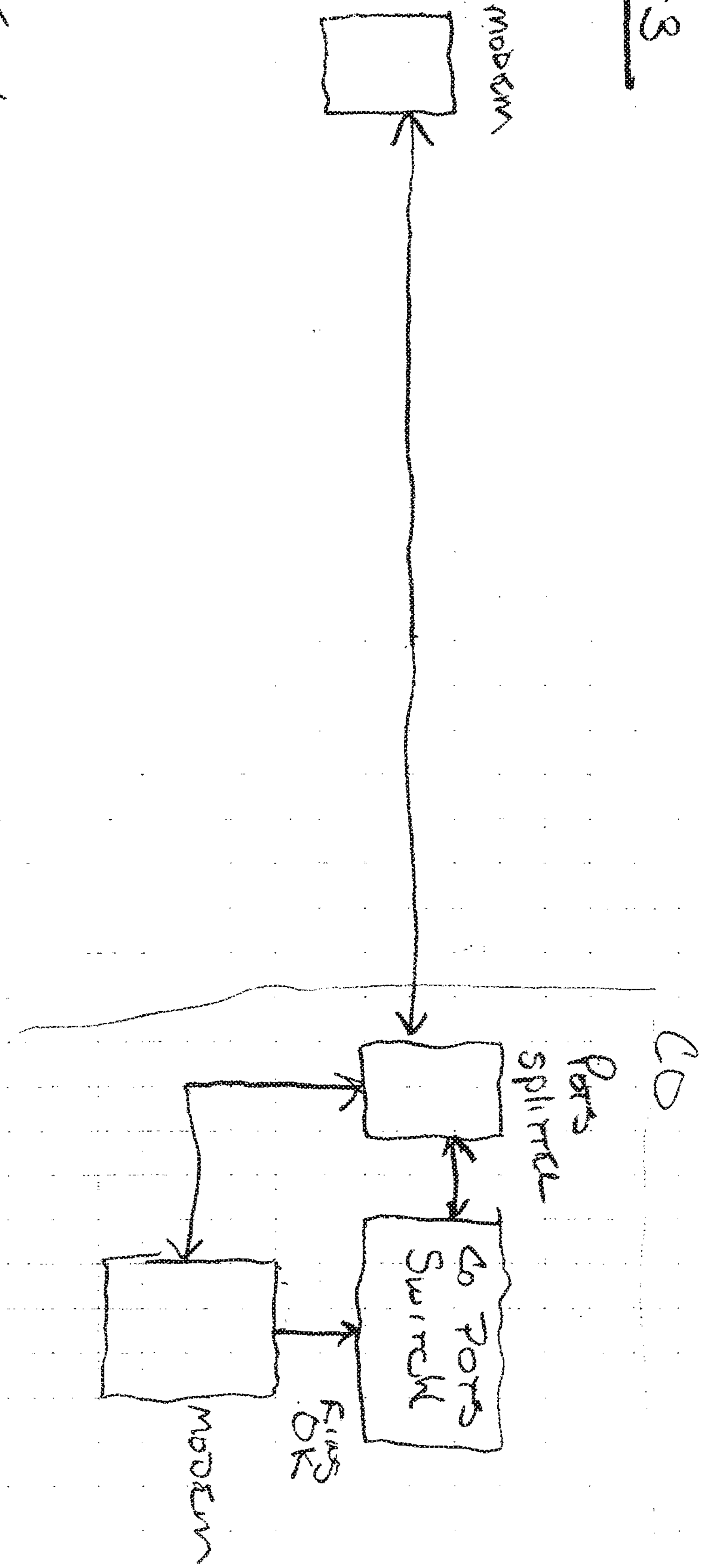
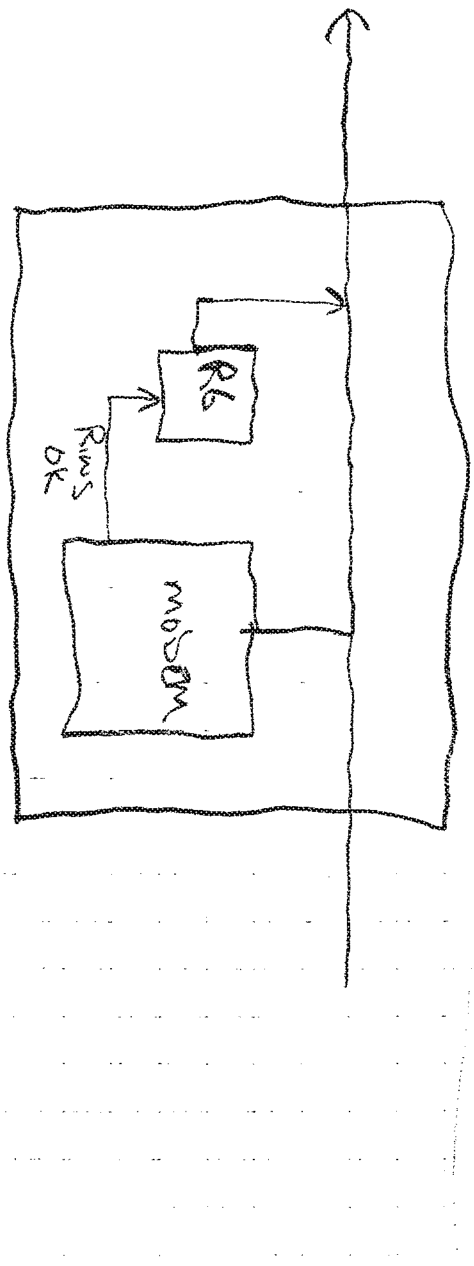


FIG 4



RG = RING GENERATION

Appendix I
to the
Bremer Declaration

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.

GEORGE M. THOMAS
JAMES W. KAYDEN
SCOTT A. HORSTEMEYER
STEPHEN R. RISLEY
JEFFREY R. KUESTER

COLLEN A. BEARD
DANIEL J. SANTOS
DANIEL R. McCLURE
ROBERT E. STACHLER II*
J. SCOTT CULPEPPER
MICHAEL J. TEMPEL
MICHAEL J. D'AURELIO*

*OTHER BARS ONLY

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AND RELATED LITIGATION

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www: http://www.tkhr.com

February 27, 1997

Assistant Commissioner of Patents
Box Provisional Patent Application
Washington, D.C. 20231

Re: U.S. Provisional Patent Application
Title: Simultaneous Multiple Telephone-Type Services on a Single Telephone Line
Filed: February 28, 1997
Our File No.: 61605-8470

Sir:

The following documents are forwarded herewith for appropriate action by the U.S. Patent and Trademark Office:

1. Transmittal for Provisional Application;

2. 5 Pages of Specification;

3. 3 Drawings on 3 Sheets; and

4. Returned Postcard.

The Commissioner is hereby authorized to charge any fee deficiency, or credit any overpayment, to the Paradyne Corporation Deposit Account No. 16-0255. A duplicate of this letter is enclosed.

Very truly yours,

THOMAS, KAYDEN, HORSTEMEYER & RISLEY

Scott A. Horstemeyer

SAH/tw
Enclosures

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.

ATTORNEYS AT LAW

INTERNATIONAL PATENT, TRADEMARK AND COPYRIGHT LAW
AND RELATED LITIGATION

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Very truly yours,

THOMAS, KAYDEN, HORSTEMEYER & RISLEY

Scott A. Horstemeyer

SAH/tw
Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(b)(2).

Docket No.: 61605-8470	Type (+) inside box [ ]

INVENTOR(S)/APPLICANT(S)

LAST NAME	FIRST NAME	MI	RESIDENCE (City and Either State or Foreign County)
Bremer	Gordon		1930 Cove Ave., Clearwater Florida 34624
Davis	Jeff		2011 Bayview Place, Indian Rocks Beach, FL 34635

TITLE OF THE INVENTION (280 Characters)

Simultaneous Multiple Telephone-type Services on a Single Telephone Line

CORRESPONDENCE ADDRESS

Scott A. Horstemeyer
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, L.L.P.
100 Galleria Parkway
Suite 1500
Atlanta, Georgia 30339
(770) 933-9500

ENCLOSED APPLICATION PARTS ***(check all that apply)***

[X] Specification Number of Pages [5] [ ] Small Entity

[3] Drawings Number of Sheets [3] [ ] Other (specify):

METHOD OF PAYMENT ***(check one)***

[ ] The Commissioner is Authorized to charge any additional fees or credit any overpayments to Deposit Account No. 16-0255 [X] The Commissioner is authorized to charge filing fees to **Deposit Account No. 16—0255**	PROVISIONAL FILING FEE AMOUNT ($)	$150.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

[X] No.
[ ] Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE: [signature] DATE: 2/25/97

TYPE or PRINTED NAME: Scott A. Horstemeyer REGISTRATION NO.: 34,183

[ ] Additional inventors are being named on separately numbered sheets attached hereto.

Express Mail Certificate of Mailing
I hereby certify that this correspondence is being deposited with the United States Postal Service as "EXPRESS MAIL POST OFFICE TO ADDRESSEE", in an envelope addressed to" Commissioner of Patents and Trademarks, Washington, D.C. 20231 on
February 25, 1997
TB982495152US [signature]
Express Mail No. Signature

forms.hor\provisio.new

PARADYNE PATENT DISCLOSURE FORM: [redacted]

The information provided by you, the inventor(s), for points 1-5 below
will be read by colleagues perhaps not expert in the field of the invention.
That information should be informative and sufficient to provide an understanding of the invention.

The amount of information should be such that a reading with understanding
should be expected to require not more than perhaps one hour.
Excessive attachments are not acceptable.

[redacted]

1	**Abstract:** *Write here a concise description of the invention. Attempt to identify unique aspects. Convey essential details. Do not defer to any attachment.* This invention enables telephone companies to provide *and charge for* two or more service offerings to a premise on a single wire pair. These services can be utilized simultaneously. Examples shown in attached Figure 2 are: • regular POTS service to all phones and modems on the line, • additional Internet phone service to two of the phones, • HyperService (high speed Internet Access and/or LAN Access) to three HyperModems, • free long-distance service on one phone, • stereo music on the home audio system, • super fax/graphics service on one machine, • power meter reading, • home management and security services, • etc. The invention can be enabled by the simultaneous multiple access techniques disclosed by Paradyne (HyperModem) or it can alternatively be accomplished with FDM multiplexing techniques and likely yet other multiplexing techniques (perhaps with lower overall performance). It also provides for an optional central office function that enables existing multiple lines from a Telco switch to be converted to multiple service on the single wire pair. Equipments at the premise can be identified by MAC addresses while each service is enabled only to those devices paid for by the customer. For the new audio services, the premise HyperModem can be coupled with audio compression, for in a telephone casing or a stereo receiver. In some services, the premise HyperModem would be used as a data-only device.
2	**Background, Present State-of-the-Art and Similar Designs:** *Briefly describe the present state-of-the-art of the technology field to which the invention applies. List and describe similar or related designs of which you are aware. Do not defer to any attachment. It is NOT necessary for the inventor(s) to do patent searches to answer this question.* Presently, telephone companies can offer only one set of services to any/all POTS-type devices on each wire pair at the premise. (Recall that this did not use to be the case! They used to charge for each phone.). That is, phones, modems, fax cannot today command any additional service revenue from the Telco, nor can the Telco offer any extra beneficial service to the premise. This is shown in Figure 1. Note that ISDN Basic Rate offers some similarity, but not with devices connected directly to the wire pair and not with simultaneous POTS.

3 **Summary Description:**

Describe the invention in the general terms of the technology to which the invention pertains. If necessary, refer to included or attached diagrams and figures. This description should not exceed perhaps 10 pages.

(Although the descriptions that follow utilize the HyperModem, other multiplexing methods should be covered by a patent. The HyperModem and/or Pinnacle technology concepts provide multiple simultaneous data sessions between one or more premises modems and a central office-located modem. The concept is polled half-duplex multipoint with the master at the central office. Data rates are typically 256 kbps or higher. The concept also permits simultaneous POTS during half-duplex multipoint at reduced rates.)

The *broad* concept of "Simultaneous Multiple Telephone-type Services on a Single Telephone Line" is shown in Figure 2, where no detail of the Telco equipment is given. This figure is meant to emphasize the new Telco services without burden of detail.

A more detailed diagram is in figure 3. (Note that not all elements of the diagram are required to achieve each attribute of the invention.) The blocks "**HM**" are HyperModems with both physical layer and higher layer functions as needed to provide simultaneous multiple access, as disclosed elsewhere. "**HyperPhone**" digitizes audio, buffers this as necessary, transmits the buffered digitized audio over a HyperModem at an average data rate of perhaps 8 kbps and performs the reverse functions in the receive direction: thus acting to the user as a telephone. HyperPhone may communicate over the PSTN via compatible digital/analog conversions in the Optional Telco Switch Expander. "**Telephone**" is a standard telephone. "**InternetPhone**" has the features of HyperPhone but with protocol required for communication over the Internet or a LAN. "**FreePhone**" has the features of the HyperPhone but has access codes to enable toll-free calls. "**HyperStereo**" receives and converts digitized high quality audio via an integrated HyperModem. "**HyperFaxGraphics**" utilizes the HyperModem to communicate fax and/or higher quality graphics. "**PowerManagement**" permits monitor/control of power utilization over a HyperModem. "**HomeManagement**" permits monitor/control of various home functions such as security systems. "**Line A**" is the local loop over which the HyperModems operate, simultaneous with POTS. "**Line B**" is the voiceband path between line A and the Telco switch. "**Line H**" is the broadband data path between Line A and the HyperModem Master. "**Lines C & D**" are standard Telco lines emanating from a standard Telco switch: either in analog form or in DSO form. "**Line E**" is the standard path from the Telco Switch to the worldwide PSTN. ""**Optional Telco Switch Service Expander**" is a function which accepts audio and control information on Lines C & D, digitizes the audio to perhaps 8 kbps, buffers as necessary, adds additional control information as may be needed for the HyperModem Master and/or the premises HyperModem and performs the reverse operations. **Lines F & G**" are digitized versions of Lines D & F, respectively, with added control data suitable for communicating normal Telco-premise telephone control information such as on/offhook and control information suitable for controlling/monitoring certain states of the HyperModem Master. "**Line J**" connects the HyperModem Master to a data service such as the Internet, a Framed Relay network or a LAN network. "**Line K**" connects the Telco Switch to an Audio Service which, for example, transmits selected compressed high quality audio to the Telco Switch which is eventually communicated to the premise HyperStereo as is clear from Figure 3. "**Line L**" connects the Telco Switch to a high quality fax or graphics network. "**HyperModem Master**" is the polling multipoint modem which has the ability to accept data from the several sources, poll the respective premise HyperModems and accept data from the premises.

The Telco may provide standard POTS service as is apparent from Figure 3.

For each additional Telco service provided, that service stores the MAC of the serviced premises devices. Those and only those devices thus are service-enabled.

For HyperPhone service each HyperPhone may, if so serviced, have its own standard telephone number or may share a number with other HyperPhones. As envisioned here, HyperPhone would have standard Telco POTS features and billing. FreePhone, on the other hand, having a different MAC and with different service, would permit free long distance calls.

The other services should be apparent from a study of Figure 3. And additional services can be envisioned.

PARADYNE PATENT DISCLOSURE FORM: 799-0059-2 REVISION P

4	**Summary Advancement and Uniqueness:** *Identify here the unique advancement(s) achieved, perhaps by reference to a problem solved. This description should seek to clearly identify what may be claimed as unique in a patent. Do not defer to any attachment.* a) The enabling of multiple Telco POTS services to a premise over a single wire pair. b) The enabling of simultaneous multiple Telco POTS services to a premise over a single wire pair. c) The enabling of advanced Telco services such as FreePhone, music and advanced graphics over a single wire pair.
5	**Attach and/or Identify Documentation:** *List and identify existing drawings, memos, listings, notebook entries or other which disclose the invention. If none exists, create and attach new sketches and new written description of the invention at a level of detail that fellow colleagues can understand. However, the volume of these attachments should be readable within a maximum of perhaps one-half hour. Addition detail can be provided to the Attorney later.* See attachment. Certain Paradyne patent disclosures [redacted] address the fundamentals of HyperModem which enable the application herein. Broadband Tech Note [redacted] (Jeff Davis) is attached.
6	**Inventors:** *List all individuals who may have possibly contributed to this invention. It is important not to exclude possible inventors. Final determination of inventors is the responsibility of the Attorney.* Gordon Bremer, Jeff Davis [redacted]
7	**First Conception:** *What is the date the invention was first conceived, the background circumstances and where is this documented? (This could be as simple as an outline of the invention).* Tech Note [redacted] indicated the invention but was brief. Tech Note [redacted] specifically identified the services herein. This document, [redacted] is perhaps the first to identify how.
8	**First Disclosed within Paradyne and to Whom:** *What is the date the invention was disclosed to others outside the inventor group and the circumstances? Who are witnesses?* [redacted].
9	**First Sketch:** *What is the date of the first documented sketch of the invention and where is it documented?* [redacted].
10	**First Written Description:** *What is the date of the first written description and where is this documented?* [redacted]
11	**Reduction to Practice:** *Is the invention reduced to practice to demonstrate the invention? If so, give the completed date and circumstances. Who performed the construction, preparation or assembly? Where is this documented? Who performed tests which demonstrated the principles of the invention and when?* [redacted]
12	**First Sale:** *What is the known or expected date of first offering for sale of a product incorporating the invention, to whom, the product and the circumstances?* [redacted]

13	**First Public Disclosure:** *What is the first known or expected date of public disclosure, offer to sell, proposal, publication, etc. and to whom?* [redacted]. [redacted]
14	**First Installation:** *What is the first known or expected date of installation outside of Paradyne and circumstances?* [redacted]
15	**Target Products:** *List all Paradyne products or product lines which may or do incorporate this invention. Model numbers, if possible.* This can specifically apply to HyperModem/Pinnacle, but also may be applied to various DSL-type products.

End of Patent Disclosure Form. Attachments Follow ....

PARADYNE

PARADYNE PATENT DISCLOSURE FORM

799-0059-2 Revision P: [redacted]

BROADBAND TECH NOTE [redacted]

[redacted]

"Jeff Davis' Views on Latest HyperModem Features"

Jeff sent the attched e-mail to his team after the [redacted] planning presentations. His comments should be taken into account as we drive toward final technology requirements.

Team,

I just got finished reviewing the Hypermodem presentation with a subsequent discussion with Gordon Bremer. The Hypermodem concept has now been expanded to include:

- **Multiple Simultaneous Internet Access**
- **Simultaneous POTS and data**

This is a significant improvement and represents a major innovation (in my opinion). With ADSL, we have been challenged to find a method for distribution of the digital signal throughout the home. Several working groups (ADSL, DAVIC and also ATM RBB subgroups) have been looking at this problem and have proposed a "Home Network". Proposals have ranged from Ethernet to USB to fiber throughout. Obviously, all these proposals share one thing in common. They require the home to be rewired.

Now for the innovation. If I'm interpreting this correctly, the Hypermodem proposal would allow multiple digital devices plus POTS to be connected onto the exisiting phone wires. What this does is allow the EXISTING HOME WIRING to become the home network. In my opinion, this subtle point is hugely significant.

Now, it becomes practical to interconnect all types of devices including:

1) **Fax machines**
2) **WebTVs**
3) **Alarm systems**
4) **Digital Stereo (Stereo on demand)**
5) **Additional phones (digital phones)**
6) **Meter reading**
7) **PCs**
8) **Personal e-mail terminals**
9) **Video conferencing stations**
10) **etc.**

In effect, the existing home wiring system becomes the **HyperLAN.** [redacted]
As far as allowing digital phones/faxes to be interconnected, this in effect, is a "**residential pair gain**" application and plays right into the "pair exhaustion" problem that many RBOCS are having now.
I don't think that HyperModem replaces the need for CAP. It simply extends the concept of DSL to new places at lower costs with fewer barriers to entry.

[redacted]

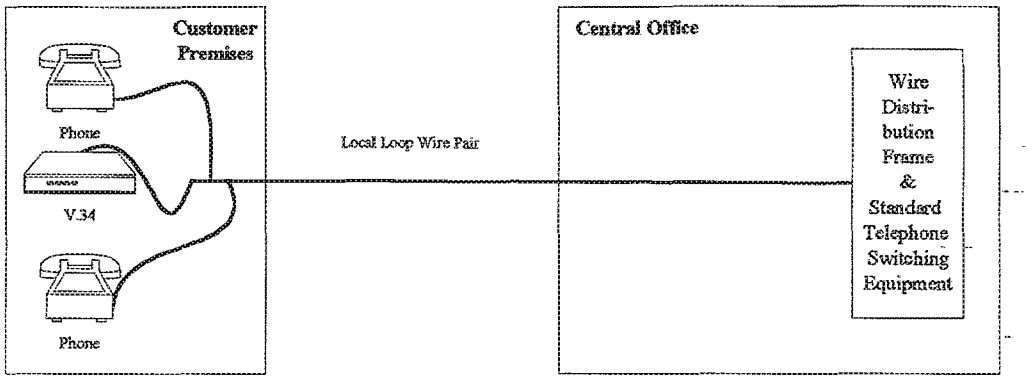


Figure 1: Conventional Telco Single-Service to The Premise

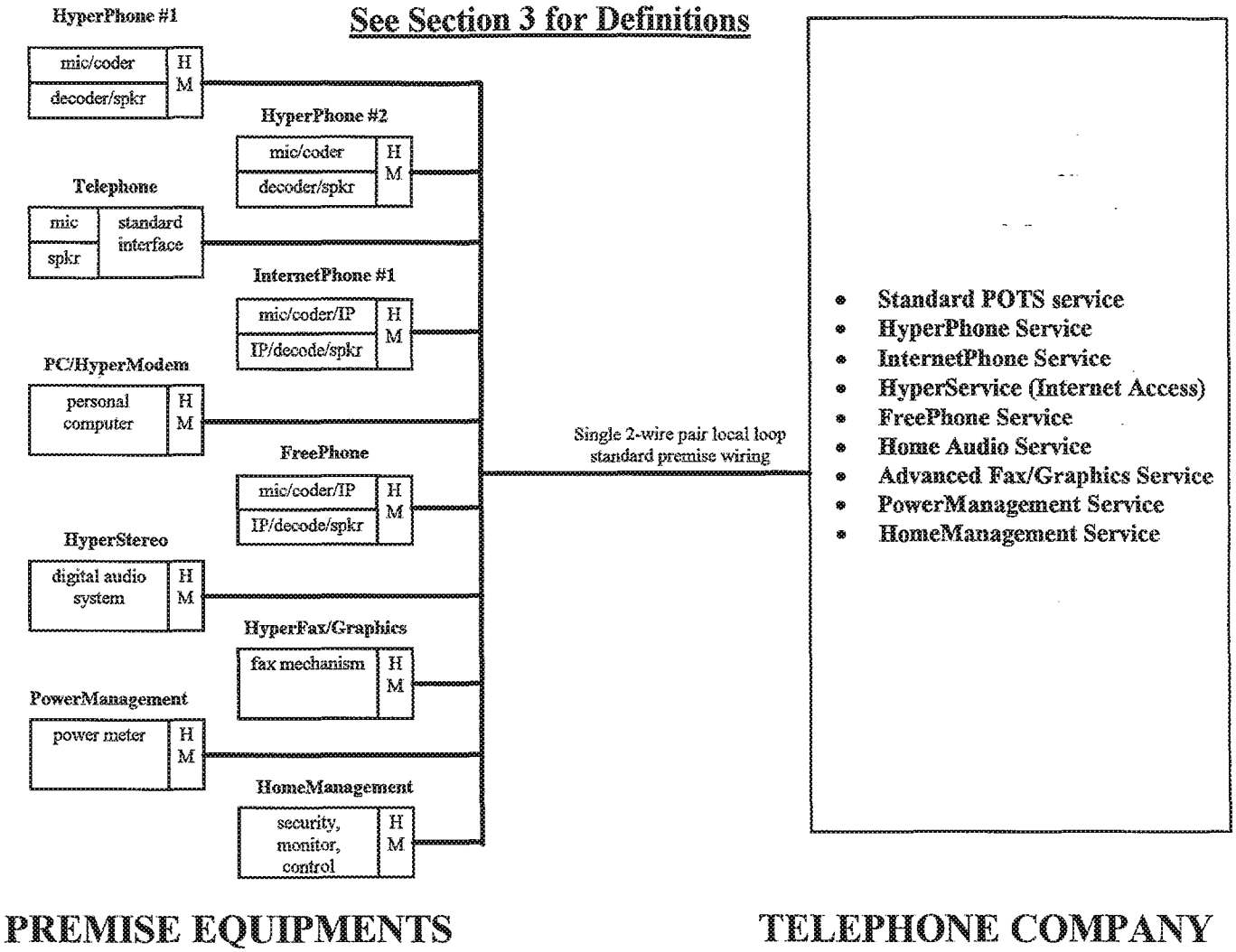


Figure 2: Broad Concept of Telco Multiple-Services to The Premise

PARADYNE PATENT DISCLOSURE FORM

799-0059-2 [redacted]

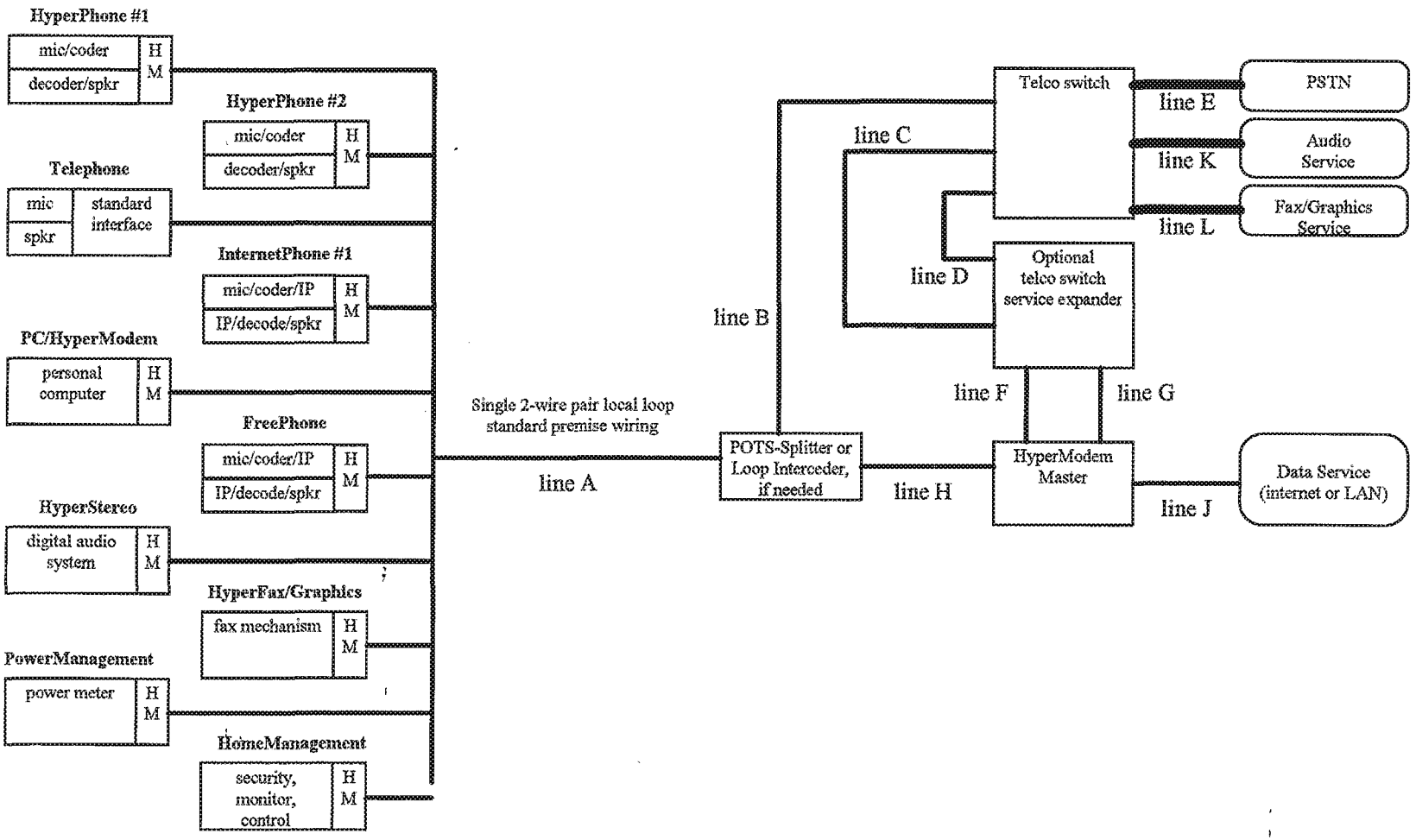
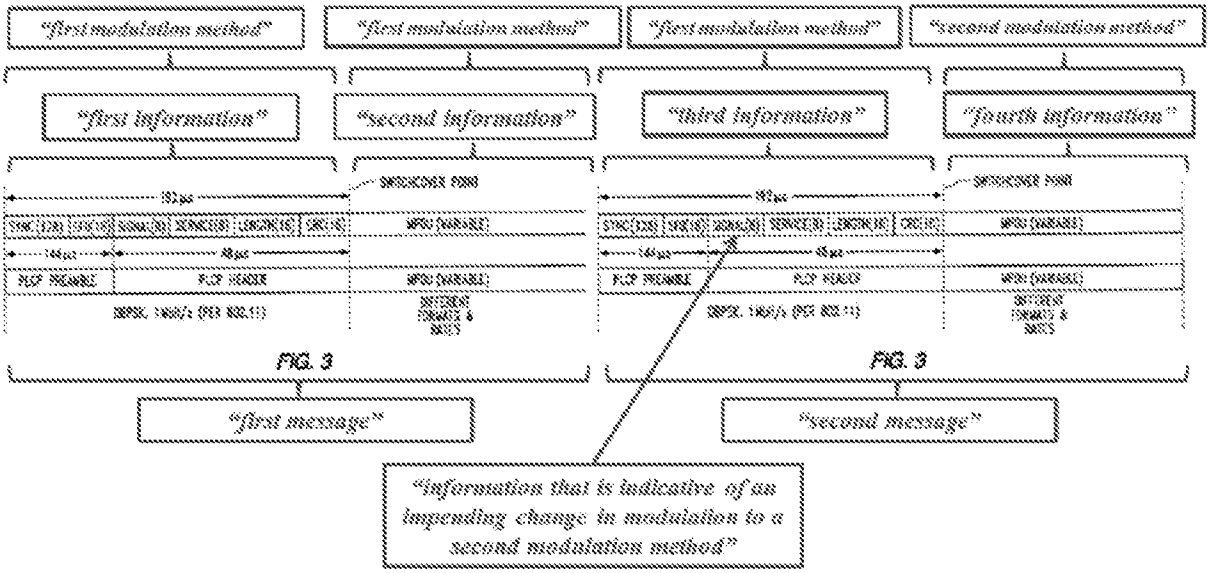


Figure 3: Detail Telco Multiple-Services to The Premise

Exhibit D

Comparison of the Requester's Presentation of Snell's Fig. 3 and Boer's Fig. 4

Snell's FIG. 3 from Reexamination Request (modified by Requestor, at 26, 54, 79, 111):



Boer's Fig. 4 from IPR2014-00892 Petition (modified by Petitioner, at 39):

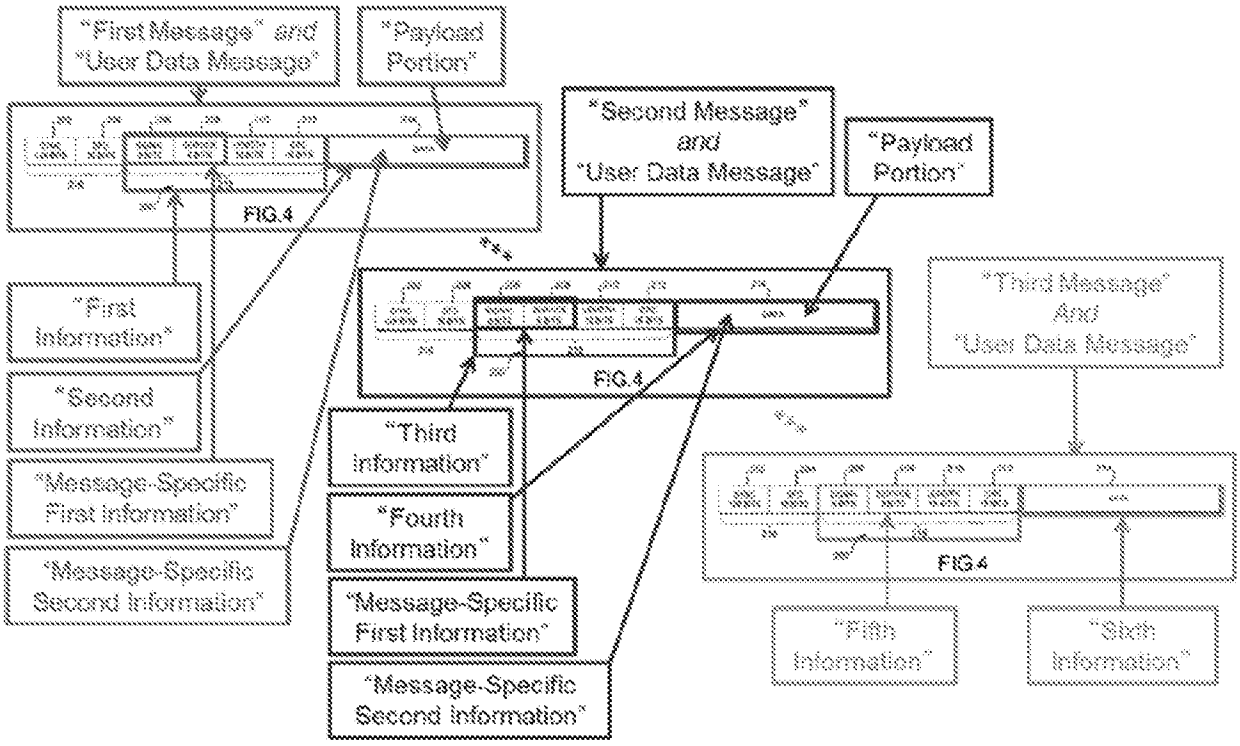


Exhibit B

Comparison of Cited Portions of Snell, Yamano, and Kamerman with Substantially Identical Portions of Boer, The APA, and Siwiak

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
1. The Office relies on Snell to support its alleged SNQs as offering "technological teachings … not previously considered" by the Office. Order, at 11. According to the Office, "Snell discloses a transceiver that serves as an access point for communicating data with other transceivers connected to a wireless local area network (WLAN)." Order, at 9 (citing Snell at col. 4, ll. 42-47 and col. 5, ll. 18-21). The portions of Snell cited by the Office read: "Referring to FIG. 1, a wireless transceiver 30 in accordance with the invention is first described. The transceiver 30 may be readily used for WLAN applications in the 2.4 GHz ISM band in accordance with the proposed IEEE 802.11 standard. Those of skill in the art will readily recognize other applications for the transceiver 30 as well." Snell at col. 4, ll. 42-47. "Like the HSP3824 baseband processor, the high data rate baseband processor 40 of the invention contains all of the functions necessary for a full or half duplex packet baseband transceiver." Snell at col. 5, ll. 18-21.	1. Boer discloses a transceiver that serves as an access point 12 for communicating data with other transceivers 18 connected to a wireless local area network (WLAN). *See, e.g.,* Boer at col. 2, ll. 6-21; col. 1, ll. 16-26; col. 2, l. 63-col. 3, l. 24. "Referring first to FIG. 1, there is shown a preferred embodiment of a wireless LAN (local area network) 10 in which the present invention is implemented. The LAN 10 includes an access point 12, which serves as base station, and is connected to a cable 14 which may be part of a backbone LAN (not shown), connected to other devices and/or networks with which stations in the LAN 10 may communicate. The access point 12 has antennas 16 and 17 for transmitting and receiving messages over a wireless communication channel." Boer, col. 2, ll. 6-15. "The network 10 includes mobile stations 18, referred to individually as mobile stations 18-1, 18-2, and having antennas 20 and 21, referred to individually as antennas 20-1, 20-2 and 21-1, 21-2. The mobile stations 18 are capable of transmitting and receiving messages … ." Boer at col. 2, ll. 16-21. "[T]here is being produced IEEE standard 802.11, currently available in draft form, which specifies appropriate standards for use in wireless LANs. This standard specifies two possible data rates for data transmission, namely 1 Mbps (Megabit per second) and 2 Mbps. Accordingly, manufacturers have produced commercially available systems operating at these data rates. However, it may be advantageous to provide stations operating at higher data rates, which are not in accordance with the standard." Boer, col. 1, ll.

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
	16-26. Fig. 2 of Boer shows functional blocks necessary for a full or half duplex packet baseboard transmission: "Referring now to FIG. 2, there is shown a functional block diagram illustrating, for a station 18, the interconnection of the functional blocks which relate to the implementation of the present invention. The block 30 represents a MAC (medium access control) control unit which includes four state machines, namely a MAC control state machine C-MST 32, a MAC management state machine M-MST 34, a transmitter state machine T-MST 36 and a receiver state machine R-MST 38. The MAC control unit 30 is shown as connected over a line 40 to a 1-out-of-2 rate selector 42 and a scrambler 44. The rate selector 42 and scrambler 44 are connected to a 1-out-of-2 encoder 46 which encodes the data bits from the scrambler 44 in accordance with the selected 1 or 2 Mbps data rate. The output of the encoder 46 is connected to a spreader 48 which effects the above-discussed spread spectrum coding and applies the signal to an RF front-end transmitter 50 for application to the antenna 20. "The receive antenna 21 is connected to an RF front-end receiver 52 which is connected to a correlator 54 which effects a correlation to "despread" the received signal. A first output of the correlator 54 is connected to carrier detector 56. A second output of the correlator 54 is connected to a 1-out-of-2 detector/decoder 58 which has an output connected to an input of a descrambler 60. The output of the descrambler 60 is connected over a line 62 to the MAC control unit 30 and to a 1-out-of-2 rate selector 64 which has an output connected to the detector/decoder 58 to control the detector/decoder 58 appropriately in accordance with control information contained

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
	in received messages." Col. 2, l. 63-col. 3, l. 24.
2. Quoting the claim language but without a citation to Snell, the Office further alleges that "Snell's transceiver may switch on-the-fly between a 'first modulation method" (e.g., BPSK) and a "second modulation method" (e.g., QPSK) that is "of a different type than the first modulation method." Order, at 9. While not cited by the Office, the following language in Snell refers to switching "on-the-fly" between BPSK and QPSK: "Moreover, a WLAN application, for example, may require a change between BPSK and QPSK during operation, that is, on-the-fly. Spreading codes may be difficult to use in such an application where an on-the-fly change is required." Snell at col. 2, ll. 15-17. "It is another object of the invention to provide a spread spectrum transceiver and associated method to permit operation at higher data rates and which may switch on-the-fly between different data rates and/or formats." Snell at col. 2, ll. 27-30. "The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at col. 7, ll. 10-14.	2. Boer discloses a transceiver that transmits data packets intended for another transmitter. Boer at Fig. 1; col. 2, ll. 6-62. Just like the communication in Snell that can switch from BPSK for the preamble and header to QPSK for the subsequent variable data portion, Snell at col. 6, l. 34-col. 7, l. 14, communication in Boer can switch from DBPSK for the preamble and header to DQPSK for the subsequent data field. *See, e.g.*, Boer at Fig. 4 (reproduced in §__); col. 3, ll. 56-62; col. 4, ll. 4-11. "With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove." Boer at col. 3, ll. 56-62. "The SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11.
3. The Office cited Fig. 3, col. 6, ll. 35-36, col. 6, ll. 52-53 to support its allegation that "Snell discloses the transceiver capable of transmitting data packets with preamble, header, and data portions, where the preamble and header are transmitted using BPSK modulation, and the data portion is transmitted	3. Boer discloses a transceiver that transmits data packets intended for another transmitter. Boer at Fig. 1; col. 2, ll. 6-62. Just like the communication in Snell that can switch from BPSK for the preamble and header to QPSK for the subsequent variable data portion, Snell at col. 6, l. 34-col. 7, l. 14, communication in

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
using either BPSK or QPSK modulation (different modulation methods)." Order, at 9. Fig. 3 is reproduced in Exhibit D, where it is shown to be substantially the same as Boer's Fig. 4. The portions cited in Snell read: "The header may always be BPSK." Snell at col. 6, ll. 35-36. "… SFD is F3A0h for the PLCP preamble 90. Now relating to the PLCP header 91, the Signal is …" col. 6, ll. 52-53.	Boer can switch from DBPSK for the preamble and header to DQPSK for the subsequent data field. *See, e.g.*, Boer at Fig. 4 (reproduced in Exhibit D); col. 3, ll. 56-62; col. 4, ll. 4-11. "With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove." Boer at col. 3, ll. 56-62. "The SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11.
4. The Office cited col. 6, ll. 35-36; col. 6, ll. 64-66; col. 7, ll. 5-14; and Fig. 3 of Snell to support an allegation that "Snell discloses that each data packet transmission is structured with a PLCP preamble and PLCP header and a 'payload portion' (e.g., MPDU data)." Order, at 9. The portions cited in Snell read: "The header may always be BPSK." Snell at col. 6, ll. 35-36. "The PLCP preamble and PLCP header are always at 1 Mbit/s, Diff encoded, scrambled and spread with an 11 chip barker. SYNC and SFD are internally generated." Snell at col. 6,	4. Boer discloses a message 200 that comprises a group of transmission sequences structured with a preamble 216, header 218, and a data field 214. *See, e.g.*, Boer at Fig. 4; col. 3, ll. 56-62; col. 4, ll. 4-11. "With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove." Boer at col. 3, ll. 56-62. "The SIGNAL field 206 has a first predetermined value if the DATA field 214 is

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
ll. 64-66. "MPDU is serially provided by Interface 80 and is the variable data scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at col. 7, ll. 5-14. Fig. 3 is reproduced in Exhibit D, where it is shown to be substantially the same as Boer's Fig. 4.	transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11.
5. The Office cited Fig. 3 and col. 6, line 48-col. 7, line 14 of Snell to support an allegation that "[t]he PLCP preamble contains SYNC and SFD fields, and the PLCP header contains SIGNAL, SERVICE, LENGTH, and CRC fields." Order, at 9. Fig. 3 is reproduced in Exhibit D, where it is shown to be substantially the same as Boer's Fig. 4. The portions cited in Snell read: "Referring now additionally to FIG. 3, the timing and signal format for the interface 80 is described in greater detail. Referring to the left hand portion, Sync is all 1's, and SFD is F3AOh for the PLCP preamble 90. Now relating to the PLCP header 91, the SIGNAL is: --- 0Ah 1 Mbit/s BPSK, 14h 2 Mbit/S QPSK, 37h 5.5 Mbit/s BPSK, and	5. Boer discloses a preamble 216 that contains SYNC and SFD fields 202, 204 and a header 218 that contains SIGNAL, SERVICE, LENGTH, and CRC fields 206, 208, 210, 212. *See, e.g.*, Boer at Fig. 4; col. 3, l. 42-col. 4, l. 24. "Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 includes a 128-bit SYNC (synchronisation) field 202, a 16-bit SFD (start of frame delimiter) field 204, an 8-bit SIGNAL field 206 (to be explained), an 8-bit SERVICE field 208 (to be explained), a 16-bit LENGTH field 210 (to be explained), a 16-bit CRC check field 212, which provides a CRC check for the portions 206, 208 and 210, and finally a DATA field 214 which comprises a variable number of data "octets", that is 8-bit data segments, sometimes referred to as "bytes". The fields 202 and 204 are together conveniently referred to as a preamble 216 and the fields 206, 208, 210 and 212 are together conveniently referred to as a header 218.

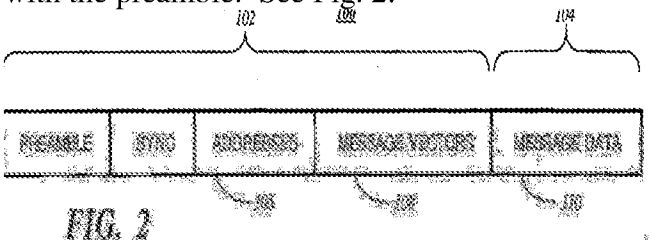
Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
6Eh 11 Mbit/s QPSK. "The SERVICE is OOh, the LENGTH is XXXXh wherein the length is in μs, and the CRC is XXXXh calculated based on SIGNAL, SERVICE and LENGTH. MPDU is variable with a number of octets (bytes)." "The PLCP preamble and PLCP header are always at 1 Mbit/s, Diff encoded, scrambled and spread with an 11 chip barker. SYNC and SFD are internally generated. SIGNAL, SERVICE and LENGTH fields are provided by the interface 80 via a control port. SIGNAL is indicated by 2 control bits and then formatted as described. The interface 80 provides the LENGTH in μs. CRC in PLCP header is performed on SIGNAL, SERVICE and LENGTH fields. "MPDU is serially provided by Interface 80 and is the variable data scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at col. 6, line 48-col. 7, line 14.	"With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove. Of course, the stations 18 are capable of transmitting at the 1 and 2 Mbps rates only, whereas the stations 22 can transmit the DATA field 214 at a selected one of the four data rates. "In more detail concerning the format of the message 200, the SYNC field 202 consists of 128 bits of scrambled "1" bits, enabling a receiving device to perform the necessary operations for synchronisation. The SFD field 204 consists of a predetermined 16-bit field identifying the impending start of the header 218. The SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate. It should be understood at this point that the stations 18, adapted to operate at the 1 and 2 Mbps rates only, ignore the SERVICE field 208. This aspect will be discussed more fully hereinafter. The LENGTH field 210 contains, if the bit rate is designated as 1 or 2 Mbps, a value corresponding to the actual number of octets in the DATA field 214. However for the 5 and 8 Mbps rates, the LENGTH field 210 contains a value which is a fraction, 2/5 and 2/8, times the actual number of octets in the DATA field 214, respectively. These values correspond to the length in octets of a transmission at 2 Mbps

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
	which would give the same transmission time of the DATA field 214, which is actually transmitted at 5 Mbps, or 8 Mbps respectively." Boer at col. 3, l. 42-col. 4, l. 24.
6. The Office cited col. 7, line 5-14 and Fig. 3 of Snell to support an allegation that "[t]he MPDU data is the data to be transmitted to the receiving transmitter." Order, at 9. The cited portion in Snell reads: "MPDU is serially provided by Interface 80 and is the variable data scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at col. 7, ll. 5-14. Fig. 3 is reproduced in Exhibit D, where it is shown to be substantially the same as Boer's Fig. 4.	6. Boer discloses that the data in DATA field 214 is the data to be transmitted to the receiving transmitter. *See, e.g.*, Boer at Fig. 4; col. 3, ll. 56-62; col. 4, ll. 4-11. "With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove." Boer at col. 3, ll. 56-62. "The SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11. "If rate switching is to take place, then after the last bit of the header 218 has passed through, the rate selector 142 provides a control signal to the encoder, to switch from operation in the 1 Mbps DBPSK mode to the 2 Mbps DQPSK mode, 5 Mbps PPM/QPSK mode or the 8 Mbps PPM/QPSK mode, whereby the DATA field 214 is encoded in the selected manner." Boer at col. 6, ll. 12-18.
7. The Office cited col. 6, ll. 52-63 to support its allegation that "Snell discloses the use of sequences in the header portion that indicate	7. Boer also discloses the use of sequences in the header portion to indicate which

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
which type of modulation is being used for transmitting the data portion." The cited portion in Snell reads: "Referring now additionally to FIG. 3, the timing and signal format for the interface 80 is described in greater detail. Referring to the left hand portion, Sync is all 1's, and SFD is F3AOh for the PLCP preamble 90. Now relating to the PLCP header 91, the SIGNAL is: 0Ah 1 Mbit/s BPSK, 14h 2 Mbit/S QPSK, 37h 5.5 Mbit/s BPSK, and 6Eh 11 Mbit/s QPSK. "The SERVICE is OOh, the LENGTH is XXXXh wherein the length is in µs, and the CRC is XXXXh calculated based on SIGNAL, SERVICE and LENGTH. MPDU is variable with a number of octets (bytes)." Col. 6, ll. 52-63.	modulation is used for transmitting data: "The SIGNAL field 206 has a first pre-determined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11.
8. The Office cited to Harris AN9614 at 3 (allegedly incorporated by reference in Snell) to support its allegation that Snell discloses "the ability to use its teachings with a polled (master/slave) protocol." Order, at 10. The section in Harris AN9614 relating to its "polled scheme" reads in its entirety (without any mention of master/slave): "With a low power watch crystal, the controller [of the PRISM chip set] can keep adequate time to operate either a polled or a time allocated scheme. In these modes, the radio is powered off most of the time and only awakens when communications is expected. This station would be awakened periodically to	8. There is no evidence that Harris AN9614 was published prior to the '228 priority date and thus could not legally be incorporated by reference in Snell. See § ___; Akl, at ¶___. In any case, Harris AN9614 does not mention and would not have suggested adapting Snell to a master/slave system. See § ___; Akl, at ¶___. In any case, the APA expressly discloses a master/slave system: "In a multipoint architecture, a single, central, or 'master' modem communicates with two or more tributary or 'trib' modems …." '228 Patent, at col. 1, ll. 58-60 ("Background"). "Fig. 1 is a block diagram of a prior art

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
listen for a beacon transmission. The beacon serves to reset the timing and to alert the radio to traffic. If traffic is waiting, the radio is instructed when to listen and for how long. In a polled scheme, the remote radio can respond to the poll with its traffic if it has any." Harris AN9614 at 3.	multipoint communications system including a master transceiver and a plurality of tributary transceivers …." Col. 3, ll. 30-33.
9. The Office also relied on "an annotated figure 3 [of Snell] to show relevant reading of the first and second information portions of a first message" presented by Samsung on page 47 of the request. Order, at 10. Annotated figure 3 is compared to a substantially identical annotated figure 4 of Boer presented by Samsung in the '892 IPR in Exhibit D.	9. "If rate switching is to take place, then after the last bit of the header 218 has passed through, the rate selector 142 provides a control signal to the encoder, to switch from operation in the 1 Mbps DBPSK mode to the 2 Mbps DQPSK mode, 5 Mbps PPM/QPSK mode or the 8 Mbps PPM/QPSK mode, whereby the DATA field 214 is encoded in the selected manner." Boer at col. 6, ll. 12-18.
10. Finally, with respect to Snell, the Office quoted col. 2, l. 61-col. 3, l. 5 without indicating the purpose of doing so. The quoted language reads: "The modulator may also preferably include header modulator means for modulating data packets to include *a header at a predetermined modulation and a third data rate defining a third format .... The third format is preferably differential BPSK."* (emphasis by Office) While the Office does not cite to claim 3 of Snell, it sheds light on what Snell means regarding "a third data rate defining a third format." Because the "third format" is in the header, it actually occurs *before* the first and second data rates/formats. Clam 3 of Snell reads: A spread spectrum radio transceiver according to claim 2 wherein said modulator comprises header modulator means for	10. With respect to the format of the header, Boer discloses that the SIGNAL and SERVICE fields 206 and 208 of the header 218 together indicate one of four data rates, each of which corresponds to a modulation mode for the DATA field 214. *See, e.g.,* Boer at col. 3, ll. 56-62; col. 4, ll. 4-11; col. 6, ll. 12-18. "With regard to the message 200, FIG. 4, it should be understood that *the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation*. The subsequent DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove." Boer at col. 3, ll. 56-62 (emphasis added). "The SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate and a second

Portions of Snell Cited in the 10-17-16 Order	Substantially Identical Portions of Boer and the APA
modulating data packets to include a header at a third format defined by a predetermined modulation at a third data rate and variable data in one of the first and second formats; and wherein said demodulator comprises *header demodulator means for demodulating data packets by demodulating the header at the third format and for switching to the respective one of the first and second formats of the variable data after the header*." (emphasis added)	predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate." Boer at col. 4, ll. 4-11. "If rate switching is to take place, then after the last bit of the header 218 has passed through, the rate selector 142 provides a control signal to the encoder, to switch from operation in the 1 Mbps DBPSK mode to the 2 Mbps DQPSK mode, 5 Mbps PPM/QPSK mode or the 8 Mbps PPM/QPSK mode, whereby the DATA field 214 is encoded in the selected manner." Boer at col. 6, ll. 12-18.

Portions of Yamano Cited in the 10-17-16 Order	Substantially Identical Portions of Siwiak, U.S. Patent No. 5,537,398
1. The Office relies on Yamano to support its alleged SNQs as offering "technological teachings … not previously considered" by the Office. Order, at 11. According to the Office, "Yamano discloses the placement of address data in the first information portion of a message. Specifically, Yamano discloses a packet structure with a preamble and a data portion, where the preamble includes a destination address of the receiving device." Order, at 10.	1. While Siwiak does not place the address in the preamble, with respect to the language of claim 21, Siwiak discloses packetized information and substantially the same placement of destination address data, i.e., in a "first transmission portion" with the preamble. See Fig. 2:  FIG. 2 Siwiak at col. 4, ll. 31-39 reads: "As shown in FIG. 2, when a message transmission is initiated on the channel, the first transmission portion 102, modulated in the well-known FM format, is transmitted on the channel. The first transmission portion 102 includes a preamble and synchronization bits, followed by

	the pager address in the address block 106 and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104."
2. The Office quoted Yamano at 19:63-64 to support its allegation that "Yamano discloses transmitting a "first message" *(e.g.,* data packet including a preamble and main body) that includes "first message address information that is indicative" *(e.g.,* "destination address" in the preamble) of the transceiver that is the "intended destination of the second information." Order, at 10. The quoted language reads: *"Packet 700* includes a *preamble 701* and a *main body* 702." (emphasis by Office)	2. The Abstract of Siwiak discloses: "A messaging system (500) for transmitting a message to a subscriber unit (312). The messaging system (500) includes a plurality of geographically distributed messaging transmitters (302-310), each transmitter designed to transmit in a first modulation format, such as FM, *during a first transmission portion (102) including address information*; and in a second modulation format, such as OFDM, during a second transmission portion (104) including message data (110) transmitted in frames." (emphasis added) Siwiak further discloses at col. 2, ll. 30-57: "The transmitters each include means for modulating, in a first modulation format, such as FM, a first transmission portion including address and other information, such as message characterization information; and means for modulating, in a second modulation format, such as OFDM, a second transmission portion including message data transmitted in frames; and means for transmitting the radio frequency signal. … Each of the plurality of data communication receivers includes receiver circuitry for receiving and demodulating the radio frequency signal transmitted in the first modulation format; means for decoding the selective call address information and the message characterization information transmitted in the first modulation format … . *The address uniquely identifies the data communication receiver (or a group of data communication receivers) to which the message is directed*, and the message characterization information identifies an information service, among other things."

3. The Office also quoted Yamano at 20: 1-7 which reads: "For example, *preamble 701* can include information which identifies: (1) a version or type field for the preamble, (2) *packet source and destination addresses,* (3) the line code (i.e., the modem protocol being used), (4) the data rate, (5) error control parameters, (6) packet length and (7) a timing value for the expected reception slot of a subsequent packet." (emphasis by Office)	3. Siwiak at col. 4, ll. 31-39 reads: "As shown in FIG. 2, when a message transmission is initiated on the channel, the first transmission portion 102, modulated in the well-known FM format, is transmitted on the channel. The first transmission portion 102 includes a preamble and synchronization bits, followed by the pager address in the address block 106 and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104."

Portions of Kamerman cited in the 10-17-16 Order	**Substantially Identical Portions of Boer**
1. The Office relies on a presentation by Kamerman to support its alleged SNQs as offering "technological teachings … not previously considered" by the Office. Order, at 11. Based on Kamerman, at 6, 11-12, the Office alleges that Kamerman "discloses an automatic rate adaptation scheme for transmitting a first data packet where the data is modulated using a first modulation method, such as BPSK (corresponding to a lower data transfer rate), and next transmitting a second data packet where the data is modulated using a second modulation method, such as QPSK (corresponding to a higher data transfer rate)."	1. As an initial matter, *Kamerman was Boer's co-inventor*, and the rate control algorithm in Kamerman's presentation (that aspect of Kamerman relied on in the Order) was described in detail in the Boer patent. *See, e.g.,* Boer, col. 1, ll. 17-30; col. 7, l. 12-col. 8. l. 16.
2.Kamerman, at 6 (in what appears to be relevant to the Office's allegations) reads: "IEEE 802. 11 supports DSSS (direct sequence spread spectrum) with differential encoded BPSK and QPSK, FHSS (frequency hopping	2. Boer at col. 1, ll. 17-30 discloses: "[T]here is being produced IEEE standard 802.11, currently available in draft form, which specifies appropriate standards for use in wireless LANs. This standard specifies two

spread spectrum) with GFSK (Gaussian FSK), and infrared with PPM (pulse position modulation)." Kamerman, at 6. "lX. AUTOMATIC RATE SELECTION "IEEE 802.11 DS specifies BPSK and QPSK, in addition there could be applied proprietary modes with M·PSK and QAM schemes that provide higher bit rates by encoding more bits per symbol. A transceiver implementation for such modulation schemes will give SNR performance figures which are a few dB worse than what the theoretical curves would show. Because of the nature of DS these higher bit rates will also provide good capture at cochannel interference scenario's as described in section 7. An automatic rate selection scheme based on the reliability of the individual uplink and downlink could be applied. The basic rate adaptation scheme could be: after unacknowledged packet transmissions the rate falls back, and after a number (e.g. 10) of successive correctly acknowledged packet transmissions the bit rate goes up. The transmissions from the accesspoint in the center of a cell to a station in the outer part. are the most sensitive for cochannel interference from a neighbor cell. The applied CRS threshold gives for path loss that corresponds fully to the exponential curves like in Fig. 6a, enclosed areas for which a certain CSlR is expected. In practice the presence of multipath fading, and hard walls will disturb the ideal case curves. "When two accesspoints don't receive each other above the CRS threshold, they are allowed to transmit at the same time. In this case he required CSIRs that depend on the applied bit rates, are very relevant. The occurrences of the various CSIR situations depend on the network load in the neighbor cells. The capture effect robustness and the lraffic process will let accommodate to the bit rate used for the uplink and downlink, At lower	possible data rates for data transmission, namely 1 Mbps (Megabit per second) and 2 Mbps. Accordingly, manufacturers have produced commercially available systems operating at these data rates. However, it may be advantageous to provide systems operating at higher data rates, which are not in accordance with the standard. "It is an object of the present invention to provide a method of operating a wireless local area network station which enables communication between stations operating at different data rates." Boer at col. 2, ll. 19-27 further discloses DBPSK and DQPSK: "The mobile stations 18 are capable of transmitting and receiving messages selectively at a data rate of 1 Mbps (Megabit per second) or 2 Mbps, using DSSS (direct sequence spread spectrum) coding. When operating at the 1 Mbps data rate, DBPSK (differential binary phase shift keying) modulation of the RF carrier is utilized, and when operating at the 2 Mbps data rate DQPSK (differential quadrature phase shift keying) modulation of the RF carrier is utilized." Boer at col. 7, l. 12-col. 8, l. 16 further discloses an automatic rate selection scheme (the same one disclosed in Kamerman's presentation): "Referring now to FIG. 7, there is shown a flowchart 500 illustrating an automatic data rate update procedure for the data rate to be used in the transmit mode, which is implemented in the preferred embodiment described herein for a station 22. The flowchart 500 begins at start block 502. Accordingly, from the start block 502, the flowchart 500 proceeds to block 504, where a determination is made as to whether the data rate is 5 or 8 Mbps. If so, the flowchart proceeds to block

load in the neighbor cells the highest bit rate can be used more often. At higher load the transmissions from the accesspoint to stations at the outer part of the cells, will be done often at fallback rates due to mutilation of transmissions by interference. In practice the network load for LANs at nowadays client-server applications is very bursty, with sometimes transmission bursts over an individual links and low activity during the rnajoli part of time. Therefore the higher bit rate can be used during the most of the time, and at high load in the neighbor cells (as will evoked by test applications) there will be switched to fall back rates in the outer part of the cell." Kamerman, at 11.

"X. THROUGHPUT DENSITY

"Only a few independent DS channels are available. in the 2.4 GHz lSM band for simultaneous operation. Therefore some strategy has to be followed to get a good medium reuse figure per channel. In the following two paragraphs we look to two cases: (1) with a CRS threshold based on the cell size and required CSIR; (2) with a fixed CRS threshold.

"The MRE given by the formula with the required CSIR can be applied also at a high density of accesspoints and small cells. However, this could imply a CRS threshold that is above the IEEE 802. 11 DS limit of -70 dBm or a TX power level that is below 17 dBm, because otherwise the CRS threshold would be the limiting element. At a fully filled up two-dimensional space (large multi-cell area) the bit rate of 2 Mbps and a minimum required CSIR of 3 dB would result in a throughput densidty of 0.2 per cell per channel. An autormatic rate selection combined with bit rates of 3, 4 Mbps gives higher rate operation in the inner cell part and during the time there

506 (to be described). If not, the flowchart proceeds to block 508 where a determination is made as to whether the ACK has been received and within a predetermined time-out time. If yes, the flowchart proceeds to block 510, where a successive correct (SC) count value is incremented. Next, as seen in block 512, a check is made as to whether the SC count value is greater than a predetermined value, selected as value 9, by way of example. In other words, a check is made as to whether more than nine successive ACK messages have been correctly and timely received. If yes, the flowchart proceeds to block 514 where a check is made as to whether the local SNR (signal-to-noise ratio) value is greater than a predetermined value, suitable for data rate incrementation. (The SNR is the ratio of received signal strength during the reception of the ACK message to the average silence level during periods at which no carrier signal is being received). If the SNR value is suitable, then the flowchart proceeds to block 516, where a data rate incrementation is implemented (if the maximum data rate is not already being used), and the SC (successive correct) count value is reset to zero. Thereafter, the data rate value and SC count value are stored (block 518), and the flowchart ends at block 520.

"Returning to block 508, if an ACK message is not received correctly and within the predetermined time interval, then the flowchart proceeds to block 522 where the SC count value is reset to zero and the data rate is decremented (if the minimum data rate is not already being used), and the flowchart proceeds over line 524 to block 518 where the new data rate and SC count value are stored. It should be noted also that if either block 512 or block 514 results in a negative determination, the flowchart also proceeds over line 524 to block 518.

"Returning now to block 504, if it is

is no significant cochannel interference. Such an automatic rate selection will allow a throughput density of 0.3 Mbps per cell per channel. "ln case of CRS threshold of -70 dBm and a TX power of 17 dBm are applied, the addition of more accesspoints cells (less than 60 meter at Υ =3.5). This makes that stations will associate with a more nearby accesspoint and the interference from other further away cells becomes relatively lower (better actual CSIRs). Thereby a higher bit rate can be used in the outer parts of a cell, but only a single transmission activity within a radius of 60 meter (0.94 hectare). At the proprietary bit rates of 3 and 4 Mbps in addition to the basic bit rates of 1 and 2 Mbps, and automatic rate selection a throughput density of 4 Mbps per hectare per channel can be found. In practice the presence of obstructions as concrete walls and floors gives additional isolation. The advantage of such an isolation is difficult to predict. Further simulation effort is needed for actual LAN traffic and indoor path loss conditions." Kamerman, at 11-12.	determined that the data rate is 5 or 8 Mbps, then the flowchart proceeds to block 506, where a determination is made as to whether the system is configured for overruling the preferred data rate by a data rate defined by monitoring the receipt of ACK messages. If no, the flowchart proceeds to block 508, previously discussed. If yes, the flowchart proceeds to block 526, where a determination is made as to whether the preferred data rate defined in the short ACK message 400 (FIG. 6) is greater than the actual data rate of the original message being acknowledged. If so, the flowchart proceeds to block 516 where the data rate is incremented and SC count value is reset to zero. If not, the flowchart proceeds directly to block 518 where the data rate and SC count value are stored. "To summarise the procedure described above with reference to the flowchart 500, it will be appreciated that an automatic data rate selection procedure has been described. At a lower data rate the transmission of data is more robust because the detection margin is larger at lower data rates. At a higher data rate the requirements with regard to channel conditions such as SNR, SIR (co-channel interference) and delay spread, are more stringent. If a station 22 doesn't receive the expected ACK message in return correctly and in due time, it will retransmit the original message packet at a lower data rate. If a station 22 does receive the expected ACK messages correctly and in due time from a particular station for a predetermined number of successive times, then it will transmit the next message to that station at a higher data rate. In this way the stations 22 adapt the operating data rate dependent on channel conditions (degradation by noise--SNR, time dispersion in the channel--delay spread) and co-channel interference (SIR)." *See also* the quotations from Boer included in the above comparison with Snell.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/013,809	Art Unit	: 3992
Patent No.	: 8,457,228	Examiner	: Scott Louis Weaver
Filed	: September 12, 2016	Conf. No.	: 7821
Customer No.	: 06449	Atty. No.	: 3277-114.RXM2

Title: SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS

Mail Stop Ex Parte Reexam
Central Reexamination Unit
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United States Patent & Trademark Office
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RESPONSE TO OFFICE ACTION

This Response is to the non-final Office Action dated May 3, 2017. On May 24, 2017, Patent Owner's petition for an extension of time was granted, extending the period for response from the original due date of July 3, 2017, to August 3, 2017. On July 10, 2017, Patent Owner's second petition for an extension of time was granted, further extending the period for response to August 13, 2017. As August 13, 2017 fell on a Sunday, this Response is being timely filed on Monday, August 14, 2017.

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Exhibit A: Timeline of Rembrandt Litigation, IPRs and Reexaminations

Exhibit B: Comparison of Cited Portions of Snell with Substantially Identical Portions of Boer

Exhibit C: Claim Construction Order in Rembrandt Wireless Tech. v. Samsung Elec. Co., No. 2:13-cv-00213 (E.D. Tex. 2013)

Exhibit D: Comparison of the Requester's Presentation of Snell's Fig. 3 and Boer's Fig. 4

Exhibit E: Clean Copy of Upender

Exhibit F: Andrew S.Tanenbaum, Computer Networks (Prentice-Hall, Inc., 3rd ed. 1996)

Remarks

I. Introduction

Claim 21 of U.S. Patent No. 8,457,228 patent ("'228 Patent") is the subject of this *ex parte* reexamination, Control No. 90/013,809, and is dependent on claim 1.[1] In its entirety, claim 21 reads:

> 21. [A master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device, the master communication device comprising:
>
> a master transceiver configured to transmit a first message over a communication medium from the master transceiver to the one or more slave transceivers, wherein the first message comprises:
>
> first information modulated according to a first modulation method,
>
> second information, including a payload portion, modulated according to the first modulation method, wherein the second information comprises data intended for one of the one or more slave transceivers and
>
> first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information; and
>
> said master transceiver configured to transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers wherein the second message comprises:
>
> third information modulated according to the first modulation method, wherein the third information comprises information that is indicative of an impending change in modulation to a second modulation method, and
>
> fourth information, including a payload portion, transmitted after transmission of the third information, the fourth information being modulated

[1] The claims of the '228 Patent have been the subject of numerous IPRs and district court litigation. *See* their history in the timeline in Exhibit A. All relevant litigation is identified in Exhibit A. With respect to invalidity/patentability issues, all litigation has been completed in the district court and in the Federal Circuit.

according to the second modulation method, the second modulation method being of a different type than the first modulation method, wherein the fourth information comprises data intended for a single slave transceiver of the one or more slave transceivers, and

second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information; and

wherein the second modulation method results in a higher data rate than the first modulation method,]

wherein the first information that is included in the first message comprises the first message address data.

In this Response, Patent Owner challenges the Office's findings and determinations made in the Office's Order for Ex Parte Reexamination (mailed October 17, 2017) ("Order") and its non-final Office Action (mailed May 3, 2017) ("May 3 Office Action") rejecting claim 21 of the '228 Patent.

A. Summary of the Office's Order Determining That There Existed A Substantial New Question ("SNQ") and Its Office Action Rejecting Claim 21 of the '228 Patent

1. The Office's Order

In its Order, the Office identified the following alleged prior art:

i. U.S. Patent No. 5,982,807, filed on Mar. 17, 1997 and issued on Nov. 9, 1999, to Snell, J. ("Snell").

ii. U.S. Patent No. 6,075,814, filed on May 9, 1997 and issued on Jun. 13, 2000, to Yamano, L., et al. ("Yamano").

iii. Andren, C. et al., "Using the PRISM™ Chip Set for Low Data Rate Applications," Harris Semiconductor Application Note No. AN9614, March 1996 ("Harris AN9614").

iv. "HSP3824 Direct Sequence Spread Spectrum Baseband Processor," Harris Semiconductor File No. 4064.4, Oct. 1996 ("Harris 4064.4").

v. Kamerman, A., "Throughput Density Constraints for Wireless LANs Based on DSSS," IEEE 4th International Symposium on Spread Spectrum

> Techniques and Applications Proceedings, Mainz, Germany, Sept. 22-25, 1996, pp. 1344-1350 vol.3 ("Kamerman").
>
> vi. Upender et al., "Communication Protocols for Embedded Systems," Embedded Systems Programming, Vol. 7, Issue 11, November 1994 ("Upender").

Order, at 3.

Without comparing the teachings of this cited art with those of the art previously considered in any of the multiple IPRs challenging the '228 Patent or during the examination of the '228 application, the Office determined:

> Each of references 1-5 has not been previously cited or considered and is considered new. Reference 6 was relied on as a teaching reference but is being considered in a new light.
>
> Because Snell was not cited or before the Office during prosecution of the application which became the '228 patent, Snell in combination with references 2-6 have not been considered before the Office prior to the instant reexamination. Accordingly, Snell in combination with references 2-6 can be used to raise a substantially new question of patentability in this *ex parte* reexamination proceeding.

Order, at 3.

Based on this art and the proposed substantial new questions ("SNQs") in the Request for *Ex Parte* Reexamination filed on September 16, 2016 ("Request"), the Office identified the following three SNQs:

1) Unpatentability of claim 21of the '228 Patent under 35 U.S.C. § 103 based on Snell in combination with Yamano and Kamerman;

2) Unpatentability of claim 21 of the '228 Patent under 35 U.S.C. § 103 based on Snell in combination with Harris 4064.4, Harris AN9614, Yamano, and Kamerman; and

3) Unpatentability of claim 21 of the '228 Patent under 35 U.S.C. § 103 based on Snell, Harris 4064.4, the Admitted Prior Art, Upender, Yamano, and Kamerman.

Order, at 9-12. The Office bases the last two SNQs on its determinations regarding Snell, Yamano and Kamerman without any analysis of the additional cited art. Order, at 12 ("Other issues alleged by the Requester relating to Snell in combination with Yamano, and Kamerman in other combinations with Harris 4064.4, Harris AN96l4, the Admitted Prior Art, Upender, as cited in the request with respect to claim 21, raise an SNQ for the same reasoning set forth above with respect to Snell, Yamano and Kamerman").

The Office's analysis falls short of that required to establish an SNQ in that it fails to recognize that Snell, Yamano, and Kamerman are at best cumulative of art already cited to and considered by the Office. For example, Snell is cumulative to U.S. Patent No. 4,706,428 ("Boer") – a reference fully considered by the PTAB in multiple IPRs. The same is true for Kamerman (a co-inventor on the Boer patent). And Yamano is cumulative to U.S. Patent No. 5,537,398 ("Siwiak"), a reference previously presented to and considered by the Office during several IPRs and the original examination of the '228 Patent. Neither the Requester nor the Office made this required determination. An argument already decided by the Office cannot raise a new question of patentability. *E.g., Ex parte Lam Research Corp.*, 2012 WL 1178196, at 5 (PTAB 2013); MPEP § 2242 (no substantial new question of patentability if "the same question of patentability has already been decided as to the claim"). A finding that the same art was not previously before the Office is not sufficient to conclude it raises an SNQ, as "the same question of patentability may have already been decided by the Office where the examiner finds the additional (newly provided) prior art patents or printed publications are merely cumulative to similar prior art already fully considered by the Office in an earlier concluded examination or

review of the claim." MPEP § 2242 I.b. *See also infra* at § II; 37 C.F.R. § 1.132 Declaration of Dr. Robert Akl ("Akl") at ¶¶ 41-70.

For the above reasons, and as explained in greater detail below, Patent Owner respectfully requests reconsideration of the Office's SNQ determination and termination of this reexamination because no SNQ was identified in the Order.

2. The Office's Grounds for Rejection of Claim 21

In its May 3 Office Action, the Office rejected claim 21 of the '228 Patent under 35 U.S.C. § 102(e) based on Snell, Office Action at 7-8, without any finding of an SNQ to support the rejection, either in the Order or the May 3 Office Action. Only substantial new questions of patentability are subject to reexamination. *In re Recreative Technologies Corp.*, 83 F.3d 1394, 1397 (Fed. Cir. 1996) (holding that "the substantial new question requirement … act[s] to bar reconsideration of any argument already decided by the Office, whether during the original examination or an earlier reexamination"). *See also In re Portola Packaging, Inc.*, 110 F.3d 786, 791 (Fed. Cir. 1997)("Even when the door to the reexamination gate is opened, the PTO is not freed from the limitations Congress placed on the reexamination process. Whatever the basis on which reexamination is granted, it was intended to deal only with substantial new questions of patentability."); *Ex parte Hisamitsu Pharmaceutical Co.,* 2014 WL 955762, slip op. at 2 (PTAB 2014)("Applicant argues that the Tsubota reference does not support a substantial new question of patentability ("SNQ"), which is required for *each* rejection during Reexamination under 35 U.S.C. §303(a)") (emphasis added). *See also* 35 U.S.C. § 304 (indicating that reexamination is for "resolution of the question," i.e., the SNQ, not to again address questions that have been considered and decided by the Office).

In addition to its § 102(e) rejection, the Office has rejected claim 21 of the '228 Patent under 35 U.S.C. §103(a) as follows:

> A.) Claim 21 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Applicants Admitted Prior Art (APA) in view of Boer and further in view of Yamano. May 3 Office Action, at 8.
>
> B.) Claim 21 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Snell in view of Yamano and further in view of Kamerman (relying on Snell's incorporation by reference of Harris AN9614 and Harris 4064.4). May 3 Office Action, at 10.
>
> C.) Claim 21 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Snell in view of Harris 4064.4, further in view of Harris AN9614, further in view of Yamano and further in view of Kamerman. May 3 Office Action, at 30.
>
> D.) Claim 21 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Snell in view of Harris 4064.4, further in view of the Admitted Prior Art, further in view of Upender, further in view of Yamano and further in view of Kamerman. May 3 Office Action, at 51.

Like the Office's anticipation rejection, its rejection A (above) is not supported by any finding of an SNQ, either in the Order or the May 3 Office Action. *See infra* at § II.B. discussing this topic more fully.

For these reasons and those given below, Patent Owner respectfully requests that these grounds of rejection be withdrawn and the reexamination terminated.

B. Summary of Patent Owner's Arguments That The Office Has Not Identified A Substantial New Question of Patentability and Has Not Established That Claim 21 is Unpatentable Based on Any of the Five Grounds Identified Above

The Office has not (1) identified a substantial new question of patentability to support reexamination or (2) established that claim 21 is unpatentable based on any of the above-noted grounds of rejection (two of which are improper due to lack of any SNQ determination). Patent Owner's arguments supporting its positions are summarized as follows:

1. The Office has not identified a substantial new question of patentability ("SNQ") because the art identified in its alleged SNQs (and relied on to support its grounds of rejection) is cumulative to art previously presented in a number of the IPRs challenging the '228 Patent and fully considered by the PTAB and during prosecution of the '228 Patent. *See infra* at § II.A.; Akl, at ¶¶ 41-70.

2. The Office has not identified any SNQ to support its § 102(e) rejection or its rejection "A" under § 103(a), and thus these rejections are *ultra vires* and must be withdrawn for this reason alone, as only new questions are subject to reexamination. *See infra* at § II.B.

3. The multiple alleged reasonable claim constructions compel a finding of indefiniteness and termination of the reexamination proceeding. *See infra* at § III.

4. The Office has not based its rejections on the broadest *reasonable* claim construction and thus has not identified where in the cited art a number of the claim limitations, when properly construed, are disclosed or suggested. *See infra* at § IV; Akl, at ¶¶ 18-27.

5. Harris AN9614 and Harris 4064.4 (collectively "Harris Documents") are not prior art and therefore could not be incorporated by reference into Snell or used as references against the '228 Patent, as their earliest publication date in the record is the date Snell issued as a patent, *i.e.*, November 9, 1999 (after the '228 priority date of December 5, 1997). *See infra* at § VI.A.-C; Akl, at ¶¶ 71-77.

6. The material Snell attempted to incorporate by reference is not the material the Office now relies on to support its rejections. Thus, even assuming portions of the Harris Documents were legally incorporated by reference, the specific material the Office is relying on was not incorporated by reference. *See infra* at § VI.D.; Akl, at ¶¶ 71-77.

7. The alleged Admitted Prior Art cannot serve as a basis for rejecting claim 21 (*e.g.*, because it is not the work of another). *See infra* at § VII.

8. The Anticipation Rejection is improper because the art relied on to support it does not disclose the claimed (i) master/slave relationship, (ii) the two different types of modulation methods, or (iii) the first and second messages. *See infra* at § VIII; Akl, at ¶¶ 78-123.

9. All of the rejections based on § 103(a) are improper because one of ordinary skill in the art would not have adapted/combined the references as the Office proposes for at least the following reasons: (i) the peer-to-peer systems of

Boer and Snell are fundamentally different than the claimed master/slave system; (ii) the "polled scheme" of Harris AN9614 was in the context of a single low data rate scheme as opposed to Snell's relied-on higher data rate scheme; (iii) Upender would have discouraged adapting Snell or Boer to a master/slave system; and (iv) the problem identified and solved by Gordon Bremer was not recognized in the cited prior art. *See infra* at § V & IX.A; Akl, at ¶¶ 78-99, 124-79.

10. All of the rejections based on § 103(a) also are improper because one of ordinary skill in the art would not have adapted Boer or Snell to a master/slave system and then combined it with Yamano as the Office proposes because moving address information from the Data Link Layer to the Physical Layer Preamble would have resulted in an inoperable system and removed error detection functionality with respect to the address value. In addition, the skilled artisan would have recognized that doing so would have been a "serious design blunder." *See infra* at § IX.B.; Akl, at ¶¶ 78-99, 124-79.

11. Further, all of the rejections based on § 103(a) are improper because one of ordinary skill in the art would not have adapted Boer or Snell to a master/slave system and then combined it with Yamano as the Office proposes because adding a destination address to the preamble of Snell or Boer would have frustrated their goals of increasing the data rate and remaining compliant with IEEE 802.11. *See infra* at § IX.B.; Akl, at ¶¶ 78-99, 124-79.

12. Rejection A is improper because it would not have been obvious to (i) adapt Boer to a master/slave system, or (ii) move destination address data to the preamble of Boer. Rejection A is additionally improper because (1) the Office relies improperly on portions of the '228 Patent as disclosing the claimed "master/slave relationship" and (2) the cited references do not disclose and would not have suggested the claimed "the second modulation method [that is] of a different type than the first modulation method." *See infra* at §§ IX & X; Akl, at ¶¶ 180-85.

13. Rejections B and C are improper because it would not have been obvious to (i) adapt Snell to a master/slave system, or (ii) move destination address data to the preamble of Snell. Rejections B and C are also improper because the cited references do not disclose and would not have suggested any of the following three claim limitations: (1) the "master/slave relationship," (2) "the second modulation method [that is] of a different type than the first modulation method," and (3) the "first message" and "second message." *See infra* at §§ IX & XI; Akl, at ¶¶ 186-206.

14. Rejection D is improper because it would not have been obvious to (i) adapt Snell to a master/slave system, or (ii) move destination address data to the

> preamble of Snell. Rejection D is also improper because (1) the Office relies improperly on portions of Harris AN9614 and the '228 Patent as disclosing the claimed "master/slave relationship" and (2) the cited references do not disclose and would not have suggested the claimed "the second modulation method [that is] of a different type than the first modulation method." *See infra* at §§ IX & XII; Akl, at ¶¶ 207-215.

II. The Office has Not Identified a Substantial New Question of Patentability

In its analysis of "The SNQ Requirement," the Office takes the following position:

> Based on the prosecution history of the '228 patent including the *inter partes* proceedings noted above which are relevant to claim 21 and in which the independent claim 1 was found unpatentable, a reference or combination of references teaching either a destination address in the header of a first message as indicated the feature not addressed in IPR 2014-00892, or the following features of claim 21, would be considered a new, non-cumulative teaching not previously before the Office during the examination of the '228 patent and the prior IPR proceedings and therefore would raise a substantial new question of patentability:
>
> > The master transceiver (as recited in claim 1) that transmits the first message which includes ...**first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information and** wherein (as recited in claim 21) ... **the first information that is included in the first message comprises the first message address data.**

Order, at 8-9 (emphasis by Office). This approach to identifying a substantial new question of patentability ("SNQ") is not correct for several reasons. First, the statement implies that the limitation of claim 21, i.e., "the first information that is included in the first message comprises the first message address data," was not addressed in the '892 IPR (when in fact it was addressed). Second, it appears to ignore the Office's consideration of Siwiak in the '555 IPR and in the prosecution of the application leading to the '228 Patent ("'228 Application"). *See* IPR2014-00892 and IPR2015-00555 (both quoted below, including *infra* at §§ II.A.3., II.A.5. & note 12). In the '892 IPR, based on its consideration of Boer and the APA, the PTAB refused to institute *inter partes* review of claim 21 because it was "not persuaded that Petitioner has

established a reasonable likelihood that it would prevail in its challenge of claim 21." '892 Institution Decision, at 13-15. Samsung again challenged claim 21 in the '555 IPR, this time including a reference previously considered during prosecution, Siwiak. In the '555 IPR, the PTAB rejected Samsung's petition based on its determination that "'the same or substantially the same prior art' previously was 'presented to the Office' in the '892 proceeding." '555 Institution Decision, at 7-8. Third, the Office's approach does not acknowledge that, in order to conclude that a reference or combination of references offers a "new, non-cumulative teaching," the reference or combination of references must be compared to those previously before the Office. Here, such a comparison exposes the fact that none of the art relied on by the Office to support its SNQs is a "new, non-cumulative teaching." *See infra* at § II.A.1.-II.A.7; Exhibits A, B, & D; Akl, at ¶¶ 41-70. Finally, to the extent the Office is suggesting otherwise, in order to determine whether an SNQ exists, the Office must consider claim 21 as a whole and not just the added limitation in dependent claim 21. Thus, it must address *all of the limitations of claim 21* in view of the art it now relies on to support its alleged SNQs. *Interconnect Planning Corporation v. Feil*, 774 F.2d 1132, 1137 (Fed. Cir. 1985) (where different claims in patent were previously found invalid, it was legal error to compare the prior art only to the differences between the claim being reviewed and the ones previously held invalid, as doing "would amount to treating the claims previously held to be invalid as prior art.").

A. The Office's Conclusory Statements Are Not Supported by Any Consideration of The Previously Considered Art

The Office identified three alleged substantial new questions of patentability ("SNQs") in its Order (listed *supra* at § I) but did not explain how any of the art relied on to support its

alleged SNQs, *i.e.*, Snell (including incorporation by reference of Harris AN9614[2]), Yamano, and Kamerman,[3] presents a "new, non-cumulative teaching" not previously before the Office during prior IPR proceedings and examination of the application leading to the '228 Patent, *i.e.*, APA, Boer, and Siwiak. Instead the Office makes the following conclusory statements:

> … Snell in combination with Yamano, and Kamerman raise a substantial new question of patentability (SNQ) in combination because one of ordinary skill would have found each of the references, Snell, Yamano and Kamerman important in teaching the combination of technological features which were indicated important to the patentability of the subject claim 21.
>
> Snell was not previously cited or considered by the Office alone or in combination with the cited art.
>
> Yamano was not previously cited or considered by the Office alone or in combination with Snell.
>
> Kamerman was not previously cited or considered by the Office alone or in combination with Snell.
>
> Thus, a reasonable examiner would consider the combination of Snell, Yamano, and Kamerman as asserted in the instant request, important in deciding whether or not the subject claim 21 is patentable.
>
> Because the combination of Snell with the cited Yamano and Kamerman references disclose the limitations of claim 21 of the 228 patent which were found important to the patentability of claim 21 during prosecution of the application which became the 228 patent as well as by the PTAB in IPR 2014 -00892, there is a substantial likelihood that a reasonable examiner would consider this combination important in deciding whether or not claim 21 of the 228 patent is patentable. Accordingly, the combination of Snell, Yamano and Kamerman as cited in the request raises a substantial new question of patentability as to claim 21 of the '228 patent.

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[2] Harris AN9614 is not prior art and therefore could not be incorporated by reference in Snell. Further, even if it were so incorporated, the page relied on by the Office was not, as Snell did not specifically identify that portion of Harris AN9614. *See infra*, at § VI; Akl, at ¶¶ 71-77, 109-115, 131-133. Thus, all of the alleged SNQs fail without Harris AN9614.

[3] The relevance of Harris 4064.4, the alleged Admitted Prior Art ("APA"), and Upender are not discussed in the Order.

> Snell in combination with Yamano, and Kamerman raise a substantial new question of patentability because the references teach technical features in combination which were missing from the art applied during prosecution. Each reference is new prior art and the combination was not applied during the original examination.
>
> The combination presents new, non-cumulative technological teaching important to the original claims in effect at the time of this request for reexamination. These technological teachings were not previously considered and discussed on the record during the prosecution of the original application that resulted in the patent for which reexamination is requested nor during the prosecution of any other prior proceeding involving the patent for which reexamination is requested.
>
> Thus, a reasonable examiner would view the new technological teachings of Snell in combination with Yamano, and Kamerman important in deciding patentability of the claims being considered, thus raising the SNQ regarding claim 21 of the '228 patent.

Order, at 11. Because the Office's three SNQ determinations rest on the allegedly new technological teachings of each of Snell, Yamano, and Kamerman, should these references prove to be merely cumulative of art already considered by the Office presented for the same purpose, all of the alleged SNQs would fail.

As an initial matter, the fact that references were "not previously considered by the Office alone or in combination," *id.*, is not sufficient to establish that an SNQ has been identified. Art that is cumulative of that already considered and being considered in the same way as the previously considered art is not sufficient to raise an SNQ. *See, e.g., Ex parte Lam Research Corp.*, 2012 WL 1178196, slip at 5 (PTAB 2013) (quoting *In re Swanson*, 540 F.3d 1368,1380 (Fed. Cir. 2008); MPEP § 2242 (no substantial new question of patentability if "the same question of patentability has already been decided as to the claim"); Ex parte Muzzy Products Corp., 2010 WL 3448876, slip op. at 6 (BPAI 2010). See also MPEP § 2242 I.b. ("[T]he same question of patentability may have already been decided by the Office where the

examiner finds the additional (newly provided) prior art patents or printed publications are merely cumulative to similar prior art already fully considered by the Office in an earlier concluded examination or review of the claim."). As the Federal Circuit explained in *In re Swanson*:

> The 2002 amendment removes the focus of the new question inquiry from whether the reference was previously considered, and returns it to whether the particular question of patentability presented by the reference in reexamination was previously evaluated by the PTO. *As was true before the amendment, an "argument already decided by the Office, whether during the original examination or an earlier reexamination" cannot raise a new question of patentability*. H.R. Rep. No. 96–1307(I), U.S. Code Cong. & Admin. News 1980, pp. 6460, 6466; *see also* H.R. Rep. No. 107–120, at 3 (explaining that the amendment did not diminish the "substantial new question requirement" and that "[t]he issue raised must be more than just questioning the judgment of the examiner."). As we explained in *In re Recreative Technologies Corp.*, the substantial new question requirement "guard[s] against simply repeating the prior examination on the same issues and arguments" and bars "a second examination, on the identical ground that had previously been raised and overcome." 83 F.3d at 1396–97.

540 F.3d at 1380 (emphasis added). Where, as here, a previously considered prior art *teaching* is being considered again for "the same or substantially the same purpose" in reexamination, no substantial new question exists. *Muzzy*, slip op. at 6. This holds true whether the teaching is found in a previously considered reference or in one that is cumulative of a reference previously considered. The proper focus is on whether there is a substantial new question of patentability which cumulative art considered in the same way cannot raise. *See, e.g., Swanson*, 83 F.3d at 1396–97 (quoted above)*; In re Portola Packaging, Inc.*, 110 F.3d 786, 791 (Fed. Cir. 1997) ("Even when the door to the reexamination gate is opened, the PTO is not freed from the limitations Congress placed on the reexamination process. Whatever the basis on which reexamination is granted, it was intended to deal only with substantial new questions of

patentability."). Here, there is no evidence that the Office actually compared Snell (including Harris AN9614), Yamano, or Kamerman, with the art previously considered during prosecution or during the multiple IPRs of the '228 Patent, including IPR2014-00892 ("'892 IPR"), *i.e.*, the APA, Boer, and Siwiak. To the extent any such comparisons were made, the Office's conclusions are not correct. *See infra* §§ II.A.1.-II.A.7; Exhibits A, B, & D; Akl, at ¶¶ 41-70.

In fact, *all of the art* cited in the Order, including Snell, the Harris Documents, Kamerman, Yamano, the APA, and Upender[4] (i) were previously considered by the Office or are at best cumulative to art previously considered by the Office and (ii) are being considered for the same or substantially the same purpose as the previously-considered art with respect to claim 21 (*e.g.*, in the '555 and '892 IPRs and the prosecution of the '228 application).[5] Again, there is no evidence that the Office actually compared the alleged "new" art purported to support its SNQs with the APA, Boer, or Siwiak. Should the Office do so to try to support an SNQ, Patent Owner reserves the right to supplement the points set forth in this Response. However, it is Patent Owner's position that attempting to establish an SNQ based on the art identified in the Order (or in the May 3 Office Action) would be futile, as the cited art is no more than cumulative to the art already considered by the PTAB and the examiner during prosecution of the application leading to the '228 Patent. *See* the discussion *infra* at § II.A.1.-II.A.7; Exhibits A, B, & D; Akl, at ¶¶ 41-70. Merely substituting previously uncited art (Snell, Yamano, and Kamerman) that is no more

[4] The copy of Upender that Samsung provided with the Request is difficult to read. To assist the Office with its review, Rembrandt provides a better copy of Upender as Exhibit E. The pages cited to Upender are the actual pages in the document.

[5] Since the Office bases its three alleged SNQs only on Snell (including Harris AN9614) combined with Yamano and Kamerman, Patent Owner limits its discussion of the SNQ issues to those four references. Should the Office attempt to bolster its SNQ determination by including any of the other references, Patent Owner requests a full opportunity to respond.

relevant to the claims' patentability than that already considered (Boer, APA, and Siwiak) and applying it in the same way does not raise an SNQ.

As illustrated below, the challenge to claim 21 presented in this reexamination is simply a repurposed version of the one presented in the '555 petition, which the PTAB found to be "substantially the same" as the '892 challenge where institution was denied on the merits. *See* the discussion *infra* at § II.A.3, II.A.5, & note 12; Exhibits A, B, & D; Akl, at ¶¶ 41-70. Given the correspondence between the challenge in this reexamination and the '555 challenge, and the fact that the PTAB has already determined that the '555 challenge lacked anything substantially new, it is clear that *none of the cited references* supports any of the Office's substantial new questions in this reexamination.

Based on the above and the reasoning below, Rembrandt respectfully requests the Office to reconsider its decision that Snell (including Harris AN9614) in combination with Yamano and Kamerman raises three SNQs. Order, at 9-12.

1. Snell (Including Harris AN9614), Combined With Yamano and Kamerman is Cumulative to Previously Considered Boer, the APA, and Siwiak

The Office relies on Snell (including Harris AN9614), combined with Yamano and Kamerman to support each of its three alleged SNQs. However, the Office does not compare these references with those previously presented to and considered by the Office, i.e., the APA, Boer, and Siwiak and thus does not recognize that the allegedly "new" art is cumulative to that already considered by the Office. Further, the Office does not explain how any of the "new" art is being viewed differently than that previously before the Office in, *e.g.*, the '892 and '555 IPRs and during prosecution of the '228 Patent. In fact, the material relied on in the allegedly "new"

references is substantially the same as that previously before the Office and is being viewed in the same light. *See* Exhibits A, B, & D; Akl, at ¶¶ 41-70.

The Office's two-page discussion of the Snell, Yamano, and Kamerman disclosures, in its entirety, reads:

> **Snell** discloses a transceiver that serves as an access point for communicating data with other transceivers connected to a wireless local area network (WLAN). Snell at col. 4, lines 42- 47 and col. 5, lines 18-21. Snell's transceiver transmits data packets intended for another transceiver, where the communication may switch on-the-fly between a "first modulation method" (e.g., BPSK) and a "second modulation method" (e.g., QPSK) that is "of a different type than the first modulation method."
>
> Snell discloses the transceiver capable of transmitting data packets with preamble, header, and data portions, where the preamble and header are transmitted using BPSK modulation, and the data portion is transmitted using either BPSK or QPSK modulation (different modulation methods). *See,* Snell at Fig. 3, 6:35-36, 6:52-63.
>
> Snell discloses that each data packet transmission is structured with a PLCP preamble and PLCP header and a "payload portion" *(e.g.,* MPDU data). *Id* at 6:35-36, 6:64-66, 7:5-14, Fig. 3.
>
> The PLCP preamble contains SYNC and SFD fields, and the PLCP header contains SIGNAL, SERVICE, LENGTH, and CRC fields. *Id* at Fig. 3, 6:48-7:14. The MPDU data is the data to be transmitted to the receiving transceiver. *Id* at 7:5-6, 7:6-14, Fig. 3.
>
> Snell discloses the use of sequences in the header portion that indicate which type of modulation is being used for transmitting the data portion, 6:52-63. Snell also discloses (through its incorporation of Harris AN9614) the ability to use its teachings with a polled (master/slave) protocol. Harris AN9614 at 3.
>
> The request provides an annotated figure 3 to show relevant reading of the first and second information portions of a first message as reproduced below from page 47 of the request.

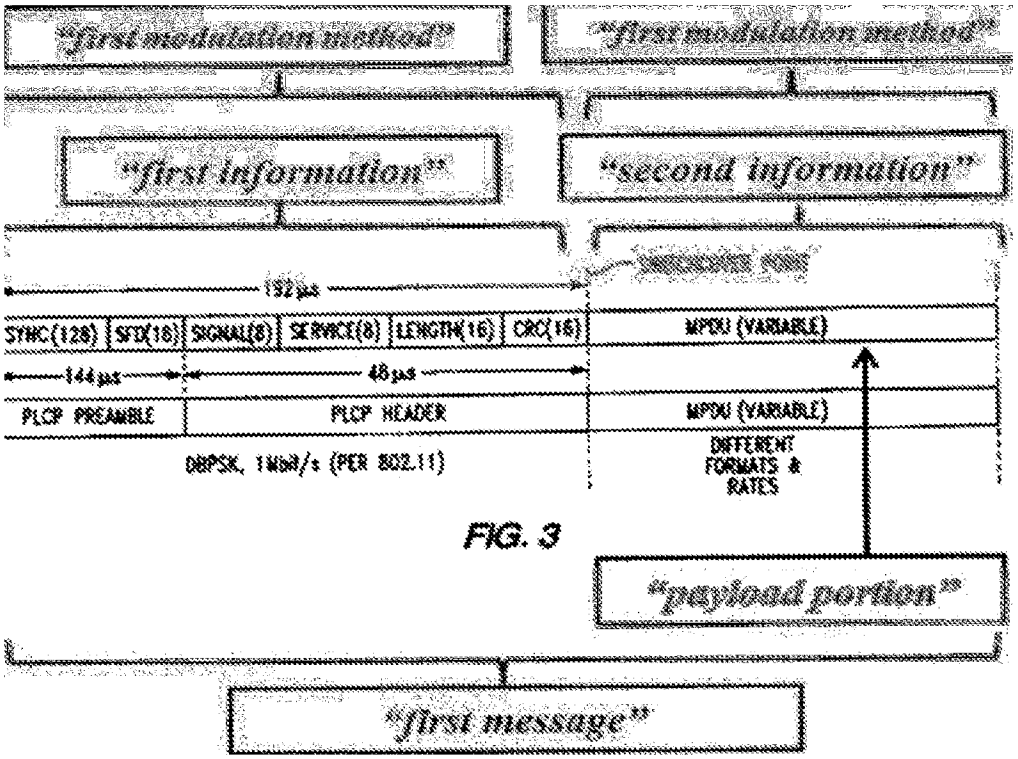


FIG. 3

Snell Figure 3 (annotated).[6]

"The modulator may also preferably include header modulator means for modulating data packets to include *a header at a predetermined modulation and a third data rate defining a third format .... The third format is preferably differential BPSK."* Snell at 2:61-3:5.

Yamano discloses the placement of address data in the first information portion of a message. Specifically, Yamano discloses a packet structure with a preamble and a data portion, where the preamble includes a destination address of the receiving device.

For example, Yamano discloses transmitting a "first message" *(e.g.,* data packet including a preamble and main body) that includes "first message address information that is indicative" *(e.g.,* "destination address" in the preamble) of the transceiver that is the "intended destination of the second information." *"Packet 700* includes a *preamble 701* and a *main body* 702." Yamano at 19:63-64.

[6] In its Request, Samsung also relies on a more extensive version of annotated Fig. 3. See Request, at 26, 54, 79, 111 (relied on in the May 3 Office Action, at 42). That annotated version of Snell's Fig. 3 is *substantially identical* to an annotated version of Boer's Fig. 4 previously presented to the Office on several occasions. See Samsung's Petition in the '892 IPR, at 39. The two annotated versions are compared in Exhibit D.

> "For example, *preamble 701* can include information which identifies: (1) a version or type field for the preamble, (2) *packet source and destination addresses,* (3) the line code (i.e., the modem protocol being used), (4) the data rate, (5) error control parameters, (6) packet length and (7) a timing value for the expected reception slot of a subsequent packet." Yamano at 20: 1-7.
>
> **Kamerman** discloses an automatic rate adaptation scheme for transmitting a first data packet where the data is modulated using a first modulation method, such as BPSK (corresponding to a lower data transfer rate), and next transmitting a second data packet where the data is modulated using a second modulation method, such as QPSK (corresponding to a higher data transfer rate). Kamerman at 6, 11- 12.

Order, at 9-11 (emphases by the Office).

Without further discussion of these three references, the Office concluded that they supported the three alleged SNQs (identified *supra* at § I). In fact, the disclosures relied on by the Office are substantially the same as the disclosures in the APA, Boer, and Siwiak which were previously before and considered by the Office.[7] *See also* their side-by-side comparison in Exhibit B.

2. Snell (Including Harris AN9614) is Cumulative to the APA and Boer

Snell is cumulative to Boer, a reference that the PTAB fully considered in a number of IPRs of the '228 Patent, including the '892 IPR.[8] Both references propose similar extensions to

[7] According to the MPEP 2242.I: "If the prior art patents and printed publications raise a substantial question of patentability of at least one claim of the patent, then a substantial new question of patentability as to the claim is present, *unless the same question of patentability has already been … (B) decided in an earlier concluded examination or review of the patent by the Office …*" (emphasis added). The PTAB's determinations regarding claim 21 in both the '892 and '555 IPRs satisfy the criteria stated in (B), as both reviews were "earlier concluded" and both addressed the same question based on cumulative art, i.e., the APA, Boer, and Siwiak. *See infra* at § II.A.3., II.A.5.; Exhibits A, B, & D; Akl, at ¶¶ 41-70.

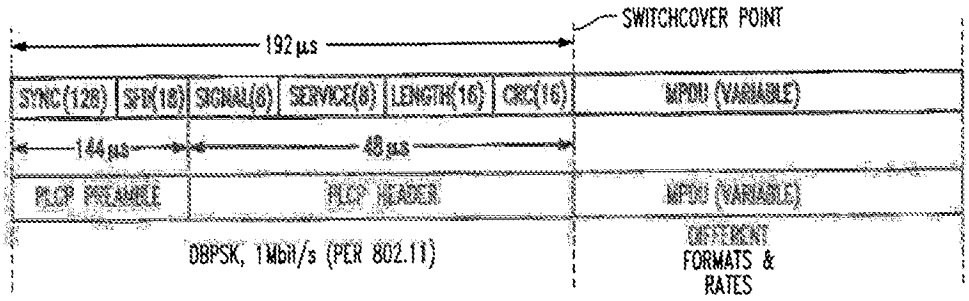
[8] Boer was cited by Samsung in six IPRs against the '228 Patent, i.e., IPR2014-00889, -00890, -00892, -00893, -00895, and IPR2015-00555. It also was cited in five IPRs against the '580

what became known as the 802.11 standard (or WiFi), namely adding two higher data rates to the 1MB/s and 2MB/s data rates in the standard. Both Snell and Boer use the packet structure defined by the standard, including packet headers with the same fields.

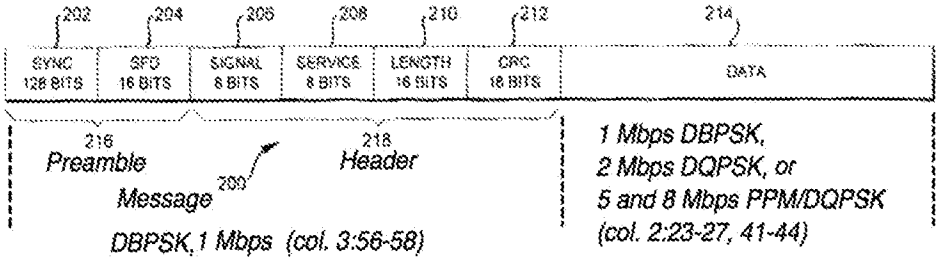
The Office relies heavily on Snell's Fig. 3 and its description of these packet structures as providing the additional limitations of claim 21. Order at 9-10 (citing to Fig. 3 five times in its one page analysis of Snell and including "an annotated figure 3." Samsung presented a more extensive annotated Fig. 3 (relied on and reproduced by the Office in its May 3 Office Action, at 42) that is substantially identical to the annotated version of Boer's Fig. 4 submitted in the '892 IPR Petition, at 39 (See Exhibit D)). Substantially identical packet structures, described in Boer and Boer's Fig. 4, were fully considered by the PTAB in a number of IPRs challenging the '228 Patent (*see supra* note 8) and found unlikely to render unpatentable claim 21of the '228 Patent in the '892 IPR. *See* '892 IPR Institution Decision, Paper 8, at 9-11 & 13-15 (December 10, 2014) (quoted *infra* at § II.A.3.).

Another comparison of Snell's Fig. 3 with Boer's Fig. 4 in a simpler format (without Samsung's multiple reproductions of the figure and with the numbers in Fig. 4 identified by Patent Owner) is presented below:

Patent (the parent of the '228 Patent). Thus, the PTAB was very familiar with Boer and Samsung's arguments based on Boer.



(Snell) *FIG. 3*



(Boer) FIG.4

Like the comparison in Exhibit D, this simpler comparison illustrates that Snell adds nothing to Boer and thus that Snell is cumulative to Boer. *See* Akl, at ¶¶ 41-53. In fact, the Snell disclosure relied on by the Office in its Order is *substantially identical* to the fully-considered disclosure in Boer.[9] Again, see Exhibit B comparing the portions of Snell cited by the Office with substantially identical portions of Boer.

As part of its description of Snell, the Office states: "Snell also discloses (through its incorporation of Harris AN9614) the ability to use its teachings with a polled (master/slave) protocol. Harris AN9614 at 3." Order at 9-10. As fully explained below, there is no evidence that Harris AN9614 was published in the patent law sense, and thus it could not be legally

[9] By the time the PTAB finally decided the '892 IPR in September 2015, Boer and the APA had been cited to and considered by the PTAB in numerous IPRs. *See* Exhibit A.

incorporated into Snell. *See infra* at § V; Akl, at ¶¶ 71-77. And, even if it were incorporated by reference, page 3 was not specifically identified as legally required by incorporation by reference. In any case, the discussion of a "polling scheme" in Harris AN9614 does not inherently or expressly disclose and would not have suggested a master/slave system but rather polling in a peer-to-peer system as disclosed by Snell. *See id.* Finally, even assuming that Harris AN9614 were properly incorporated by reference *and* would have suggested a master/slave system, it is less relevant than the APA disclosure which was considered to clearly disclose such a system. Akl, at ¶¶ 51-52. Thus, Snell (even including Harris AN9614) is *at best* cumulative to the APA and Boer.

3. The APA and Boer Were Previously Considered by the PTAB

In its '892 Institution Decision, the PTAB considered the APA and Boer teachings, including Boer's Fig. 4, with respect to the patentability of claim 21 and concluded that there was not "a reasonable likelihood of prevailing on the obviousness ground of unpatentability as to claim 21 based on APA and Boer":

> Petitioner contends that the '228 patent contains material that may be used as prior art against the patent under 35U.S.C.§103(a). Figure1of the patent is labeled as "Prior Art." Pet. 5; Ex. 1301, Fig. 1. Further, the '228 patent's specification refers to "prior art" multipoint communication system 22 comprising master modem or transceiver 24, which communicates with a plurality of tributary modems ("tribs") or transceivers 26. Pet. 6; Ex. 1301, col.3, l.64–col.4, l.1. …
>
> … Petitioner has met its initial burden … in demonstrating that the subject matter of the '228 Patent's Figure 1, and accompanying description, constitutes "prior art" ….
>
> ….
>
> Boer describes a wireless LAN that includes first stations that operate at 1 or 2 Mbps (Megabits per second) data rate and second stations that operate at 1,2, 5, or 8 Mbps data rate. Exhibit 1304, Abstract.

Figure 1 of Boer is reproduced below.

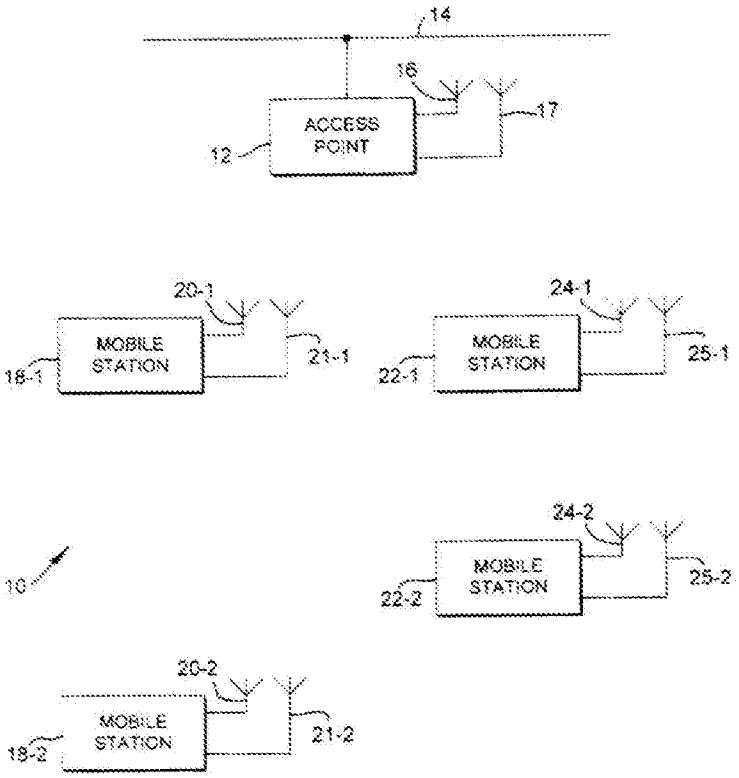


FIG.1

Figure 1 is said to be a block diagram of a wireless LAN embodying Boer's invention. Ex. 1304, col. 1, ll. 53–54. LAN 10 includes access point 12, serving as a base station. The network includes mobile stations18-1and 18-2 that are capable of transmitting and receiving messages at a data rate of 1or 2 Mbps using DSSS (direct sequence spread spectrum) coding. When operating at 1 Mbps, a station uses DBPSK (differential binary phase shift keying) modulation. When operating at 2 Mbps, a station uses DQPSK (differential quadrature phase shift keying) modulation. *Id.* at col. 2, ll. 6–27. Mobile stations 22-1and 22-2 are capable of operating at the1and 2 Mbps data rates using the same modulation and coding as stations 18-1 and 18-2. In addition, stations 22-1and 22-2 can operate at 5 and 8 Mbps data rates using PPM/DQPSK (pulse position modulation–differential quadrature phase shift keying) in combination with the DSSS coding. *Id.* at col.2, ll. 34–44. ['892 Institution Decision, at 8-11.]

…

> Claim 21, which depends directly from claim 1, recites that the first information that is included in the first message "comprises the first message address data." Petitioner maps the claimed "first information" as corresponding to header 218 of message 200 depicted in Figure 4 of Boer.
>
> Pet. 39, 41; Ex.1304, col.3, ll.42–55. Petitioner admits that Boer does not teach placing its address information in header 218 (Ex.1304, Fig.4). Pet. 39. Boer teaches that DATA field 214 (Fig.4), which is deemed to correspond to the "second information," contains a destination address. Pet. 38–39; Ex. 1304, col. 6, ll. 28–31.
>
> Petitioner submits that the '228 patent "admits" that placing address information in the training sequence of a message is prior art. Pet. 39. Petitioner does not indicate how such an admission might be relevant to claim 21. The '228 patent teaches that in a multipoint system the address of the trib with which the master is establishing communication is also transmitted during the training interval. Ex. 1301, col. 4, ll. 19–22. The "training signals" that are exchanged during the training interval, however, are "sequences of signals of particular subsets of all signals that can be communicated via the agreed upon common modulation method." *Id.* at col. 4, ll. 5–10. Petitioner does not identify any teaching of placing address data in the message header.
>
> Petitioner concludes that "[a] person having ordinary skill in the art would have been motivated to combine the APA with Boer due to the similarities between the packet structures and because where the address fields are placed is a matter of design choice." Pet. 39, citing Ex. 1323 ¶ 212. Petitioner has not identified a teaching in the applied prior art of placing address data in the header of a message. Nor has Petitioner provided evidence sufficient to demonstrate that the ordinary artisan would have considered placing the address data as claimed to be a mere matter of "design choice." Petitioner's conclusory allegation of "design choice" does not provide the required "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007).
>
> For the foregoing reasons we are not persuaded that Petitioner has established a reasonable likelihood that it would prevail in its challenge of claim 21.

'892 Institution Decision, at 8-11, 13-15. Given the lack of any new, non-cumulative teaching in Snell (compared to the APA and Boer disclosures) and the PTAB's consideration of the APA

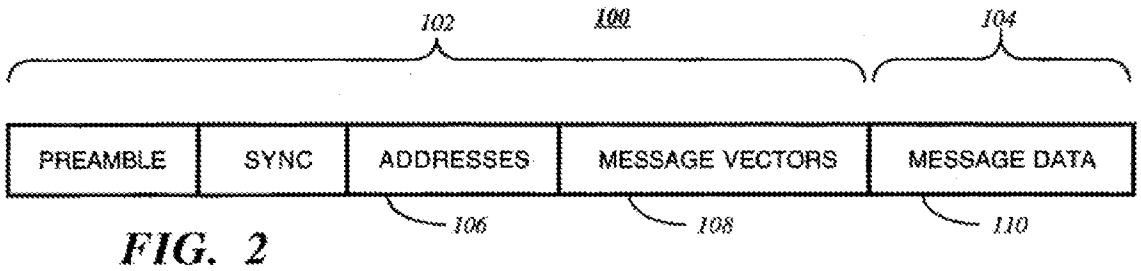
and Boer, Snell (even including Harris AN964) does not support an SNQ of patentability of claim 21.

4. Yamano Is Cumulative To Siwiak

The Office relies on Yamano as disclosing "the placement of address data in the first information portion of a message." Order, at 10. Yamano is cumulative to Siwiak. See Exhibit B comparing the portions of Yamano relied on by the Office with the Siwiak teachings. Siwiak was previously considered for the same purpose, *i.e.,* the placement of address data in the first information portion of a message.

5. Siwiak Was Previously Presented To And Considered By The PTAB

In its '555 IPR Petition, Samsung previously presented Siwiak to the PTAB in substantially the same way it presented Yamano in its '228 reexamination request:

> … Siwiak discloses a "high speed simulcast multi-rate data messaging and paging system." Ex. 1324, 1:6-8. Siwiak utilizes a message format having header and data fields. Siwiak illustrates this message format in Fig. 2:
>
> 
>
> FIG. 2
>
> Ex. 1324, Fig. 2.
>
> As is seen in its Fig. 2, Siwiak discloses a message 100 having a "first transmission portion" 102 (i.e. a header) and "second transmission portion" 104 (which contains "message data 110"). Ex. 1324, 2:57-65 ("As illustrated in FIG. 2, the paging system includes a **transmission format protocol 100** which has two portions. The **first transmission portion 102** is sent in a first modulation format, for example FM. The first transmission portion allows the subscriber unit receivers to work in a lower power consumption mode which enhances battery life. The **second transmission portion 104** is sent in a second modulation format,

> preferably OFDM, which requires the receiver to work in a higher power mode."). Ex. 1325, ¶11. Thus Siwiak discloses a packetized communication system having a message format having a header that precedes a data field. *Id.* ...
>
> Claim 1 requires that a master transmit a "first message" having "first information modulated according to a first modulation method" and "second information, including a payload portion." Claim 21 depends from claim 1, and requires that "the first information that is included in the first message comprises the first message address data." The "first information" recited in claims 1 and 21 is a header of a message, and it must contain "the first message address data." …
>
> In the ['892] Institution Decision, The Board construed claim 21 to require that the "first message address data" be located in the header of a message. Inst. Dec., Decision at 14. The first transmission portion 102 of Siwiak includes the address of an intended destination of the transmission 100. Ex. 1325, ¶13. *See also* Ex. 1324, 2:30-57 ("The transmitters each include means for modulating, in a first modulation format, such as FM, **a first transmission portion including address** and other information, such as message characterization information . . . . The **address uniquely identifies the data communication receiver** (or a group of data communication receivers) **to which the message is directed**, and the message characterization information identifies an information service, among other things."); *see also*, *id.* at 4:31-39 ("As shown in FIG. 2, when a message transmission is initiated on the channel, the first transmission portion 102, modulated in the well-known FM format, is transmitted on the channel. **The first transmission portion 102** includes a preamble and synchronization bits, **followed by the pager address in the address block 106** and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104."). Ex. 1325, ¶13.

'555 IPR Petition, at 23-25 (emphases Samsung's). A comparison of Samsung's arguments based on Siwiak to those it made in its reexamination request expose their substantial identity.[10]

[10] Samsung also presented Siwiak (with a draft IEEE 802.11 standard and Boer) in IPR2014-00889. Again, Siwiak was presented in the substantially the same way in this earlier challenge to claim 21: "Another example is U.S. Patent 5,537,398 [Siwiak], Ex. 1007, which discloses placing address fields in the first portion of a packetized message, where the first portion uses one modulation method and the second portion uses another modulation method. See Ex. 1007, 4:31-39 and Fig. 2 (where "first transmission portion 102" includes "addresses" modulated using "a first modulation format, for example FM," and "second transmission portion 104" is modulated using "a second modulation format, preferably OFDM")." Samsung '889 Petition, at 59. The PTAB did not institute the IPR: "The Petition fails to demonstrate a reasonable likelihood of prevailing on the grounds that the challenged claims are … obvious over Draft

The PTAB considered Samsung's arguments based on Siwiak and refused to institute the '555 IPR because "the same or substantially the same prior art" previously was "presented to the Office" in the IPR '892 proceeding and Samsung's petition presented merely "the same or substantially the same prior art or arguments" previously presented in IPR '892:

> The difference between what Petitioner presents in this proceeding and what Petitioner presented in IPR '892 with respect to claim 21 of the '228 patent is that Petitioner now offers Siwiak as support for the asserted obviousness of placing address data in a message header as taught by Boer. Pet. 24–57; Mot. Join. 5–6. Petitioner, however, presents no argument or evidence that Siwiak was not known or available to it at the time of filing IPR '892. In fact, Petitioner applied Siwiak in proposed grounds of rejection against claim 21 of the '228 patent in another petition filed the same day as that in the IPR '892 proceeding. See IPR2014-00889, Paper 2 at 58–60. On this record, *we exercise our discretion and "reject the petition" because "the same or substantially the same prior art" previously was "presented to the Office" in the IPR '892 proceeding.* 35 U.S.C. § 325(d); *see also Unilever, Inc., v. The Proctor & Gamble Co.*, Case IPR2014-00506, slip op. at 6 (PTAB July 7, 2014) (Paper 17) (informative) (seven new references added to six that were applied in earlier petition).
>
> Petitioner is requesting, essentially, a second chance to challenge the claims. We, however, are not persuaded that a second chance would help "secure the just, speedy, and inexpensive resolution of every proceeding." 37 C.F.R. § 42.1(b). Permitting second chances in cases like this one ties up the Board's limited resources; we must be mindful not only of this proceeding, but of "every proceeding." *Id.* …
>
> In this proceeding, however, we are not apprised of a reason that merits a second chance. Petitioner simply presents arguments now that it could have made in IPR '892, had it merely chosen to do so. In view of the foregoing, and especially in light of the fact that, barring joinder, this petition is time-barred under 35 U.S.C. § 315(b), *we exercise our discretion under 35 U.S.C. § 325(d) to deny the petition, because it presents merely "the same or substantially the same prior art or arguments" presented to us in IPR '892.*

Standard *and prior art references* [Boer and Siwiak]." '889 Institution Decision, at 11 (Dec. 10, 2014).

'555 Institution Decision, at 7-9 (emphasis added). Thus, the PTAB clearly and necessarily considered Samsung's presentation of Siwiak in view of what was previously presented in the '892 IPR in order to so conclude.

As the above illustrates, Samsung's challenge to claim 21 presented in this reexamination is simply a repurposed version of the one it presented in the '555 petition, which the PTAB considered and found to be "substantially the same" as that made in the '892 IPR where institution was denied on the merits. Given the correspondence between the present challenge and that in the '555 IPR, and the PTAB's determination that the '555 petition did not present anything substantially new, [11] coupled with the substantial identity of Yamano and Siwiak (see

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[11] Although the Office has not so stated in the Order, to the extent the Office believes that the prior PTAB decisions denying institution with respect to claim 21 are inapplicable to an SNQ analysis, such a position cannot be reconciled with the *inter partes* review statute, which states that the "determination by the Director whether to institute an inter partes review shall be *final and nonappealable*." 35 U.S.C. §314(d). In promulgating the rules implementing this statute, the Office has stated:

> The Board may deny a ground at any time prior to institution before or after receiving any patent owner preliminary response. *Denial of a ground is a final Board decision* and thus is subject to request for reconsideration at that time. § 42.71(c)(2). *The decision of the Director on whether to institute review on any ground is not reviewable*. 35 U.S.C. 314(d), as amended, and 35 U.S.C. 324(e). Fed. Reg./Vol. 77, No. 157, at 48702 (emphasis added).

Given that the present reexamination is a repurposed version of prior failed IPR challenges made by the same challenger, proceeding with reexamination under such circumstances negates both the finality and nonappealability of the prior Board decisions denying institution. As the Office has stated, a decision denying institution is "final" and "not reviewable," meaning that it cannot be revisited. *In re Cuozzo Speed Technologies*, LLC, 793 F.3d 1268, 1273 (Fed. Cir. 2015)("Section 314(d) provides that the decision is both "nonappealable" and "final," i.e., not subject to further review.") The Office is acting contrary to this prohibition, by reviewing anew the same patentability issues that, e.g., the Board considered and rejected in denying institution with respect to claim 21 in the '892 and '555 IPRs. In addition, by proceeding with this reexamination, the Office is violating the statutory mandate that the denial of institution is "nonappealable." It is not appropriate for a challenger to respond to a final, non-appealable

Exhibit B), it is clear that Yamano does not support any of the Office's alleged substantial new questions.

6. Siwiak Was Previously Considered During Prosecution Of The '228 Application

Siwiak also was considered during the examination of the '228 application and is identified on the face of the '228 Patent. It was also considered during prosecution of U.S. Patent No. 8,023,580 ("'580 Patent"), the parent of the '228 Patent. The '580 and '228 Patents have identical disclosures, and, in fact, the '228 Patent is subject to a terminal disclaimer based on the '580 Patent, which was filed to address an obviousness-type double patenting rejection in the '228 application. Further, both patents were prosecuted by the same examiner, Primary Examiner Dac Ha. The '580 Patent issued on September 20, 2011 (after the '228 application was filed on August 4, 2011).

The '580 application was filed on August 19, 2009 with a number of claims, including dependent claim 34. This claim included the limitation "wherein the first data comprises an address." In an Office Action mailed September 1, 2010, Examiner Ha rejected a number of the claims, including claim 34, under 35 U.S.C. § 102(b) based on Siwiak, finding *inter alia* that, with respect to claim 34, "Siwiak … discloses 'the first data comprises an address' in col. 4, ll. 31-39; Fig. 2." September 1 Office Action, at 4. Thus, when the '228 application was filed less than one year after Examiner Ha issued his September 1 Office Action in the '580 application, Examiner Ha was well aware of the teachings of Siwiak. In fact, in the first Office Action

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Board decision denying institution by filing a follow-on reexamination that presents the same teachings in the same way, and for the Examiner to consider the challenge anew and reach a decision contrary to the Board. Permitting such a process turns the "nonappealable" requirement of §314(d) on its head, by allowing a nonappealable Board decision to be reheard by the CRU.

(mailed April 30, 2012), Examiner Ha expressly identified Siwiak as "pertinent to applicant's disclosure" (the only reference so identified) and listed it on an 892 form. April 30 Office Action, at 4. All of the rejections in the April 30 Office Action were based on obviousness type double patenting in view of the '580 Patent. In response, applicants amended the claims. In doing so, they added, among others, dependent claim 41 which added the limitation "wherein the first information that is included in the first message comprises the first message address data." October 19, 2012 Response, at 10. The same response included a terminal disclaimer which overcame the double patenting rejections. Examiner Ha did not reject claim 41 (or any other claim) based on Siwiak.

Based on the above, there can be no question that Siwiak was previously considered by the Office on several occasions for the same purpose that Yamano is now being considered, *i.e.*, the alleged disclosure of the additional limitation found in claim 21 ("the first information that is included in the first message comprises the first message address data").[12]

[12] While this section of Patent Owner's response focuses on the Order, notably the motivation offered in the Office Action for combining Yamano with Snell, i.e., the filtering of "packets that do not need to be demodulated," (May 3 Office Action, 9-10) was also presented based on Siwiak in Samsung's '555 challenge: "One advantage of choosing to place the address in the header is power savings. For example, *a transceiver may stop demodulating a message once it determines the packet is addressed to a different receiver*, thereby saving the power that would be required to decode the remainder of the packet. By placing the address early in the packet (i.e. in the header), receivers can sleep sooner … Siwiak explicitly describes this motivation. …" ('555 Pet., at 21-22 (emphasis added).) Again, the PTAB "reject[ed] the petition" *because "the same or substantially the same prior art" previously was "presented to the Office" in the IPR '892 proceeding*." '555 Institution Decision, at 7-8.

7. Kamerman is Cumulative to Boer

Kamerman also is cumulative to Boer. In fact, *Kamerman was Boer's co-inventor*,[13] and the rate control algorithm in Kamerman's presentation[14] (that aspect of Kamerman relied on in the Order) was described in detail in the Boer patent. *See, e.g.,* Boer, col. 7, l. 12-col. 8. l. 16; Akl, at ¶¶ 64-68 (comparing Kamerman to Boer). *See also* Exhibit B ("Table Comparing Snell, Yamano, and Kamerman to the APA, Boer and Siwiak").

B. The Office Has Not Even Alleged A Substantial New Question of Patentability For Two Of Its Rejections

The Office rejected claim 21 as obvious over Boer, the so-called Admitted Prior Art ("APA") and Yamano (collectively, "the Boer Rejection"). May 3 Office Action, at 8-10. It also rejected claim 21 as anticipated by Snell ("the Snell Anticipation Rejection"). *Id.* at 7-8. Neither the Order, nor the Office Action even asserted, let alone made the required threshold

[13] A portion of the cover of the Boer (with highlighting) is reproduced below.

United States Patent [19]
Boer et al.

[11] **Patent Number: 5,706,428**
[45] **Date of Patent: Jan. 6, 1998**

[54] **MULTIRATE WIRELESS DATA COMMUNICATION SYSTEM**

[75] Inventors: **Jan Boer**, Odijk; **Wilhelmus Josephus Diepstraten**, Diessen; **Adriaan Kamerman**, Nieuwegein; **Hendrik van Bokhorst**, Nijkerk; **Hans van Driest**, Bilthoven, all of Netherlands

[73] Assignee: **Lucent Technologies Inc.**, Murray Hill, N.J.

[21] Appl. No.: **615,408**

[22] Filed: **Mar. 14, 1996**

"Welcome to IEEE P802.11"; Working Group for Wireless Local Area Networks; Set-up on Dec. 17, 1996, update of May 20, 1997.

"Bell Labs Unveils 10-Megabit Wireless-Network Technology, Offering Five Times Today's Highest Data-Transmission Capacity"; ICA New Product Announcement, Apr. 22, 1997.

Primary Examiner—James P. Trammell
Assistant Examiner—Shah Kaminis
Attorney, Agent, or Firm—Christopher N. Malvone

[57] **ABSTRACT**

[14] It appears Kamerman was permitted to talk about the invention disclosed in the Boer patent once the application was filed. Such a procedure is typical with companies, particularly large companies like Lucent Technologies (assignee of the Boer patent and Kamerman's employer). *See* Akl, at ¶ 64, note 5.

determination that the grounds supporting either rejection presented a substantial new question of patentability. The Office's failure to do so renders the Office Action *ultra vires*.

1. The Office Has Not Alleged A Substantial New Question of Patentability For The Boer Rejection

As a jurisdictional matter, *ex parte* reexamination based on the Boer Rejection can only proceed if the Office *first* makes the threshold determination that the grounds relied on to support the Boer Rejection present an SNQ. As noted in *In re Recreative Technologies Corp.*, 83 F.3d 1394, 1397 (Fed. Cir. 1996):

> As explained in the legislative history, matters that were decided in the original examination would be barred from reexamination:
>
> > This "substantial new question" requirement would protect patentees from having to respond to, or participate in unjustified reexaminations. ***Further, it would act to bar reconsideration of any argument already decided by the Office, whether during the original examination or an earlier reexamination***.

Id. at 7, *reprinted in* 1980 U.S.C.C.A.N. at 6466 (emphasis added). The court in *Recreative Technologies* continued:

> In this case, the Commissioner points out that the Manual of Patent Examining Procedure authorizes the procedure that was followed. Section 2258 of the M.P.E.P. states that
>
> > [O]nce initiated, the scope of reexamination includes reexamination of the patent in view of any pertinent patents or printed publications, including issues previously addressed by the Office.
>
> Thus the Commissioner argues that it is within the examiner's authority to apply the old ground of rejection on the Ota reference, as the only ground of rejection. We cannot agree. This is the very action against which the statute protects. The Commissioner's argument that reexamination, once begun, can be limited to grounds previously raised and finally decided, cannot be accommodated by the statute, and is directly contravened by the legislative history. Although Congress may entrust the administrative agency with administration of a statute, the agency cannot depart from the statutory purpose.

> [The courts] must reject administrative constructions of the statute, whether reached by adjudication or by rulemaking, that are inconsistent with the statutory mandate or that frustrate the policy that Congress sought to implement.
>
> *Patlex*, 771 F.2d at 487, 226 USPQ at 989 (quoting *Federal Election Commission v. Democratic Senatorial Campaign Committee*, 454 U.S. 27, 31–32, 102 S.Ct. 38, 41–42, 70 L.Ed.2d 23 (1981)).
>
> ....
>
> The statutory instruction that a new question of patentability must be raised is explicit in 35 U.S.C. § 303. ***Reexamination is barred for questions of patentability that were decided in the original examination***. That power cannot be acquired by internal rule of procedure or practice. The policy balance reflected in the reexamination statute's provisions cannot be unilaterally realigned by the agency.[2] To the extent that M.P.E.P. § 2258 enlarges the statutory authorization, it is void. *See Patlex*, 771 F.2d at 487 (quoting *Mourning v. Family Publications Service, Inc.*, 411 U.S. 356, 369, 93 S.Ct. 1652, 1660, 36 L.Ed.2d 318 (1973) (quoting *Thorpe v. Housing Authority of the City of Durham*, 393 U.S. 268, 280–81, 89 S.Ct. 518, 525–26, 21 L.Ed.2d 474 (1969) (regulation promulgated under statutory authority not valid if not reasonably related to the purposes of the enabling legislation))).

83 F.3d at 1397-98 (emphasis added). *See also In re Portola Packaging, Inc.*, 110 F.3d 786, 791 (Fed. Cir. 1997) ("Even when the door to the reexamination gate is opened, the PTO is not freed from the limitations Congress placed on the reexamination process. Whatever the basis on which reexamination is granted, it was intended to deal only with substantial new questions of patentability."); *Ex parte Hisamitsu Pharmaceutical Co.*, 2014 WL 955762, slip op. at 2 (PTAB 2014)("Applicant argues that the Tsubota reference does not support a substantial new question of patentability ("SNQ"), which is required for each rejection during Reexamination under 35 U.S.C. §303(a)").

Given the long history of Samsung's failed challenges to claim 21 based on Boer and the APA, it is not surprising that the Office has failed to even allege that the Boer Rejection presents a substantial new question. A brief synopsis of those failed challenges is set forth below:

- On June 4, 2014, the Requestor filed ***six*** IPR Petitions directed to the '228 patent: IPR2014-00889; -00890; -00891; -00892; -00893 and -00895.

- IPR2014-00892 challenged Claim 21 based on Boer and the APA:

> Unlike claim 21, Boer did not place its address information in the Header 218. However, it would have been obvious to include address fields in the Header of a message. Indeed, the `228 patent admits that placing address information in the training sequence of a message is prior art. Ex. 1301 ("In a multipoint system, the address of the trib with which the master is establishing communication is also transmitted during the training interval."). A person having ordinary skill in the art would have been motivated to combine the APA with Boer due to the similarities between the packet structures and because where the address fields are placed is a matter of design choice. Ex. 1323, ¶212. Thus, claim 21 is obvious. '892 Pet., at 39.

- IPR2014-00899 challenged Claim 21 based on the 802.11 "Standard" in view of either the APA or Siwiak; and APA or Siwiak, further in view of Boer.

- On December 10, 2014, the PTAB issued a decision denying institution with respect to claim 21 in the '892 IPR. The PTAB rejected Samsung's contention that "a person having ordinary skill in the art would have been motivated to combine the APA with Boer due to the similarities between the packet structures and because where the address fields are placed is a matter of design choice." *Samsung Electronics Col. LTD. et al. v. Rembrandt Wireless Technologies, LP.*, IPR2014-00892, Paper No. 8 at 13-15 (PTAB December 10, 2014). In the same decision, the PTAB instituted review with respect to certain other claims in the '228 Patent. *Id.* at 15.

- On December 10, 2014, the PTAB also denied institution with respect to all challenged claims (including claim 21) in the '889 IPR, because the petition failed to

establish that the "Standard" (in fact, it was actually a confidential draft of the standard) was a "printed publication" and, thus, prior art. *Samsung Electronics Col. LTD. et al. v. Rembrandt Wireless Technologies, LP.*, IPR2014-00889, Paper No. 8 at 7-11 (PTAB December 10, 2014).

- On December 23, 2014, Samsung filed a "Request for Rehearing" in the '892 IPR, arguing that the PTAB erred in deciding not to institute with respect to claim 21 based on Boer and the APA. *Samsung Electronics Col. LTD. et al.*, IPR2014-00892, Paper No. 14 (December 23, 2014). There, Samsung rehashed its prior argument that the APA taught placing address information in the header, and that it would have been obvious to move Boer's address information to the header based on the APA. *Id.* at 8-10.
- On January 9, 2015, while its Request for Rehearing was still being considered by the PTAB, Samsung filed yet a *seventh* IPR directed to the '228 Patent (*Samsung Electronics Col. LTD. et al. v. Rembrandt Wireless Technologies, LP.*, IPR2015-00555, Paper No. 1 (January 9, 2015) ("'555 Pet.")), challenging claim 21 as obvious based on Boer, the APA and Siwiak. *Id.* at 15-57. Samsung argued that Boer and the APA taught all of the limitations of claim 21 and that Siwiak, which showed address information in the packet header, provided a motivation for placing address information in the header, namely, allowing the receiving modem to avoid demodulation of packet payloads not addressed to the modem. *Id.* at 21-22.

- On January 27, 2015, the PTAB denied the Request for Rehearing in the '892 IPR. *Samsung Electronics Col. LTD. et al.*, IPR2014-00892, Paper No. 17 (January 27, 2015).
- On June 19, 2015, the PTAB denied institution of the '555 IPR (*Samsung Electronics Col. LTD. et al.*, IPR2015-00555, Paper No. 20 at 7-9 (PTAB June 19, 2015)) because the issues it raised were *substantially the same* as those raised in the previous failed challenges:

> The difference between what Petitioner presents in this proceeding and what Petitioner presented in IPR '892 with respect to claim 21 of the '228 patent is that Petitioner now offers Siwiak as support for the asserted obviousness of placing address data in a message header as taught by Boer. … On this record, we exercise our discretion and "reject the petition" because "the same or substantially the same prior art" previously was "presented to the Office" in the IPR '892 proceeding. *Id.* at 7-8.

Given this extensive history of Samsung's failed challenges to claim 21 based on Boer and the APA and the substantial identity of the teachings relied on in Siwiak and Yamano (*see supra* at § II.A.4.; Exhibit B; Akl, at ¶¶ 56), it would be futile to even allege that the Boer Rejection presents a substantial new question. In any event, the Boer Rejection must be withdrawn because neither the Order, nor the Office Action, made the required threshold determination that the Boer Rejection presented a substantial new question of patentability.

2. The Office Has Not Alleged A Substantial New Question of Patentability For Its Anticipation Rejection Over Snell

Again, as a jurisdictional matter, *ex parte* reexamination based on the Snell Anticipation Rejection can only proceed if the Office *first* makes the threshold determination that the grounds relied on to support the Snell Rejection present an SNQ. *See, e.g., In re Recreative Technologies* and other cases (quoted above).

The Snell Anticipation Rejection of claim 21 is based on a claim construction that affords no patentable weight to the majority of the limitations of claim 21. *See* May 3 Office Action, at 5 ("as long as a transceiver can transmit messages, it will meet the limitations of claim 21 ...."). Given the clear conflict between the "no patentable weight" construction now advanced in the Office Action, and the construction applied by the PTAB, it is not surprising that the Office has failed to even allege that the Snell Anticipation Rejection presents a substantial new question. Specifically, the PTAB construed claim 21 in a manner that *accorded patentable weight to all the limitations of the claim*. Given that the PTAB *instituted* a trial with respect to independent claim 1, but *denied* institution with respect to dependent claim 21, it necessarily follows that the Board accorded patentable weight to the additional limitation recited in claim 21. Moreover, a fair reading of the PTAB's Institution Decision and Final Written Decision in the '892 IPR demonstrates that *all* of the limitations of base claim 1 were accorded patentable weight by the PTAB. *See* both the '892 Institution Decision and Final Written Decision *passim*. As explained in *Ex parte Hisamitsu Pharaceutical Co., Inc.*, 2014 WL 955762, slip op. at 6 (PTAB 2014), such a "difference of opinion" on claim construction cannot raise a substantial new question:

> While claim construction is a matter of law that is considered de novo and without deference, in our view, this principal does not supersede the limitation on revisiting a specific issue that was previously decided. On the record before us, the scope of the claims as including or excluding pores is simply not a new issue. The Tsubota reference is relied on for the same teachings as in the original prosecution. Only the determination as to the scope of the claims is different. That is, a mere difference in the opinions between the CRU Examiner and the original Examiner on the same question (whether the claims exclude the pores) does not raise a substantial new question ...

In view of the above and the substantial identity of Snell and Boer (*see supra* at § II.A.2; Exhibit B; Akl, at ¶¶ 48-53), it would be futile for the Office to argue that the Snell Anticipation

Rejection presents a substantial new question. In any event, it did not do so. Thus, the Snell Anticipation Rejection must be withdrawn because neither the Order, nor the Office Action, made that required threshold finding.

C. The Office's Determination That Snell in Combination with Yamano and Kamerman Raises Three SNQs Is Contrary To The Record and Congress's Intent, As Is The Office's Failure to Support Two Of Its Rejections with Any SNQ At All, And Thus Requires That This *Ex Parte* Reexamination Be Terminated

Congress intended that the substantial new question determination be judiciously interpreted to prevent cases of abusive tactics and harassment of patentees through reexamination. *In re Swanson*, 540 F.3d 1368, 1380-1381 (Fed. Cir. 2008) (*citing* H. R. Rep. No. 107-120, at 3). Thus, an argument already decided by the Office cannot raise a new question of patentability. *Ex parte Lam Research Corp.*, 2012 WL 1178196, slip at 5 (PTAB 2013) (citing *Swanson*, 540 F.3d at 1380; MPEP § 2242 (no substantial new question of patentability if "the same question of patentability has already been decided as to the claim").

The substantial new question requirement guards against repetition of issues and arguments that have been previously raised and overcome. *Lam,* at 5. Thus, it clearly cannot be met by advancing a previously rejected interpretation of substantially the same teachings to reach a different conclusion as to obviousness. *See Ex parte Muzzy Products Corp.*, 2010 WL 3448876, slip op. at 6 (BPAI 2010). *See also* MPEP § 2242 I.b. ("[T]he same question of patentability may have already been decided by the Office where the examiner finds the additional (newly provided) prior art patents or printed publications are merely cumulative to similar prior art already fully considered by the Office in an earlier concluded examination or review of the claim."). Where, as here, a previously considered prior art *teaching* is being

considered again for the same or similar purpose in reexamination, no substantial new question exists. *See Muzzy*, slip op. at 6.

For the reasons given above, Snell combined with Yamano and Kamerman is cumulative of previously considered APA, Boer, and Siwiak and is being considered in the same way that the APA, Boer, and Siwiak were considered in a number of IPRs, including the '892 and '555 IPRs challenging, *inter alia*, claim 21 of the '228 Patent. Thus, nothing in the combination of art relied on by the Office to support its three SNQs is sufficient to do so (even assuming incorporation by reference of Harris AN9614). *See* Akl, at ¶¶ 41-70.

MPEP §2246 *requires* the Office to articulate *in its Order* its rationale supporting each SNQ. As stated in MPEP §2246:

> In the examiner's decision, the examiner must identify at least one substantial new question of patentability and explain how the prior art patents and/or printed publications raise such a question. The examiner should indicate, insofar as possible, his or her initial position on all the issues identified in the request or by the requester (without rejecting claims) so that comment thereon may be received in the patent owner's statement and in the requester's reply. (emphasis added).

In the present case, the Office attempted to address this requirement without comparing the allegedly "new" art with that previously presented to and considered by the PTAB and that previously considered by Examiner Ha during examination of the '228 application and its parent '580 application. Because the art identified in the three alleged SNQs is, in fact, cumulative to that previously considered and is being presented for the same purpose, even if the Office were to try to bolster its reasoning in an attempt to support an SNQ, such as exercise would be futile. Where, as here, it is clear that the reasoning set forth in the reexamination Order is inadequate to support even a single SNQ, the reexamination proceedings should be terminated.

In this respect, the Federal Circuit's decision in *In re Recreative Technologies Corp.*, 83 F.3d 1394 (Fed. Cir. 1996) is controlling. In that case, the Board attempted to "cure" a reexamination that should not have been granted in the first place by introducing a "new issue" at a later stage of the proceedings. In reversing the Board and finding that the reexamination should have been terminated, the Federal Circuit explained:

> … this procedure by the Board can not overcome the fact that reexamination should not have been granted …. Thus even on the Commissioner's argument that a rejection on the same reference but styled as lack of novelty instead of obviousness is a "new ground"—an interesting question that we do not reach—the requirement of § 303 was not met. It would eviscerate the statutory safeguard to permit the Board to cure an improper reexamination with the creation of a new issue at the appellate stage of the reexamination proceeding.

Id. at 1398-99. As was the case in *Recreative Technologies*, the Office in the present reexamination cannot "cure" its deficient reasoning set forth in its Order by setting forth a "new" explanation later in the process as to how the references raise SNQs, as doing so would deprive Patent Owner of its due process right to fully address such action. Likewise, it cannot later provide an SNQ to support the Boer Rejection or the Snell Anticipation Rejection. Again, such an approach would deprive Patent Owner of its due process right to fully address such action. Under such circumstances, where no SNQ exists or no SNQ was even identified to support a rejection, the Office lacks jurisdiction to proceed, and the present reexamination proceedings should be terminated as they were improperly ordered.

III. The Multiple Alleged Reasonable Claim Constructions Compel a Finding of Indefiniteness and Termination of the Reexamination Proceeding

The Office Action sets forth *multiple* Broadest "Reasonable" Interpretations of claim 21[15] reasoning that:

> Examiners are unaware of any requirement that there should be a single Broadest Reasonable Interpretation (BRI). If Patent Owner is aware of any statute, rules, or case law requiring such, examiners request Patent Owner present such authority in the next response. Office Action, at 10, n. 4.

While there may be no rule precluding an Examiner from finding multiple reasonable interpretations of a claim, the rules are clear that in such a situation reexamination proceedings must be terminated, as doing so would necessarily be based on a speculative assumption as to the meaning of the claims.

If, as the Examiner has found, a claim is susceptible to more than one broadest reasonable interpretation, then it is indefinite. *See, e.g.*, MPEP 2173.01 I (a claim is indefinite "if the language of [the] claim, given its broadest reasonable interpretation, is such that a person of ordinary skill in the relevant art would read it with *more than one reasonable interpretation*" (emphasis added)). *See also Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2123 (U.S. 2014) ("A patent is invalid for indefiniteness if its claims, read in light of the patent's specification and prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.").

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[15] First, the Office construes claim 21 as a "single means" claim. Office Action at 5 ("[t]he limitations of claim 21 including the limitations of claim 1 comprise a single means"). Second, the Office construes the claim by ignoring most of the claim limitations on the theory that they are intended uses and do not need to be given patentable weight and applies this construction in the Anticipation Rejection under 35 U.S.C. § 102(e). *See id.* at 7. Third, the Office provides a construction that considers limitations ignored in the first construction and applies this second construction in at least Rejections B-D. *Id.* at 10 ("In [Rejections B-D] under 35 USC §103, all limitations are interpreted under a broadest reasonable interpretation, see section IV.C. above.").

Where, as here, the Office's view is that claims are susceptible to more than one reasonable interpretation[16] and therefore indefinite, reexamination on the basis of patents and printed publications cannot proceed. As the Board explained in *CBS Interactive Inc. et al., v. Helferich Patent Licensing, LLC*, 2016 WL 7494542 (PTAB 2016):

> …the Board will not address the question of whether any original claim in an *inter partes* reexamination is indefinite under 35 U.S.C. § 112, ¶ 2. … Nonetheless, our reviewing court has also instructed the Board not to speculate as to the meaning of claim terms when reviewing the reasonableness of an obviousness rejection. *See In re Steele,* 305 F.2d at 862 (holding that the Examiner and the Board were wrong in relying on what, at best, were speculative assumptions as to the meaning of the claims and in basing a rejection under 35 U.S.C. § 103 thereon).
>
> For the reasons set forth above, we conclude that undue speculation is required to determine the meaning, as well as the interrelationships among, the claim terms "content provider, "content notification system," and internet-accessible storage system." *Because each of the claims on appeal contain these terms, the Examiner could not have reasonably determined the metes and bounds of the claims undergoing reexamination. As such, the Examiner erred in adopting each of the proposed obviousness rejections because doing so necessarily entailed engaging in undue speculation*.
>
> For the reasons set forth above, we do not sustain any of the adopted obviousness rejections of claims 1-78.

Id. (emphasis added). *See also Google, Inc. v. Function Media*, L.L.C., 2012 WL 1891077 (BPAI 2012) ("[I]n the present case, it would be pointless to enter a new ground of rejection on the basis of indefiniteness because such rejections are beyond the scope of reexamination for issued claims … Yet, without a discernable claim construction, an anticipation or obviousness analysis cannot be performed …. Consequently, we find that proper disposition of this appeal is

[16] Rembrandt disputes that claim 21 of the '228 Patent is susceptible to more than one reasonable interpretation, or indefinite. The correct claim construction was reached by the district court in *Rembrandt Wireless Technologies, LP, v. Samsung Electronics Co., Ltd.*, 2014 WL 3385125 (E.D. Texas 2014), and affirmed on appeal by the Federal Circuit in *Rembrandt Wireless Technologies, LP, v. Samsung Electronics Co., Ltd.*, 2017 WL 1370089 (Fed. Cir. 2017).

to reverse the speculative prior art rejections of record .... [W]e understand this disposition leaves a critical issue with the claims unresolved ..."); *Ex parte Webexchange Inc.*, 2014 WL 2946395 (PTAB 2014) ("[R]ejections based on 35 U.S.C. § 112 are beyond the scope of a reexamination proceeding for originally issued patent claims....Thus, we are constrained from presenting a rejection under 35 U.S.C. § 112, second paragraph for these claims. Yet, we reverse the rejections of independent claim 1 and its dependent claims, because applying prior art to such claims would be speculative"); *Superior Communications, Inc., v. Voltstar Technologies, Inc.*, 2014 WL 5474770 (PTAB 2014) ("[R]ejections based on 35 U.S.C. § 112 are beyond the scope of a reexamination proceeding for originally issued patent claims. ... Thus, we are constrained from presenting a rejection under 35 U.S.C. § 112, ¶ 2, for these claims. Accordingly, we do not sustain the Examiner's decision to reject independent claims 1 and 10, as well as their dependent claims, claims 5-8 and 11-16, because applying prior art to such claims would be unduly speculative.").

Similarly, in the context of *inter partes* review proceedings, the Board has explained:

> If the scope of the claims cannot be determined without speculation, the differences between the claimed invention and the prior art cannot be ascertained. The Board has previously terminated proceedings or denied institution when the scope of the claims being challenged could not be determined without speculation. Several such decisions arise in the context of means-plus-function claim terms for which supporting structure or a specific algorithm for performing the function was not identified in the specification. However, Board decisions have applied the same reasoning to other types of claim terms whose metes and bounds are unclear.

Globus Medical v. Flexuspine, IPR2015-01830, paper 11, at 9-10 (PTAB 2016) (citations omitted). In refusing to move forward with a patentability analysis with respect to prior art, the Board in *Globus Medical* reiterated that "prior art grounds of unpatentability must fall, *pro*

forma, because they [would be] based on speculative assumption as to the meaning of the claims." IPR2015-01830, paper 11, at 15. *See also Samsung Display et al. v. Gold Charm Ltd.*, IPR2015-01452, paper 12, at p.13 (PTAB 2015) (denying institution) ("the prior art grounds of unpatentability must fall, *pro forma*, because they [would be] based on speculative assumption as to the meaning of the claims." … Therefore, we decline to institute an *inter partes* review of claims 1–14"); *Apple Inc., v. Immersion Corp.*, IPR2016-01372, paper 7, at 20-21 (PTAB 2017) (denying institution) ("Because we are unable to determine the scope and meaning of claims 12-18 … we cannot conduct the necessary factual inquiry for determining obviousness …. Accordingly, we decline to institute an *inter partes* review of claims 12-18"); *Facebook, Inc., v. TLI Communications, LLC.,* IPR2014-00566, paper 14, at 13 (PTAB 2014)(denying institution) ("[B]ecause the claims are not amenable to construction, we are unable to conclude that there is a reasonable likelihood that Petitioner would prevail in its challenge…"); *American Honda Motor Co., v. Signal IP, Inc.,* 2015 WL 5818259 (PTAB 2015) (denying institution) ("In the absence of a sufficient demonstration of the scope of the claimed invention, we do not attempt to apply claims 1 and 7 to the asserted prior art.").

Simply put, the Office has consistently terminated similar proceedings where it believed that the scope of claims being challenged could not be determined without speculation. Given the Office's belief that claim 21 is susceptible to more than one reasonable construction (which would render the claim indefinite), the Office must follow the same course here and terminate this reexamination proceeding.

Similarly, the Office should terminate this reexamination proceeding based on it's position that "[t]he limitations of claim 21 including the limitations of claim 1 comprise a single

means." May 3 Office Action at 5. A "single means" claim is *indefinite* because it covers *every conceivable means* for achieving the desired result. *Ex parte David Chater-Lea*, 2010 WL 665664 (BPAI 2010). Given the Office's view is that claim 21 is indefinite, no prior art rejection can be issued (and hence reexamination on the basis of patents and printed publications cannot proceed), as doing so would necessarily be based on a speculative assumption as to the meaning of the claims.

IV. Broadest Reasonable Interpretation of Claim 21

The Office has found that "[t]he scope of claim 21 is the *same* regardless of whether claim terms are interpreted under BRI or *Phillips* standard." May 3 Office Action at 6. In *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, No. 16-1729, at 7 (Fed. Cir. April 17, 2017) (rehearing denied) (emphasis added), the Federal Circuit construed claim 21 under *Phillips* in a manner that is inconsistent with each of the multiple claim constructions advanced in the Office Action. The Office Action does not acknowledge the Federal Circuit's decision, which must control where claim scope is "the *same* regardless of whether claim terms are interpreted under BRI or *Phillips* standard," as the Office allages here. May 3 Office Action at 6.

During reexamination of an unexpired patent, the Office may not construe claims so broadly that its constructions are unreasonable under general claim construction principles. *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015). Even under the broadest reasonable interpretation, the Office's construction "cannot be divorced from the specification and the record evidence." *Id.* A construction that is "unreasonably broad" and which does not "reasonably reflect the plain language and disclosure" will not pass muster. *Id.*

To support its § 102(e) rejection, the Office relies on a claim construction that ignores substantially all of the claim limitations, is contrary to what was done by the PTAB in the multiple IPRs (now concluded favorably to Patent Owner with respect to claim 21), and is contrary to the district court construction (now affirmed by the Federal Circuit). Neither the PTAB nor the court ignored the master/slave limitations in the claims, and neither determined that the claims were "single means" claims, as now alleged by the Office. *See* May 3 Office Action at 5-8. The Office does not explain why its positions are different than those of the PTAB, the district court, or the Federal Circuit, contrary to MPEP § 2258(I)(G) (quoted *infra* at note 17).

As a specific example regarding the Office's failure to properly analyze the meaning of the claim terms, the Office concluded that it was "unable to locate any lexicographic definitions … with reasonable clarity, deliberateness, and precision." May 3 Office Action at 4. In fact, the district court drew just the opposite conclusion with respect to the meaning of "modulation method [] of a different type" based on the prosecution history. The Federal Circuit affirmed the district court's claim construction as follows:

> Samsung disputes the district court's construction of "modulation method [] of a different type." The district court construed this limitation as "different families of modulation techniques, such as the FSK [frequency-shift keying] family of modulation methods and the QAM [quadrature amplitude modulation] family of modulation methods." Claim Construction Order, 2014 WL 3385125, at *15.
>
> ….
>
> Here, *the clearest statement in the intrinsic record regarding the meaning of the "different types" limitation is the descriptive statement the applicant made to the examiner when he inserted the limitation into the claims*.

Rembrandt Wireless Tech. v. Samsung Elec. Co., No. 16-1729, slip op. at 7 (Fed. Cir. April 17, 2017) (rehearing denied) (emphasis added). In view of the Federal Circuit's determination, and the Office's finding that claim scope is "the *same* regardless of whether claim terms are interpreted under BRI or *Phillips* standard," Office Action at 6, the Office's present claim construction in this reexamination cannot stand. *See* Akl, at ¶¶ 18-27.

A. According No Patentable Weight to Most of The Claim Limitations is an Unreasonable Claim Construction

Without citation to any authority, the Office asserts that "all of the limitations after 'configured to' are intended, and therefore are not given patentable weight." May 3 Office Action at 7. *See also id.* at 5 ("The clauses 'configured to communicate…' and 'configured to transmit…' are an intended use."), 7 ("The clauses 'configured to communicate…' and 'configured to transmit…' are an intended use of the transceiver."). Based on this analysis, the Office goes on to assert that claim 21 is met by *any* transceiver that "*can transmit messages*." *Id.* at 5, 7 (emphasis added). Simply put, this claim construction is completely divorced from the specification, and unreasonably broad. It is also completely at odds with the PTAB's institution decision in IPR2014-00892, which accorded *all* limitations of the claims patentable weight, and found that the additional limitations in dependent claim 21 were decisive in distinguishing that claim from the cited references. The Office fails to even acknowledge the PTAB's findings that accord all limitations patentable weight, let alone supply reasoning to support a different interpretation.[17] *See* May 3 Office Action *passim*.

[17] The May 3 Office Action also is inconsistent with the district court's construction which, like the PTAB's, accorded patentable weight to all the claim limitations. *See Rembrandt Wireless Tech. v. Samsung Elec. Co.*, No. 2016-1729 (Fed. Cir. April 17, 2017); Claim Construction Order in *Rembrandt Wireless Tech. v. Samsung Elec. Co.* (Exhibit C). *See also* MPEP §

The failure to accord patentable weight to virtually all of the claim limitations on the ground that they are "intended use," is also divorced from numerous decisions from the Office interpreting the meaning of "*configured to*" in similar claims. In this regard, claim 21 of the '228 Patent specifies as follows:

> A master communication device *configured to* communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device, the master communication device comprising:
>
> a master transceiver *configured to* transmit a first message over a communication medium from the master transceiver to the one or more slave transceivers, wherein the first message comprises … ; and
>
> said master transceiver *configured to* transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers wherein the second message comprises … . (Emphasis added).

The law is clear and well settled that where, as here, the term "configured to" is used to describe programming or structure required to perform a specified function, it cannot be ignored by the Examiner when applying the prior art. In *Ex parte Hosoito*, faced with similar claim language, the Board reasoned as follows:

> … the Examiner repeatedly dismisses all of the claim limitations that begin with "*configured to*" as "intended use and therefore *carries no patentable weight*." We disagree. To the extent that the Examiner's position is that these claims recite only general purpose control unit(s) as the claimed control units, determining unit, etc., *the Examiner's position is untenable*. Although it is well established that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function, in order to satisfy the functional limitations in an

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2258(I)(G). ("Where there is related litigation and a federal court has made a judicial interpretation of a disputed claim term, the examiner in treating the disputed claim term should set forth his or her reasoning by, for example, acknowledging the judicial interpretation and assessing whether the judicial interpretation is consistent with the broadest reasonable construction of the term. Moreover, if adopting a different claim construction than the judicial interpretation, the examiner should supply reasoning to support the different interpretation.").

> apparatus claim, however, the prior art apparatus must be capable of performing the claimed function. As such, to be capable of performing the functional limitations in claim 1, *the control units or comparable structure must possess the necessary structure, that is, programming, to function as claimed*.

2012 WL 889723, slip op. at 3 (BPAI 2012) (citing *In re Schreiber*, 128 F.3d 1473, 1477-78 (Fed. Cir. 1997) (emphasis added) (citations omitted). *See also Ex parte Hider*, 2016 WL 6216592, slip op at 3 (PTAB 2016) (rejecting Examiner's position that limitations reciting structure "*configured to*" send data are non-limiting statements of intended use); *Ex parte Heyman*, 2016 WL 7487206, slip op. at 5 (PTAB 2016) (citing *Typhoon Touch Techs. v. Dell, Inc.*, 659 F.3d 1376, 1380 (Fed. Cir. 2011) (Board rejecting Examiner's position that functional recitations using "for," "*configured to*" or "operable" are intended use language entitled to no patentable weight); *Ex parte Eckardt*, 2016 WL 827260, slip op. at 2 (PTAB 2016) (citing *K-2 Corp. v. Solomon SA*, 191 F.3d 1356, 1363 (Fed. Cir. 1999) (Board rejecting Examiner's position "that the '*configured to*' language in the claim is a recitation of intended use that does not patentably distinguish the claimed invention from the prior art").

In *Ex parte Black*, 2007 WL 4178434 (BPAI 2007), the Board explained why limitations describing a device as "*configured to*" perform certain functions cannot be ignored. Specifically, in rejecting the Examiner's finding that such limitations could be dismissed as "intended use," the Board stated:

> The Examiner alleges that Santini '838 teaches all of the limitations of claim 8. The Examiner errs, however, in reading "configured to" as "capable of," i.e., the Examiner reads it as merely being limited to intended use. Specifically, according to the Examiner:
>
> > With respect to the recitations … "configured to release", "configured to activate" and "configured to sense" these recitations are intended use of the circuit … If the prior art structure is capable of

> performing the intended use, then it meets the claim. Therefore, Santini … reads on the instantly recited claims.
>
> "Configure," however, is defined as to "design, arrange, set up, or shape with a view to specific applications or uses." That definition is consistent with the case law cited by Appellants to support their assertion that "a processor that is programmed to provide a particular function is structurally different than other processor circuits that are programmed to provide a different function."

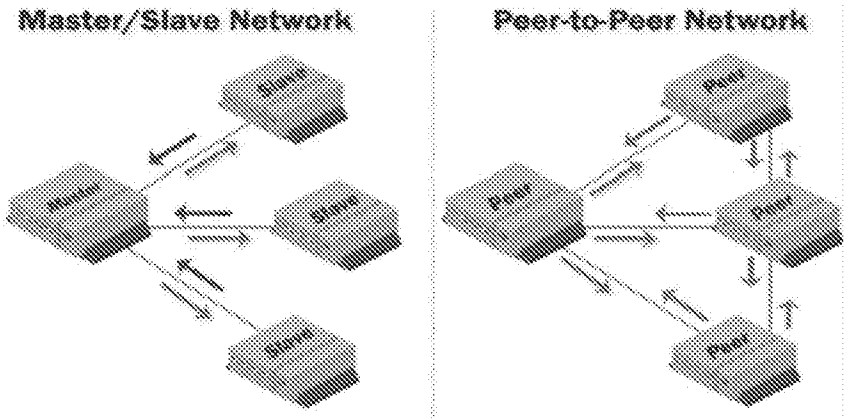
Ex parte Black, 2007 WL 4178434, slip op. at 2 (BPAI 2007). *See also Ex parte Kumar*, 2015 WL 729625, slip op. at 3 (PTAB 2015) (rejecting Examiner's reasoning that "*configured to*" expressions in the claims could be met by any device "capable of being adapted to provide the recited function," noting that a "programmed machine is structurally different from a machine without that program"); *Ex parte Hahn-Carlson*, 2013 WL 5402246, slip op. at 1 (PTAB 2013) (rejecting Examiner's determination that "*configured and arranged to*" language should not be given patentable weight because it "imparts functional characteristics to the underlying processor structure, and thus are not intended use."); *Ex parte Stahl*, 2012 WL 177838, slip op. at 2 (BPAI 2012) ("A computing unit that is *configured to* perform the steps recited in claim 17 is structurally different from a computing unit that is not configured or otherwise set up to perform the recited steps. Thus, the claim language at issue is not merely an intended use but rather imparts structure to the claimed apparatus."); *Ex parte Hodsdon*, 2009 WL 383716, slip op. at 2 (BPAI 2009) (rejecting Examiner's finding that a computer "*configured to*" perform a certain function is merely a statement of intended use which need not be given patentable weight).

Simply put, the Office's position that almost all of the limitations of claim 21 can be ignored as "intended use," and that the claims are met by any transceiver that can transmit messages, is contrary to the law and at odds with the analysis of the PTAB in IPR2014-00892 (and that of the district court in *Rembrandt Wireless Tech. v. Samsung Elec. Co*). The limitations

of the challenged claims that have been dismissed as "intended use" cannot be ignored. In addition, such limitations can only be met by prior art that is programmed or otherwise set up to perform the functions specified by such limitations.

B. The Broadest Reasonable Interpretation of "Master/Slave"

The claim term "master/slave" should be given its plain and ordinary meaning as one skilled in the art would have understood it in the context of the '228 Patent. In the field of data communications, the electrical devices can be arranged in various network configurations. The '228 Patent and its claims are directed to a network historically-referred to in the computer industry as a master/slave network because one centralized "master" device controls all network communications with the other subordinate "slave" or "tributary" devices. The slave devices do not directly communicate with one another, but instead only communicate with the master. This is very different from a peer-to-peer network, in which network control is distributed amongst the devices in the network and each device communicates directly with its peers:



Persons of ordinary skill at the relevant time would have recognized that the plain and ordinary meaning of a "master" is "a device which controls all communications with other devices (*i.e.*, slaves) in a network" and the plain and ordinary meaning of a "slave" is "a device

whose network communications are controlled by a master." Akl, at ¶ 21. That is the way "master/slave" is used in the specification of the '228 Patent. *See* Akl, at ¶ 22. For example, the device disclosed in the '228 Patent includes "[a] master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device." '228 Patent at 10:18-23. "[A] master controls the initiation of its own transmission to the tribs and permits transmission from a trib only when that trib has been selected." *Id.* at 4:31-33. Similarly, the Summary of the Invention section of the '228 Patent states that "[c]ommunication from the one or more *slave* transceivers may be *in response to a communication from the master* to at least one of the one or more slave transceivers." '228 Patent at 2:31-34 (emphasis added).

This definition is supported by numerous technical sources. For example, the IEEE Wireless Dictionary states:

> "master: In the context of wireless protocols, this refers to a device that controls the operation of a network. …"
>
> "slave: In the context of wireless protocols, a device that is dependent on another device for control, usually called the master. …"

IEEE Wireless Dictionary at 55, 80; *see also, e.g.*, Comprehensive Dictionary of Electrical Engineering (1999) at 397 ("master: the system component responsible for controlling a number of others (called slaves)."); Modern Dictionary of Electronics (1997) at 932 ("slave: a component in a system that does not act independently, but only under the control of other similar components."). Akl, at ¶ 23.

Understanding the claimed master/slave configuration is key to understanding the problem Gordon Bremer identified and solved. The Summary section of the '228 Patent states:

> The present invention disclosed herein includes methods and systems for communication of data according to a communications method in which a *master* transceiver communicates with one or more slave transceivers according to a *master/slave relationship*. Communication from the one or more *slave* transceivers may be in response to a communication from the master to at least one of the one or more *slave* transceivers. Example communication methods may include transmitting at least a first message, which may be low data rate message, of a plurality of data messages. The plurality of data messages may be transmitted over a communication medium from the *master* transceiver to the one or more *slave* transceivers. … The first message may include first message address data that may be indicative of an identity of one of the one or more *slave* transceivers as an intended destination of the second information. Example communication methods may include transmitting a second message, which may be a high data rate message, of the plurality of data messages. … The second message may comprise the fourth information … The fourth information may be intended for a single *slave* transceiver of the one or more *slave* transceivers. The higher data rate data may be transmitted at a higher data rate than the low data rate application data. The second message may indicate an identity of the single *slave* transceiver as being an intended destination of the fourth information using second message address data included in the second message.

'228 Patent at 2:27-3:6 (emphasis added). Indeed, the '228 Patent uses the term "master" 150 times, the term "slave" 64 times, and the term "trib" 90 times. Further, the master/slave configuration is explicitly recited in claim 21. For example, claim 1 of the '228 Patent, from which claim 21 depends, recites "[a] *master* communication device configured to communicate with one or more slave transceivers according to a *master/slave relationship* in which a *slave* communication from a *slave* device to the master communication device occurs in response to a *master* communication from the *master* communication device to the *slave* device." '228 Patent at 10:18-23 (emphasis added). Persons of ordinary skill would have recognized from the above disclosures that the claimed master/slave configuration is an important part of claim 21. Akl, at ¶ 25.

C. The Federal Circuit has Determined that the Prosecution History of the '228 Patent is Intrinsic Evidence that Unambiguously Defines Modulation Methods of "A Different Type" to Mean Different Families of Modulation Methods

In *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, No. 2016-1729 (Fed. Cir. April 17, 2017), the Federal Circuit analyzed the prosecution history of the '228 Patent, which includes the prosecution history of parent U.S. Patent No. 8,023,580 ("the '580 Patent"), and confirmed that it includes an *unambiguous* statement that defines "different types of modulation methods" as "different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods." Slip op. at 9. The Federal Circuit reasoned as follows:

> During prosecution of the '580 parent patent, the applicant inserted the "different types" limitation into its claims after the examiner had already issued a notice of allowance. In the applicant's contemporaneous remarks to the examiner, he indicated that he inserted the limitation into the independent claims to "more precisely claim the subject matter." The applicant explained:
>
> > Applicant has further amended [its] claims . . . with additional recitations to more precisely claim the subject matter. For example, the language of independent claim 1 has been clarified to refer to two types of modulation methods, *i.e., different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods.*
>
> … Samsung contends that the plain claim language requires only that the different types of modulation methods be "incompatible" with one another. According to Samsung, the claims cover devices that modulate signals using the same family of modulation methods (for example, FSK modulation), but operating with different amplitudes between modems. Samsung asserts that, because modulating using different amplitudes makes the devices incompatible, this arrangement embodies "different types" of modulation.
>
> We disagree with Samsung and adopt the construction entered by the district court. Here, *the **clearest** statement in the intrinsic record regarding the meaning of the "different types" limitation is the descriptive statement the applicant made to the examiner when he inserted the limitation into the claims.*

> *Samsung's arguments to the contrary do not diminish this **unambiguous** statement in the prosecution history.*
>
> For example, Samsung avers that we should not give the prosecution history statement definitional weight because it uses the phrase "i.e.," which Samsung argues introduces an exemplary item in a set. A patentee's use of "i.e.," in the intrinsic record, however, is often definitional. Indeed, the term "i.e." is Latin for *id est*, which means "that is." … *The context here strongly supports the conclusion that Rembrandt used "i.e." to define the "different types" limitation* … .
>
> * * *
>
> We therefore agree with the construction entered by the district court that the term "modulation method [] of a different type" means "different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods."

Slip op. at 6-9 (emphasis added; citations omitted).

In the May 3 Office Action, the Office does not acknowledge (let alone analyze) applicant's unambiguous remarks in the prosecution history defining "different types" of modulation methods, or the Federal Circuit's opinion. Instead, the Office simply states:

> After careful review of the original specification, the *prosecution history*, and unless expressly noted otherwise by the Examiner below,[18] the Examiner finds that she is unable to locate any lexicographic definitions (either express or implied) with *reasonable clarity, deliberateness, and precision*. Because the Examiner is unable to locate any lexicographic definitions with reasonable clarity, deliberateness, and precision, the *Examiner concludes that Applicants are not their own lexicographer*.

May 3 Office Action at 4 (emphasis added).

To the extent the Examiner's conclusion that "Applicants are not their own lexicographer" was based on his belief that applicant's definitional statement in the prosecution history lacked "*reasonable clarity, deliberateness, and precision*," the Examiner's reasoning

[18] No lexicographic definitions were identified later in the May 3 Office Action.

cannot stand, as it is squarely at odds with the Federal Circuit's determination that Rembrandt *unambiguously defined* the "different types" limitation in the prosecution history. As explained below, and in light of the Federal Circuit's opinion, the *only reasonable* construction of "different types" is the one Rembrandt explicitly set forth in the prosecution history. Akl, at ¶ 20.

1. The Prosecution History Defined "Different Types"

The original claims of the '228 Patent required a first modulation method that was "different" from a second modulation method, but did not require "different **types**" of modulation methods. For example, claim 1 required in material part:

> 1. A communication system, comprising:
> a transmitter capable of transmitting at least two modulation methods, wherein the at least two modulation methods comprise a first modulation method and a second modulation, wherein the second method is ***different*** than the first modulation method, …

U.S. Application Serial No. 13/198,568, Claim 1 (emphasis added). After a first Office Action that included only non-statutory obviousness-type double patenting rejections, the original claims of the '228 Patent were canceled and replaced with claims that required that "the second modulation method be[] of a ***different type*** than the first modulation method." October 19, 2012 Reply at 6-7. Claim 21 of the '228 Patent includes this requirement.

The original claims of the parent '580 Patent also required a first modulation method that was "different" from a second modulation method, but did not require "different **types**" of modulation methods. *See* U.S. Application Serial No. 12/543,910, Claim 1. In the first Office Action during the prosecution of the '580 Patent, a number of claims were allowed, including Claim 1 and its dependent claims. A significant number of other claims were rejected under 35

U.S.C. §§ 102 and 103 based on U.S. Patent No. 5,537,398 to Siwiak ("Siwiak"). Siwiak disclosed a messaging system for a plurality of geographically distributed transmitters designed to transmit in a first modulation format, such as FM (frequency modulation) during a first transmission portion, and in a second modulation format, such as OFDM (orthogonal frequency division multiplexing), during a second transmission portion. *See* Siwiak Abstract. In response, many of the claims were amended to further distance them from Siwiak. The amendments to claim 1 (shown below) are illustrative of the amendments made to further distance the claims from Siwiak:

> 1. (Currently Amended) A communication ~~system~~ device capable of communicating according to a **master/slave** relationship in which a slave communication from a slave to a master occurs in response to a master communication from the **master to the slave**, the device comprising:
>
> a transceiver, in the role of the master according to the master/slave relationship, for sending at least ~~transmitter capable of transmitting~~ transmissions modulated using at least two **types of** modulation methods, wherein the at least two **types of** modulation methods comprise a first modulation method and a second modulation method, wherein the second modulation method is of a different **type** than the first modulation method, ~~and~~ wherein the ~~first transceiver is configured to transmit~~ transmissions comprise groups of transmission sequences, each group of said groups of transmission sequences structured with a first portion and a payload portion wherein first information in **the first portion indicates at least which of the first modulation method and the second modulation method is used for modulating second information in the payload portion**, wherein at least one group of transmission sequences is addressed for an intended destination of the payload portion, and wherein for the at least one group of transmission sequences:
>
> the first information for said at least one group of transmission sequences comprises a first sequence, in the first portion and modulated according to the first modulation method, wherein the first sequence ~~that~~ indicates an impending change from the first modulation method to the second modulation method, and
>
> the second information for said at least one group of transmission sequences comprises a second sequence, ~~in~~ modulated according to the second modulation method, wherein the second sequence is transmitted after the first ~~data~~ sequence.

March 1, 2011 Reply at 2 (emphasis added).

Specifically, the narrowing amendments to claim 1 of the '580 Patent fall into three general categories: (i) the claim was amended to require that the first and second modulation methods were "of different types" of modulation, rather than merely requiring that the modulations were "different;" (ii) the communication system and transceiver were narrowed to require a master/slave relationship; and (iii) the claim was amended to specifically require that the indication of an impending modulation change was located in the first portion of the transmission sequence. Each of these amendments further distinguished the claim from Siwiak. In conjunction with this amendment, the applicant made clear its intention, stating it was adding additional limitations "to more precisely claim the subject matter":

> Applicant thanks Examiner Ha for the indication that claims 1-18, and 37-57 are allowed (office action, p. 7). Applicant has further amended claims 1-2, 9-15, 18, 37-38, and 45-46 with additional recitations to more precisely claim the subject-matter. For example, *the language of independent claim 1 has been clarified to refer to two types of modulation methods, i.e., different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods*.

March 1, 2011 Reply at 20 (emphasis added).

This prosecution history statement from the original prosecution of the parent '580 Patent clearly reflects a narrowing of the claims to require two different types of modulation methods, and further clarified that "different types of modulation methods" refers to "different families of modulation techniques" in a definitional *i.e.* statement. Akl, at ¶ 20.

2. Prosecution History of the Parent '580 Patent regarding the "Different Type" Limitation Applies Equally to the "Different Type" Limitation of the '228 Patent

Similar to the claims of the '580 Patent, claim 21 of the '228 Patent includes the requirement that "the second modulation method be[] of a ***different type*** than the first

modulation method." As the '228 and '580 Patents derive from the same initial application, the prosecution history in the '580 Patent regarding the "different type" limitation applies with equal force to the '228 Patent, which also includes the "different type" limitation. *Gemalto S.A. v. HTC Corp.*, 754 F.3d 1364, 1371 (Fed. Cir. 2014) (quoting *Elkay Manufacturing Co. v. EBCO Manufacturing Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999)) ("when multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation"). *See also Jonsson v. Stanley Works*, 903 F.2d 812, 817-18 (Fed. Cir. 1990)); *Andersen Corp. v. Fiber Composites*, LLC, 474 F.3d 1361, 1368-69 (Fed. Cir. 2007) (construing claim language based on statements made during prosecution of parent application regarding similar claim language); *Biovail Corp. Int'l v. Andrx Pharms., Inc.*, 239 F.3d 1297, 1301-02 (Fed. Cir. 2001) (construing disputed limitation based on statements relating to that limitation during prosecution of a patent deriving priority from the same original application as the patent-in-suit); *Microsoft Corp. v. Multi-Tech Sys. Inc.*, 357 F.3d 1340, 1349 (Fed. Cir. 2004) ("the prosecution history of one patent is relevant to an understanding of the scope of a common term in a second patent stemming from the same parent application"). Accordingly, the "different type" limitation in both the '580 and '228 Patents requires that the first and second modulation techniques be of "different families of modulation techniques." Akl, at ¶ 20.

3. Under the Broadest Reasonable Construction, a Definition Governs If It is Set Forth in the Prosecution History

As the Federal Circuit has explained, as part of its determination of the broadest reasonable construction, "[t]he PTO *should also consult the patent's prosecution history* in proceedings in which the patent has been brought back to the agency for a second review."

Microsoft Corp., 789 F.3d at 1298 (emphasis added); *see also Straight Path IP Group, Inc. v. Snipet EU S.R.O.*, 806 F.3d 1356, 1262 (Fed. Cir. 2015) (stating that prosecution history "is to be consulted even in determining a claim's broadest reasonable interpretation"); *Mylan Pharamceuticals v. Yeda Research & Development*, 2015 WL 5169139 (PTAB 2015) (noting that the Federal Circuit "instructed that we should "also consult the patent's prosecution history in proceedings in which the patent has been brought back to the agency for a second review," and agreeing "with Patent Owner that, during prosecution, the applicant clearly disavowed" certain claim scope); *Google v. Motorola Mobility*, 2105 WL 4976582 (PTAB 2015) ("[s]ince Patent Owner filed its Response and Petitioners filed their Reply, the Federal Circuit has admonished that "[t]he PTO should also consult the patent's prosecution history in proceedings in which the patent has been brought back to the agency for a second review" (citing *Microsoft Corp.*, 789 F.3d at 1298)).

Moreover, under the broadest reasonable construction, where the patentee sets forth a definition in either the specification or prosecution history, that definition governs. *Cisco Systems, Inc. v. AIP Acquisition, LLC*, 2014 WL 2364452, at *6 (PTAB May 27, 2014); *accord Advanced Fiber Techs. Trust v. J&L Fiber Servs.*, 674 F.3d 1365, 1374 (Fed. Cir. 2012). The Federal Circuit has repeatedly held that an inventor can act as his own lexicographer if he uses a "special definition of the term [that] is clearly stated in the patent specification or file history." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

Further, in *Abbott Labs. v. Novopharm Ltd.*, 323 F.3d 1324 (Fed. Cir. 2003), the Federal Circuit held that a patent specification's use of the letters "i.e." (Latin for "that is") in conjunction with a claim term typically connotes a binding definition. *Id.* at 1330. In *Abbott*, the

patentee argued for a definition that was different than it had given in an "i.e." parenthetical in the specification, while the accused infringer argued that the "i.e." definition was controlling. The Court held that "i.e." defined the claim term "co-micronization," which was "in fact explicitly defined at column 1, lines 35-38, of the '726 patent." *Id.*

Given the Federal Circuit's analysis of the prosecution history of the '228 Patent, which includes the prosecution history of the parent '580 Patent, there can no longer be any serious dispute that Rembrandt's use of "i.e." in the prosecution history of the '228 Patent was indeed definitional and clear in equating "different types of modulation methods" with "different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods." *See* Akl, at ¶ 20.

4. A Construction that Equates "Different Modulation Methods" with "Different *Type[s]*" of Modulation Methods Is Unreasonably Broad Because It Reads "Type" Out of the Claims

The claims themselves make it apparent that the inclusion of the word "***type***" was purposeful and must be given meaning. The requirement that the first and second modulation methods constitute "different type[s]" of modulation methods appears in independent claims 1, 22, and 26 of the '228 Patent and in independent claims 1 and 58 of the '580 Patent, but not in other independent claims of the '580 Patent. Independent Claim 40 of the '580 Patent, by way of contrast, requires only "a second modulation method that is different than the first modulation method." Thus, claim 40 of the '580 Patent only specifies that the first modulation method and the second modulation are "different," whereas claims 1, 22, and 26 of the '228 Patent and claims 1 and 59 of the '580 Patent require that the first and second modulation methods be "of

different type[s]." Thus, "different type[s]" must mean something more than that the modulation methods are "different" in some respect. *See* Akl, at ¶ 20.

Moreover, a construction that ignores or gives no weight to claim terms is improper. *PPC Broadband, Inc. v Corning Optical Communications RF, LLC*, 815 F.3d 734, 744 (Fed. Cir. 2016 (claims expressly require that "continuity member … *maintains* a continuous electrical connection," which the Board declined to require in its treatment of claims) (emphasis in original); *In re Buszard*, 504 F.3d 1364, 1367 (Fed. Cir. 2007) (claims specifically require "a *flexible* polyurethane foam reaction mixture" which cannot be broadly construed to cover a rigid foam reaction mixture) (emphasis added). If "different types of modulation methods" is construed the same as "different modulation methods," then the word "type" has not been given any weight. To the extent that the Examiner's "incompatible"[19] construction equates "different types" of modulation methods with modulation methods that are simply "different," it is legally improper.

5. Differences Between the BRI And *Philips* Are Irrelevant to Whether the '228 Prosecution History Unambiguously Defines "Different Types"

The Office has found that the scope of claim 21 is "the *same* regardless of whether claim terms are interpreted under BRI or *Phillips* standard." *See* May 3 Office Action at 6 (emphasis added). Even if this were not the case, any differences between the broadest reasonable

[19] In advancing its "incompatible" construction, the Office has not defined "incompatible" nor explained whether it means anything other than "different." *See* May 3 Office Action at 6. In any case, there is no evidence that the cited references disclose or were addressing incompatible modulation methods, as that term is used in the '228 Patent. In that context, first and second modulation methods are incompatible when one modem using the first method cannot communicate with a second modem using the second method. *See* '228 Patent at 1:47-67. Importantly, "incompatible" as used in the '228 Patent cannot be considered in a vacuum but must be considered in the context in which it is used. Akl, at ¶ 26.

construction ("BRI") standard and the *Philips* standard would not impact the claim construction analysis with respect to "different types." More specifically, where, as here, an applicant unambiguously defines a claim limitation in the intrinsic record, that definition governs *regardless* of whether the claim is being interpreted under the BRI or *Philips*. In addition, it would make no sense for the Office to argue that whether a particular definition is or is not ambiguous differs depending on whether one is applying the BRI or Philips. In this respect, ambiguity (or the lack thereof) is binary: Something either "is" or "is not" ambiguous, there is no in between.

6. The Office's Construction of "Different Types" Cannot Be Justified by the PTAB's Final Written Decision in the '892 IPR

The Office's claim construction cannot be justified based on the PTAB's Final Written decision in the '892 IPR. When the PTAB issued its Final Written Decision in the '892 IPR, it did not have the benefit of the Federal Circuit's decision regarding the construction of the '228 Patent claims. In addition, the PTAB's findings that "Patent Owner's purported 'definition' is *anything but clear or precise*" (Final Decision, at 9) and that "[t]he prosecution history is, *at best, ambiguous*" (Final Decision, at 10) cannot be squared with the Federal Circuit's conclusion that the patent applicant *unambiguously* defined the "different types" limitation in the prosecution history. On the legal question of whether the definition of "different types" set forth in the prosecution history is or is not ambiguous, the PTAB's decision in the '892 IPR has been superseded and effectively has been overruled by the Federal Circuit.

For these reasons, and in light of the Federal Circuit's opinion construing the claims of the '228 Patent, Rembrandt respectfully submits that the *only reasonable* construction of "different types" of modulation methods is the one Rembrandt explicitly set forth in the

prosecution history namely, "different families of modulation techniques, such as the FSK family of modulation methods and the QAM family of modulation methods." *See* Akl, at ¶ 20. Based on this construction alone, all the rejections in the May 3 Office Action must be withdrawn because none of the cited art discloses two different types of modulation methods. *See* the discussion *infra* at §§ VIII.B, X.B, XI.B, XII.B; Akl, at ¶¶ 116-121, 183-185, 189-195, 212-214.

V. Description of the Invention Disclosed and Claimed in the '228 Patent

A. A Brief Explanation of the State of Master/Slave Art Prior to the Invention of the '228 Patent

According to the '228 Patent, prior art master/slave systems could only communicate when all network devices used a single common type of modulation method. *See* '228 Patent at 1:29-67, 3:64-4:5. Thus, if a slave using an additional type of modulation method were added to the network, the new slave could not easily communicate with the master using the different modulation type because it would not be compatible with the common type of modulation method. *Id.* Annotated figure 1 of the '228 Patent shows such a prior art master/slave system, where all devices in the network communicate using only a single common type of modulation method (such as the amplitude modulation used by AM radio), even though some of the devices may be capable of communication via other types of modulation methods:

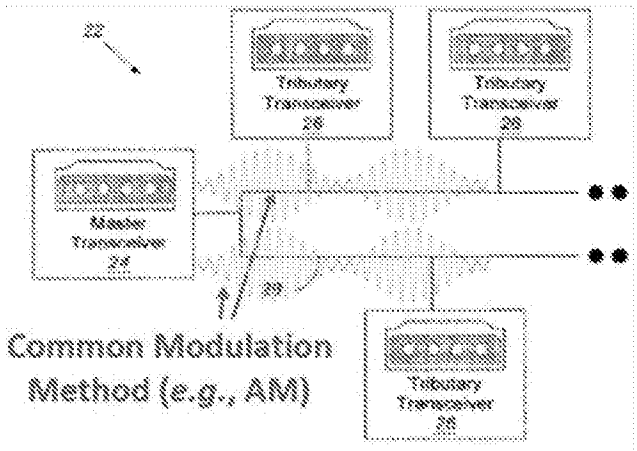


FIG. 1
Prior Art

The state of master/slave art prior to the '228 invention is described in the '228 Patent at col. 3, line 64-col. 5, line 7, with reference to Fig. 2. Akl, at ¶¶ 82-84.

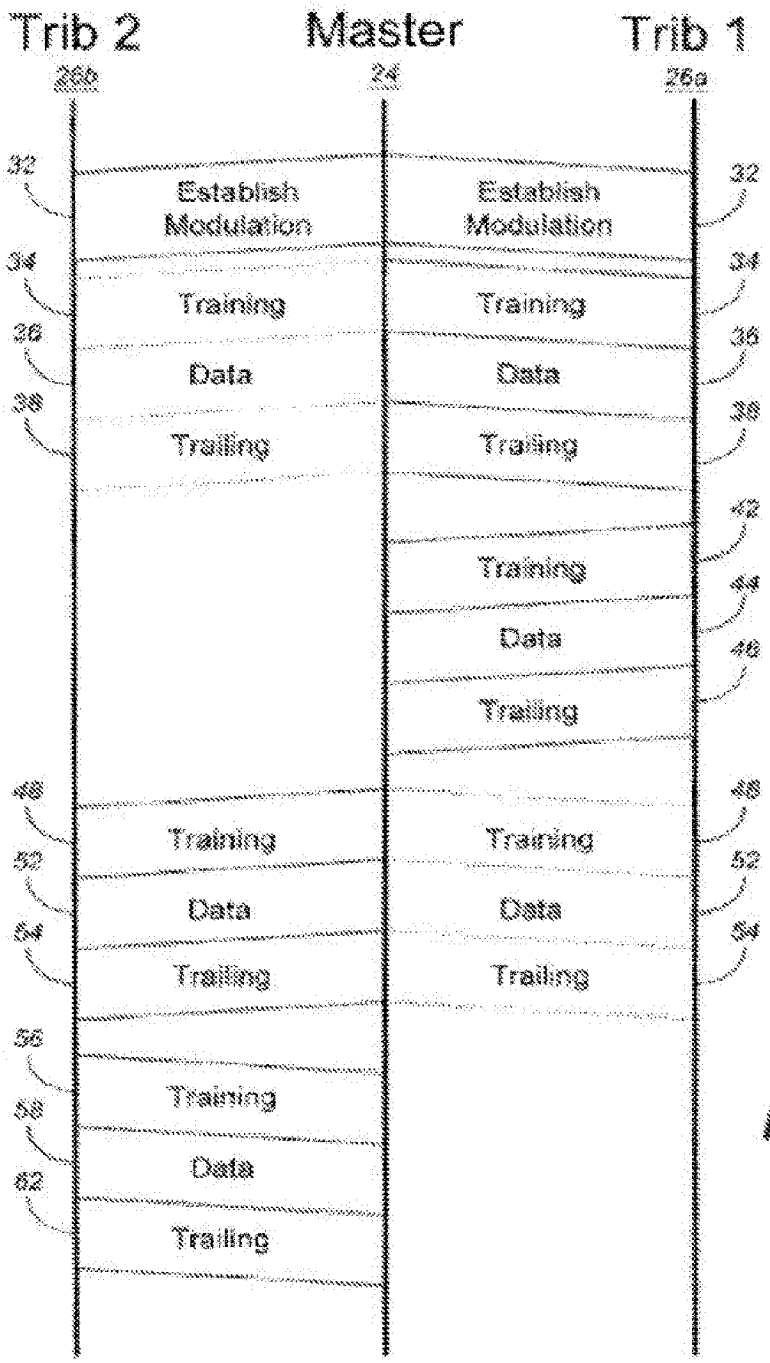


FIG. 2

Briefly, Fig. 2 discloses a polled multipoint master/slave system. At the beginning of a session, the master established a common modulation type for communication with all its slaves

(sequence 32 in Fig. 2). All slaves were identical in that they shared a common modulation with the master. Akl, at ¶ 80.

The master then communicated with its slaves, one at a time, by sending a training sequence with the address of the slave with which it wants to communicate, followed by data, and finally a trailing sequence to end the communication (sequences 34-38 in Fig. 2). A slave could not initiate a communication, but, if the slave were polled by the master, it could respond to the master in a similar fashion (sequences 42-46 in Fig. 2). When the master had completed its communications with the first slave, it could then communicate with a second slave using the same negotiated common modulation (sequences 48-54 in Fig. 2). Akl, at ¶ 81.

B. The Problem Identified in the '228 Patent

Again, with reference to FIG. 2, the problem Gordon Bremer both identifies and addresses in his detailed description is as follows:

> Consider the circumstance in which master transceiver 24 and trib 26b share a common modulation type A while trib 26a uses a second modulation type B. When master transceiver attempts to establish A as a common modulation during sequence 32, trib 26a will not be able to understand that communication. Moreover, trib 26a will not recognize its own address during training interval 34 and will therefore ignore data 36 and trailing sequence 38. Master transceiver 24 may time out waiting for a response from trib 26a because trib 26a will never transmit training sequence 42, data 44, and trailing sequence 46 due to the failure of trib 26a to recognize the communication request (training sequence 34) from master transceiver 24. Thus, if the tribs in a multipoint communication system use a plurality of modulation methods, the overall communication efficiency will be disrupted as specific tribs will be unable to decipher certain transmissions from the master transceiver and any unilateral transmission by a trib that has not been addressed by the master transceiver will violate the multipoint protocol.

'228 Patent at 5:13-31.

Summarizing the incompatibility problem Gordon Bremer identified:

a) If the master in the APA wanted to communicate with a slave using a second modulation method that was incompatible with that used to communicate with its other slaves, it was necessary to tear down the session and begin a new session. Doing so was disruptive.

b) If the APA master attempted to communicate using an incompatible modulation type without beginning a new session, the other slaves would not understand the attempted communications and would not respond to any polling directed at them, resulting in repeated attempts by the Master to communicate. In addition, the slaves may be confused by the transmissions and make improper communication attempts.

One of ordinary skill in the relevant art would have understood that FIG. 2 and its description do not disclose or suggest the incompatibility problem identified by Gordon Bremer, or even the goal of using incompatible modulations in one master/slave session. Akl, at ¶¶ 82-84.

C. The '228 Solution to These Incompatibility Problems in a Master/Slave Setting

In the context of the master/slave system described above, Gordon Bremer invented "a system and method of communication in which multiple modulation methods are used to facilitate communication among a plurality of modems in a network, which have heretofore been incompatible." '228 Patent at 2:20-23. Mr. Bremer solved the above-described incompatibility problem with his claimed master/slave communication system in which slaves can seamlessly communicate over a network through a master using multiple types of modulation methods, thereby permitting selection of the modulation type best suited for a particular application. '228 Patent at 2:27-3:14, 5:32-46; Akl, at ¶ 85.

The claimed invention of the '228 Patent is further described with reference to Figure 2 and in Figures 3-8 and the written description. Specifically, Figures 3 and 4 show block diagrams of the master transceiver and tributary transceivers, while Figure 5 shows a ladder

diagram illustrating the operation of those transceivers. Figures 6 and 7 show state diagrams for exemplary tributary transceivers. Figure 8 shows a signal diagram for exemplary transmissions. Akl, at ¶ 86.

Annotated FIG. 4 shows an embodiment of the patented technology where some devices in the network communicate using one type of modulation method (e.g., amplitude modulation used by AM radio), while other devices communicate using a different type of modulation method (e.g., the frequency modulation used by FM radio):

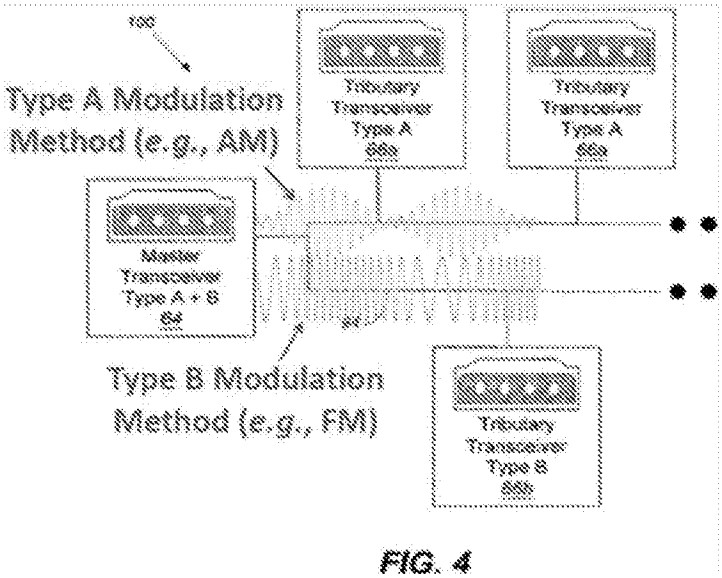
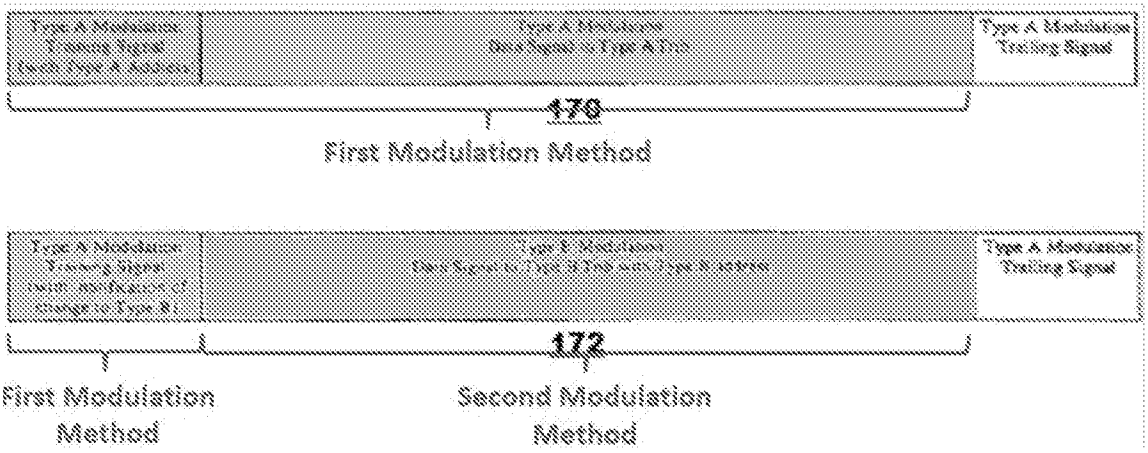


FIG. 4

'228 Patent at 6:4-13. Such a system provides for greater efficiency, seamless communication with all devices, backward-compatibility, and decreased costs. *Id.* at 3:9-14; *see also id.* at 2:1-18, 5:32-46. Akl, at ¶ 87.

Annotated FIG. 8 shows two communications intended for different slaves. The first communication 170 uses a first type of modulation method for both the initial training signal and the subsequent data signal, while communication 172 uses the first type of modulation method for the training signal and the second type of modulation method for the data signal:



'228 Patent at Fig. 8, 4:45-48, 4:66-5:1. Information in the training signal indicates whether there will be an impending change from the first type of modulation method to the second type of modulation method. *Id.* (training signal includes "notification of change to Type B" modulation method). Akl, at ¶ 88.

Mr. Bremer's solution is captured and claimed in his seamless "switches" from one modulation type to another and is described with reference to Fig. 5:

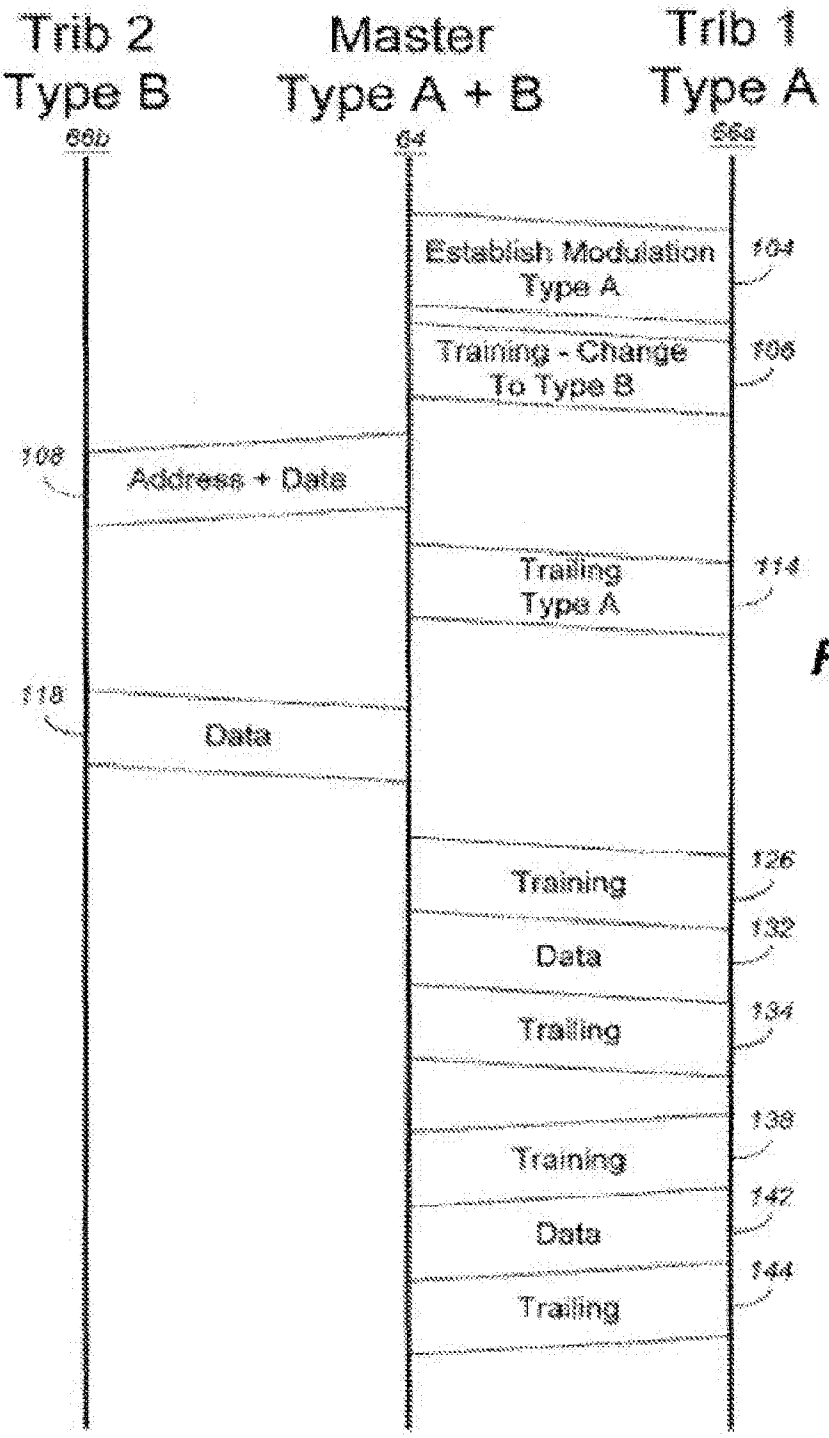


FIG. 5

With reference to FIG. 5, for the Master ("Master Type A and B 64") to communicate with a Type A trib ("Trib 1 Type A 66a") using a negotiated first modulation type A method in

the normal fashion, the Master transmits a "first message" (sequences 126, 132, 134). The "first message" includes (i) "first information" (training sequence 126) modulated according to the first modulation type A method and (ii) "second information" (transmission sequence 132) modulated according to the first modulation type A method and including data intended for the Type A trib. The "first information" includes first message address information that is indicative of the Type A trib being an intended destination of the "second information." '228 Patent at 7:11-13 ("a training sequence 126 in which an address of a particular type A trib 66a is identified"). *See also* Akl at ¶ 89.

For the Master ("Master Type A and B 64") to communicate with a Type B trib ("Trib 2 Type B 66b") using a second modulation type B method, the Master transmits a "second message" (sequences 106, 108, 114). The "second message" includes "third information" (training sequence 106) modulated according to the first modulation type A method and including information that is indicative of an impending change in modulation to the second modulation type B method. '228 Patent at 6:27-30 ("To switch from type A modulation to tybe B modulation, master transceiver 64 transmits a training sequence 106 to type A tribs in which these tribs are notified of an impending change to type B modulation."). The "second message" also includes "fourth information" (transmission sequence 108) that is transmitted after transmission of the "third information," is modulated according to the second modulation type B method, and includes data intended for the single Type B trib. '228 Patent at 6:32-36 ("After notifying the type A tribs 66a of the change to type B modulation, master transceiver 64, using type B modulation, transmits data along with an address in sequence 108, which is destined for a particular type B trib 66b."). In addition, the "second message" includes second message

address information that is indicative of the single Type B trib being an intended destination of the fourth information. *Id.* *See also* Akl at ¶ 90.

The specification of the '228 Patent describes the claimed switches as follows:

> "To switch from type A modulation to type B modulation, master transceiver 64 transmits a training sequence 106 to type A tribs 66a in which these tribs are notified of an impending change to type B modulation. … After notifying the type A tribs 66a of the change to type B modulation, master transceiver 64, using type B modulation, transmits data along with an address in sequence 108, which is destined for a particular type B trib 66b. …. [Col. 6, ll. 27-36.]
>
> …. If, however, master transceiver transmits a training sequence in which the type A tribs 66a-66a are notified of a change to type B modulation as indicated by sequence 106, then a transition is made to state 124 where all type B transmissions are ignored until a type A modulation trailing sequence (e.g., sequence 114) is detected. Upon detecting the type A trailing sequence, a type A trib 66a returns to state 122 where it awaits a training sequence." [Col. 7, ll. 3-10.]
>
> "To initiate a communication session with a type A trib 66a, master transceiver 64 transmits a training sequence 126 in which an address of a particular Type A trib 66a is identified. The identified Type A trib 66a recognizes its own address and transitions to state 128 to receive data from master transceiver 64 as part of sequence 132." [Col. 7, ll. 11-16.]

The combination of Gordon Bremer's claimed first through fourth information in the first and second messages captures his solution to the incompatibility problem, *i.e.*, switching from one modulation type to another incompatible modulation type when switching from one trib type to another. None of the cited references discloses or suggests either the problem Mr. Bremer set out to solve in the master/slave setting, or his solution to that problem. *See* '228 Patent at 6:14-7:39 (describing Fig. 5); Akl, at ¶ 92).

VI. The Evidence is Not Sufficient to Establish that the Harris Documents were Published Because There is No Evidence that Either was Accessible to the Relevant Public, And, Thus, Snell's Attempted Incorporation by Reference Fails

Neither Harris AN9614 nor Harris 4064.4 (the "Harris Documents") qualifies as prior art under 35 U.S.C. § 102 because the evidence is not sufficient to establish that either was published, *i.e.*, made available to the interested public, as required by statute.[20] In order to prove that a document is a publication under § 102, the document must have been "disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it." *In re Wyer*, 655 F.2d 221, 226 (CCPA 1981) (quoted in MPEP § 2128). *See also Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006) (quoting *In re Wyer*, 655 F.2d 221, 226 (CCPA 1981)); *Ex parte Jennings*, Appeal 2007-0064, 2007 WL 774798, at *2-3 (BPAI Mar. 9, 2007); *Ex Parte Textron Innovations, Inc.*, Appeal 2010-011891, 2011 WL 2095629, at * 21-22 (BPAI May 23, 2011). Public accessibility is the "touchstone in determining whether a reference constitutes a 'printed publication' bar under 35 U.S.C. § 102." *In re Hall*, 781 F.2d 897, 898-99 (Fed. Cir. 1986), quoted in *SRI Int'l, v. Internet Sec. Sys.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008). *See also In re Lister*, 583 F.3d 1307, 1316-17 (Fed. Cir. 2009) (rev'g the Board's rejection because the government failed to make a *prima facie* case that the relied-upon reference was publicly accessible prior to critical date); *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 936 (Fed. Cir. 1990) ("A document, to serve as a 'printed publication', must be generally available."); MPEP § 2128.02.

[20] The plain meaning of "publication" requires that a document be made accessible to the public to be considered a publication. *See, e.g.,* American Heritage Dictionary of the English Language (5th ed. 2016) (Houghton Mifflin Harcourt Publishing Co.) ("publication" means the act of making public).

The May 3 Office Action contains no discussion addressing (let alone establishing) public accessibility of the Harris Documents. The Order reasoned that the Harris Documents are prior art simply because they "are incorporated by reference in Snell."[21] Order at 3. As explained below, the mere attempted incorporation by reference of the Harris Documents into Snell does not transform the Harris Documents into prior art. The burden to establish public accessibility of the Harris Documents is on the patent challenger. *See, e.g., Ex parte Trend Micro*, Appeal 2012-005205, 2012 WL 2991616, at *3-4 (BPAI July 17, 2012); *Ex parte Spalding*, Patent Interference No. 104,699, 2002 WL 230978, at *5-6 (BPAI 2002). In this case, the Office Action fails to meet that burden.

Nothing on the face of either Harris Document evidences that it was publicly accessible prior to the priority date of the '228 Patent and, thus, available as a § 102 reference. The mere inclusion of an unregistered copyright date is not sufficient. Snell's attempted incorporation by reference of the Harris Documents is also ineffective to render them "printed publications," because documents such as the Harris Documents, which are not publications (in the legal sense), cannot be incorporated by reference, and any attempt to do so fails. Finally, Snell's submission of the Harris Documents to the U.S. Patent and Trademark Office ("USPTO") in an Information Disclosure Statement ("IDS") during the prosecution of Snell, which resulted in the Harris Documents being included in the Snell file wrapper and listed on the Snell cover, also

[21] Although pages 29-32 of the Request contained additional arguments that the Harris Documents were "printed publications," those portions of the Request were *not* incorporated by reference in the May 3 Office Action. While the Office Action has not adopted or incorporated these additional arguments, in an effort to expedite this proceeding, Rembrandt provides preliminary remarks responsive to Requestor's additional arguments on this issue. Should the Examiner adopt some or all of Requestor's additional arguments relating to the Harris Documents being "printed publications" in a future Office Action, the Patent Owner reserves the right to supplement the points set forth in this Response.

fails to establish public accessibility of the Harris Documents *at the time the Snell application was filed* (or any time before the Dec. 5, 1997, priority date of the '228 Patent). In fact, there is no evidence in the record of their public accessibility prior to the issuance of the Snell patent, which did not occur until Nov. 9, 1999 (well after the priority date of the '228 Patent).

A. Nothing in the Harris Documents Demonstrates Accessibility to the Relevant Public

The "March 1996" and "October 1996" dates on Harris AN9614 and Harris 4064.4, respectively, and their 1996 copyright notices by Harris Corporation are not sufficient to establish a date of dissemination or accessibility to "persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence." *Wyer*, 655 F.2d at 226. Unlike a publication date, a copyright date merely establishes "the date the document was created or printed." *Hilgraeve, Inc. v. Symantic Corp.*, 271 F. Supp. 2d 964, 975 (E.D. Mich. 2003). *See also Ex parte Rembrandt Gaming Technologies, LP*, Appeal 2014-007853, Reexamination Control No. 90/012,379 at 5 (PTAB December 3, 2014) ("the 1993 copyright date in Tequila Sunrise does not show the requisite availability in 1993"); *ServiceNow, Inc. v. Hewlett-Packard Co.*, IPR2015-00716, Paper No. 13 at 17 (PTAB Aug. 26, 2015) ("we are not persuaded that the presence of a copyright notice, without more, is sufficient evidence of public accessibility as of a particular date"). In this case, there is no evidence that the copyrighted material was ever registered or that the documents were deposited with the Library of Congress. Lacking such evidence, a copyright notice has little, if any, evidentiary value.

Accordingly, the dates and copyright notices on the Harris Documents merely establish the dates they were created or printed, and do not establish that they were disseminated or otherwise made available to the relevant public by those dates.

B. No Other Cited Evidence Remedies the Above-Described Shortcomings of the Harris Documents

Harris Semiconductor submitted the Harris Documents to the Office on March 17, 1997, in an IDS during the prosecution of Snell. While that submission apparently resulted in the Harris Documents being included in the Snell file wrapper and listed under "Other Publications" on the face of Snell, that handling of the Harris Documents in the Office does not establish their public accessibility. Neither does the fact that Snell refers to Harris 4064.4 as "a publication," Snell at 1:50-54, 5:13-17, and to Harris AN9614 as being part of "the Harris PRISM 1 chip set literature." *Id.* at 4:65-5:7. Like the dates and copyright notices of the Harris Documents, these statements fail to establish that the documents were publicly accessible any time prior to the issuance of the Snell patent, which occurred *after* the priority date of the '228 Patent.

First, the submission of the Harris Documents in an IDS does not demonstrate that they were prior art publications because the "[m]ere listing of a reference in an information disclosure statement is not taken as an admission that the reference is prior art against the claims." MPEP § 2129(IV) (citing *Riverwood Int'l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346, 1354-55 (Fed Cir. 2003) (listing of applicant's own prior patent in an IDS does not make it available as prior art absent a statutory basis). *See also* 37 CFR § 1.97(h) ("The filing of an information disclosure statement shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in § 1.56(b)."). Moreover, although the Harris Documents were listed as "Other Publications" on the cover of Snell when it issued in 1999, Harris Semiconductor did not submit the documents as publications but instead labelled them as "Other Art." Request, Exhibit L at 78.

Second, the presence of the Harris Documents in the file wrapper of the *unpublished* Snell application does not demonstrate that they were publicly accessible at any time before the Snell application issued as a patent on November 9, 1999. *See* MPEP § 1120(I) (35 U.S.C. § 122(a)) ("Except as provided in subsection (b),[22] applications for patents shall be kept in confidence by the Patent and Trademark Office and no information concerning the same given without authority of the applicant or owner unless necessary to carry out the provisions of an Act of Congress or in such special circumstances as may be determined by the Director."). Thus, *until the Snell patent issued*, the interested public would not have known of the Snell application's existence and would not have known of the existence of the Harris Documents in its file wrapper. *Microsoft Corp. v. Biscotti Inc.*, Case IPR2014-01457 (PTAB Mar. 19, 2015) (Paper 9) addressed this exact situation:

> Patent Owner argues that the citation of the HDMI Specification in an IDS filed in the prosecution of U.S. Patent No. 7,940,809 also fails to support Petitioner's position. Patent Owner notes that "[t]he published application from which the '809 patent derives … does not cite [the HDMI Specification]," and that "U.S. Patent No. 7,940,809 was not granted until 2011, long after the priority date of the '182 patent." Patent Owner elaborates that Petitioner does not explain how submission of a document in an IDS of an unpublished, ungranted patent application demonstrates public accessibility of the document, noting that Petitioner does not identify any way that an interested person could or would have located the document submitted in the IDS of an unpublished, ungranted patent application. Patent Owner argues that "the mere apparent possession of the specification by the assignee [of the unpublished, ungranted patent application]—a single company—does not demonstrate the document's public availability."
>
> …
>
> We are persuaded that Petitioner has not demonstrated the public accessibility of the HDMI Specification. For the reasons explained by Patent

[22] Section (b) applies only to applications filed on or after November 29, 2000. Thus, section (b) does not apply to Snell, which was filed in 1997.

> Owner, the evidence cited by Petitioner facially fails to demonstrate the public accessibility of the document prior to the effective filing date of the '182 patent.

Microsoft Corp. v. Biscotti Inc., Case IPR2014-01457, slip op. at 26–28 (PTAB Mar. 19, 2015) (Paper 9) (citations and footnotes omitted, emphasis in original).

In *Microsoft Corp.*, the PTAB found that Petitioner had not demonstrated the public accessibility of the HDMI Specification even though: (1) in addition to the citation of the HDMI Specification in an IDS of an unpublished application, Petitioner provided the date on the HDMI Specification, a press release regarding the HDMI Specification, and a PC Magazine article about the HDMI Specification as evidence, id. at 25-26, and (2) the HDMI Specification was cited in an IDS by an assignee (Synerchip Co. Ltd.) who was *not* the source of the HDMI Specification (Hitachi, Ltd. et al.), which indicated that a company other than the source has possession. *Id.* at 7; U.S. Patent No. 7,940,809. Here, (1) there is even less evidence of public accessibility for the Harris Documents, and (2) Harris Semiconductor was the source of both the Harris Documents and the IDS submitting the Harris Documents. Accordingly, like the situation in *Microsoft Corp.*, public accessibility of the Harris Documents has not been established.

Notably absent is any evidence in the record demonstrating that the Harris Documents were disseminated to anyone other than the Office before the December 5, 1997, priority date of the '228 Patent. In fact, there is no evidence that anyone outside of Harris Semiconductor and the Office even knew of the Harris Documents before the issuance of Snell as a patent on November 9, 1999. *See De Graffenried v. United States*, 20 Cl.Ct. 458, 471 (Cl. Ct. 1990) ("There is no evidence in the record of any distribution beyond DTIC [Defense Technical Information Center]; there is no indication that any entity, much less those entities technologically knowledgeable and interested, ever requested or received from DTIC either an

actual copy of the Haag report or any information … indicating that the report existed."). *See also* Akl, at ¶ 73. In addition, even if interested persons had known of the existence of the Harris Documents, there is no evidence that an interested person, exercising reasonable diligence, could have located the Harris Documents submitted to the Office in an IDS of an *unpublished* patent application, an application that did not issue before the priority date of the '228 Patent. To the contrary, by law, the Snell application (including the IDS and the Harris Documents) was kept in confidence by the Office until the Snell patent issued on November 9, 1999. *See* 35 U.S.C. § 122(b); MPEP § 1120(I).

Moreover, there is a complete absence of evidence as to how an interested person could have located and accessed the Harris Documents before November 9, 1999. For instance, there is no evidence that, before the December 5, 1997 priority date of the '228 Patent, the Harris Documents were indexed or catalogued in any meaningful way to enable an interested person to locate them. *See SRI Int'l, Inc. v. Internet Security Sys., Inc.*, 511 F.3d 1186, 1195-96 (Fed. Cir. 2008) (citing *Application of Bayer*, 568 F.2d 1357, 1358–59 (CCPA1978); *In re Cronyn*, 890 F.2d 1158, 1161 (Fed.Cir.1989)). Accordingly, the Office has failed to establish that the Harris Documents were "disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it." *Wyer*, 655 F.2d at 226.

C. The Harris Documents were Not "Incorporated by Reference" in Snell

Snell's attempt to incorporate by reference "the entire disclosure" of the Harris Documents fails because such incorporation is limited by law to certain types of documents and the Harris Documents do not qualify as any of those types of documents. *See* 37 C.F.R. §§

1.57(d) & (e). Thus, contrary to the Office's position (Order, at 3), Snell's attempt at incorporation fails and thus does not render the Harris Documents prior art under § 102(e).

Sections 1.57(d) and (e) read:

> (d) *"Essential material" may be incorporated by reference, but only by way of an incorporation by reference to a U.S. patent or U.S. patent application publication*, which patent or patent application publication does not itself incorporate such essential material by reference. "Essential material" is material that is necessary to: …
>
> (e) *Other material ("Nonessential material") may be incorporated by reference to* U.S. patents, U.S. patent application publications, foreign patents, foreign published applications, prior and concurrently filed commonly owned U.S. applications, or *non-patent publications*. …." [emphasis added]

Thus, only certain types of documents may be incorporated by reference. Other than U.S. patent applications, *only published* documents, *i.e.*, ones reasonably accessible to the interested public, may be incorporated by reference. If a document is not published and thus is not a publication in the legal sense, it cannot be incorporated by reference, and any attempt to do so must fail.

More specifically, assuming that the Harris Documents were "non-essential" to Snell's disclosure, they could only be incorporated by reference if they were "*publications*" under section (e) above. However, the record does not support a finding that these documents were publications, for the reasons given above. The fact that the Snell application refers to the Harris Documents and states Snell's intent to incorporate them by reference does not render them so incorporated, as there is no basis in law for incorporation by reference of a nonpublished document. *See* 37 C.F.R. § 1.57(e) (quoted above); *cf. Quaker City Gear Works, Inc. v. Skil Corp.*, 747 F.2d 1446 (Fed. Cir. 1984) ("Incorporation by reference has never been permissible under 35 U.S.C. § 112 of material necessary for an adequate disclosure which is unavailable to

the public"); *In re Howarth*, 654 F.2d 103, 106 (CCPA 1981) ("After ruling that prior U.S. patents may be so incorporated … this court extended the doctrine of incorporation by reference stating as a general guideline …that 'any reference to a disclosure which is available to the public is permissible.'" (emphasis added)); *Atmel Corp. v. Information Storage Devices, Inc.*, 198 F.3d 1374 (Fed. Cir. 1999) ("If an incorporated reference, which is the sole support for a corresponding structure, is publicly unavailable, then the claim is not understandable"); *General Elec. Co. v. Brenner*, 407 F.2d 1258, 1262 (D.C. Cir. 1968) ("[I]ncorporation by reference has a home in patent cases *provided that any reference made is to that which is available to the public*") (emphasis added); *Linear Technology Corp. v. Micrel, Inc.*, 524 F.Supp.2d 1147, 1153 (N.D. Cal. 2005) ("A patent applicant may incorporate external public works in the specification of a patent by explicit reference") (citations omitted); *Chiron Corp. v. SourceCF Inc.*, 431 F.Supp.2d 1019, n. 5 (N.D. Cal. 2006) ("A patentee may, in fact, incorporate by reference any source 'which is available to the public'") (citations omitted); *In re Lund*, 376 F.2d 982, 989 (CCPA 1967) ("the disclosure in a patent application may be deliberately supplemented or completed by reference to … 'disclosure which is available to the public'") (citations omitted). At most, Snell's attempted incorporation renders the documents publications as of Snell's issue date – well after the priority date of the '228 patent.

For the reasons set forth above, the Office has not established that either of the Harris Documents was a "publication," *i.e.*, available to the relevant public, as required by law, as of the March 17, 1997, filing date of the Snell application (or any time prior to the '228 priority date). Therefore, the Harris Documents could not be and were not incorporated by reference into Snell and, thus, are not prior art under § 102(e).

D. Even Assuming that the Harris Documents were Published, Incorporation by Reference Fails Because Snell did Not Specifically Incorporate the Materials in the Documents Assumed to be Relied on by the Office to Support Its Rejections

None of the sections of either of the Harris Documents specifically referenced by Snell provides any support for the Office's rejections. Thus, incorporation by reference, even if successful (which it cannot be), would not have incorporated material useful to support the Office's positions.

The Office relies on the disclosure in Harris AN9614 of a controller that can keep adequate time to operate in either a polled or a time allocated scheme and asserts that the polled scheme of Harris AN9614 corresponds to the claimed "master/slave relationship." May 3 Office Action at 11-12, 30-31, 52-53 (citing Harris AN9614 at 3). The Office's reliance is flawed for two reasons. First, as explained above, Harris AN9614 could not have been properly incorporated by reference into Snell because the Office did not establish that Harris AN9614 was a publication accessible by the relevant public before the December 5, 1997, priority date of the '228 patent. *See supra* at § VI.A-B. Second, even assuming, solely for the sake of argument, that Harris AN9614 was a publication capable of being incorporated by reference into Snell, Snell would have only incorporated the description of various filters and voltage controlled oscillators in Harris AN9614 and not the communication using a polled scheme. Snell's description of Harris AN9614 is limited to the following:

> Various *filters* 36, and the illustrated *voltage controlled oscillators* 37 may also be provided as would be readily understood by those skilled in the art and *as further described in the Harris PRISM 1 chip set literature, such as the application note No. AN9614* ….

Snell at 5:2-6 (emphasis added).

As explained below, at most, Snell's reference to Harris AN9614 incorporated only the description of various filters and voltage controlled oscillators from Harris AN9614 into Snell, and not any disclosure relating to the unrelated concept of polling.

"To incorporate material by reference, the host document must identify with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents." *Advanced Display Systems, Inc. v. Kent State University*, 212 F.3d 1272 (Fed.Cir. 2000) (citing *In re Seversky*, 474 F.2d 671, 674 (CCPA 1973); *In re Saunders*, 444 F.2d 599, 602–03 (CCPA 1971); *National Latex Prods. Co. v. Sun Rubber Co.*, 274 F.2d 224, 230 (6th Cir.1959); *In re Lund*, 376 F.2d 982, 989 (CCPA 1967)) (quoted in *Zenon Environmental, Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1378 (Fed.Cir. 2007); *Cook Biotech Inc. v. Acell, Inc.*, 460 F.3d 1365, 1376 (Fed.Cir.2006)). Snell does not identify at all (and certainly not "with detailed particularity") communication using a polled scheme as the specific material it incorporates. Snell at 5:2-7. Instead, Snell identifies only the "filters" and "oscillators" described in Harris AN9614 as the specific material it incorporates. *Id.* Accordingly, the polled scheme of Harris AN9614 relied upon by the Office was not incorporated into Snell.

For example, in *Zenon Environmental*, the Fed. Cir. considered the following incorporation by reference language:

> The vertical skein is not the subject matter of this invention and any prior art vertical skein may be used. Further *details relating to the construction and deployment of a most preferred skein* are found in the parent U.S. Pat. No. 5,639,373, and in Ser. No. 08/690,045, *the relevant disclosures of each of which are included by reference* thereto as if fully set forth herein.

Zenon Environmental, 506 F.3d at 1379. The Federal Circuit agreed "that the gas distribution system disclosed in the '373 patent is not a detail that relates to the construction and deployment of a vertical skein," *id.* at 1379-80, and found that "the '250 patent fails to incorporate by reference, with sufficient particularity to one reasonably skilled in the art, the gas distribution system disclosed in the '373 patent." *Id.* at 1382. Here, Snell fails to incorporate by reference, with sufficient particularity to one reasonably skilled in the art, the polled scheme of Harris AN9614, which is not a detail that relates to the "filters" and "oscillators" described in Harris AN9614. *See* Snell at 5:2-7; Harris AN9614 at 3. *See also Ex parte Carlucci*, 2012 WL 4718549 (BPAI 2012) ("Although Hammons states '[t]he disclosures of all patents . . . mentioned throughout this patent application are hereby incorporated by reference herein', Hammons does not identify with specificity the transparency of Ahr '045's apertured film. … Hammons's disclosure is directed to the function and dimensions of Ahr '045's apertured film. Accordingly, we do not find that Hammons incorporates by reference the transparent characteristic of Ahr '045's apertured film. Hence, the Examiner's finding that "Hammons discloses a transparent topsheet through incorporation of the Ahr ['045] reference'' is incorrect"); *Ojmar US, LLC v. Security People, Inc.*, 2015 WL 6510359 (PTAB 2015) (specific reference to "drive unit" coupled with general incorporation by reference insufficient to incorporate subject matter other than the "drive unit.").

Moreover, to the extent that that Snell attempted a blanket incorporation by reference of Harris AN9614 in its entirety (as opposed to merely the portions of Harris AN9614 describing various filters and voltage controlled oscillators), the PTAB has rejected the notion that a patent can incorporate by reference another document in its entirety (as opposed to merely specific

material identified with detailed particularity). In *Ex parte Koppolu*, the PTAB explained the rationale for prohibiting applicants from incorporating entire documents without an explanation of what they are being on relied on to show:

> [I]t is evident that the absence of a specific identification of the material of the source document that is being incorporated by reference and an explanation of what it is being relied on to show *will make it difficult for examiners*, the public, and the courts *to determine which material the inventor considered to be part of his or her invention* when the application was filed. …
>
> [B]y permitting applicants to incorporate by reference entire documents without an explanation of what they are being relied on to show would invite the wholesale incorporation by reference of large numbers of documents and correspondingly increase the burden on examiners, the public, and the courts to determine the metes and bounds of the application disclosures.
>
> For the foregoing reasons, we will apply the law on incorporation by reference as stated in *Advanced Display* and repeated in *Cook Biotech*.
>
> Appellants' argument that MPEP § 2163.07(b) "expressly authorizes the incorporation by reference of an entire document," … is unconvincing because an incorporation by reference must satisfy the specificity requirement of *Advanced Display*.

Ex parte Koppolu, 2005 WL 4806276 (BPAI 2005) (emphasis added). *See also, e.g., Oxford Nanopore v. Univ. of Washington*, 2014 WL 4644357 (PTAB 2014) ("In the instant case, although Petitioner urges that Akeson incorporates by reference the disclosure at column 13, lines 10-13 of the '782 patent, the Petition does not direct us to any express or specific disclosure in Akeson mentioning that passage with detailed particularity. … Nor does the Petition direct us to any clear or specific disclosure in Akeson suggesting that Akeson sought to incorporate by reference any teachings in the '782 patent as to the physical properties Akeson required of its nanopores. … Accordingly, we are not persuaded that the Petition has shown that, because Akeson incorporates the '782 patent as a whole by reference, among many other references,

Akeson in effect can be considered as positively teaching the subject matter disclosed at column 10, lines 10-13 of the '782 patent." (citations omitted)); *Ex parte Carlucci*, 2012 WL 4718549 (BPAI 2012) (rejecting assertion that blanket incorporation by reference was effective to incorporate transparent characteristic of Ahr '045's apertured film). Accordingly, despite Snell's attempt to incorporate by reference "the entire disclosure" of Harris AN9614, Snell at 5:2-7, Snell should not be considered as positively teaching the polled scheme of Harris AN9614.

VII. Alleged Admitted Prior Art Cannot Serve as Basis for Rejecting Claim 21

In rejecting claim 21 as unpatentable over the alleged Admitted Prior Art (APA) in view of Boer and further in view of Yamano (Rejection A) and Snell in view of Harris 4064.4, further in view of the alleged APA, further in view of Upender, further in view of Yamano and further in view of Kamerman (Rejection D), the Office relied upon portions of the '228 patent that do not qualify as Admitted Prior Art. May 3 Office Action at 19, 53-56 (citing '228 Patent at Figs. 1-2, 3:64-5:7). First, the portions of the '228 Patent relied upon as the alleged APA include descriptions of the invention. *See* '228 Patent at 4:45-48, 4:66-5:1. Second, as set forth in the attached declaration of the inventor, Gordon Bremer, the subject matter disclosed in connection with Figs. 1 and 2 of the '228 Patent was *the inventor's own work*:

> The common modulation systems to which I refer in Figures 1-2 and pages 2-3 of the '562 Provisional and Figs. 1-2, col. 2:27-34, col. 3:64-4:1, and col. 4:28-33 of the '228 Patent are my own work and systems that were developed under my supervision during my employment at Paradyne. When I used the term "prior art" in the '562 Provisional, the '228 Patent, and my earlier descriptions of the invention, I was referring to my own prior work on common modulation systems and, in particular, to Paradyne's Hypermodem/Pinnacle technology.

Bremer Declaration, ¶ 14 (emphasis added). *See also id.* at ¶¶ 5-13. The Office cannot use the alleged APA as a basis for rejecting the claims because it is not the work of another.[23]

A. Alleged APA includes Non-Prior Art Descriptions of the Invention

The Office asserts that Figs. 1-2 and col. 3:64-5:7 of the '228 Patent are admitted prior art. May 3 Office Action at 19, 53-56 (citing '228 Patent at Figs. 1-2, 3:64-5:7). The portions of the '228 Patent relied upon as the alleged APA include descriptions of Fig. 8. '228 Patent at 4:45-48, 4:66-5:1. Fig. 8 of the '228 Patent and its descriptions illustrate an embodiment of the invention and are most certainly not admitted prior art. *Id.* at 3:50-51 ("FIG. 8 is a signal diagram for an exemplary transmission according to an embodiment."), 4:45-48, 4:66-5:1. For example, the portion of the '228 Patent relied upon as alleged APA includes a disclosure that, "with reference to FIG. 8, sequence 172 illustrates a Type A modulation signal, with notification of changes to Type B, followed by a Type B modulation data signal." *Id.* at 4:66-5:1. There is no evidence that the embodiment of the invention illustrated in Fig. 8 of the '228 Patent and described in the alleged APA is prior art, and the Office's reliance on portions of the '228 Patent that include descriptions of Fig. 8 is clearly improper.

B. The Doctrine of Admitted Prior Art is Not Applicable to an Inventor's Own Work

The law is clear and well-settled that the doctrine of prior art by admission "is inapplicable when the subject matter at issue is the inventor's own work." *Riverwood Int'l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346, 1354 (Fed. Cir. 2003). As the Federal Circuit has explained:

[23] The Board found that the alleged APA may be applied as prior art in the '892 IPR. '892 Institution Decision at 8-9; '892 Final Decision at 13-14. However, the Board did not have the benefit of the Bremer Declaration (and its supporting evidence) when making its determination regarding the alleged APA.

"One's own work may not be considered prior art *in the absence of a statutory basis*, and a patentee should not be 'punished' for being as inclusive as possible and referencing his own work… ." *Riverwood Int'l Corp.,* 324 F.3d at 1355 (emphasis added) (citing *In re Nomiya,* 509 F.2d 566, 571 n.5 (CCPA 1975)). *See also Reading & Bates Construction Co. v. Baker Energy Resources Corp.,* 748 F.2d 645 (Fed. Cir. 1984) (holding that patentee's discussion in the "Summary of the Prior Art" did not constitute an admission that one's own prior work is prior art); MPEP § 2129 ("the examiner must determine whether the subject matter identified as 'prior art' is applicant's own work or the work of another").

In *Riverwood Int'l*, the court examined a line of cases from the Federal Circuit and its predecessor court and set forth the following "policy behind requiring a statutory basis before one's own work may be considered as prior art":

> There is an important distinction between the situation where the inventor improves upon his own invention and the situation where he improves upon the invention of another. In the former situation, where the inventor continues to improve upon his own work product, his foundational work product should not, *without a statutory basis*, be treated as prior art solely because he admits knowledge of his own work. It is common sense that an inventor, regardless of an admission, has knowledge of his own work.

Riverwood Int'l Corp., 324 F.3d at 1355 (quoting *Reading & Bates Construction Co.,* 748 F.2d at 650) (emphasis added).

In this case, the subject matter of Figs. 1 and 2 was the inventor's own work. Bremer Decl. at ¶¶ 5-14. Moreover, none of the alleged APA (*i.e.*, Figs. 1-2 and col. 3:64-5:7 of the '228 Patent) is located in or described in the Background section of the '228 Patent. Instead, the alleged APA is in the "Detailed Description of Illustrative Embodiments" section, which further illustrates that the inventor viewed the alleged APA as his own work. Therefore, the alleged

APA (*i.e.*, Figures 1-2 and cols. 3:64-5:7 of the '228 Patent) does not qualify as prior art, and the rejections that rely upon it (*i.e.*, Rejections A and D) are improper.

C. The Inventor's Own Identification of the Problem to be Solved is Inseparable From the Invention as a Whole and Cannot Be Considered Admitted Prior Art

As the inventor, Gordon Bremer, explained in his attached declaration, the portions of the specification relied upon as the alleged APA represent the inventor's own foundational work product, from which he identified both a problem and a solution to that problem:

> Figures l and 2 of the '562 Provisional (and their respective descriptions) and Figures 1 and 2 of the '228 Patent (and their respective descriptions) refer to my foundational work product to present a problem that I had identified for which the '228 Patent provides a solution.

Bremer Declaration, ¶ 15. *See also id.* at ¶¶ 5-13.

In the case of *In re Linnert*, the Court held that patentee's own analysis of the problem which led him to the solution was an inseparable part of the invention as a whole, which made it unobvious over the prior art. *In re Linnert*, 309 F.2d 498 (CCPA 1962). The court stated:

> Much of what we have quoted above is, in fact, appellant's own analysis of the causes of the failure which led him to the means for its solution. In cases of this kind it must not be lost sight of, as pointed out by the Supreme Court in *Eibel Process Co. v. Minnesota & Ontario Paper Co.,* 261 US 45, 67, that the inventive act which entitles an applicant to a patent resides as well in the discovery of the source of trouble as in the application of the remedy.

Id. at 502. Similarly, in the present case, the inventor's recognition of the problem that the claimed invention solved is an inseparable part of the invention as a whole.

With reference to Figures 1 and 2 of the '228 Patent, the inventor postulated a system in which a transceiver and tribs were employed in a multipoint master/slave arrangement. '228 Patent at 3:64-5:7. The inventor identified the problems that he foresaw with such a system. *Id.*

at 4:3-10, 4:33-40, 5:13-31. For example, in the description of Figure 1, the inventor stated that "before any communication can begin in multipoint system 22, the master transceiver and tribs 26-26 *must agree* on a common modulation method. *If* a common modulation method is found, the master transceiver 24 and a single trib 26 will then exchange sequences of signals …." *Id.* at 4:3-10 (emphasis added). *See also id.* at 4:33-38 (""the master transceiver 24 establishes a *common* modulation … that is used by both the master 24 and the tribs 26a, 26b for communication."). The inventor, thus, pointed out that so long as a common modulation method is present, the communication is successful. *See id.* at 4:3-10, 4:33-38. If, however, no common modulation method is established, then the master and the tribs will not be able to communicate. *See id.* at 4:3-10, 4:33-38, 5:13-31.

In the description of Figure 2, and again by way of his postulated system, the inventor illustrated an exemplary multipoint communication session using a common modulation method. '228 Patent at 4:28-5:7. The inventor then described the problem that the '228 Patent intends to solve where more than one modulation method is employed between the master and the various tribs:

> Consider the circumstance in which master transceiver 24 and trib26*b* share a *common modulation type A* while trib 26*a* uses a *second modulation type B*. When master transceiver attempts to establish A as a common modulation during sequence 32, trib 26*a* will not be able to understand that communication. Moreover, trib 26a will not recognize its own address during training interval 34 and will therefore ignore data 36 and trailing sequence 38. Master transceiver 24 may time out waiting for a response from trib 26a because trib 26a will never transmit training sequence 42, data 44, and trailing sequence 46 due to the failure of trib 26a to recognize the communication request (training sequence 34) from master transceiver 24. Thus, if the tribs in a multipoint communication system use a plurality of modulation methods, the overall communication efficiency will be disrupted as specific tribs will be unable to decipher certain transmissions from the master transceiver and any unilateral transmission by a trib that has not been addressed by the master transceiver will violate the multipoint protocol.

'228 Patent at 5:13-31 (emphasis added).

"[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified." *In re Nomiya*, 509 F.2d 566, 571 (CCPA 1975)). Accordingly, and consistent with the Federal Circuit precedent, the fact that the inventor of the '228 Patent postulated a system that allowed him to identify the problem to be solved should not negate patentability.

VIII. The Anticipation Rejection is Improper

The Office has rejected claim 21 of the '228 Patent, *inter alia*, as allegedly anticipated by Snell under 35 U.S.C. § 102(e). As an initial matter, this rejection fails because it is based on an overly broad claim construction. *See supra* at § IV. When properly construed, the Anticipation Rejection fails to establish unpatentability because Snell (even if the Harris Documents were incorporated by reference) fails to disclose the following three claims limitations: (i) the "master/slave relationship," (ii) "the second modulation method [that is] of a different type than the first modulation method" (or even incompatible modulation methods), and (iii) the "first message" and "second message." Akl, at ¶¶ 100-123.

The missing limitations are found at least in the following claim language:

(i) "A master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device;"

(ii) first, second, and third information "modulated according to the first modulation method" and "fourth information … modulated according to the second modulation method, the second modulation method being a different type than the first modulation method;" and

(iii) "a master transceiver configured to transmit a first message … , wherein the first message comprises: first information modulated according to a first modulation method, [and] second information … modulated according to the first modulation method … ; and said master transceiver configured to transmit a second message … wherein the second message comprises: third information modulated according to the first modulation method, wherein the third information comprises information that is indicative of an impending change in modulation to a second modulation method, and fourth information … modulated according to the second modulation method … wherein the first information that is included in the first message comprises the first message address data."

A. The Claimed Master/Slave Relationship is Not Present in Snell

Claim 21 requires "[a] master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device." In the Anticipation Rejection, to address this master/slave relationship requirement, the Office drew the following conclusion:

> Snell teaches a communication device (Abstract, Figs. 1-2 and 5-8) configured to (capable of)[24] communicate according to a master/slave

[24] The Office equates "configured to" and "capable of." May 3 Office Action at 7. The claimed "master communication device" must be configured in a particular way to satisfy the claim limitations. *See supra* at § IV.A (discussing claim construction).

> relationship in which a slave communication from a slave to a master occurs in response to a master communication from the master to the slave (the transceiver of Snell is capable of such communication), the device comprising: a transceiver (Fig. 1), in the role of the master according to the master/slave relationship … ."

May 3 Office Action at 7 (tracking the language of claim 1 of the '580 Patent as opposed to claim 1 of the '228 Patent and providing no supporting citations for the alleged teaching of the claimed master/slave relationship). The Office also asserted that "Snell incorporates by reference each of Harris AN9614 and Harris 4064.4 which show the communication via polled protocol." *Id.*

Rembrandt and its expert Dr. Akl have carefully reviewed the cited portions of Snell and the Harris Documents and find no mention of the words "master" or "slave," let alone an express teaching of the claimed master/slave relationship. *See* Akl, at ¶ 103. With respect to page 3 of Harris AN9614, Rembrandt notes (1) Harris AN9614 is not prior art and thus, legally, could not have been incorporated by reference and (2) the portions of Harris AN9614 that Snell attempted to incorporate by reference have nothing to do with a master/slave relationship and are found on the first two pages of Harris AN9614 (not page 3, which a "polled scheme"). *See supra* at § VI. Significantly, Harris AN9614 uses the polled scheme in the context of peer-to-peer communications (which is the topic being discussed in Snell and Harris AN9614), not master/slave communications. *See* Akl, at ¶¶ 77, 104, 114.

1. There is No Evidence that Snell's Carrier Sense Transceiver is Configured to Act in the Role of Master or Slave in a Master/Slave System as Claimed

Snell discloses a transceiver 30, Snell at Fig. 1, 4:42-43, designed for peer-to-peer communications, such as carrier sense multiple access with collision avoidance (CSMA/CA) communications. *See* Snell at 5:26-29 (disclosing that Snell's transceiver includes a "CCA

circuit block 44" that "provides a clear channel assessment (CCA) to avoid data collisions," *i.e.*, collisions which do not occur in a master/slave setting). *See also id.* at Fig. 1; Akl, at ¶ 105.

Systems that implement a CSMA/CA protocol for collision avoidance are fundamentally different than a master/slave system. In a CSMA/CA system, any device on the network can initiate a communication whenever the device determines that no other communications are occurring. In stark contrast, claim 21 of the '228 Patent is limited to master/slave communications, in which slave devices can only communicate on a network when prompted by a master. Thus, Snell does not disclose master/slave communications, let alone the master/slave relationship required by claim 21 of the '228 Patent. *See* Akl, at ¶¶ 78-92 (describing the technology of the '228 Patent), 105.

The Office summarily concludes that "the transceiver of Snell is capable of such communication [according to a master/slave relationship]." May 3 Office Action at 7. The Office asserts that "Snell incorporates by reference each of Harris AN9614 and Harris 4064.4, which show the communication via polled protocol." *Id.* The Office's failure to establish that the transceiver of Snell (as opposed to the transceiver of Harris AN9614 or Harris 4064.4[25])

[25] The transceiver of Snell is different than the transceivers of Harris AN9614 and Harris 4064.4. For example, Snell discloses "a set of integrated circuits for a WLAN under the mark PRISM 1 which is compatible with the proposed IEEE 802.11 standard." Snell at 1:47-50. "While the PRISM 1 chip set is operable at 2 Mbit/s for BPSK and 4 Mbit/s for QPSK, these data rates may not be sufficient for higher data rate applications." *Id.* at 1:61-63. Snell discloses that "[t]he present invention provides an *extension* of the PRISM 1 product from 1 Mbit/s BPSK and 2 Mbit/s QPSK to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK." *Id.* at 5:30-32 (emphasis added). In contrast, Harris AN9614 describes the PRISM 1 chip set *without* the extension described in Snell. *See* Snell at 1:50-54, 5:5-7. Harris AN9614 discloses that an *unextended* PRISM 1 chip may operate a "polled" scheme. Harris AN9614 at 3. Snell and Harris AN9614 do not disclose and would not have suggested that the *extended* PRISM 1 chip is capable of operating the polled scheme of Harris AN9614. *See* Snell *passim.* Given Snell's statements that the extended PRISM

without modification is capable of functioning "according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device" defeats the Office's Anticipation Rejection. *See, e.g., Ex parte Kumar*, Appeal 2012-010829, 2015 WL 729625 at *4 (PTAB February 18, 2015) (citing *Typhoon Touch Techs*, 659 F.3d at 1380) ("Because the Examiner has not shown that Proulx's apparatus can perform the function stated in the claim without requiring to specifically program or reconfigure the apparatus, and thus change the apparatus's structure, the Examiner does not establish that Proulx's apparatus anticipates claim 67."); *Ex parte Eckardt*, Appeal No. 2013-007294, 2016 WL 827260 at *2 (PTAB February 29, 2016) ("Lacking any explanation by the Examiner regarding why the functional language in claim 1 following the term "configured to" fails to limit the structure of the claimed system, and lacking any explicit finding that Eckhardt's device including a catalytic recombiner would satisfy the "configured to" language of claim 1, we do not sustain the rejection of claim 1.").

2. The Office's Reliance on "Incorporation by Reference" of Harris AN9614 Fails

The Anticipation Rejection relies on Harris AN9614 being incorporated by reference into Snell. May 3 Office Action at 7 ("Snell incorporates by reference each of Harris AN9614 and Harris 4064.4"). However, for the reasons set forth above in § VI, the attempted incorporation by reference of Harris AN9614 fails.

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1 chip set would operate using carrier sense methods (as opposed to polling), *see* Snell at 5:23-29, and the fact that Snell operated at multiple higher data rates (rather than the single low data rate associated with the polling discussed in Harris AN9614), Snell at 5:30-32, there would have been no reason for the extended PRISM 1 chip set to include any "polling" functionality. *See* Akl at ¶ 108, note 10.

3. The Claimed Master/Slave Relationship is Not Inherently or Expressly Disclosed in Harris AN9614's "Polled Scheme"

Even if, contrary to the case we have here, (1) Harris AN9614 were prior art so, as a matter of law, it could have been incorporated by reference *and* (2) Snell identified the "polled scheme" of Harris AN9614 with detailed particularity as the specific material it incorporates, the "polled scheme" discussion of Harris AN9614 does not disclose the claimed "master/slave relationship." *See* Akl, at ¶¶ 76-77, 110-115.

The Office asserts that "communication via polled protocol" corresponds to the claimed communication "according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device." *See* May 3 Office Action at 7. Assuming *arguendo* that the "polled scheme" on page 3 of Harris AN9614 had been properly incorporated into Snell, Rembrandt respectfully disagrees with the Office assertion that the claimed "master/slave relationship" is the same as or inherent to the "polled scheme" of Harris AN9614. *See* Akl, at ¶¶ 76-77, 110-115.

Whether described expressly or inherently, "[a]nticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983) (citing *Sound-scriber Corp. v. U.S.*, 360 F.2d 954, 960, 148 USPQ 298, 301 (Ct. Cl. 1966)). *See also Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Thus, a finding of inherent anticipation requires more than "probabilities or possibilities." *Motorola Mobility LLC v. Int'l Trade Comm'n*, 737 F.3d 1345, 1350 (Fed. Cir. 2013); *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). "The mere fact that a certain thing may result from a given set of circumstances is not

sufficient to establish inherency." *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993); *In re Robertson*, 169 F.3d at 745.

Further, the burden rests on the Office to "reasonably support" any allegation of inherent disclosure:

> "*In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.*" *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original) (Applicant's invention was directed to a biaxially oriented, flexible dilation catheter balloon (a tube which expands upon inflation) used, for example, in clearing the blood vessels of heart patients). The examiner applied a U.S. patent to Schjeldahl which disclosed injection molding a tubular preform and then injecting air into the preform to expand it against a mold (blow molding). The reference did not directly state that the end product balloon was biaxially oriented. It did disclose that the balloon was "formed from a thin flexible inelastic, high tensile strength, biaxially oriented synthetic plastic material." *Id.* at 1462 (emphasis in original). The examiner argued that Schjeldahl's balloon was inherently biaxially oriented. The Board reversed on the basis that the examiner did not provide objective evidence or cogent technical reasoning to support the conclusion of inherency.).

MPEP § 2112 (emphasis added).

In this case, to the extent the Office is relying on inherent disclosure in Snell (or Harris AN9614), the Office has failed to meet its burden because it has failed to provide a "basis in fact and/or technical reasoning to reasonably support" the determination that the master/slave limitations in the challenged claims necessarily flow from the teachings of Snell (even presuming that Harris AN9614 had been properly incorporated). Moreover, it is plain that a "master/slave relationship" is not inherent in Harris AN9614's "polling scheme," because polling can and does take place in peer-to-peer systems (like the CCA systems described at col. 5, lines 26-29 of Snell), which by definition are not master/slave systems. Akl, at ¶ 111.

For example, node A and node B could communicate according to a polled scheme in which (i) node A polls node B to request information from node B, (ii) after node B sends the requested information to node A, node B polls node A to request information from node A, and (iii) node A sends the requested information to node B. In this way, nodes A and B would use a polled scheme to communicate, but neither of nodes A and B would be a master or slave. *See* Akl, at ¶ 112 (citing "Telecommunications network," at 2, Britannica Online Encyclopedia ("A decentralized form of polling is called token passing. In this system, a special "token" packet is passed from node to node. Only the node with the token is authorized to transmit; all others are listeners.")).

Further, the Office's equation of Harris AN9614's "polled scheme" with a master/slave configuration is based on a faulty understanding of the scope of "polling" in the relevant art and an incorrect reading of Harris AN9614 and the '228 Patent. While polling can take place in a master/slave system, *see* '228 Patent at 4:30-33 (describing its master/slave protocol as a "polled multipoint communications protocol"), polling is not used exclusively in master/slave protocols. Instead, polling is a more general term in the relevant art, and a master/slave protocol is but one protocol in which polling can be used. In fact, there is no suggestion in Harris AN9614 that its "polled scheme" is taking place in anything other than the *peer-to-peer* communications protocol being discussed in Harris AN9614. *See* Harris AN9614 at 3. Akl, at ¶ 113.

Page 3 of Harris AN9614 does not mention "master" or "master/slave" but instead merely states:

> With a low power watch crystal, the controller [of the PRISM chip set] can keep adequate time to operate either a polled or a time allocated scheme. In these modes, the radio is powered off most of the time and only awakens when communications is expected. This station would be awakened periodically to

> listen for a beacon transmission. The beacon serves to reset the timing and to alert the radio to traffic. If traffic is waiting, the radio is instructed when to listen and for how long. In a polled scheme, the remote radio can respond to the poll with its traffic if it has any.

Harris AN9614 at 3. That is the full extent of the "polled scheme" discussion in Harris AN9614. Given the brevity of this discussion, and the fact that both Snell and Harris AN9614 are focused on peer-to-peer communications, one of ordinary skill in the relevant art would conclude that the discussion of a "polled scheme" in Harris AN9614 refers to polling as part of peer-to-peer communications, not master/slave communications. Akl, at ¶ 114.

Thus, Harris AN9614 does not disclose that its polled scheme includes "a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device," as required by claim 21 of the '228 Patent. Akl, at ¶ 115.

In addition, Snell in combination with Harris AN9614 fails to inherently or expressly disclose the master/slave limitations of claim 21 "arranged as in the claim." As explained in note 25, *supra*, the transceiver of Snell (an *extension* of the PRISM 1 product) is different than the transceiver of Harris AN9614 (PRISM 1 chip set *without* the extension described in Snell). The transceiver of Harris AN9614 (PRISM 1 chip set *without* the extension described in Snell) does not include the higher data rate functionality from Snell that the Office has mapped to aspects of claim 21. Moreover, it is not inherent that Snell's *extended* PRISM 1 chip would have been capable of operating the polled scheme of Harris AN9614. On the contrary, given Snell's statements that the extended PRISM 1 chip set would operate using carrier sense methods (as opposed to polling), and the fact that Snell operated at multiple higher data rates (rather than the single low data rate associated with the polling discussed in Harris AN9614), there would have

been no reason for the extended PRISM 1 chip set to include any "polling" functionality. Akl, at ¶ 108, note 10.

B. The Claimed At Least Two Different Types of Modulation Methods are Not Present in Snell

Claim 21 requires that "the second modulation method be[] of a *different type* than the first modulation method." As explained above, and confirmed by the Federal Circuit and Dr. Akl, the proper construction of "different types of modulation methods" is "*different families* of modulation techniques, *such as the FSK family* of modulation methods and the QAM family of modulation methods." *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, Docket No. 2016-1729, slip op. at 7 (Fed. Cir. April 17, 2017) ("the *clearest* statement in the intrinsic record regarding the meaning of the "different types" limitation is the descriptive statement the applicant made to the examiner when he inserted the limitation into the claims. Samsung's arguments to the contrary do not diminish this *unambiguous* statement in the prosecution history." (emphases added)). *See also supra* at § IV.C (discussing the broadest reasonable interpretation of the claims); Akl at ¶ 20 (discussing same).

In the Office's Anticipation Rejection, the Office fails to identify what disclosure in Snell allegedly corresponds to the claimed "different type[s]" of modulation methods. *See* May 3 Office Action at 7 (incorrectly alleging that "all limitations after 'configured to' are intended" and not giving "patentable weight" to them). For the reasons explained above in section § IV.A, the Office's rejection is based on unreasonably broad interpretation that ignores numerous claim limitations as "intended use," is divorced from the specification, and completely at odds with the PTAB's institution decision in IPR2014-00892. The Anticipation Rejection is, therefore, improper.

In any event, the Office's anticipation rejection fails under the proper construction of "different type," as there can be no dispute that Snell's BPSK and QPSK formats (and DBPSK and DQPSK) are in the same PSK family. Akl, ¶ 184. *See also infra* at § XI.B (addressing the portions of Snell and Harris 4064.4 cited by the Office in Rejections B and C for the claimed "different type[s]" of modulation methods and explaining why they do not correspond to the claimed "different type[s]" of modulation methods under either of the Federal Circuit's claim construction and the Office's overly broad claim construction).

C. The Claimed First and Second Messages are Not Present in Snell

Claim 21 requires a master transceiver configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising "third information" and "fourth information." Snell does not disclose the claimed master transceiver configured to transmit the first and second messages. Akl, at ¶¶ 122-123, 196-206, 215.

In the Office's Anticipation Rejection, the Office fails to identify what disclosure in Snell allegedly corresponds to any of the claimed first and second messages and first through fourth information. *See* May 3 Office Action at 7 (incorrectly alleging that "all limitations after 'configured to' are intended" and not giving "patentable weight" to them). For the reasons explained above in section § IV.A, the Office's rejection is based on unreasonably broad interpretation that ignores numerous claim limitations as "intended use," is divorced from the specification, and completely at odds with the PTAB's institution decision in IPR2014-00892. The Anticipation Rejection is, therefore, improper. *See also infra* at § XI.C (addressing the

portions of Snell cited by the Office in Rejections B and C for the claimed first and second messages and explaining why they do not correspond).

IX. It Would Not Have Been Obvious to Combine the References in the Manner Proposed by the Office (Obviousness Rejections A-D)

All of the outstanding obviousness rejections (*i.e.*, Rejections A, B, C and D) must be withdrawn because a person of ordinary skill in the art ("POSITA") would not have been motivated to modify Snell or Boer in the manner proposed by the Office.

First, there would have been no motivation to adapt Boer or Snell to a master/slave system. Rejections A-D rely on impermissible hindsight reasoning to conclude that adapting the peer-to-peer systems of Snell and Boer to a master/slave system would have been obvious. *See infra* at § IX.A.1. *See also* Akl, at ¶¶ 93-99. With respect to Boer in Rejection A and Snell in Rejection D, the alleged APA cannot be relied upon as providing motivation for the reasons set forth above in Section VII. With respect to Snell in Rejections B-D, Harris AN9614 cannot be relied upon as providing the motivation because (a) it has not been shown to be a prior art publication, (b) it was not properly incorporated by reference in Snell, (c) it does not expressly or inherently suggest using a master/slave protocol, and (d) even if it did disclose a master/slave protocol, it was in the context of a single low data rate scheme as opposed to the multiple higher data rate schemes described in Snell. *See supra* at §§ VI, VIII.A; *infra* at § IX.A.2. Also, contrary to what the Office found, the Upender reference would have actually discouraged a POSITA from using a master/slave protocol in implementing the teachings of Boer and Snell. *See infra* at §§ IX.A.3-4. Moreover, there was no recognition in the cited art of the problem identified and solved by the '228 Patent; therefore, even if it were obvious to adapt Boer or Snell

to a master/slave system, a POSITA would have had no reason to further modify the cited art in the manner proposed by the Office. *See infra* at § IX.A.1.

Second, a POSITA would have had no motivation to modify Boer or Snell by inserting address information into the preamble (as proposed) because it would have resulted in an inoperable system and/or would have resulted in removal of error correction functionality and/or would have been considered a serious design blunder. *See infra* at §§ IX.B.2-4. In addition, a POSITA would have had no motivation to modify Boer or Snell by inserting address information into the preamble (as proposed) because it would have rendered the system unsatisfactory for its intended purpose. *See infra* at §§ IX.B.5-6.

A. It Would Not Have Been Obvious to Adapt Snell or Boer to a Master/Slave System (Rejections A-D)

Rejections A, B, C and D must be withdrawn because they share a common, significant deficiency – none of the cited references would have motivated a POSITA to adapt Snell or Boer to a master/slave system. The Office relies on Boer and the alleged APA in Rejection A. The Office relies on Snell, Yamano, Kamerman, Harris AN9614, and Harris 4064 in each of Rejections B, C, and D, and it also relies on Upender and the alleged APA in Rejection D.

None of Boer, Snell, Yamano, and Kamerman discloses or would have suggested communications in a master/slave setting, even if Harris AN9614 and Harris 4064.4 had been successfully incorporated by reference into Snell (which they had not been). *See infra* at §§ IX.A & X.A; Akl, at ¶ 128. Rejections A-D rely on impermissible hindsight reasoning to conclude that adapting the peer-to-peer systems of Snell and Boer to a master/slave system would have been obvious. *See infra* at § IX.A.1. Even if the Harris Documents were prior art at

the time of the invention (which has not been shown[26]), neither discloses or would have suggested a master/slave system. *See supra* at § VIII.A.3; *infra* at §§ X.A, XI.A, XII.A; Akl, at ¶¶ 76-77, 110-115, 182, 187-188, 209-211. The "polled scheme" briefly discussed in Harris AN9614 does not disclose and would not have suggested a master/slave system, *see id.*, is mentioned in the context of a single low data rate scheme that would not experience the problem the '228 solved, and in any case is not particularly identified as being incorporated by reference. *See supra* at §§ VI.D, VIII.A.3. Furthermore, with respect to Rejections A and D, the alleged APA does not qualify as prior art, *see supra* § VII, and Upender would have actually discouraged a POSITA from adapting Snell to a master/slave system. *See infra* at §§ IX.A.3-4.

1. Rejections A-D Rely on Impermissible Hindsight to Conclude that Adapting the Peer-to-Peer Systems of Snell and Boer to a Fundamentally Different Master/Slave System Would Have Been Obvious

Snell and Boer do not disclose and would not have suggested communication according to a master/slave relationship and instead disclose peer-to-peer communications, such as carrier sense multiple access with collision avoidance (CSMA/CA) communications. *See* Snell at 5:26-29 (disclosing that Snell's transceiver includes a "CCA circuit block 44" that "provides a clear channel assessment (CCA) to avoid data collisions," *i.e.*, collisions which do not occur in a master/slave setting); Boer at 4:25-27 ("it should be understood that the LAN 10 operates on a CSMA/CA (carrier sense multiple access with collision avoidance) protocol"); Akl, at ¶ 129. *See also* Akl, at ¶¶ 93-99. Systems that implement a CSMA/CA protocol for collision avoidance are fundamentally different than a master/slave system. In a CSMA/CA system, any device on the network can initiate a communication whenever the device determines that no other

[26] *See supra* at § VI.A-C.

communications are occurring. In stark contrast, claim 21 of the '228 Patent is limited to master/slave communications, in which slave devices can only communicate on a network when prompted by a master.

Because of this fundamental difference, the problem the '228 Patent set out to solve within the context of a more rigid master/slave setting was not one faced by Snell or Boer, and the solution claimed in the '228 Patent is not one disclosed or suggested by Snell or Boer. *See supra* at § V.B-C; Akl, at ¶¶ 130. Thus, Snell and Boer do not disclose and would not have suggested master/slave communications, let alone the master/slave relationship required by claim 21 of the '228 Patent, without using the claimed invention as a roadmap.[27] *See* Akl, at ¶¶ 78-99, 130. An analogous issue was addressed in the rehearing of *In re Prater*:

> We have carefully considered the basic position of the Patent Office that it would be obvious to program a general-purpose digital computer to practice appellants' invention and that apparatus claim 10 reads on such a computer, as well as the disclosed analog device. We find that position fatally defective in that it, in effect, assumes the existence *as prior art* of appellants' discovery that the relationship indicative of error amplification "is related to, and may be expressed in terms of, the determinants of the subsets of equations, the determinant of largest magnitude indicating the subset of equations involving least error amplification." Perhaps today, *after* reading appellants' disclosure, the public dissemination of which the patent system fosters and encourages, it might be obvious to program a general-purpose digital computer to practice the invention. But 35 U.S.C. § 103 requires an analysis of the prior art *at the time the invention was made* to determine whether the invention was obvious. *Graham v. John*

[27] The same is true of Kamerman and Yamano in that they also describe peer-to-peer communications– again, fundamentally different than the claimed master/slave system in the '228 Patent. Akl, ¶¶ 99-99, 106, note 9. Kamerman expressly relates to "wireless LANs that operate to conform to the IEEE 802.11 DSSS (direct sequence spread spectrum) standard." Kamerman at 6 (disclosing that IEEE 802.11 is compatible with a "CSMA/CS (carrier sensor multiple access with collision avoidance"' protocol). *See also id.* at 8 ("IEEE 802.11 CSMA/CA"), *id.* at 12 ("[t]he CSMA/CA behavior of wireless LANs operating to conform to IEEE 802.11 DS"). *See* Yamano, at col. 19, ll. 21-36 (recommending using 'a carrier sense multiple access (CSMA) scheme"). Yamano and Kamerman are silent regarding any master/slave communications. Akl, at ¶ 106, note 9.

> *Deere Co.*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). Assuming the existence, at the time of the invention, of general-purpose digital computers as well as typical programming techniques therefor, it is nevertheless plain that appellants' invention, as defined in apparatus claim 10, was not obvious under 35 U.S.C. § 103 because one not having knowledge of appellants' discovery simply would not know what to program the computer to do. *See Ex parte King*, 146 USPQ 590 (Pat.Off.Bd.App. 1964).

In re Prater, 415 F.2d 1393, 1397-98 (CCPA 1969) (emphasis added). As occurred in *Prater*, Rejections A-D are based on hindsight – with the claimed invention of the '228 Patent used as a roadmap – and cannot stand. Without such a roadmap, one simply would not know how to configure the transceivers of Snell and Boer to address the problem Gordon Bremer identified and solved. Akl, at ¶ 130.

2. The "Polled Scheme" Disclosure in Harris AN9614 was in the Context of a Single Low Data Rate Scheme as Opposed to the Multiple Higher Data Rate Schemes Described in Snell (Rejections B-D)

The "polled scheme" disclosure in Harris AN9614 at page 3 is not of a communications system using multiple modulation methods, as claimed in the '228 Patent. In addition to the limitations described above, Harris AN9614's "polled scheme" appears in a section of Harris AN9614 dedicated to describing a protocol where burst transmissions are used for achieving a "Low Average Data Rate" by operating the PRISM 1 chip at a *single, low data rate of 1 MBPS*:

> The system approach is to accept the 1 MBPS data rate of the radio as long as the achievable range is acceptable, and use it in a short burst mode which is consistent with its packet nature. With a low power watch crystal, the controller can keep adequate time to operate either in a polled or time allocated scheme. In these modes, the radio is powered off most of the time and only awakens when communications is expected. … With these techniques, the average power consumption of the radio can be reduced by more than an order of magnitude while meeting all data transfer objectives.

Harris AN9614 at 3.

There is nothing in Harris AN9614 suggesting that its 1 MBPS system should or even could be used in combination with the higher data rate schemes described in the body of Snell. Put another way, there is nothing in Harris AN9614 suggesting that its 1 MBPS polled scheme was intended to be used to accomplish, for example, the scheme depicted at col. 6, lines 55-60 of Snell, which the Office has mapped to other elements in claim 21.

Harris AN9614 suggests adapting its "high data rate configuration" to one using 1 MBPS only in order to avoid "the design considerations … of concern" with high data rate configurations. *See* Harris AN9614 at 3. Significantly, this suggestion is directly contrary to Snell's goal of obtaining higher variable data rates "from 1 Mbit/s BPSK and 2 Mbit/s QPSK to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK." Snell at 5:30-32. Thus, one of ordinary skill in the art reading Snell and Harris AN9614 would have understood the discussion in Harris AN9614 of a polled scheme to be inapplicable to the multi-data rate scheme that is the focus of Snell. Akl, at ¶ 133. Accordingly, even if Harris AN9614 were a publication (it was not), and the "polled scheme" of Harris AN9614 were incorporated by reference into Snell (it was not), and the disclosure of a polled scheme in Harris AN9614 would have suggested a "master/slave relationship" (it would not have), the combination of Snell with Harris AN9614 would not have yielded or suggested the communications system claimed in the '228 Patent that requires at least two modulation methods. Akl, at ¶ 133.

3. Upender Would Have Discouraged a POSITA from Adapting Snell to a Master/Slave System (Rejection D)

Contrary to what the Office found, *i.e.*, that "Upender's express teaching that a polled (master/slave) protocol is advantageous for its 'simplicity and determinacy,' would have motivated one of ordinary skill to use such a system in implementing Snell's communication

system …," May 3 Office Action, at 63-64 (citing Upender at 7), the teachings of Upender would have actually discouraged a POSITA from adapting Snell to a master/slave system.

In the companion district court case, the Federal Circuit found substantial evidence supported the jury's finding that Upender would not have motivated a POSITA to adapt Boer from a CSMA/CA protocol to a master/slave protocol:

> Substantial evidence likewise supports the jury's presumed finding that there was no motivation to combine Boer with Upender, as Rembrandt had argued. The '580 and '228 patents claim a master/slave communication protocol, whereas Boer discloses devices communicating under the CSMA/CA protocol. Samsung had argued that combining Boer with Upender—which discusses and compares several communication protocols, including master/slave—would render Rembrandt's patents obvious. Rembrandt countered that one of skill in the art would not have been motivated to combine the references because Upender teaches away from substituting Boer's CSMA/CA approach with master/slave. Specifically, Upender analyzes the tradeoffs between different communication protocols based on various attributes, such as efficiency, robustness, and cost. *Upender concludes that CSMA/CA is at least as good—and most often, better—than master/slave in every respect.* We conclude that this disclosure provides substantial evidence to support the jury's presumed finding that one of ordinary skill in the art would not have been motivated to replace the CSMA/CA protocol already in place in Boer with a master/slave arrangement as taught by Upender.
>
> ….
>
> Samsung misses the mark by arguing that we must find a motivation to combine if we agree with it that there is not substantial evidence to support a finding that Upender teaches away from substituting CSMA/CA with master/slave. Whether a reference teaches away is doctrinally distinct from whether there is no motivation to combine prior art references. *See Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1051 n.15 (Fed. Cir. 2016) (en banc) (identifying motivation to combine and teaching away as "two discrete bases" supporting district court's denial of JMOL); *see also Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d 1364, 1374–75 (Fed. Cir. 2011). …
>
> … [T]he jury did not need to find that Upender taught away from using master/slave in order to find that there would be no motivation to replace CSMA/CA in Boer with master/slave. Even if Upender "does not teach away, its statements regarding users['] prefer[ences] . . . are relevant to a finding regarding whether a skilled artisan would be motivated to combine" Upender with Boer.

> *Apple*, 839 F.3d at 1051 n.15. Therefore, because Upender strongly suggests that master/slave is inferior to CSMA/CA, substantial evidence supports the jury's presumed factual finding that one of skill in the art would not have been motivated to combine Boer with Upender's teaching of master/slave.

Slip op. at 12-14 (emphasis added). *See also* Akl, at ¶ 135.[28]

The Federal Circuit's determinations as to what Upender would have suggested with respect to combining Boer and Upender applies equally to the Office's proposed adaptation of Snell to a master/slave protocol based on Upender, due to the substantial identity of the Boer and Snell teachings. *See* discussion *supra* at § II.A.1-3; Akl, at ¶ 136. Just like Boer, Snell relates to a CSMA/CA-type system. While the Snell patent does not expressly identify such a system, one of ordinary skill would have read Snell, Kamerman and Boer together, and understood that Snell's 802.11 system (like Boer's 802.11 system) used such a system. Akl, at ¶ 136. As the Office points out,[29] Snell's system operates "in accordance with the proposed IEEE 802.11

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[28] The PTAB rendered its Final Decision in the '892 IPR prior to the above-quoted Federal Circuit decision, and thus did not have the benefit of the Federal Circuit's insight. While the PTAB decision was not appealed and therefore stands with respect to claim 1, that decision does not impact the patentability of claim 21 in view of the art now relied on by the Office. In this case, the Federal Circuit's later determination should be adopted as controlling.

[29] The May 3 Office Action, at 25, reads:

> Moreover, Snell and Kamerman are in the same field of art, with both relating to communications between transceivers that use BPSK and QPSK modulation methods to transfer data at different rates *according to the draft IEEE 802.11 standard* available at that time. *See, e.g.,* Snell at 1:47-63 ("The assignee of the present invention has developed and manufactured a set of integrated circuits for a WLAN under the mark PRISM 1 *which is compatible with the proposed IEEE 802.11 standard* .... "), 5:31-33 ("The present invention provides an extension of the PRISM 1 product from 1 *Mbitls BPSK and* 2 *Mbitls QPSK* .. . "); Kamerman at 6 ("This paper considers the critical parameters for *wireless LANs that operate conform to the IEEE 802.11 DSSS (direct sequence spread spectrum) standard* ... "), 11 ("IEEE 802.11 DS specifies bit rates of 1 and 2 Mbps. ", 11 ("IEEE 802.11 DS specifies BPSK and QPSK ... ").

standard." Snell, at 4:45-46. Kamerman also makes clear that the proposed IEEE 802.11 standard used CSMA/CA. Kamerman, at 1344 ("IEEE 802.11 supports DSSS (direct sequence spread spectrum) … The basic medium access behavior allows interoperability … through the use of CSMA/CA."). Thus, in this regard (as well as many others identified *supra* at § II.A.1-3 and in Exhibit B), Snell is cumulative to Boer.

The Upender teachings support the Federal Circuit's determination that "one of skill in the art would not have been motivated to combine Boer with Upender's teaching of master/slave" (and therefore that one of skill in the art would not have been motivated to combine Snell with Upender's teaching of master/slave). While Upender identifies a number of media access protocols, Upender notes that they "demonstrate *fundamentally different ways* of accessing the shared medium." Upender at 46 (emphasis added). *See also* Akl, at ¶ 137. Perhaps for this very reason, Upender does not suggest combining the fundamentally different protocols or adapting one to another but rather merely states that "this article's discussion of the special considerations and media access protocol strengths and weaknesses should allow you *to select the best protocol* to match your needs." Upender at 57.[30] The fundamental differences between

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> It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Kamerman' s teaching of transmitting a first data packet where the data is modulated using a first modulation method and next transmitting a second data packet where the data is modulated using a second modulation method in implementing Snell's system (modified in light of Yamano) for communicating data packets modulated according to different modulation methods, as *both Snell and Kamerman are directed to IEEE 802.11 systems* …. [emphasis added]

[30] The Office acknowledges this teaching without explaining how it would have suggested combining two "fundamentally different" protocols: "Upender expressly teaches that *a protocol for a particular application* should be selected in light of the respective costs and benefits of available protocols, noting that the discussion of the strengths and weaknesses of the different

peer-to-peer protocols and master/slave and the very different problems faced by each are discussed *supra* at § IX.A.1; Akl, at ¶¶ 94-99, 137.

As the Federal Circuit observed, "Upender strongly suggests that master/slave is inferior to CSMA/CA." In fact, Upender's "Media access tradeoffs" Table supports this conclusion:

TABLE 1
Media access tradeoffs

↑ Good — OK ↓ Poor	Efficiency Light Traffic	Efficiency Heavy Traffic	Determinacy	Prioritization	Robustness	Physical Layer Flexibil.	Low Cost/ Node
Connection	—	↓	↑	—	↑	↓	—
Polling	↓	—	↑	↓	↓	↑	—
TDMA	↓	↑	↑	↓	↓	↑	↓
Token Ring	↑	↑	↑	↑	—	—	—
Token Bus	—	↑	↑	—	—	↑	—
Binary Cnt.	↑	↑	—	—	↑	↓	↑
CSMA/CD	↑	↓	↓	—	↑	↑	—
CSMA/CA	↑	↑	↑	↑	↑	↑	↑

Notably, Upender does not identify a single characteristic for master/slave, which Upender refers to as "Polling,"[31] that it rates better than that for CSMA/CA. In fact, Upender rates *five* characteristics for its master/slave "Polling" more poorly than it rates those for CSMA/CA. A fair reading of Upender in its entirety, including its Table 1, dictates the conclusion that "CSMA/CA is at least as good—and most often, better— than master/slave in every respect," as noted by the Federal Circuit. *Rembrandt Wireless*, slip op. at 13.

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protocols 'should allow you to select *the best protocol* to match your needs'." May 3 Office Action, at 63-64 (quoting Upender at 10-11) (emphasis added).

[31] Upender does not use "polling" to refer to polling in general and instead uses "polling" to refer to a specific type of polling in which "a centrally assigned master periodically sends a polling message to the slave nodes, giving them explicit permission to transmit on the network." Upender at 50.

To support its position that Upender would have provided motivation to adapt Snell's CSMA/CA protocol to a master/slave protocol, the Office cites IPR2014-00892, Pap. 46 at 17 (citing Upender at 10-11 and finding that Upender does not "teach away" from using the master/slave protocol). May 3 Office Action, at 63. As the Federal Circuit observed in the opinion quoted above: "Even if Upender "does not teach away, its statements regarding users[']prefer[ences] . . . are relevant to a finding regarding whether a skilled artisan would be motivated to combine" Upender with Boer. *Apple*, 839 F.3d at 1051 n.15." *Rembrandt Wireless*, slip op. at 14. Thus, to the extent Upender does not "teach away" (a position with which Patent Owner disagrees), that finding is not sufficient to conclude that Upender would have motivated the skilled artisan to adapt Snell to a master/slave protocol, *i.e.*, to take a protocol strongly favored by Upender and adapt it to one clearly disfavored. Akl, at ¶ 139.

As further support for its position, the Office relies on "Upender's express teaching that a polled (master/slave) protocol is advantageous for its 'simplicity and determinacy,' would have motivated one of ordinary skill to use such a protocol in implementing Snell's communication system, particularly in any system in which simplicity and determinacy are important considerations." May 3 Office Action, at 63 (citing Upender at 7). In fact, Upender rates "simplicity and determinacy" the same for CSMA/CA and "Polling." *See* the Table above. Further, the Office does not explain what would have motivated a skilled artisan to sacrifice the many superior characteristics provided by a CSMA/CA-type protocol (such as that of Snell) or how doing so would have impacted the very characteristics the Office alleges Snell contributes to the claimed invention. Akl, at ¶ 140.

The Office continues: "Upender further teaches that a polled (master/slave) protocol is *'ideal for a centralized data-acquisition system* where peer-to-peer communication and global prioritization are not required,' such as Snell's centralized data-acquisition system comprising an access point transceiver supporting a group of transceivers which does not require communicating using peer-to-peer communication or global prioritization. *See* Snell at 1 :34-46." May 3 Office Action, at 64 (emphasis by Office). The section of Snell relied on by the Office is in the "Background of the Invention" and is discussing the prior art, *not* the more advanced protocol of Snell relied on by the Office to meet certain claim limitations in claim 21, i.e., a protocol that implements PRISM 1 and that "is compatible with the proposed 802.11 standard." Snell, col. 1, ll. 47-49. The protocol of the Snell invention is clearly a CSMA/CA-type peer-to-peer protocol. *See* the discussion above; Snell, col. 5, ll. 8-36 (discussing collisions that are only a concern in a peer-to-peer protocol). Akl, at ¶ 141.

Based on the above, it is unreasonable for the Office to conclude that "Upender's express teaching that a polled (master/slave) protocol is advantageous for its 'simplicity and determinacy,' would have motivated one of ordinary skill to use such a system in implementing Snell's communication system …." May 3 Office Action, at 63. The Upender teachings support just the opposite conclusion, as the Federal Circuit determined. Akl, at ¶¶ 142, 212.

4. Upender Would Have Discouraged a POSITA from Adapting Boer to a Master/Slave System (Rejection A)

In Rejection A, the Office relies on the analysis in the Final Decision in IPR2014-00892 to show that claim 1 of the '228 Patent (from which claim 21 depends) was obvious over the APA and Boer. However, as noted above, the alleged APA does not describe the work of another and should not have been relied upon. *See supra* at § VII. In addition, although not

acknowledged in the Office Action, the Board in IPR2014-00892 also relied on Upender to show that there was motivation to adapt Boer to a master/slave system. Final Written Decision in IPR2014-00892 (Paper 46), at 16-19.

As noted above, subsequent to the Board rendering its Final Decision, the Federal Circuit found substantial evidence supported the jury's finding that Upender would not have motivated a POSITA to adapt Boer from a CSMA/CA protocol to a master/slave protocol. *See supra* at § IX.A.3. Thus, while the Board's decision stands with respect to claim 1, that decision does not impact the patentability of claim 21 in view of the art now relied on by the Office. In this case, the Federal Circuit's later determination that Upender would not have motivated a POSITA to adapt Boer to a master/slave system should be adopted by the Office as it reflects how one of ordinary skill would understand Upender.

B. A POSITA Would Not Have Been Motivated to Adapt Boer or Snell to a Master/Slave System and Then Combine with Yamano as Proposed (Rejections A-D)

Claim 21 of the '228 patent requires a master transceiver configured to transmit a first message that comprises (i) "first information" and (ii) "second information," wherein "the first information … comprises the first message address data" that "is indicative of the one of the one or more slave transceivers being an intended destination of the second information." In Rejections A-D, the Office asserts that, based on Yamano, it would have been obvious to move destination address data to the preambles of Boer and Snell. May 3 Office Action at 9-10 (Rejection A), 18-19 & 28-29 (Rejection B), 40 & 49-50 (Rejection C), 65-66 & 74-75 (Rejection D). However, a person of ordinary skill in the art would not have found the proposed combinations obvious because they would have rendered the systems of Boer and Snell

inoperable, resulted in the removal of error detection functionality, and/or would have been considered a serious design blunder. In addition, the proposed combinations would have rendered the systems of Snell and Boer unsatisfactory for their intended purpose.

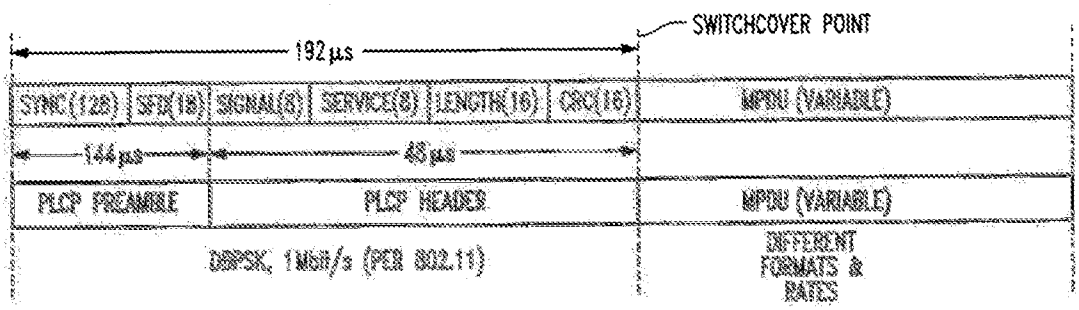
1. It Would Not Have Been Obvious to Adapt Boer or Snell to a Master/Slave System and Solve the Problem Identified and Solved in the '228 Patent Because There Was No Recognition of the Problem in the Prior Art (Rejections A-D)

It would not have been obvious to combine the art as the Office has proposed in a way that would have yielded the invention claimed in the '228 Patent because there was no recognition of the problem identified and solved in the '228 Patent – a problem specific to the master/slave setting when a master attempts to communicate with a slave using an incompatible modulation method. *See* detailed discussion *supra* at § V.B-C; Akl, at ¶¶ 82-92, 145. The named inventors of the systems described in the references were not faced with that problem and, thus, would have had no reason to invent the solution of the '228 patent. Akl, at ¶ 145. Instead they were faced with different problems that resulted from the fundamentally different ways their systems accessed the shared medium. Akl, at ¶ 119, 145. As previously noted, those "fundamentally different ways" involved peer-to-peer communications, such as CSMA and CDMA types, instead of those between a master and a slave. *See supra* at § IX.A.1; Akl, at ¶¶ 94-99, 129-130, 145.

2. Moving Address Information from the Data Link Layer (Where It Resides in Snell/Boer) to the Physical Layer Preamble Would Have Resulted in an Inoperable System

Snell and Boer proposed similar extensions to what became known as the 802.11 standard (or WiFi), namely adding two higher data rates to the 1MB/s and 2MB/s data rates in

the proposed standard.[32] Both references use the packet structure defined by the proposed standard, including packet headers with the same fields, and would have been considered together by one of ordinary skill at the time. Snell's Fig. 3 (virtually identical to Boer's Fig. 4) is shown below:



(Snell) FIG. 3

As shown above, the first portion of the packet (sent using "DBPSK, 1 Mbit/s") includes a "PLCP Preamble" and the "PLCP Header." "PLCP" is an acronym for *physical layer* convergence protocol. Akl, ¶ 148. The second portion of the packet is identified with the acronym "MPDU," which stands for *MAC* protocol data units, where "MAC" refers to the *media access control sublayer*. Akl, ¶ 148. In 1997, a person of ordinary skill would have understood that the physical layer (associated with the first portion of the packet) referred to the first layer of

[32] *See, e.g.,* Boer at 1:16-25 (". . . there is being produced IEEE standard 802.11 . . . This standard specifies two possible data rates for data transmission, namely 1 Mbps (Megabit per second) and 2 Mbps. . . . However, it may be advantageous to provide systems operating at higher data rates . . . It is an object of the present invention to provide a method operating a wireless local area network station which enables communication between stations operation at different data rates."); and Snell at 1:47-50 (describing "a set of integrated circuits for a WLAN under the mark PRISM 1 which is compatible with the proposed IEEE 802.11 standard"); Snell at 5:30-32 (disclosing "an extension of the PRISM 1 product from 1 Mbit/s BPSK and 2 Mbit/s QPSK to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK"); and Snell at 4:42-43, 5:30-32 (describing "a wireless transceiver 30" that "may be readily used for WLAN applications in the 2.4 GHz ISM band *in accordance with the proposed IEEE 802.11 standard.*") (emphasis added).

the seven-layer OSI model (described below), and that the MAC sublayer (associated with the second portion of the packet) referred to a sublayer of the second layer (the data link layer) of the OSI model. Akl, at ¶ 148. It was well known at the time that the MAC sublayer was responsible for communicating a device address (or MAC address), and one of ordinary skill would have read Snell and Boer together and understood that they included a MAC address in the media access control layer portion of the packet. *See, e.g.,* Boer at col. 6, lines 28-31 ("The C-MST[33] 132 determines if an incoming message is addressed to its own station, using a destination address included in data field 214."); Akl, ¶ 148.

Snell and Boer fail to meet claim 21, because those references position their address information in the MAC sublayer of the data link layer. This arrangement fails to meet the limitation of claim 21 because, the PLCP header and PLCP preamble -- which the Office has mapped to the claimed "first information [in the first message] modulated according to a first modulation method" -- do not have the "first message address data" required by claim 21. An example of the Office's mapping of PLCP header and PLCP preamble to the claimed "first information [in the first message] modulated according to a first modulation method" is set forth below:

wherein the first message comprises:
first information modulated according to a first modulation method,

Snell discloses that the master transceiver transmits **a first message** (PLCP header and PLCP preamble, figure 3 annotated below) which comprises first information **modulated according to a first modulation method (BPSK),** *See, e.g.,* Snell at Abstract, 1:34-46, 1:47-50, 1:55-57, 1:58-61, 2:27-30, 2:56-59, 2:61-3:5, 4:42-47, 5:18-2, 6:35-36, 6:52-59, 6:64-66,

[33] At col. 3, lines 1-2, Boer defines "C-MST" as a "MAC control state machine."

May 3 Office Action at 13 (Rejection B). The Office Action uses an identical mapping for Rejection C (May 3 Office Action, at 34), and Rejection D (May 3 Office Action, at 56-57). The same mapping is also used for Rejection A.[34]

Mapping the "first information [in the first message] modulated according to a first modulation method" to the PLCP header and PLCP preamble in Snell and Boer results in a serious deficiency with respect to meeting the additional limitation of claim 21, because neither the PLCP header nor the PLCP preamble include the required "first message address data." Recognizing this deficiency, the Office Action reasons that it would have been obvious to *move the address information in Snell and Boer from the data link layer to the PLCP Preamble (in the physical layer)*. For example, the Office Action reasoned as follows:

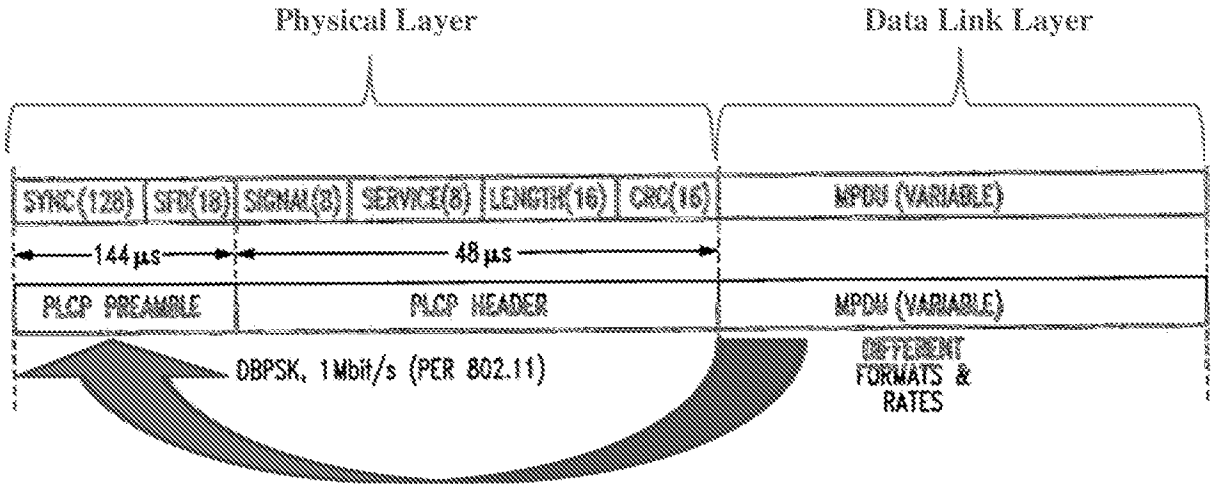
> Snell and Yamano are in the same field of art, with both relating to transmitting data packets over a network at varying rates. *Yamano expressly teaches that including a destination address in the preamble portion* of the data packet …
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to *use Yamano' s teaching of including a destination address in the preamble portion* of a data packet in implementing Snell's data packet comprising preamble, header, and MPDU data portions …, as taught by Yamano. …
>
> In addition, *Snell teaches structuring its data packet to include a preamble*, header, and MPDU data portion, and *Yamano teaches structuring its data packet to also include a preamble* and data portion, and *to place the destination address in the preamble portion*.
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made to include *a destination address in the preamble portion of a*

[34] For rejection A, the Office relies on the Final Written Decision in IPR2014-00892 for this mapping. May 3 Office Action at 8. The Final Written Decision in turn relies on the discussion and claim charts in the '892 Petition. *See* '892 Final Written Decision at 16. The '892 Petition maps the "first information modulated according to a first modulation method" to the SIGNAL, SERVICE, LENGTH and CRC fields of Boer's header 218, which are identical to the SIGNAL, SERVICE, LENGTH and CRC fields of Snell's PLCP header. '892 Petition at 22.

> *data packet, as taught by Yamano, in implementing Snell's system* for transmitting data packets between transceivers, as *Snell teaches that its data packet already includes a preamble portion* and in combination, each element (Yamano' s teaching of placing a destination address in the preamble and Snell's teaching of a system for communicating data packets modulated according to different modulation methods between transceivers) performs the same function as it would separately.... For these reasons, a person of ordinary skill would have been motivated and found it obvious and straightforward to use the teachings of Yamano including *a destination address in the preamble of a data packet in implementing Snell's communication system*. (citations omitted; emphasis added).

May 3 Office Action, at 18-19 (Rejection B); *see also* May 3 Office Action at 28-29 (Rejection B). The Office Action uses substantially identical reasoning for Rejection A (May 3 Office Action at 9-10), Rejection C (May 3 Office Action at 40, 49-50), and Rejection D (May 3 Office Action at 65-66, 74-75).

This Office's proposed modification – moving the address information from the data link layer to the PLCP Preamble -- is shown diagrammatically below:



Move MAC Address To Physical Layer

Significantly, if one of ordinary skill attempted to move address information into the PLCP Preamble as the Office has suggested, the result would have been an *inoperable* system. The PLCP Preamble includes only two fields: (i) a "SYNC" field (used for synchronization)

which "is all 1's" (Snell, 6:51), and (ii) an "SFD" (or start frame delimiter) that is "F3A0h" (Snell, 6:52). There is no place in this preamble for an address, and if one of the existing fields were replaced with an address field, the system would become inoperative because it requires both synchronization between devices (accomplished by the SYNC field) and a mechanism such as the SFD (start frame delimiter) field to demarcate the start of each frame. Akl, at ¶ 152. The system would also become inoperative if a new "address field" were positioned before the SYNC field or after the SFD field in the PLCP Preamble, because the preamble must begin with a SYNC field and end with a SFD field to be considered valid. Akl, at ¶ 152. Moreover, to the extent the Office were to argue that a new "address field" could have been inserted between the SYNC and SFD fields in the PLCP Preamble, the system would still have been inoperative because, as one of ordinary skill would have understood, the system would not be designed to process data (such as address data) that is positioned *before* the *start* frame delimiter. Akl, at ¶ 152.

3. Moving Address Information from the Data Link Layer (Where It Resides in Snell/Boer) to the Physical Layer Preamble Would Have Resulted in Removal of Error Detection Functionality with Respect to the Address Value

Another problem with positioning the address field in the PLCP Preamble is that, if the address were so positioned, the system would lack any capability to detect errors in the address value. Neither Snell nor Boer includes a CRC field (or any other error detection capability) in the PLCP Preamble. While both references include a CRC field in the PLCP Header for detecting errors, that CRC value is only calculated based on the fields in the PLCP Header (and not the fields in the PLCP Preamble). Placement of the address in the PLCP Preamble as suggested by the Office Action would have exposed the resulting system to errors in the address

value that could not be detected (let alone corrected). Akl, at ¶ 153. Andrew S. Tanenbaum, a leading authority on computer communications and networks,[35] in his 1996 textbook, remarked on the problem of transmission errors in wireless systems (which would have included systems like Snell and Boer). With respect to such systems, Tanenbaum stated that "transmission errors are going to be a fact of life for many years to come." Tanenbaum, at 184.[36] In such an environment, no person of ordinary skill would have been motivated to position an address value at a position where error detection capabilities were absent.

4. Moving Address Information from the Data Link Layer (Where It Resides in Snell/Boer) to the Physical Preamble Layer Would Have Been Regarded as a Serious Design Blunder

Even if it is were possible to move address information into the PLCP Preamble and have an operative system, such a modification would have been regarded as a serious design blunder by one of ordinary skill in the art. Understanding why such a modification would have been a serious blunder requires a more thorough understanding of the state of the network communication art at the time, which is set forth below.

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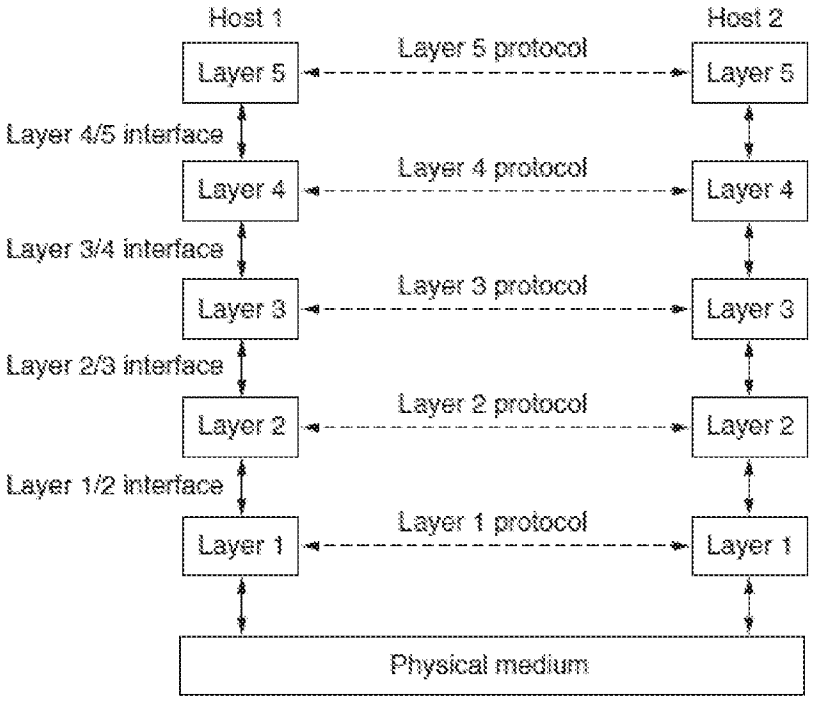
[35] Tanenbaum is well known for his computer science textbooks, which are regarded as standard texts in the field. His textbooks include: *Computer Networks,* co-authored with David J. Wetherall (1st ed. 1981, 2nd ed. 1988, 3rd ed. 1996, 4th ed. 2002, 5th ed. 2010); *Operating Systems: Design and Implementation,* co-authored with Albert Woodhull; *Modern Operating Systems*; *Distributed Operating Systems*; *Structured Computer Organization; Distributed Systems: Principles and Paradigms,* co-authored with Maarten van Steen. His books have appeared in over 175 editions and are used at universities around the world. *See,* en.wikipedia.org/wiki/Andrew_S._Tanenbaum.

[36] The cited portions of the 1996 textbook are provided as Exhibit F.

a. The State of the Art of Layered Network Protocol Hierarchies in 1997

In order to reduce design complexity and improve interoperability, by 1997 most networks were organized as a series of layers or levels, each one built upon the one below. Tanenbaum, at 17; Akl, at ¶ 156. The purpose of each layer is to offer certain services to the higher layers, shielding those layers from the details of how the offered services are actually implemented. *Id.* Each layer is like a virtual machine, offering services to the layer above it. *Id.* The fundamental idea is that a particular piece of software (or hardware) provides a service to its users but keeps the details of its internal state and algorithms hidden from them. *Id.* For illustration purposes, a generic five-layer protocol hierarchy is shown below. Virtual communication is shown by dotted lines and physical communication by solid lines:



Layer n on one machine (Host 1) carries on a virtual conversation with layer n on another machine (Host 2). The rules and conventions used in this conversation are collectively known as the layer n protocol. Basically, a protocol is an agreement between the communicating parties on how communication is to proceed. Violating the protocol would make communication more difficult, if not impossible. In reality, no data are directly transferred from layer n on one machine to layer n on another machine. Instead, each layer passes data and control information to the layer below it, until the lowest layer is reached. *See* Akl, at ¶ 157.

Layer interfaces are used to pass information between adjacent layers. As Andrew S. Tanenbaum wrote just a year before the priority date explained, it is important for each layer interface to be "clean," such that a change can be affected in some layer without the layers above it and below it even noticing:

> Between each pair of adjacent layers there is an interface. The interface defines which primitive operations and services the lower layer offers to the upper one. When network designers decide how many layers to include in a network and what each one should do, one of the *most important considerations is defining clean interfaces between the layers*. *Doing so, in turn, requires that each layer perform a specific collection of well-understood functions*. In addition to minimizing the amount of information that must be passed between layers, *clean-cut interfaces also make it simpler to replace the implementation of one layer with a completely different implementation* (e.g., all the telephone lines are replaced by satellite channels) because all that is required of the new implementation is that it offer exactly the same set of services to its upstairs neighbor as the old implementation did.

Tanenbaum, at 18 (emphasis added).

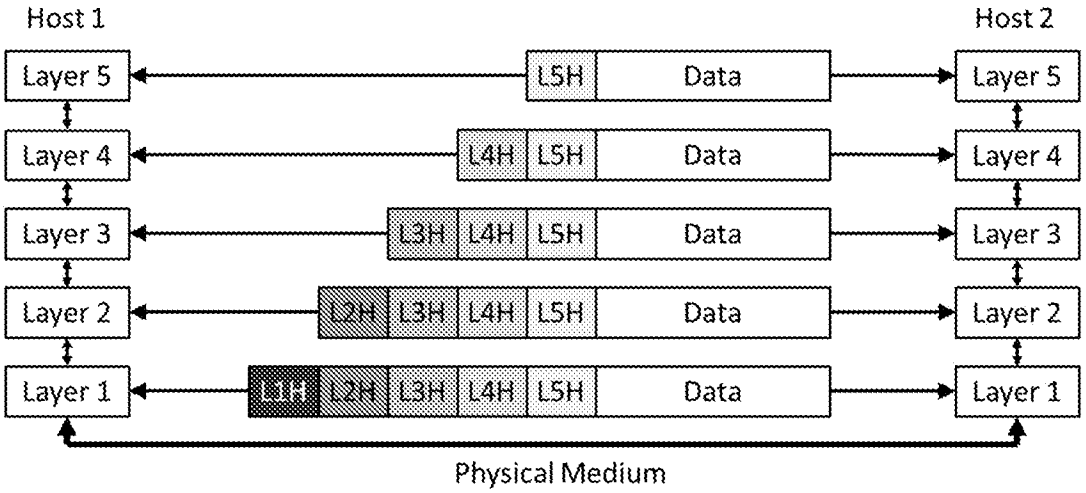
Thus, an aspect central to layered architectures is the design constraint requiring layer independence, which permits a "change in some layer without the layers above and below it even noticing." Layer independence results in the decoupling of "services" and "protocols." Significantly, any violation of such decoupling was regarded as a "***serious blunder***" by network

designers at the time. Tanenbaum at 9 (emphasis added). As Tanenbaum (writing a year before the priority date) explained:

> Services and protocols are distinct concepts, although they are frequently confused. This distinction is so important, however, that we emphasize it again here. A *service* is a set of primitives (operations) that a layer provides to the layer above it. The service defines what operations the layer is prepared to perform on behalf of it users, but it says nothing at all about how these operations are implemented. A service relates to an interface between two layers, with the lower layer being the service provider and the upper layer being the service user.
>
> A *protocol*, in contrast, is a set of rules governing the format and meaning of the frames, packets, or messages that are exchanged by the peer entities within a layer. Entities use protocols in order to implement their service definitions. They are free to change their protocols at will, provided they do not change the service visible to their users. In this way, the service and the protocol are completely decoupled.
>
> * * *
>
> *Many older protocols did not distinguish the service from the protocol*. In effect, a typical layer might have had a service primitive SEND PACKET with the user providing a pointer to a fully assembled packet. This arrangement meant that all changes to the protocol were immediately visible to the users. *Most network designers now regard such a design as a serious blunder*.

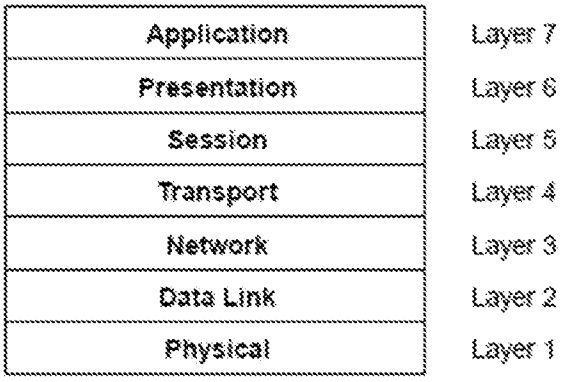
Tanenbaum, at 27-28 (emphasis added).

Finally, layered protocol hierarchies typically used data encapsulation to logically separate (or abstract) functions in each network layer. During encapsulation, each layer adds a header containing control information to the information from the layer above. Below is a diagram showing such encapsulation for the generic five-layer protocol hierarchy (discussed above). The header for each layer n is denoted "LnH":



b. The State of the Art of the OSI Model in 1997

The OSI model was a well-known seven-layer hierarchical networking framework developed in the late 1970s and early 1980s. As was the case with protocol hierarchies in general, in the OSI model, each layer is logically separated from higher and lower layers with clean, well-defined interfaces, only exchanging messages within a layer, and providing services to the next higher layer. Akl, ¶ 161. A diagram of the seven-layer OSI model is shown below:



In the OSI model, each layer has different and distinct network responsibilities. The first two layers (i.e., the physical layer and the data link layer) are pertinent to the Office's rejection

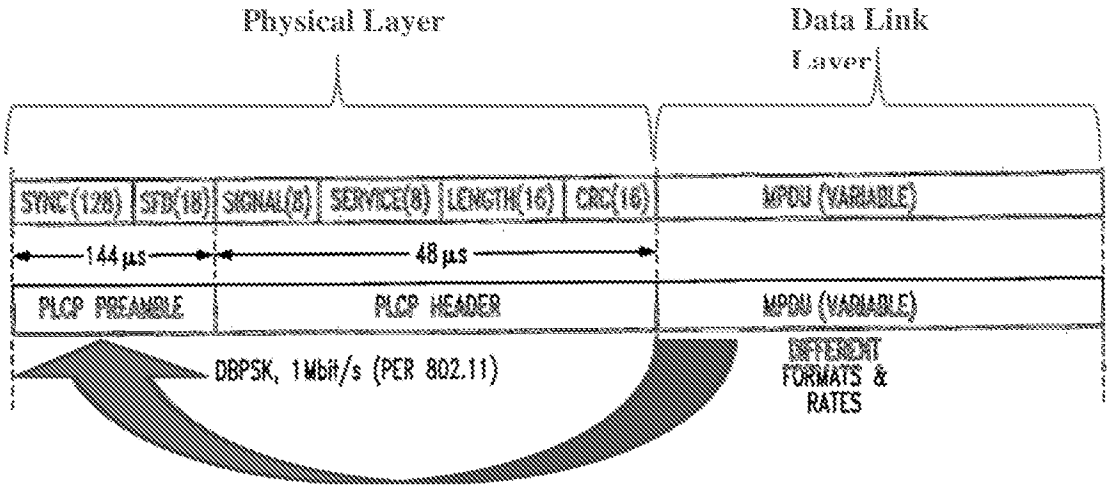
of claim 21, and are discussed in more detail below. *The task of the physical layer [layer 1] is to transmit "raw bits* over a communication channel." Tanenbaum, at 29 (emphasis added). Typical issues dealt with by the physical layer include:

- how many volts should be used to represent a 1 and how many for a 0,
- how many microseconds a bit lasts,
- whether transmission may proceed simultaneously in both directions,
- how the initial connection is established and how it is torn down …,
- how many pins the network connector has and what each pin is used for.

Tanenbaum, at 30. The datalink layer (Layer 2) includes two sublayers: the MAC sublayer which is closest to the physical layer, and the logical link control layer which is positioned between the MAC sublayer and the network layer (Layer 3). *The primary responsibility of the MAC sublayer is to define a device address, called a MAC address*, unique to each individual network interface. Thus, *in the OSI model, device addressing occurs at the data link layer rather than at the physical layer*. Akl, ¶ 162.

c. Moving Address Information from the Data Link Layer (Where It Resides in Snell and Boer) to the Physical Layer Would Have Been a Serious Design Blunder

As mentioned above, in both Snell and Boer the address information is included in a header in the MAC sublayer of the data link layer. This arrangement fails to meet the limitations of claim 21 because, the PLCP header and PLCP preamble (which the Office has mapped to the claimed "first information [in the first message] modulated according to a first modulation method") do not have the "first message address data" recited in claim 21. Recognizing this deficiency, the Office Action proposes that it would have been obvious to move the address information in Snell and Boer from the data link layer to the PLCP Preamble (in the physical layer), as shown diagrammatically below:



One of ordinary skill in the relevant art would *never* have implemented this proposed modification because the physical layer lacks functionality to know about MAC addresses, and if the MAC address does not go to the data link layer then that layer will not have the information it needs. Akl, at ¶ 164. More fundamentally, however, this proposed modification would amount to a merging of the physical and data link layers, and the coupling of services with protocols – a change that would have been regarded at the time as a "*serious blunder*." Tanenbaum, at 28 (emphasis added). The disparagement of such a modification in the contemporaneous literature represents a classic teaching away.

The reason that Bremer arrived at his system is because he identified and solved a fundamentally different problem than faced in any of the cited references. *See supra* at §§ V, IX.A.1; Akl, at ¶ 165. As described in the '228 Patent, and in stark contrast to the combination proposed by the Office, Bremer was concerned with modems that communicated using different

modulation types *at the physical layer*.[37] For example, Bremer envisioned a network where slaves that communicated at the physical layer using PSK could coexist in the same session with other slaves that communicated at the physical layer using QAM. '228 Patent, at 1:29-46, 2:1-23, 5:31-46. This stands in stark contrast to references like Snell and Boer, where all of the modems start off with the capability of communicating at the physical layer using the same one or more modulation methods, *e.g.*, BPSK. Far from the "serious design blunder" suggested by the Office Action, Bremer identified an elegant solution to a problem that was previously not even identified in the art. Akl, at ¶ 165.

d. If a Person of Ordinary Skill was Motivated to Implement Address Filtering with Snell/Boer, He Would Have Implemented This Functionality at the Data Link Layer

A person of ordinary skill would have understood that in Snell and Boer, the MAC portion of the packet contains device address information.[38] Akl, at ¶ 166. In keeping with the encapsulation scheme used in the OSI model, one of ordinary skill would have expected to find this address information in the header of the MAC sublayer in both Snell and Boer, as shown below. Akl, at ¶ 166.

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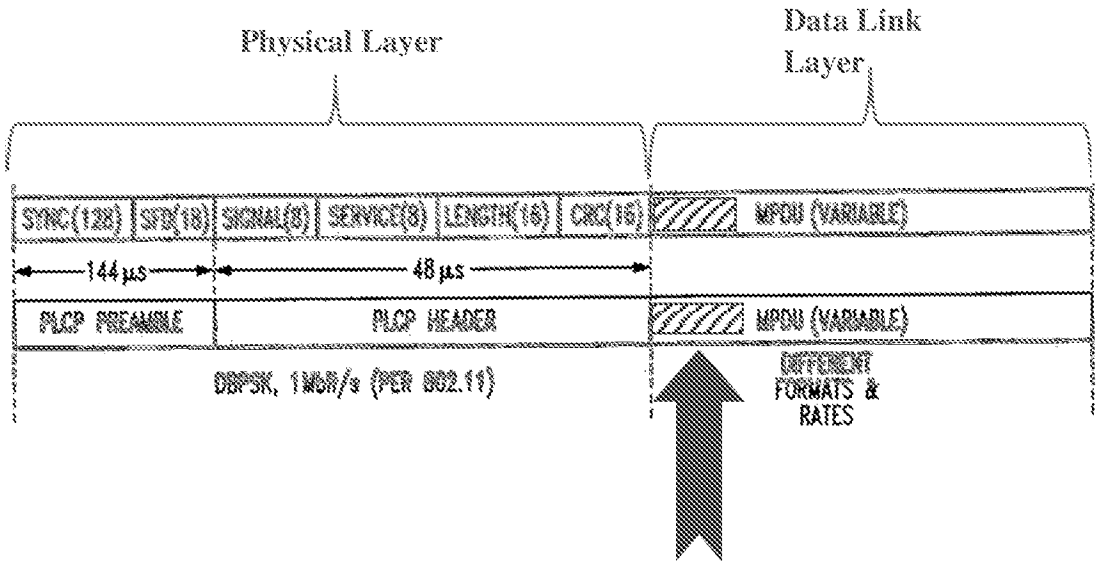
[37] *See* '228 Patent, Background, at 1:29-44 ("In existing data communications systems, a transmitter and receiver modem pair can successfully communicate only when the modems are compatible at the physical layer. … While the modems may be capable of using several different modulation methods, a single common modulation is negotiated at the beginning of a data session to be used throughout the duration of the session. Should it become necessary to change modulation methods, the existing data session is torn down, and a new session is negotiated using the new modulation method.").

[38] *See, e.g.,* Boer at col. 6, lines 28-31 ("The C-MST 132 determines if an incoming message is addressed to its own station, using a destination address included in data field 214."). At col. 3, lines 1-2, Boer defines "C-MST" as a "MAC control state machine."



MAC header with address information

If a person of ordinary skill had been motivated to implement the type of packet filtering suggested in the Office Action (*e.g.*, filtering packets which do not need to be demodulated),[39] a person of ordinary skill would have sought to implement this functionality *at the data link layer* in both Snell and Boer (rather than *at the physical layer*). Akl, at ¶ 167. Such an implementation would have permitted the filtering to occur after the address information was demodulated by the MAC sublayer, and could have been implemented without changing the functionality of the physical layer or violating any of the fundamental design tenants of the OSI model described above. Akl, at ¶ 167. Indeed, one need not even speculate about where (in the OSI stack) one of ordinary skill would have sought to implement such address filtering, because

[39] *See* May 3 Office Action at, e.g., 9-10 ("Yamano expressly teaches that including a destination address in the preamble portion of the data packet, which precedes the data portion, will advantageously reduce processing requirements of receiving devices because the receiving device can filter out packets which it does not need to demodulate.")

Boer et al. explains that it was in fact implemented *at the MAC sublayer*.[40] Of course, such an implementation does not meet claim 21 because, in that case, the PLCP header and PLCP preamble (which the Office has mapped to the claimed "first information [in the first message] modulated according to a first modulation method") would not have the "first message address data" required by claim 21. Akl, at ¶ 167.

e. The Cited References Would Not Have Enabled a POSITA to Make and Use the Invention

Moreover, the problems associated with moving address information into the preamble of Snell or Boer set forth above are evidence that the prior art would not have enabled a POSITA to make and use the invention, which requires that "the first information … comprise[] the first message address data" that "is indicative of the one of the one or more slave transceivers being an intended destination of the second information." *See, e.g., In re Kumar*, 418 F.3d 1361 (Fed. Cir. 2005).

5. Adding a Destination Address to the Preamble of Snell or Boer Would Have Frustrated the Goal of Increasing the Data Rate

Both Snell and Boer are silent regarding address information indicative of a destination slave transceiver for the second information.[41] Akl at ¶ 169. The Office instead relies on

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[40] *See, e.g.*, Boer at 6: 28-37 ("The C-MST 132 determines if an incoming message is addressed to its own station, using a destination address included in the data field 214 of the message 200. *If the address matches* … then assuming there is no error, *the C-MST forwards the data field 214 for further processing* in the station."). If the address did not match, the packet would not be processed further. Akl, ¶ 167, note 22.

[41] *See* Boer and Snell *passim*. *See also* May 3 Office Action at 9 ("APA in view of Boer did not teach as pertains to claim 21 "The master communication device as in claim 1, wherein the first information that is included in the first message comprises the first message address data.""), 17 ("Snell does not expressly disclose the first message comprises first message address information

Yamano as disclosing a destination address,[42] asserting that "[i]t would have been obvious … to use Yamano's teaching of including a destination address in the preamble portion of a data packet in implementing" the Snell/Boer data packet "to advantageously specify which receiver the data is intended for and to beneficially reduce the processing requirements at the receiving device, as taught by Yamano." May 3 Office Action at 10 and 18-19 (citing Yamano at 20:54-59). *See also id.* at 30, 40, 51. *See also* Akl, at ¶ 169.

Patent Owner respectfully disagrees. The goal of both Snell and Boer is to *increase the data rate* at which information is communicated.[43] However, the preambles of both Snell and

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that is indicative of the one of the one or more slave transceivers being an intended destination of the second information."), 39, and 64.

[42] May 3 Office Action at 9-10 (citing Yamano at Fig. 8, 19:63-64, 20:1-7, 20:54-59), 39-40 (citing Yamano at Fig. 8, 19:63-64, 20:1-7, 20:54-59), and 17-19. At the cited portions, Yamano discloses that its packet is in the preamble, *i.e.*, a packet 700 having a preamble 701 that "can include information which identifies … packet source and destination addresses." Yamano at 20:1-7. *See also id.* at 20:54-59 (disclosing that, "[w]hen the preamble in a burst-mode packet includes the destination address of the packet, the receiver circuits can monitor the destination address of the packet, and in response, filter packets which do not need to be demodulated, thereby reducing the processing requirements of the receiver circuits."), Fig. 8.

[43] *See, e.g.,* Boer at 1:16-29 (". . . there is being produced IEEE standard 802.11 . . . This standard specifies two possible data rates for data transmission, namely 1 Mbps (Megabit per second) and 2 Mbps. . . . However, it may be advantageous to provide systems operating at higher data rates . . . It is an object of the present invention to provide a method operating a wireless local area network station which enables communication between stations operation at different [i.e., higher] data rates." (parenthetical added)); and Snell at 2:24-25 ("permitting operation at higher data rates than conventional transceivers"), 2:28-29 ("permit operation at higher data rates"); 5:30-34 ("The present invention provides an extension of the PRISM 1 product from 1 Mbit/s BPSK and 2 Mbit/s QPSK to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK" and "allows the same RF circuits to be used for higher data rates."), 7:10-14 ("increase the data rate").

Boer are transmitted at the *lowest* (i.e., 1 Mbit/s) data rate.[44] Therefore, adding a destination address to the preambles of Snell and Boer would increase the amount of information *transmitted at the lowest data rate*, frustrating their common goal of *increasing the data rate*. Akl, at ¶ 170. For at least this reason, it would not have been obvious to one of ordinary skill in the relevant art to combine Yamano's teaching of a destination address in a preamble with Snell or Boer. *See* Akl, at ¶ 170.

6. Combining Boer with APA and Yamano or Snell with Yamano and Kamerman Would Have Frustrated Their Goal of Remaining Compliant with IEEE 802.11

As explained above, the disclosures of both Snell and Boer relate to an extension of the proposed IEEE 802.11 standard.[45] Significantly, while Snell and Boer may have been privy to the proposed standard through the involvement of their employers (Harris and Lucent) on the standard committee, there is no evidence that the proposed standard itself was publicly known at that time. In fact, the Office has already found that, as of the priority date of the '228 patent, the

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[44] Boer at 3:56-59 ("With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation.") and *Snell* at 6:64-66 ("The PLCP preamble and PLCP header are always at 1 Mbit/s, Diff encoded, scrambled and spread with an 11 chip barker. SYNC and SFD are internally generated."). *See also id.* at Fig. 3, 6:51-59, 7:10-14.

[45] *See, e.g.,* Boer at 1:16-25 (". . . there is being produced IEEE standard 802.11 . . . This standard specifies two possible data rates for data transmission, namely 1 Mbps (Megabit per second) and 2 Mbps. . . . However, it may be advantageous to provide systems operating at higher data rates . . . It is an object of the present invention to provide a method operating a wireless local area network station which enables communication between stations operation at different data rates."); and Snell at 1:47-50 (describing "a set of integrated circuits for a WLAN under the mark PRISM 1 which is compatible with the proposed IEEE 802.11 standard"); Snell at 5:30-32 (disclosing "an extension of the PRISM 1 product from 1 Mbit/s BPSK and 2 Mbit/s QPSK to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK"); and Snell at 4:42-43, 5:30-32 (describing "a wireless transceiver 30" that "may be readily used for WLAN applications in the 2.4 GHz ISM band *in accordance with the proposed IEEE 802.11 standard.*") (emphasis added).

draft IEEE 802.11 standard was not available to anyone outside the IEEE 802.11 Working Group:

> Notably absent … from the Petition and Mr. O'Hara's declaration are any assertions or evidence in support of the availability of Draft Standard to the public interested in the art. We do not find sufficient argument or evidence to indicate that the July 8–12 meeting of the 802.11 Working Group (or any other 802.11 Working Group meeting) was advertised or otherwise announced to the public. Nor do we find sufficient argument or evidence that any individual who was interested in the art would have known about Draft Standard such that he or she would have known to request a copy or ask to be added to an email list for access to the document.

Samsung Electronics Co. LTD v. Rembrandt Wireless Technologies, LP, IPR2014-00889, Paper No. 8 at 7-10 (PTAB December 10, 2014).[46]

In view of the above, it is clear that the Office's assertion that the draft IEEE 802.11 standard was "*available at that time*"[47] (May 3 Office Action at 25, 46) is incorrect. Moreover, the question of the lack of public availability of the draft standard has already been decided by the Office, and cannot be revisited in these reexamination proceedings.

Without access to the proposed IEEE 802.11 standard, one of ordinary skill reading Snell or Boer would know only that the proposed standard used a collision avoidance protocol (like CSMA), as that is the only protocol disclosed in Snell and Boer. Boer at 4:25-40 ("Referring to

[46] *See also Samsung Electronics Co. LTD v. Rembrandt Wireless Technologies, LP*, IPR2014-00514, Paper No. 18 at 7-8 (PTAB September 9, 2014); *Samsung Electronics Co. LTD. v. Rembrandt Wireless Technologies, LP*, IPR2014-00515, Paper No. 18 at 6-10 (PTAB September 9, 2014); *Samsung Electronics Co. LTD v. Rembrandt Wireless Technologies, LP*, IPR2014-00890, Paper No. 8 at 7-10 (PTAB December 10, 2014); *Samsung Electronics Co. LTD v. Rembrandt Wireless Technologies, LP*, IPR2014-00891, Paper No. 8 at 8-12 (PTAB December 10, 2014).

[47] "Snell and Kamerman are in the same field of art, with both relating to communications between transceivers that use BPSK and QPSK modulation methods to transfer data at different rates according to the draft IEEE 802.11 standard *available at that time*." May 3 Office Action at 25, 46 (emphasis added).

FIG. 1, it should be understood that the LAN 10 operates on a CSMA/CA (carrier sense multiple access with collision avoidance) protocol."); Snell at 5:23-29. Such a conclusion would have been buttressed by Kamerman, which similarly described the proposed standard only in the context of a CSMA/CA (carrier sense multiple access with collision avoidance) protocol. Kamerman at 006, 008, 012. *See also* Akl, at ¶ 173.

Despite the indications in Boer tying the proposed IEEE 802.11 standard to a collision avoidance protocol, it is the Office's position that, prior to combining Boer and Yamano, Boer would have been converted to a master/slave system (although it is not clear how that would be done). Again, assuming that were done, there would be no reasonable expectation that the Boer transceiver adapted to a master/slave system and combined with Yamano would function in accordance with the draft IEEE 802.11 standard, particularly when Boer discussed the proposed standard is only in connection with collision avoidance protocols associated with peer-to-peer systems. Akl, at ¶ 174.

Similarly, despite the indications in both Snell and Kamerman tying the proposed IEEE 802.11 standard to a collision avoidance protocol, it is the Office's position that, prior to combining Snell and Kamerman, Snell would have been converted to a master/slave system (although, again, it is not clear how that would be done). Assuming that were done, there would be no reasonable expectation that the Snell transceiver adapted to a master/slave system would function in accordance with the draft IEEE 802.11 standard, particularly when both Snell and Kamerman discussed the proposed standard only in connection with collision avoidance protocols associated with peer-to-peer systems. Akl, at ¶ 175.

In other words, it would not have been obvious to combine Boer with Yamano or Snell with Yamano and Kamerman *after adapting Snell and Boer to a master/slave system* because there is no evidence that Snell or Boer would remain compliant with the draft IEEE 802.11 standard. That would have discouraged the skilled artisan from making the suggested combination, as one of the intended purposes of Snell and Boer was to maintain compatibility with the proposed IEEE 802.11 standard. *See* Boer at 1:16-25; Snell at 1:47-50 ("PRISM 1 … is compatible with the proposed IEEE 802.11 standard"), 4:42-46 (a wireless transceiver 30 used "in accordance with the proposed IEEE 802.11 standard"), 5:30-32 ("[t]he present invention provides an extension of the PRISM 1 product"); Akl, at ¶ 176. Without access to any teachings of the proposed IEEE 802.11 standard, one of ordinary skill in the art would not have any reasonable expectation that the Snell/Boer transceiver would still act in accordance with the proposed IEEE 802.11 standard if it were modified to act in a master/slave relationship instead of a peer-to-peer relationship, such as a carrier sense multiple access with collision avoidance (CSMA/CA) relationship, and further modified in view of Yamano. Akl, at ¶ 176.

Accordingly, one of ordinary skill in the relevant art would have been discouraged from modifying the Snell/Boer transceiver as suggested by the Office without a reasonable expectation that it would function as intended, *i.e.*, in accordance with the proposed IEEE 802.11 standard. *See, e.g., In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (prior art reference "teaches away" from proposed modification because the prior art apparatus "would be rendered inoperable for its intended purpose"), cited in *In re Urbanski*, 809 F.3d 1237, 1243 (Fed. Cir. 2016) and MPEP § 2143.01(V) ("If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the

proposed modification."). *See also* Akl, at ¶ 177. Thus, it would not have been obvious to modify the Snell/Boer transceiver to act in the role of the master according to a master/slave relationship and then combine Boer as modified with Yamano or Snell as modified with Yamano and Kamerman. Akl, at ¶ 177.

Similarly, given that peer-to-peer communication systems, such as that described in Snell and Boer, are fundamentally different than master/slave systems (*see supra* at § VIII.A.1), one of ordinary skill in the art would have been further discouraged from making the proposed modifications of Snell and Boer as that fundamental difference would have weighed against having any reasonable expectation that Boer or Snell, as modified, would still act in accordance with the proposed IEEE 802.11 standard or would have provided predictable results. Akl, ¶ 178. *See also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (U.S. 2007) ("a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions"); *L.A. Biomedical Research Inst. at Harbor-UCLA Med. Ctr. v. Eli Lilly & Co.*, 849 F.3d 1049 (Fed. Cir. Feb. 28, 2017) (citing *Genzyme Therapeutic Prods. Ltd. P'ship v. Biomarin Pharm. Inc.*, 825 F.3d 1360, 1373 (Fed. Cir. 2016)) ("In the case of a combination of references that together disclose all the limitations of the claimed invention, the adjudicator must determine … whether a person of skill in the art at the time of the invention would have had a 'reasonable expectation of success' in pursuing that combination."); *PersonalWeb Techs., LLC v. Apple*, Inc., 848 F.3d 987 (Fed. Cir. Feb. 14, 2017) (citing *In re NuVasive, Inc.*, 842 F.3d 1376, 1381-82 (Fed. Cir. 2016); *In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333-34 (Fed. Cir. 2016); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1364-67 (Fed. Cir. 2015)) ("the Board had to find that a person of ordinary skill in the art would have been motivated to

combine the prior art in the way claimed … and had a reasonable expectation of success in doing so"); MPEP § 2143.02 (citing *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)) ("The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success."); MPEP § 2143.02 ("Obviousness does not require absolute predictability, however, at least some degree of predictability is required."); MPEP § 2143.01(III) (citing *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007)) ("The mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art.").

Thus, *even if* Snell and Boer were adapted to a master/slave system as the Office suggests (in spite of no motivation to do so), there is no evidence they could have been combined with Yamano and/or Kamerman and still conform to the draft IEEE 802.11 standard. In fact, the skilled artisan would have been discouraged from making such adaptations followed by the proposed combinations due to the potential loss of compliance with the standard (as well as the potential inoperability, removal of error detection functionality, frustration of goal of increasing data rate, and the suggestion that doing so would be a "serious design blunder"). Akl, at ¶ 179.

X. Rejection A is Improper

The Office has rejected claim 21 of the '228 Patent as allegedly unpatentable over the alleged APA in view of Boer and further in view of Yamano (Rejection A). May 3 Office Action at 8-10. In this rejection, the Office rejected claim 1 "for the reasons indicated in the Final Written Decision entered on September 24, 2105 [*sic*] (IPR2014-00892, Paper 46) as obvious over APA and Boer," May 3 Office Action at 8, and then asserted that "[i]t would have

been obvious … to use Yamano's teaching of including a destination address in the preamble portion of a data packet in implementing the modified Boer APA data packet." *Id.* at 10.

Rejection A is improper for the reasons set forth above in Section IX. That is, Rejection A is improper because it would not have been obvious to (i) adapt Boer to a master/slave system, *see supra* at § IX.A, or (ii) move destination address data to the preamble of Boer. *See supra* at § IX.B. Rejection A is additionally improper because (1) the Office relies improperly on portions of the '228 Patent as disclosing the claimed "master/slave relationship" and (2) the cited references do not disclose and would not have suggested the claimed "the second modulation method [that is] of a different type than the first modulation method."

A. No Master/Slave Relationship

In Rejection A, the Office relies on the PTAB's reasoning in the Final Written Decision in the '892 IPR, which is based on Figures 1 and 2 and col. 3:64-5:7 of the '228 Patent being Admitted Prior Art. '892 Final Decision at 13-14.[48] In particular, the PTAB relies on the alleged APA "for teaching of master/slave communications systems." *Id.* at 16. However, a number of the relied-on portions of the '228 Patent do not qualify as Admitted Prior Art for the reasons set forth above in Section VII. For example, the relied-on portions of the '228 Patent include descriptions of Fig. 8, which illustrate an embodiment of the invention, and are most certainly not admitted prior art. *See supra* § VII.A. In addition, the relied-on portions of the '228 Patent are not the work of another. *See supra* at § VII.B. Moreover, the alleged APA should not negate patentability because a number of the relied-on portions of the '228 patent represent the inventor's own foundational work product, from which he identified both a problem and a

[48] In the '892 IPR, the PTAB did not have the benefit of the Bremer Declaration (and it supporting evidence) when making its determination regarding the alleged APA.

solution to that problem. *See supra* at § VII.C. The other references in Rejection A (*i.e.*, Boer and Yamano) do not disclose and would not have suggested the claimed master/slave relationship. *See* Boer at 4:25-27 ("it should be understood that the LAN 10 operates on a CSMA/CA (carrier sense multiple access with collision avoidance) protocol"); Yamano at 19:21-53 ("the transmitter circuits … can transmit packets whenever necessary," which "may introduce collisions between packet information sent by the transmitter circuits"). Therefore, Rejection A is improper.

B. No Different Types of Modulation Methods

Claim 21 requires that "the second modulation method be[] of a *different type* than the first modulation method." Rejection A is improper because it adopts the reasoning of the PTAB in the Final Written Decision in the '892 IPR, which incorrectly interpreted "different type[s]" of modulation methods as "modulation methods that are incompatible with one another." '892 Final Decision at 13. Based on this incorrect interpretation, the PTAB found the DBPSK and either the DQPSK or the PPM/DQPSK of Boer correspond to the claimed "different type[s]" of modulation methods. *Id.* at 19.

As explained above, and confirmed by the Federal Circuit, the proper construction of "different types of modulation methods" is "*different families* of modulation techniques, *such as the FSK family* of modulation methods and the QAM family of modulation methods." *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, Docket No. 2016-1729 (Fed. Cir. April 17, 2017). *See also supra* at § IV.C (discussing the broadest reasonable interpretation of the claims). Under the proper construction, the DBPSK and either the DQPSK or the PPM/DQPSK of Boer do not correspond to the claimed "different type[s]" of modulation methods as DBPSK, DQPSK,

and PPM/DQPSK are all in the same PSK family. Akl, ¶ 184. As such, even if the alleged APA, Boer, and Yamano were combined in the proposed manner, the combination would not include the claimed "different type[s]" of modulation methods.

Further, even under the PTAB's overly broad claim construction in which it defines "different type[s]" of modulation methods to mean "modulation methods that are incompatible with one another," '892 Final Decision at 13, Rejection A fails because Boer does not disclose and would not have suggested any incompatibility problem whatsoever. The Office does not define the term "incompatible," but, in the context of the '228 Patent, first and second modulation methods may be incompatible when, for example, one modem using the first method cannot communicate with a second modem using the second method, *i.e.*, when no common modulation method is shared. *See* '228 Patent at 1:47-67; Akl at ¶ 185. Importantly, whether two modulation methods are incompatible, as used in the '228 Patent, cannot be considered in a vacuum but must be considered in the context in which term or phrase is used. *See* Akl, at ¶ 185. In the case of Boer, there is no issue of incompatible modulation methods because Boer relates to a peer-to-peer communication system where all devices use compatible modulation methods. *See* Boer at 4:25-27 ("it should be understood that the LAN 10 operates on a CSMA/CA (carrier sense multiple access with collision avoidance) protocol"); Akl at ¶ 185. Accordingly, the DBPSK and either the DQPSK or the PPM/DQPSK of Boer are not incompatible with one another.

XI. Rejections B and C are Improper

The Office has rejected claim 21 of the '228 Patent, *inter alia*, as allegedly unpatentable over Snell in view of Yamano and Kamerman (Rejection B) and allegedly unpatentable over

Snell in view of Harris 4064.4, Harris AN9614, Yamano, and Kamerman (Rejection C). Rejections B and C are improper for the reasons set forth above in Section IX. That is, Rejections B and C are improper because it would not have been obvious to (i) adapt Snell to a master/slave system, *see supra* at § IX.A, or (ii) move destination address data to the preamble of Snell. *See supra* at § IX.B. Rejections B and C are also improper because the cited references do not disclose and would not have suggested any of the following three claim limitations: (1) the "master/slave relationship," (2) "the second modulation method [that is] of a different type than the first modulation method," and (3) the "first message" and "second message."

A. No Master/Slave Relationship

Claim 21 requires "[a] master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device." In Rejections B and C, which are based on Snell, Yamano, Kamerman, and the Harris Documents,[49] to address the master/slave relationship requirement, the Office asserted that:

> Snell discloses a master communication device (transceiver 30) that serves as an access point for communicating data with other transceivers connected to a wireless local area network (WLAN) and is configured to communicate with one or more slave transceivers (end users connect to LAN through transceivers) according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device. *See, e.g.*, Snell at 1:34-46, 1:47-50, 1:55-57, 2:27-30, 4:42-47, 5:18-21; Harris AN9614 at 3.

[49] In Rejection B, the Office relies on the Harris Documents as incorporated by reference into Snell. May 3 Office Action at 10. In Rejection C, the Office relies (additionally or alternatively) on the Harris Documents as "independent references from Snell." *Id.* at 33.

...

With respect to the 'slave communication from a slave device to the master communication device occurring in response to a master communication from the master communication device to the slave device', Snell teaches the master (access point transceiver) communicates with slave transceivers on the WLAN via **polled protocol**. A **polled protocol** is a master/slave protocol as confirmed by the '228 patent, '228 patent at 4:30-34 where the slave is given permission to transmit on the network.

Snell incorporates by reference Harris AN96145 [], which discloses that the communications between transceivers can operate according to a polled (i.e., master/slave) protocol, which is a master/slave communication system.[6 [or 11]] *See e.g.*, Harris AN9614 at 3.

[Footnotes 6 and 11:] A polled protocol is a master/slave protocol, as confirmed by the '228 patent. '228 patent at 4:30-34. *See also* IPR2014-00892, Pap. 46 at 16 ("In [a polling] protocol, a centrally assigned master periodically sends a polling message to slave nodes, giving them explicit permission to transmit on the network."); '228 Prosecution History at 352; IPR2014-00892, Ex. 1323 (Goodman Declaration) Para124.

May 3 Office Action at 11-12, 30-31 (emphasis in original). In addition, in Rejection C, the Office asserts that:

One of ordinary skill in the art would have additionally been motivated and found it obvious and straightforward to use Harris AN9614's teaching of a polled (master/slave) protocol in implementing the communication system taught by Snell (in light of Harris 4064.4). Harris AN9614 is incorporated by reference into Snell (Snell at 5:2-7), both references are directed to the PRISM chipset and HSP 3824 baseband processor (Harris AN9614 at 1, 2; Snell at 1:47-63, 5:8-17, 5:31-33), and Harris AN9614 is a publication of Harris Corporation, the same original assignee of Snell. Moreover, AN9614 expressly teaches that it is beneficial to use a polled (master/slave) protocol because "the average power consumption of the radio can be reduced by more than an order of magnitude while meeting all data transfer objectives." Harris AN9614 at 3.

Polling (master/slave) enables this reduction in power consumption because "the system can be set at its sleep mode most of the time to achieve low power consumption. It only needs to operate at full power consumption during the transmission of a packet or during the expected window for received packets." Harris AN9614 at 3. In addition to Snell's express suggestion to apply Harris AN9614's disclosures, one of ordinary skill in the art would have been motivated

> to use Harris AN9614's teaching of a polled (master/slave) protocol in implementing Snell's communication system (implemented in light of Harris 4064.4, *see supra)* because a polled (master/slave) communication system advantageously provides a simple protocol that has good determinacy *(e.g.,* a reduction in collisions). It would have been routine for one of ordinary skill in the art to use a polled (master/slave) protocol in implementing Snell's communication system (as implemented in light of Harris 4064.4), as master/slave communication systems were common and well-known in the art (*see* '228 patent at 3: 64- 5:7), and thus implementing a polled (master/slave) protocol in Snell's transceiver (which serves as an access point to support communications with multiple other transceivers - Snell at 1:34-46) would involve nothing more than using common and known techniques to improve a similar system in the same way to yield predictable results. *KSR,* 550 U.S. at 416. One of ordinary skill in the art would have thus recognized that this combination (yielding the claimed limitation) would have worked as expected. For these reasons, one of ordinary skill in the art would have been motivated and found it obvious and straightforward to implement a polled (master/slave) protocol in implementing Snell's system (as implemented in light of Harris 4064.4).

May 3 Office Action at 33-34.

The Office's reliance on reduction of the average power consumption of the radio as providing a motivation for using the polled scheme of Harris AN9614 fails because, as stated in Harris AN9614, "[e]ven using the 802.11 network protocols, the low data rate can allow low average power operation." Harris AN9614, at 3. As described in Boer and Snell, the 802.11 network protocol used CSMA rather than a polled scheme. Given that the reduced power consumption feature already applied in the 802.11 (CSMA) context, it could not have provided a motivation for switching from that protocol to polled scheme of Harris AN9614 as suggested.

Rejections B and C also fail because they rely on the "polled scheme" discussion on page 3 of Harris AN9614 as being incorporated by reference into Snell, May 3 Office Action at 10, 31, and Rejection C relies (additionally or alternatively) on Harris AN9614 as an "independent reference[] from Snell." *Id.* at 33. For the reasons set forth above in Sections VI and VIII.A.2, Snell did not successfully incorporate Harris AN9614 (or at least the "polled scheme" discussion

on page 3 thereof).[50] For the reasons set forth above in Sections VI.A, Harris AN9614 does not qualify as prior art because the evidence is not sufficient to establish that it was published. In addition, for the reasons set forth above in Sections VIII.A.1 and VIII.A.3, neither Snell nor Harris AN9614 discloses or would have suggested the claimed master/slave relationship (or even mentions the words "master" or "slave").[51] Significantly, Harris AN9614 discloses the "polled scheme" in the context of peer-to-peer communications (which is the topic being discussed in Snell and Harris AN9614), not master/slave communications. *See* Akl, at ¶¶ 104, 188. Not even with hindsight would one of ordinary skill in the relevant art have surmised the polled scheme of Harris AN9614 as being used in a context other than peer-to-peer communications. *Id.* at ¶ 104, 188. *See also supra* at §§ IX.A.1.

B. No Different Types of Modulation Methods

Claim 21 requires that "the second modulation method be[] of a *different type* than the first modulation method." As explained above, and confirmed by the Federal Circuit, the proper construction of "different types of modulation methods" is "*different families* of modulation techniques, *such as the FSK family* of modulation methods and the QAM family of modulation methods." *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, Docket No. 2016-1729 (Fed. Cir.

[50] Harris AN9614 is not prior art and thus, legally, could not have been incorporated by reference. In addition, the portions of Harris AN9614 that Snell attempted to incorporate by reference have nothing to do with a master/slave relationship and are found on the first two pages of Harris AN9614, not the page relied on by the Office. *See supra* at § VI.

[51] With respect to page 3 of Harris AN9614, Rembrandt notes (1) Harris AN9614 is not prior art and thus, legally, could not have been incorporated by reference and (2) the portions of Harris AN9614 that Snell attempted to incorporate by reference have nothing to do with a master/slave relationship and are found on the first two pages of Harris AN9614, not the page relied on by the Office. *See supra* at § VI.

April 17, 2017). *See also supra* at § IV.C (discussing the broadest reasonable interpretation of the claims).

In the Office's Rejections B and C, the Office asserts that the "different type" limitation is met by the two PSK formats disclosed, namely the BPSK and QPSK formats of Snell, the DBPSK and DQPSK formats of Snell, or the DBPSK and DQPSK formats of Harris 4064.4. *See* May 3 Office Action at 20 ("Snell discloses … a 'first modulation method' (*e.g.*, BPSK) and a 'second modulation method' (*e.g.*, QPSK) that is 'of a different type than the first modulation method.'"), 22 ("Snell .. alternatively describes that the 'first modulation method' may be differential BPSK ('DBPSK') and that the 'second modulation method' may be differential QPSK ('DQPSK'), which is also a different 'type' than the first modulation method."), 22-23 (quoting Harris 4064.4's disclosure of DBPSK and DQPSK). The Office's assertion fails under the proper construction of "different type," as there can be no dispute that BPSK and QPSK (and DBPSK and DQPSK)[52] are in the same PSK family. Akl, ¶ 190. None of the cited references (*i.e.*, Yamano, Kamerman, Harris AN9614, and Harris 4064.4) cures this deficiency. *Id.*

Further, even under the Office's overly broad claim construction in which it defines "different type[s]" of modulation method to mean "modulation methods that are incompatible with one another," May 3 Office Action at 6, the Office's rejection fails. None of the cited references (*i.e.*, Snell, Yamano, Kamerman, Harris AN9614, and Harris 4064.4) discloses or would have suggested any incompatibility problem whatsoever. The Office does not define the term "incompatible," but, in the context of the '228 Patent, first and second modulation methods

[52] With respect to DBPSK and DQPSK, the inclusion of "D" (Differential) does not change the family in which the modulation method falls. They remain in the same family. Akl, at ¶ 190, note 32.

may be incompatible when, for example, one modem using the first method cannot communicate with a second modem using the second method, *i.e.*, when no common modulation method is shared. *See* '228 Patent at 1:47-67; Akl at ¶ 191. Importantly, whether two modulation methods are incompatible, as used in the '228 Patent, cannot be considered in a vacuum but must be considered in the context in which term or phrase is used. *See* Akl, at ¶ 191.

The lack of any incompatibility problem faced in the cited references explains why none of Snell, Yamano, Kamerman, Harris AN9614, and Harris 4064.4 discloses the invention claimed in the '228 Patent. The '228 Patent identified and solved an incompatibility problem in a *master/slave setting* and was specific to a master/slave setting when a master attempts to communicate with a slave using an incompatible modulation method. The *peer-to-peer* communications systems described in the cited references were not faced with that problem. Instead they were faced with different problems that resulted from the fundamentally different ways their peer-to-peer systems accessed the shared medium. Akl, at ¶¶ 94-99, 192. Those "fundamentally different ways" involve peer-to-peer communications, such as CSMA and CDMA types, instead of those between a master and a slave. Akl, at ¶ 192. *See also supra* at §§ V, IX.A.1.

More specifically, the problems Snell, Yamano, Kamerman, and Harris 4064.4 were facing and attempting to address as the result of peer-to-peer communications, while at the same time attempting to increase date rates for communications between the stations, were, e.g., collisions, interference, and the like. *See, e.g.*, Snell at 1:64-2:19 (describing a problem with prior art DSSS), 2:22-30 (summarizing Snell's solution to the problem), 3:40-43 (discussing the need for a "clear channel"), 5:23-29 (identifying how "to avoid data collisions"), 5:54-59

(identifying how to "combat multi-path and reduce the effects of interference"); Yamano at 11:62-12:9 (explaining the interference problem), 19:21-36 (explaining how to address the collision problem using CSMA system); Kamerman at 6 (explaining how CSMA/CA "is designed to reduce the collision probability between multiple stations"), 11 (discussing the problem "due to mutilation of transmissions by interference"). Akl, at ¶ 193.

For these reasons, even under the Office's overly broad claim construction, the cited references neither identify nor address incompatible modulation methods, as are addressed in the '228 Patent in a master/slave setting when attempting to allow a master to communicate using different, incompatible modulation methods. Akl, at ¶¶ 78-99. Thus, they do not disclose and would not have suggested the problem of incompatible modulation methods, let alone the claimed solution to that problem provided in the '228 Patent. Without recognition of the incompatibility problem created by incompatible modulation methods in a master/slave setting, one skilled in the art would not have turned to any of the peer-to-peer disclosures in the cited references to solve that problem. Akl, at ¶¶ 191-194.

C. No First and Second Messages

Claim 21 requires a master transceiver configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising "third information" and "fourth information." The cited references do not disclose and would not have suggested the claimed master transceiver configured to transmit the first and second messages. Akl, at ¶¶ 196-206.

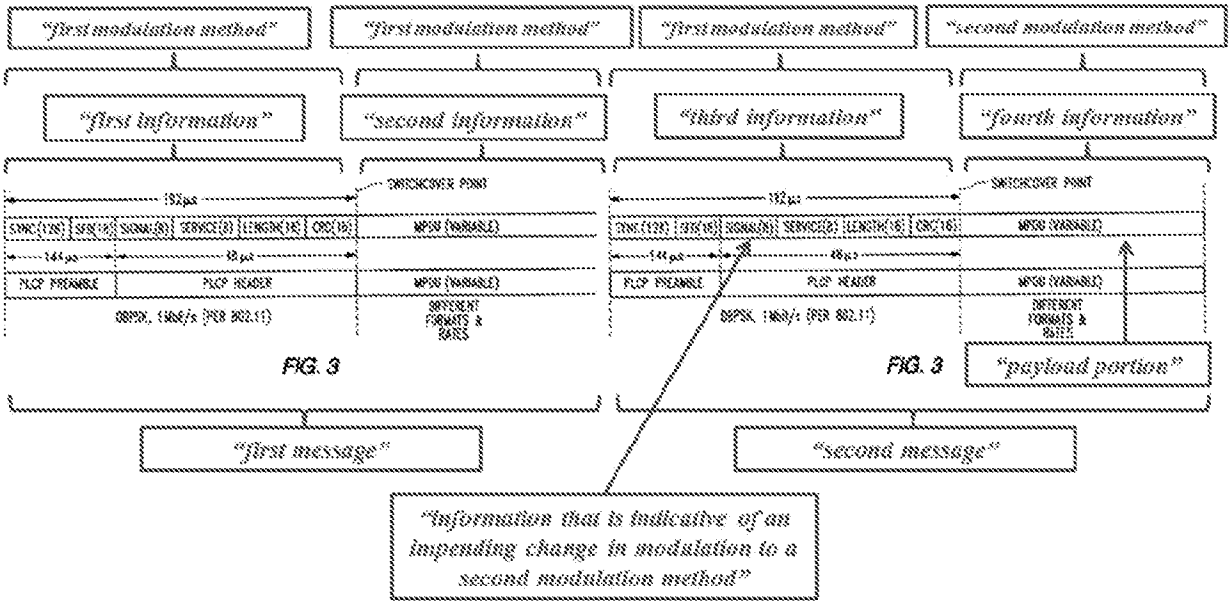
The reason why Snell, Yamano, Kamerman, Harris AN9614, and Harris 4046.4 do not teach and would not have suggested the claimed invention is because of the fundamentally

different systems and the very different problems/solutions presented due to those fundamental differences. *See* the discussion *supra* at §§ V, VIII.A.1, IX.A.1; Akl, at ¶¶ 94-99, 137. Only through a contrived application of disclosures in the prior art peer-to-peer communication systems is the Office able to arrive at the invention claimed in the '228 Patent, which includes a master transmitter configured to transmit the claimed "fourth information" intended for a slave transceiver and modulated according to the second modulation method that is incompatible with the modulation method used by other slave transceivers in the master/slave system. *See id.* at 196.

Although Snell discloses a peer-to-peer communication system (*see supra* §§ VIII.A.1, IX.A.1), the Office asserts that:

> … Snell discloses that the transceiver transmits data packets to multiple different end user slave transceivers, as such multiple messages of format shown in figure 3 are provided to the slave transceivers and where the communication may switch on-the-fly between a 'first modulation method' (*e.g.*, BPSK) and a 'second modulation method' (*e.g.*, QPSK) that is 'of a different type than the first modulation method.' **Snell thus teaches transmitting a 'first message' and a 'second message' as shown in annotated Figure 3 below.** *See, e.g.*, Snell at 1:34-46, 1:47-50, 1:55-57, 2:27-30, 2:61-66, 7:1-2, 7:5-14, Fi s. [*sic*] 2, 3, 5; Harris AN9614 at 3; Harris 4064.4 at 14-16, Fig. 10.

May 3 Office Action at 20, 41 (emphasis in original). The "annotated" version of Fig. 3 is reproduced below:



In particular, the Office creates two instances of Fig. 3 of Snell and then uses hindsight to assign "0Ah" and "14h" to the SIGNAL fields of the PLCP header of the first and second instances of Fig. 3, respectively. *See* May 3 Office Action at 20-21, 41-42. The Office posits that the first and instances of Fig. 3 correspond to the claimed "first message" and "second message," respectively. *Id.* The Office posits that the PLCP preamble and PLCP header (with SIGNAL field using 0Ah) of the first instance of Fig. 3 correspond to the claimed "first information," that the MPDU data of the first instance of Fig. 3 corresponds to the claimed "second information," that the PLCP preamble and PLCP header (with SIGNAL field using 14h) of the second instance of Fig. 3 correspond to the claimed "third information," and that the MPDU data of the second instance of Fig. 3 corresponds to the claimed "fourth information." *Id.* *See also* Akl, at ¶ 198.

However, Snell never teaches or suggests the specific first and second instances of Fig. 3 (*i.e.*, a first instance having a code 0Ah in the SIGNAL field and a second instance having a code

14h in the SIGNAL field) relied upon by the Office. That is, nowhere does Snell explicitly or inherently teach two different instances of Fig. 3—much less a first instance of Fig. 3 with an MPDU data field modulated using BPSK and an immediately subsequent second instance of Fig. 3 with an MPDU data field MPDU data field modulated using QPSK. Snell does not disclose and would not have suggested different versions of its Fig. 3 combined in the way the Office has attempted to combine them without using hindsight, *i.e.*, in view of the teachings of the '228 Patent. *See* Akl, at ¶ 199.

Moreover, Snell discloses "switch[ing] on-the-fly between different data rates and/or formats," Snell at 2:29-30, but not in the manner claimed or for the reason behind the claim 21 of the '228 patent. More specifically, the ability of Snell's transceiver to "switch on-the-fly" is not a teaching of sending multiple messages in the signal format shown in Fig. 3 that switch from using a first modulation method for the MPDU data portion of a first message to using a second modulation method for the MPDU data portion of the second message, as the Office posits. *See* Snell at Fig. 3. To the contrary, the on-the-fly switching of Snell relates to a modulation switch between the PLCP header and the MPDU variable data portion within a single message having the format shown in Fig. 3. *See* Snell at Fig. 3 (clearly showing the "switchover point" to be between the PLCP header and the MPDU variable data portion *within* the illustrated signal format), 3:18-20 ("The carrier tracking loops permit switching to the desired format *after the header* and on-the-fly." (emphasis added)), 7:10-14 ("The *variable data* may be modulated and demodulated in *different formats than the header portion* to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." (emphasis added)). Snell does not disclose and would not have suggested first and second messages each

having the signal format shown in Fig. 3 and having MPDU data portions modulated using different methods. Snell certainly does not disclose and would not have suggested the specific first and second instances of Fig. 3 that the Office created using the claimed invention as a roadmap. *See* Akl, at ¶ 200.

Accordingly, Snell does not disclose and would not have suggested that Snell's transceiver is a master transceiver configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising "third information" and "fourth information," as required by claim 21 of the '228 Patent. *See* Akl, at ¶ 201.

Neither Yamano nor Kamerman discloses or would have suggested the claimed first and second messages including the claimed first through fourth information. Yamano is only applied for its disclosure of a destination address in an effort to provide the claimed first and second message address information, *see* May 3 Office Action at 17-19, 27-28, 30, 39-40, 49-51, so it will not be further discussed here. *See* Akl, at ¶ 202.

As to Kamerman, the Office concludes that "[o]ne of ordinary skill in the art … would have been motivated and found it obvious and straight forward to use Kamerman's teaching of transmitting a first data packet where the data is modulated using a first modulation method and next transmitting a second data packet where the data is modulated using a second modulation method in implementing Snell's system for communicating data packets modulated according to different modulation methods … to advantageously maximize the data transfer rate and adapt to changing channel conditions (as also taught by Kamerman)." May 3 Office Action at 24, 46 (citing Kamerman at 6, 11-12).

Kamerman discloses a transmission rate that "falls back" during higher load conditions and that "goes up" during load conditions that occur "most of the time." Kamerman at 11. There is no teaching or suggestion that it would "fall back" to address an incompatibility issue when a master – which it does not have and would not have suggested – wants to communicate with a slave –which it does not have and would not have suggested. Further, Kamerman is completely silent about how the transceiver would indicate changes to the transmission rate. *See* Akl, at ¶ 204.

Notably, maximizing the data transfer rate and adapting to changing channel conditions in a peer-to-peer communications system – an objective of Kamerman -- would not have provided the solution to the master/slave incompatibility problem identified and claimed in the '228 Patent, *i.e.*, it would not have provided "a master transceiver" configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising "third information" and "fourth information," wherein "the third information comprises information that is indicative of an impending change in modulation to a second modulation method," as required by claim 21 of the '228 Patent. *See* Akl, at ¶ 205.

Instead, if Snell were modified in the proposed manner (*i.e.*, implementing Kamerman's automatic rate selection in Snell's system), Snell's transceiver would increase the transmission rate during lower load periods (e.g., as indicated by "a number … of successive correctly acknowledged packet transmissions") and would decrease the transmission rate during higher load periods (e.g., as indicated by "unacknowledged packet transmissions"). *See* Kamerman at 11; Akl, at ¶ 206. Such modification would not provide the claimed first and second messages with the claimed first through fourth information, as Kamerman's rationale as to when to change

modulation methods has nothing to do with making a change in modulation method so that a master can communicate with a particular slave using a different type of modulation method to address a potential incompatibility issue. For that reason alone, one of ordinary skill would not have been motivated by Kamerman to vary the modulation method when needed to address the '228 Patent incompatibility problem as done in the '228 Patent, *i.e.*, to provide "a master transceiver" configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising "third information" and "fourth information," wherein "the third information comprises information that is indicative of an impending change in modulation to a second modulation method," as required by claim 21 of the '228 Patent. *See* Akl, at ¶ 206.

XII. Rejection D is Improper

The Office has rejected claim 21 of the '228 Patent as allegedly unpatentable over Snell in view of Harris 4064.4, the alleged APA, Upender, Yamano, and Kamerman (Rejection D). May 3 Office Action at 51-76. In part, that is because the Office is relying on 7 references/documents to support its Rejection D of claim 21 of the '228 Patent. While the use of multiple documents to support a rejection is permitted, Rejection D is improper because the Office has not satisfactorily identified what would have motivated the skilled artisan to combine the references in the way the Office has done through the use of hindsight. May 3 Office Action at 51-76. *See also* Akl, at ¶ 129-130. In addition, Rejection D is improper for the reasons set forth above in Section IX. That is, Rejection D is improper because it would not have been obvious to (i) adapt Snell to a master/slave system, *see supra* at § IX.A, or (ii) move destination address data to the preamble of Snell. *See supra* at § IX.B. Rejection D is also improper

because (1) the Office relies improperly on portions of Harris AN9614 and the '228 Patent as disclosing the claimed "master/slave relationship" and (2) the cited references do not disclose and would not have suggested the claimed "the second modulation method [that is] of a different type than the first modulation method." Akl, at ¶¶ 207-215.

A. No Master/Slave Relationship

In Rejection D, the Office relies on Snell and Harris AN9614 as disclosing the claimed "master/slave relationship." May 3 Office Action at 53-53 (citing Snell at 1:34-46, 1:47-50, 1:55-57, 2:27-30, 4:42-47, 5:18-21; Harris AN9614 at 3). For the reasons set forth above in Section VIII.A, the cited portions of Snell and Harris AN9614 do not disclose and would not have suggested the claimed master/slave relationship. With respect to Harris AN9614, Patent Owner notes (1) Harris AN9614 is not prior art and thus, legally, could not have been incorporated by reference and (2) the portions of Harris AN9614 that Snell attempted to incorporate by reference have nothing to do with a master/slave relationship and are found on the first two pages of Harris AN9614, not page 3, the page relied on by the Office. *See supra* at §§ VI & VIII.A.2. In addition, the claimed "master/slave relationship" is neither the same as nor inherent in the "polled scheme" of Harris AN9614 and would not have been suggested by Harris AN9614. Significantly, Harris AN9614 uses the polled scheme in the context of peer-to-peer communications (as opposed to master/slave communications). *See supra* at § VIII.A.3.

The Office additionally relies on the alleged APA (*i.e.*, Figures 1 and 2 and col. 3:64-5:7 of the '228 Patent) as disclosing the claimed master/slave relationship. May 3 Office Action at 53-56. However, the relied-on portions of the '228 Patent do not qualify as Admitted Prior Art for the reasons set forth above in Section VII.

The Office posits that, based on the teachings of Harris AN9614, the alleged APA, and Upender, it would have been obvious to implement the communication system of Snell using a master/slave communication protocol. May 3 Office Action at 62-64. Patent Owner respectfully disagrees because (1) Harris AN9614 is not prior art, *see supra* at § VI.A-B, (2) the relied-on portions of the '228 Patent do not qualify as Admitted Prior Art, *see supra* at § VII, (3) Upender would have discouraged the skilled artisan from modifying Snell in the proposed manner, *see supra* at § IX.A.3, (4) the "polled scheme" disclosure in Harris AN9614 is limited to "single rate" applications as opposed to applications involving more than one modulation method, *see infra* at § IX.A.2, and (5) the peer-to-peer systems of Snell, Kamerman, and Yamano are fundamentally different than a master/slave system and were not faced with the incompatibility problem solved by the '228 Patent. *See supra* at §§ V.B-C, IX.A.1.

Moreover, the Office's reliance on reduction of the average power consumption of the radio as providing a motivation for using the polled scheme of Harris AN9614 fails because, as stated in Harris AN9614, "[e]ven using the 802.11 network protocols, the low data rate can allow low average power operation." Harris AN9614, at 3. As described in Boer and Snell, the 802.11 network protocol used CSMA rather than a polled scheme. Given that the reduced power consumption feature already applied in the 802.11 (CSMA) context, it could not have provided a motivation for switching from that protocol to polled scheme of Harris AN9614 as suggested.

B. No Different Types of Modulation Methods

Claim 21 requires that "the second modulation method be[] of a *different type* than the first modulation method." As explained above, and confirmed by the Federal Circuit, the proper construction of "different types of modulation methods" is "*different families* of modulation

techniques, such as the FSK family of modulation methods and the QAM family of modulation methods." *Rembrandt Wireless Tech. v. Samsung Elec. Co.*, Docket No. 2016-1729, Slip op. at 6-9 (Fed. Cir. April 17, 2017). *See also supra* at § IV.C (discussing the broadest reasonable interpretation of this limitation in claim 21).

In the Office's Rejection D, the Office posits that the "different type" limitation is met by two PSK formats, namely the BPSK and QPSK formats of Snell, the DBPSK and DQPSK formats of Snell, or the DBPSK and DQPSK formats of Harris 4064.4. *See* May 3 Office Action at 67 ("Snell discloses … a 'first modulation method' (*e.g.*, BPSK) and a 'second modulation method' (*e.g.*, QPSK) that is 'of a different type than the first modulation method.'"), 69 ("Snell … alternatively describes that the 'first modulation method' may be differential BPSK ('DBPSK') and that the 'second modulation method' may be differential QPSK ('DQPSK'), which is also a different 'type' than the first modulation method."), 69-70 (quoting Harris 4064.4's disclosure of DBPSK and DQPSK). The Office's position cannot be maintained under the proper construction of "different type," as there can be no dispute that BPSK and QPSK (and DBPSK and DQPSK) are in the same PSK family. Akl, ¶ 213.

Further, even under the Office's overly broad claim construction in which it defines "different type[s]" of modulation method to mean "modulation methods that are incompatible with one another," May 3 Office Action at 6, the Office's rejection fails for the reasons set forth above in Section XI.B.

C. No First and Second Messages

Claim 21 requires a master transceiver configured to transmit (i) "a first message" comprising "first information" and "second information" and (ii) "a second message" comprising

"third information" and "fourth information." The Office again relies on a contrived application of the peer-to-peer communication systems of the cited references, which is shown in the "annotated" version of Fig. 3 of Snell. May 3 Office Action at 66-72. For the reasons set forth above in Section XI.C with respect to Rejections B and C, the cited references do not disclose and would not have suggested the claimed master transceiver configured to transmit the first and second messages. Akl, at ¶¶ 196-206, 215. For instance, Snell never teaches or suggests the specific first and second instances of Fig. 3 (*i.e.*, a first instance having a code 0Ah in the SIGNAL field and a second instance having a code 14h in the SIGNAL field) relied upon by the Office, the remaining references do not remedy the deficiencies of Snell, and it would not have been obvious to modify Snell in the proposed manner.

XIII. Relief Requested

Based on the above, Patent Owner respectfully requests the Office to withdraw all of its rejections of claim 21 of the '228 Patent and issue a reexamination certificate confirming its patentability.

XIV. Litigation

Pursuant to 37 C.F.R. § 1.565(a), Patent Owner hereby informs the Office of prior and concurrent proceedings in which the patent is or has been involved by listing them in Exhibit A.

Respectfully submitted,

Date: August 14, 2017 By: /Michael V. Battaglia/

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CERTIFICATE OF SERVICE

It is hereby certified that on this 14th day of August, 2017, the foregoing **RESPONSE TO OFFICE ACTION** was served, by first-class U.S. Mail, on the attorney of record for the third-party Requesters Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., at the following address:

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Electronic Acknowledgement Receipt

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Application Number:	90013809
International Application Number:	
Confirmation Number:	7821
Title of Invention:	SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS
First Named Inventor/Applicant Name:	8457228
Customer Number:	6449
Filer:	Michael Vincent Battaglia/Judith Pennington
Filer Authorized By:	Michael Vincent Battaglia
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reexam Miscellaneous Incoming Letter	ExhibitA.pdf	57436 c6157e93a190eee4c4f24407fadce250d496eada	no	7

Warnings:

Information:					
2	Reexam Miscellaneous Incoming Letter	ExhibitC.pdf	745101 812d25b0ace31cff710a459453406f1bab7807d3	no	58
Warnings:					
Information:					
3	Reexam Miscellaneous Incoming Letter	ExhibitE.pdf	8236239 cd547192e4fc631222b651301fc6fdf3ff537e34	no	10
Warnings:					
Information:					
4	Reexam Miscellaneous Incoming Letter	ExhibitF.pdf	6005048 36d67bd710ef5bfa6d48063392a940c21ed689aa	no	10
Warnings:					
Information:					
5	Reexam Miscellaneous Incoming Letter	AklDeclaration.pdf	3965766 db6e19e06c717d811c71322ae634477980eff228	no	141
Warnings:					
Information:					
6	Reexam Miscellaneous Incoming Letter	BremerDeclaration.pdf	1058193 b940c0476e956c2b988c273c05ce16452fdcbc7d	no	5
Warnings:					
Information:					
7	Reexam Miscellaneous Incoming Letter	AppendixABremer.pdf	100425 81113305d6954e14de6528ac642fa90a94f99c4f	no	3
Warnings:					
Information:					
8	Reexam Miscellaneous Incoming Letter	AppendixBBremer.pdf	297047 0e03a025e960bcbd50a62ef2b1a4d8dcc9490b97	no	26
Warnings:					
Information:					

9	Reexam Miscellaneous Incoming Letter	ApendixCBremer.pdf	172380 cca866ad37353f9cd11e952c913145f5662dc4a1	no	3
Warnings:					
Information:					
10	Reexam Miscellaneous Incoming Letter	AppendixDBremer.pdf	102816 084e4b7362920d6ba10d7bd5362af413de5b96af	no	2
Warnings:					
Information:					
11	Reexam Miscellaneous Incoming Letter	AppendixEBremer.pdf	87049 ec7905793d68f57b387e45453fb58ae4c33dd456	no	2
Warnings:					
Information:					
12	Reexam Miscellaneous Incoming Letter	ApependixFBremer.pdf	94914 356b59e7c1ed092ad27ec49f97313473e21030c8	no	2
Warnings:					
Information:					
13	Reexam Miscellaneous Incoming Letter	AppendixGBremer.pdf	152874 4113273dff8810e4f1abfdf3b2f21722b24fb0bb	no	12
Warnings:					
Information:					
14	Reexam Miscellaneous Incoming Letter	AppendixHBremer.pdf	1300893 7289830bf8ad8f0fa952f29b90fe4e12e0a41588	no	9
Warnings:					
Information:					
15	Reexam Miscellaneous Incoming Letter	AppendixIBremer.pdf	1538743 18c46803edc1f0c1464e54bb7c21dd8a2a259170	no	12
Warnings:					
Information:					

16	Reexam Miscellaneous Incoming Letter	ExhibitD.pdf	898963 6ef675cac662eea4d6690a52fdb00dcb944fd577	no	2
Warnings:					
Information:					
17	Reexam Miscellaneous Incoming Letter	ExhibitB.pdf	183558 3d09433b6b10d6c768c0d15867f7388f613b2d8b	no	16
Warnings:					
Information:					
18	Response after non-final action-owner timely	Response.pdf	4467964 7d278a48ea8fb66d48684deb394fe9cc6c03952d	no	165
Warnings:					
Information:					
			Total Files Size (in bytes):	29465409	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Control No.	: 90/013,809	Art Unit	: 3992
Patent No.	: 8,457,228	Examiner	: Scott Louis Weaver
Filed	: September 12, 2016	Conf. No.	: 7821
Customer No.	: 06449	Atty. No.	: 3277-114.RXM2

Title: SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
United States Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION REQUESTING RECONSIDERATION OF OPLA'S NOVEMBER 28, 2016 DISMISSAL OF REMBRANDT'S SEPTEMBER 30, 2016 PETITION UNDER RULE 181/182 REQUESTING THE DIRECTOR TO EXERCISE HER DISCRETIONARY AUTHORITY UNDER 35 U.S.C. § 325(D) AND A FINAL PETITION DECISION IN ACCORDANCE WITH PTAB PRACTICE

In *Ex Parte* Reexamination Control No. 90/013,809 ("'809 Reexamination"), Patent Owner ("Rembrandt") respectfully requests (1) reconsideration of OPLA's November 28, 2016 Dismissal ("'228 Petition Dismissal") of Rembrandt's September 30, 2016 "Petition Requesting the Director to Exercise Her Discretionary Authority Under 35 U.S.C. § 325(d) Pursuant to 37 C.F.R. § 1.181(a)(2) and/or § 1.182" ("'228 Petition") and (2) a Final Petition Decision in accordance with the PTAB's consistent § 325(d) practice for the reasons given below.

Rembrandt is not aware of any regulation that would render Rembrandt's request for reconsideration and a final petition decision untimely or prevent OPLA's consideration of Rembrandt's request, particularly given that OPLA has not yet issued a final decision on the '228 Petition. Nevertheless, to the extent OPLA believes a regulation exists that would render the

present request untimely, Rembrandt further petitions the Director to suspend any such regulation under the power granted to the Director by 37 C.F.R. § 1.183.

On September 12, 2016, Third Party Requester ("Samsung") filed a request for *ex parte* reexamination of U.S. Patent 8,457,228 ("'228 Patent"). On September 30, 2016, Rembrandt filed the '228 Petition. Samsung filed an opposition to the '228 Petition on October 13, 2016. On October 25, 2016, Rembrandt filed a reply to Samsung's opposition. The Office of Patent Legal Administration ("OPLA") treated the '228 Petition as a petition to vacate the order granting reexamination mailed October 17, 2016 and to issue an order denying reexamination pursuant to § 325(d). '228 Petition Dismissal, at 3-4.[1]

Section 325(d) gives the Director discretion to deny a reexamination request when "the same or substantially the same prior art or arguments ***previously were presented*** to the Office." Thus, even prior to considering the substantial new question issue and the analysis that entails, the Director has the power to curb abuse of the reexamination system under § 325(d).[2] However, while exercise of that power is discretionary, the statute obligates the Director to at least determine whether substantially the same art ***or*** arguments were previously presented. Failure to do so is contrary to the statute and Congressional intent (as explained further below).

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[1] A complete history of the events relevant to this reconsideration request are included in Exhibit 2.

[2] By considering § 325(d) as a threshold matter, the Director can exercise his/her discretion prior to making the substantial new question ("SNQ") determination under § 304. This order of consideration would conserve Office resources and clearly *is* permitted by § 325(d) ("In determining whether to … order a proceeding under chapter 30 …."). OPLA's statement to the contrary, i.e., that the petition could not have been filed before the reexamination was ordered ('228 Petition Dismissal, at 3) cannot be correct. However, such an order is not required. *See Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at 5.

In this case, without determining whether the same ***or substantially the same*** art ***or*** arguments had been previously presented to the Office by comparing the art and arguments presented in the request with those previously presented, OPLA dismissed the '228 Petition. '228 Petition Dismissal, at 7.[3] Instead of making the necessary comparison, OPLA improperly placed the burden on Rembrandt to do so.[4] *Id.* at 4. OPLA then proceeded to focus on the issues raised by § 304 rather than those raised by § 325(d), based primarily on OPLA's misunderstanding of the relationship between 35 U.S.C. § 325(d) and § 304. *Id.* at 4-6.

Rembrandt respectfully disagrees with OPLA's approach as explained further below. Again, the Director has an obligation to at least consider whether he/she should exercise his/her discretion when "the same or substantially the same prior art or arguments were previously presented to the Office." Accordingly, Rembrandt respectfully requests OPLA to reconsider its earlier dismissal and render a final decision on the '228 Petition by exercising the Director's § 325(d) authority to vacate and terminate the improvidently ordered *ex parte* reexamination of the '228 Patent. Should OPLA render a final decision without considering whether "the same or substantially the same prior art or arguments were previously presented to the Office," such a decision would be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). *See* the discussion *infra* at section I.E.

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[3] In dismissing the '228 petition, OPLA considered the '228 Petition and Samsung's opposition but not Rembrandt's reply.

[4] Rembrandt believes this burden rests on the Director. Of course, the Director has the option of refusing to order reexamination if a requester fails to provide the necessary comparison as part of its request (in the present case, Samsung failed to provide such a comparison in its request). In any case, Rembrandt responds to OPLA's criticism by providing such a comparison in section II.A, *infra*, and Exhibit 3.

I. Reconsideration of the '228 Petition Dismissal is Warranted Based on the Office's Misunderstanding of the Second Sentence of 35 U.S.C. § 325(d)

The second sentence of 35 U.S.C. § 325(d) states:

> In determining whether to institute or order a proceeding under this chapter, chapter 30, or chapter 31, the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.

As reflected in the '228 Petition Dismissal, OPLA misunderstands the obligations and authority this statute imposes on the Office, its relationship to 35 U.S.C. § 304, the requirements for its consideration and application, its application in *ex parte* reexamination compared to *inter partes* review, and the Office's consistent agency practice with respect to its consideration and application.

A. The '228 Petition Dismissal Misunderstands the Relationships between § 325(d) and § 304

In the '228 Petition Dismissal, OPLA takes the position that 35 U.S.C. § 304 does not permit the Office to deny a request for reexamination pursuant to 35 U.S.C. § 325(d) when the petition for reexamination presents a substantial new question of patentability. '228 Petition Dismissal, at 4-6 ("The statute merely permits the Office, within the Office's discretion, to reject the request if the same or substantially the same prior art or arguments previously were presented to the Office with respect to that patent. 35 U.S.C. 304, however, *requires* the Office to order reexamination if the Office finds that a substantial new question of patentability affecting any claim of the patent concerned is raised by the request.")(emphasis in original).

With all due respect, OPLA misunderstands the relationship between §§325(d) and 304. The Office's own prior decisions confirm OPLA's error. For example, the Board has previously explained that:

> Under section 325(d), second sentence, however, the Office could nevertheless refuse a subsequent request for ex parte reexamination with respect to such an issue, **even if it raises a substantial new question of patentability**, because the issue previously was presented to the Office in the petition for inter partes or post-grant review.

Ariosa Diagnostics v. Verinata Health, Inc., IPR2013-00276 and -00277, paper 63, at 6 (emphasis added). The panel in *Ariosa* reached this conclusion based on a clearly expressed intent behind the inclusion of the second sentence in § 325(d). As explained in the legislative history of the America Invents Act:

> In the second sentence of 325(d), the present bill also authorizes the Director to reject **any** request for *ex parte* reexamination or petition for post-grant or *inter partes* review on the basis that the same or substantially the same prior art or arguments previously were presented to the Office. This will prevent parties from mounting attacks on patents that raise issues that are substantially the same as issues that were already before the Office with respect to the patent. The Patent Office has indicated that it currently is **forced to accept many requests for *ex parte* and *inter partes* reexamination** that raise challenges that are cumulative of or substantially overlap with issues previously considered by the Office with respect to the patent.

157 Cong. Rec. S1360-S1394, S1376 (emphasis added).

In other words, the purpose behind the second sentence of § 325(d) is to permit the Office to reject reexamination requests that it was previously "forced to accept." Of course, the only such requests that the Office was forced to accept were those that presented a substantial new question of patentability. 35 U.S.C. §§ 302-304. Because § 325(d) is intended to permit the Office to reject requests for reexamination that it previously was forced to grant, i.e., those that presented a substantial new question of patentability, it *must* be the case that § 325(d) permits the Office to deny requests that present a substantial new question of patentability; a result correctly reached by the panel in *Ariosa.*

Said differently, the '228 Petition Dismissal essentially reads the second sentence of § 325(d) out of the statute. OPLA takes the position that § 325(d), which was implemented *after* § 304, only permits the Office to deny reexamination requests that do not present a substantial new question of patentability. '228 Petition Dismissal at 4-5. Of course, the Office lacks authority to grant such requests and has no discretion to do otherwise. 35 U.S.C. § 303(a); *see also Ethicon, Inc. v. Quigg,* 849 F. 2d 1422, 1427 (Fed. Cir. 1988) ("The Commissioner, on the other hand, has no inherent authority, only that which Congress gives."). Accordingly, OPLA reads the second sentence of § 325(d) as a nullity providing no meaning beyond that already in the law. Such an interpretation must be incorrect. *Williams v. Taylor*, 529 US 362, 404 (2000) ("It is, however, a cardinal principle of statutory construction that we must give effect, if possible, to every clause and word of a statute.") (internal quotations omitted); *Walton v. United States*, 551 F. 3d 1367, 1370 (Fed. Cir. 2009); *BASR Partnership v. United States*, 795 F.3d 1338, 1360 (Fed. Cir. 2015). Furthermore, as indicated above, the legislative history of the America Invents Act makes explicitly clear the intended effect for the second sentence of § 325(d): providing the authority for the Director to deny requests for reexamination even if those requests present a substantial new question of patentability.

In fact, the Director has championed Rembrandt's interpretation of the authority provided by § 325(d) to the Court of Appeals for the Federal Circuit. "Brief for the Intervenor, Director of USPTO," *Ariosa Diagnostics v. Illumina, Inc.*, Fed. Cir. Appeal Nos. 2016-2388, 2017-1020, filed April 26, 2017, at 12, 23-24 ("[u]nder section 325(d), second sentence … the Office could … refuse a subsequent request for ex parte reexamination with respect to such an issue, *even if it raises a substantial new question of patentability*, because the issue previously was presented to the Office in the petition for inter partes or post-grant review.") (emphasis added).

Accordingly, the '228 Petition Dismissal is based on a clear misunderstanding of the authority provided by the second sentence of § 325(d) – one that conflicts with how § 325(d) is interpreted and applied by the Office. Rembrandt respectfully requests reconsideration of the '228 Petition Dismissal in view of the clear meaning of the second sentence of § 325(d) relative to that of § 304.

B. The '228 Petition Dismissal Incorrectly Requires an Instituted or Completed Proceeding Before § 325(d) Applies

In the '228 Petition Dismissal, OPLA incorrectly determined that failure to institute an *inter partes* review upon certain grounds or based on certain art prevents the Office from applying § 325(d) to deny a subsequent reexamination request based on substantially the same art. *See, e.g.,* '228 Petition Dismissal at 5 ("[N]one of the three *inter partes* reviews involved a review of claim 21 of the '228 patent, which is the only claim under reexamination in the present proceeding. Only three of the inter partes reviews included challenges to claim 21, and in each case, review of claim 21 was denied."). Accordingly, OPLA has taken the position that § 325(d)'s instruction to take into account whether or not "the same or substantially the same prior art or arguments previously *were presented to the Office*" is limited to considering issues which have been considered after an *inter partes* review trial has begun and has been completed. Again, with due respect, this is an incorrect application of § 325(d). The Office's own decisions, including those held up as "informative" by the Board, illustrate that a previously denied petition for *inter partes* review is more than sufficient to deny a subsequent request for review pursuant to § 325(d). *See, e.g., Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25 at 4-5. In other words, issues "presented to the Office" in a petition for *inter partes* review, even if the petition is

denied, are sufficient "presentation" for denying a subsequent petition for review *or* subsequent request for reexamination under § 325(d).

In *Unilever*, the Board denied a subsequent petition for *inter partes* review after determining that the art and arguments presented in the second petition were substantially the same as those presented in an earlier first petition. *Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25 at 4-5. The Board relied upon its authority pursuant to § 325(d) to deny the second petition even though the Board had previously declined to institute an *inter partes* review in response to the first petition. *Id.* Clearly, based on *Unilever,* an earlier denied petition is more than sufficient "presentation" to the Office to deny a subsequent request for reexamination pursuant to 35 U.S.C. § 325(d). The Board's informative opinion in *Cultec, Inc. v. Stormtech, LLC,* IPR2017-00777, further illustrates this point. In *Cultec,* a third-party submission submitted during the prosecution of an application was deemed sufficient presentation of the reference for purposes of § 325(d) to reject a petition for *inter partes* review based upon that reference, even though the reference was never cited in a rejection of the claims in the application. *Cultec, Inc. v. Stormtech, LLC,* IPR2017-00777, paper 7 at 11 (August 22, 2017). Clearly, § 325(d) does not require a complete adjudication of a reference in order for the Office to deny a subsequent request for review based upon that reference pursuant to § 325(d). The Board reached this same conclusion in its informative *Unified Patents v. Berman (*IPR2016-01575) decision. Specifically, the Board determined that "Although the claims at issue were never rejected over Russell … we find that Russell was considered previously by the Office …" *Unified Patents v. Berman*, IPR2016-01571, paper 10 at 11 (December 14, 2016).

Unilever also clarifies that a subsequent request for review of a patent may be decided pursuant to 35 U.S.C. § 325(d) even when the art in the subsequent review is different than that

cited in an earlier denied petition for *inter partes* review. *Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25 at 5 ("Unilever points out differences between the art and arguments raised in the two petitions. We did not overlook these differences. … We considered the differences, but found the art and arguments are nonetheless 'substantially the same' within the meaning of the statute.") (internal citations omitted). The Board's informative decision in *Unified Patents* reached the same conclusion. Specifically, in the *Unified Patents* case, the Board determined that a newly cited reference was "substantially the same prior art" as a reference originally considered by the Office during the initial examination of the application that matured into the patent at issue because the different references provided the same teachings. *Unified Patents* at 11-12 ("We find the manipulation and display of windows described in cited sections of Intel User's Manual is substantially the same prior art as that presented previously to the Office by Russell.").

Furthermore, OPLA should not lose sight of the fact that the PTAB did in fact render decisions regarding claim 21 of the '228 patent and did finally conclude the *inter partes* review. With respect to claim 21, the PTAB was "not persuaded that Petitioner has established a reasonable likelihood that it would prevail in its challenge of claim 21." *Samsung Electronics Co. Ltd., v. Rembrandt Wireless Technologies, LP*, IPR2014-00892, paper 8 at 15. The PTAB's decision regarding claim 21 was based on art and arguments that are substantially the same and cumulative of the art cited in the '809 Reexamination. *See, infra,* section II.A, and Exhibit 3. While again, Rembrandt believes it is not its burden to compare the art and arguments presented

in the earlier proceedings with that presented in the '809 Reexamination, that comparison has been made (*see* section II.A, *infra,* and Exhibit 3) and supports the application of § 325(d).[5]

Accordingly, the '228 Petition Dismissal is based on a clear misunderstanding of the second sentence of § 325(d) and the obligation placed on the Office by that sentence. Section 325(d) provides authority to reject a subsequent request for reexamination over an earlier filed petition for *inter partes* review even when the earlier filed petition did not result in an instituted *inter partes* review of the challenged claims (as is the case here). *See* IPR2015-00555, paper 20, at 5, 7-9 (applying § 325(d) to reject another attack on claim 21 even though *inter partes* review of claim 21 had never been instituted on that claim); IPR2015-00114, paper 14, at 4, 6-8 (applying § 325(d) to reject another attack on claims 2 and 59 even though *inter partes* review of claims 2 and 59 had never been instituted on these claims). Furthermore, § 325(d) provides authority to deny a subsequent reexamination request even when the art being cited is not the same as that previously presented to the Office. *See Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25 at 5; IPR2015-00555, paper 20, at 7-9 (applying § 325(d) to reject another attack on claim 21 even though allegedly "new" art (Siwiak) had not been cited in the earlier *inter partes* review petition). Again, Rembrandt respectfully requests reconsideration of the '228 Petition Dismissal in view of the clear meaning of the second sentence of § 325(d) which provides the Director with the authority to deny a subsequent request for reexamination over a previously denied petition for *inter partes* review based on newly cited references. In fact, based

[5] Again, there is no requirement that *patent owner* show that the art presented in a follow-on request for review is substantially the same or cumulative of that presented in an earlier request in order for the Office to exercise its authority pursuant to § 325(d). *See, e.g., Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63 at 11-12; *Samsung Electronics Co. Ltd., v. Rembrandt Wireless Technologies, LP*, IPR2015-00555, paper 20, at 6-9 (denying request under § 325(d) without patent owner arguing that § 325(d) should be applied).

on the language of § 325(d), this would be true even if the art is not substantially the same, if the arguments are substantially the same. *See* § 325(d) ("the Director may take into account whether, and reject the petition or request because, the same or substantially the same prior art **or** arguments previously were presented to the Office").

C. OPLA Incorrectly Assumes the Analysis Pursuant to § 325(d) is Different for Inter Partes Review and Ex Parte Reexamination

In the '228 Petition Dismissal, OPLA posits that the standard for denying a reexamination request pursuant to § 325(d) is somehow different than denying a subsequent *inter partes* review petition. '228 Petition Dismissal at 5-6 ("The patent owner points out that the Patent Trial and Appeals Board (Board), when determining whether to institute an *inter partes* review, has analyzed whether a petitioner has shown whether the art or arguments were known or available to the requester at the time of filing the earlier *inter partes* reviews. The present proceeding, however, is an *ex parte* reexamination proceeding, not an *inter partes* review. The standard for determining whether a request for *ex parte* reexamination is granted is whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request. . ."). As a result, OPLA declined to consider factors that the Office has consistently applied when making determinations pursuant to § 325(d). *Id.* However, there is no such distinction in the law; § 325(d) applies equally to chapter 30 (the *inter partes* review chapter) and chapter 31 (the *ex parte* reexamination chapter) of Title 35 of the U.S. Code. Furthermore, no such distinction has ever been recognized by the Office. *See, e.g., Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63.

For example, in the *Ariosa* case, the Office rejected a subsequently filed *ex parte* reexamination request using the same factors that the Office used in the *Unilever* case to reject a

subsequently filed *inter partes* review petition. *Compare Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, Paper 63, at 10-12 *with Unilever v. Proctor & Gamble,* IPR2014-00506, paper 17, at 5-8; paper 25 at 2-5. In fact, in the *Ariosa* case the Office explicitly considered whether or not the references cited in the subsequently filed *ex parte* reexamination request were known to the requester at the time of the earlier filed petition for *inter partes* review. *Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at 12 ("Finally, Petitioner does not appear to have offered any explanation as to why those references could not have been relied upon in the petitions for *inter partes* review in IPR2013-00276 and IPR2013-00277."). Respectfully, OPLA is simply mistaken that such factors are not part of a § 325(d) analysis. *Contrast Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at 12 *with* '228 Petition Dismissal, at 5-6. *See also General Plastic Industrial Co., v. Canon Kabushiki Kaisha*, Case IPR2016-01357, at 15-19 (Paper No. 19) (September 6, 2017) (considering substantially the same factors in connection with an IPR denial under § 314(a) (discussed and quoted below). [6]

Accordingly, Rembrandt respectfully requests reconsideration of the '228 Petition Dismissal so that OPLA can fairly and consistently apply § 325(d) pursuant to the Office's procedures as followed in the *Unilever* and *Ariosa* cases, including consideration of the all of the relevant factors, such as whether or not the art cited in the reexamination request was available to and known by Samsung at the time of the earlier filed *inter partes* review petitions.

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[6] Section II.B.4.i of the opinion (pp. 15-19) was designated Precedential.

D. The General Plastic *Factors Weigh in Favor of Termination of the '228 Reexam*

The Board recently issued a precedential opinion identifying a number of factors that should be considered in deciding whether the Director should exercise his discretion to deny a follow-on IPR petition under § 314(a). *General Plastic Industrial Co., v. Canon Kabushiki Kaisha*, Case IPR2016-01357, at 9-10 & 16 (Paper No. 19) (September 6, 2017).[7] While the *General Plastic* case was decided pursuant to § 314(a), the expanded panel noted that "the factors set forth [in the decision], at the very least, serve to act as a baseline of factors to be considered in [the Office's] future evaluation of follow-on petitions." *General Plastic at 18.* Those same factors should be considered as a "baseline" in deciding whether to exercise the Director's discretion under § 325(d) to terminate and vacate the '228 reexamination request, a follow-on request for review of the '228 patent.[8] The fact that *General Plastic* addressed the Board's denial of follow-on petitions under § 314(a) should not impact consideration of the stated factors, as long as the additional requirements of § 325(d) are met (which they are in this case).[9]

In fact, well before *General Plastic* was decided, the Board had developed and applied substantially the same factors in the context of 325(d), and Rembrandt's original § 325(d) Petition analyzed and applied many of those factors to the facts surrounding the '228 Reexam. *See* '228 Petition, *passim*, & the cases cited to support the petition (submitted September 30, 2016).

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[7] Section II.B.4.i of the opinion was designated Precedential.

[8] The same action should be taken in the reexamination of the '580 Patent (the parent of the '228 Patent). A request for reconsideration of an earlier petition in the '580 Reexam was submitted on September 18, 2017 and is pending.

[9] Section 325(d) gives the Director discretion to deny a reexamination request when "the same or substantially the same prior art or arguments previously were presented to the Office." While Rembrandt maintains that the comparison should be made by the Office prior to ordering a follow-on reexam request, the analysis in section II.A and Exhibit 3 demonstrate that the allegedly new art and arguments were, in fact, "previously presented to the Office."

The factors are:

1. whether the same petitioner previously filed a petition directed to the same claims of the same patent;
2. whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it;
3. whether at the time of filing of the second petition the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition;
4. the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;
5. whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;
6. the finite resources of the Board; and
7. the requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

General Plastic, at 9-10 & 16 (hereafter the "*General Plastic* factors").

When the *General Plastic* factors are considered in this case (and its parent), an even stronger case is made for refusing to permit Samsung's end-run around the Board's earlier refusal to permit a follow-on petition and for terminating and vacating the '228 Reexam:

(1) Samsung filed multiple IPRs directed to claim 21, i.e., the '889, 892, and '555 IPRs;

(2) Based on a glaring failure to allege otherwise, it can be assumed that Samsung knew of the prior art asserted, including Snell (and Boer, the APA, and Upender were actually relied on in numerous previous IPRs[10]);

(3) Samsung had the benefit of the Board's multiple decisions when it filed the '228 Reexam and thus could use the Board's decisions as a roadmap in its '228 Reexam Request;

[10] *See* Exhibit 2 ("Timeline of Rembrandt Litigation, IPRs and Reexaminations") summarizing the numerous IPR requests attacking both the '228 and '580 Patents.

(4) At least with respect to Boer and the alleged APA, Samsung knew of those references more than two years prior to filing its '228 Reexam Request when it filed the '889 IPR Request on June 4, 2014;

(5) Samsung did not provide any reason why it waited so many years to request reexamination; and

(6) the Office's, including the Board's, resources are finite and should be spent on more deserving cases, ones that are not seeking yet *another* "bite at the apple."[11]

While factor 7, i.e., the one year time period to complete an IPR, does not apply to reexaminations, the Office is tasked with completing a reexamination "with special dispatch." 35 U.S.C. § 305. Given the many IPRs related to the '228 Reexam and a *completed and affirmed* district court case (with respect to all validity issues), the volume of evidence to be considered in the '228 Reexam makes completing the '228 Reexam with special dispatch extremely difficult, if not impossible.

General Plastic also supports Rembrandt's position that the Office had an obligation to compare the allegedly "new" art and arguments with those previously presented by Samsung in the IPRs in order to decide whether the same or substantially the same art or arguments were previously presented (which they were, as explained below). The Office did not do so but rather placed that burden on Rembrandt. To the contrary, *General Plastic* shows that the burden rests with the petitioner to show how the *General Plastic* factors favor additional review. For example, the burden lies with the petitioner to explain why under factor 2 a reasonably diligent search could not have uncovered the newly applied prior art at the time of the earlier request for review. *General Plastic* at 18-19. Similarly, factors 4 and 5 place the burden on the petitioner to provide an adequate explanation for the time elapsed between the discovery of the asserted art and the filings of multiple petitions directed to the same claims of the same patent. *Id.* at 10-11, 16. As *General Plastic* sets the baseline of factors for the Office to evaluate in exercising its

[11] The Board dismissed the last IPR filed by Samsung attacking claim 21 under § 325(d) as, in essence, seeking a "second bite at the apple." *See* '555 IPR Institution Decision, at 8 (finding no reason to give Samsung a second chance to challenge claim 21).

discretion to deny follow-on requests for review, and places the burden on the initiating party to justify the follow-on request for review, it was inappropriate for the Office to place the burden on Rembrandt to show that the same or substantially the same art or arguments were previously presented to the Office. Nevertheless, Rembrandt makes this showing in section II.A, *infra,* and Exhibit 3 filed concurrently with this petition.

The facts relevant to the *General Plastic* factors surrounding the '228 Reexam Request are very similar to those considered in *General Plastic* and found to "strongly favor[] non-institution" of the follow-on petitions. *See General Plastic*, at 10-12. Likewise, consideration of the *General Plastic* factors in this case strongly favors termination as improvidently granted.

The policy reasons for denial of the follow-on petitions in *General Plastic* also apply at least with equal force here:

> Our intent in formulating the factors was to take undue inequities and prejudices to Patent Owner into account. Thus, factor 3 is directed to Petitioner's potential benefit from receiving and having the opportunity to study Patent Owner's Preliminary Response, as well as our institution decisions on the first-filed petitions, prior to its filing of follow-on petitions. … [W]e are concerned here by the shifts in the prior art asserted and the related arguments in follow-on petitions. … Multiple, staggered petitions challenging the same patent and same claims raise the potential for abuse. The absence of any restrictions on follow-on petitions would allow petitioners the opportunity to strategically stage their prior art and arguments in multiple petitions, using our decisions as a roadmap, until a ground is found that results in the grant of review. All other factors aside, this is unfair to patent owners and is an inefficient use of the *inter partes* review process *and other post-grant review processes*. Considering other factors (i.e., factors 2, 4, and 5) allows us to assess and weigh whether a petitioner should have or could have raised the new challenges earlier.
>
> ….
>
> As we discussed above, § 314(a) recites "may not" when referring to authorization for *inter partes* review, and does not specify any particular circumstance in which review must be authorized. That means institution of review is committed to the Director's discretion, which, in turn, has been delegated to the Board. *See* 35 U.S.C. § 314(a); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016); 37 C.F.R. § 42.4(a). Similarly, under §

> 325(d), whether "the same or substantially the same prior art or arguments previously were presented to the Office" is an issue that "may" be taken into account in considering institution, also manifesting the discretionary nature of application of § 325(d). ….

General Plastic, at 17-19 (citations and footnotes omitted).

Finally, as discussed below, while application of §§ 314(a) and 325(d) is discretionary with the Director, the application of that discretion must not be arbitrary or capricious when considered from case to case.

E. The '228 Petition Dismissal is Arbitrary as it Deviates From Consistent Agency Practice

As illustrated above (*see supra* at sections I.A-C), the '228 Petition Dismissal deviates from consistent agency practice regarding the interpretation and application of § 325(d). Specifically, the Office has consistently interpreted § 325(d) as charging the Office with the responsibility to consider whether the authority given to it by § 325(d) should be exercised to reject a subsequent challenge to the patentability of an issued claim, including one made through a request for *ex parte* reexamination, even if the request presents a substantial new question of patentability. The '228 Petition Dismissal takes the exact opposite approach. *Compare* '228 Petition Dismissal, at 4-6 *with* "Brief for the Intervenor, Director of USPTO," *Ariosa Diagnostics v. Illumina, Inc.*, Fed. Cir. Appeal Nos. 2016-2388, 2017-1020, filed April 26, 2017, at 12, 23-24 *and Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at 6; *see also Unified Patents, Inc., v. PersonalWeb Techs., LLC,* IPR2014-00702, paper 13; *Medtronic Inc., v. Nuvasive, Inc.,* IPR2014-00487, paper 8; *Prism Pharma Co. Ltd., v. Choongwae Pharma Corp.,* IPR2014-00315, paper 14; *Medtronic Inc., v. Robert Bosch Healthcare Systems, Inc.,* IPR2014-00436, paper 17; *Intelligent Bio-Systems, Inc., v. Illumina Cambridge Ltd.,* IPR2013-00324, paper 19; *ZTE Corp. v. ContentGuard Holdings, Inc.*,

IPR2013-00454, paper 12. "An unexplained inconsistency in agency policy is a reason for holding an interpretation to be an arbitrary and capricious change from agency practice." *Encino Motorcars, LLC v. Navarro*, 136 S. Ct. 2117, 2126 (2016)(internal quotations omitted). Accordingly, the '228 Petition Dismissal, if made final in its present form, would represent an unlawful agency action. 5 U.S.C. § 706(2)(A) ("The reviewing court shall hold unlawful and set aside agency action, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law …").

The failure of OPLA to properly consider whether the '809 Reexamination should have been ordered and, once ordered, should have been vacated and terminated under § 325(d) is particularly troublesome as the '228 Patent (and its parent, U.S. Patent No. 8,023,580) have been previously challenged by Samsung in *thirteen* IPRs, and in district court litigation, all of which have concluded in Rembrandt's favor with respect to the validity of claim 21 of the '228 Patent (and of claims 2 and 59 of the '580 patent). *See* Exhibit 2. This number of challenges is extreme.[12] As illustrated in the discussion *supra,* it is the Office's consistent practice to deny follow-on petitions for review when petitioners have been given significantly fewer "bites at the apple" than is the case here. The PTAB has followed this consistent practice with regard to Samsung's multiple challenges to the '228 and '580 Patents. When the PTAB was faced with Samsung's cumulative follow-on petitions, it considered whether the Director's authority under §

[12] *See, e.g.,* the Remarks by Michelle K. Lee at the George Washington University School of Law on May 16, 2017: "In sum, the data shows that the large majority of patents are only challenged only one time in AIA trials. And a relatively small percentage are challenged more than two times. Although it is important to understand the overall numbers, we understand that multiple challenges to even a single patent are a serious concern to our patent holders. And even a single challenge simply to harass a patent owner is unacceptable." The pie chart accompanying Director Lee's presentation indicates that less than 0.5% of the patents challenged in IPRs are challenged 7 times or more.

325(d) should be exercised and correctly declined to institute further *inter partes* reviews. *Samsung v. Rembrandt Wireless Tech., LP*, IPR2015-00555, Paper 20, at 7-9. *See also Samsung v. Rembrandt Wireless Tech., LP*, IPR2015-00114, Paper 14 at 7; *Samsung v. Rembrandt Wireless Tech., LP*, IPR2015-00118, Paper 14 at 6-7. OPLA's '228 Dismissal to the contrary is inexplicable and unsupportable.

The America Invents Act was implemented to provide *inter partes* review as a substitute for litigation and to correct the problems in reexamination that forced the Office to accept serial challenges. *See, e.g.,* 157 Cong. Rec S1360-S1394, S1376. Here, Samsung has already frustrated that purpose as it has been permitted to challenge the '228 Patent (and '580 Patent) in both litigation and *inter partes* review. OPLA has now permitted Samsung to further frustrate the purpose of the America Invents Act by allowing Samsung's fifteenth and sixteenth challenges to Rembrandt's two patents to proceed.

The mistaken dismissal by the Office of Rembrandt's § 325(d) Petition is highlighted by the fact that the CRU has determined in this proceeding that at least some of the references cited in the present proceeding are the same as those in the earlier filed IPRs and relies on this equivalency in an attempt to justify the rejection of claims in Patent Owner's patents. *See, e.g.,* Final Office Action in *Ex Parte* Reexamination No. 90/013,808 at 40.[13] Specifically, the Examiner argues that:

> Harris AN9614 is used to show that the transceiver of Snell can be used in a master/slave relationship. Further, claims 1 and 58 recite using multiple modulations and it is determined by PTAB that APA and Boer discloses it. Snell and Harris AN9614 similarly disclose all the limitation of claims 1 and 58.

[13] This Final Office Action was issued in Reexamination Control No. 90/013,808, a reexamination of U.S. Patent No. 8,023,580, the parent of the '228 Patent. Much of the art cited in the '808 Reexamination is the same as that in the '809 Reexamination, including the Snell reference and Harris documents discussed in section II.A. below.

Id.

This argument supports Rembrandt's position that the Office should exercise its discretion under § 325(d): the CRU recognizes that the teachings of these references are the same and relies on this equivalency for its own purposes while simultaneously declining to recognize this equivalency for purposes of the analysis under § 325(d). These internally inconsistent positions undermine any argument by the Office that it is fairly and consistently applying § 325(d) in the current proceeding.

Accordingly, Rembrandt respectfully requests reconsideration of the '228 Petition Dismissal and a final decision that conforms to the Office's consistent agency practice. Without such a final decision, the '228 Petition Dismissal represents an unlawful exercise of the Office's authority.

II. The '809 Reexamination Should be Terminated Pursuant to § 325(d)

Rembrandt respectfully submits that when the decision to order the '809 Reexamination is reconsidered in light of the correct understanding of § 325(d), the Office should terminate the '809 Reexamination. Specifically, the art and arguments presented in the '809 Reexamination are substantially the same and cumulative of those previously presented and found lacking in Samsung's previous petitions for *inter partes* review of the claims of the '228 Patent. Second, vacating the order and terminating the '809 Reexamination would conform to the Office's consistent practice in determining whether to exercise the Director's discretion under § 325(d) (and § 314(a)). Third, policy considerations support terminating the '808 and '809 Reexaminations.

A. The Art and Arguments Presented in the '809 Reexamination Request are Substantially the Same as Those Previously Presented to the Office in its IPR Petitions, Including the '555 IPR Petition

To determine whether the Director should exercise his authority under § 325(d), the Office must consider whether the art or arguments presented for consideration were previously presented to the Office, including art or arguments presented in earlier petitions for *inter partes* review that were ultimately not instituted on the claims being challenged. *See supra* at section I.B-C. (discussing the *Unilever* and *Ariosa* cases). It is not sufficient to merely conclude that the *same* art was not cited. Rembrandt maintains its position that it does not bear the burden to make that required comparison in this case. *See also General Plastic* at 18-19 (placing the burden on the party requesting review of a patent to explain the delay in filing a follow-on request for review). Nevertheless, Rembrandt has done so in the interest of assisting the Office and advancing this case. That comparison establishes that substantially the same art or arguments were previously presented to the Office in Samsung's IPR petitions challenging the '228 Patent.

As will be shown below, the art cited in the '809 Reexamination Request and the previously decided IPRs provides substantially the same teachings because the primary references, Snell (cited in the '809 Reexamination Request) and U.S. Patent No. 5,706,428 ("Boer") (cited in the IPRs) in particular, are directed to substantially the same improvement to the Institute of Electrical and Electronics Engineers ("IEEE") standard for WiFi communication, IEEE 802.11. *See, e.g.,* Snell at 1:47-50, 4:42-46; *see also, e.g.,* Boer at 1:16-19. That is, both Boer and Snell disclose a technique to transmit at higher data rates within the IEEE 802.11 standard using the same types of signal modulation with spread spectrum transceivers. *Compare* Snell at, 1:22-30 ("It is another object of the invention to provide a spread spectrum transceiver and associated method to permit operation at higher data rates and which may switch on-the-fly

between different data rates and/or formats.) *with* Boer at Abstract, 1:26-30 ("The 1 and 2 Mbps rates use DBPSK and DQPSK modulation, respectively. The 5 and 8 Mbps rates use PPM/DQPSK modulation. All four data rates use direct sequence spread spectrum (DSSS) coding. … It is an object of the present invention to provide a method of operating a wireless local area network station which enables communication between stations operating at different data rates."). Furthermore, the comparison shows that the art presented in Samsung's '228 Reexam Request actually discloses *less* than that previously presented and found by the PTAB to be unlikely to be successful in invalidating claim 21 of the '228 Patent.[14]

1. The Art Presented by Samsung in the '228 Reexamination Request

In Samsung's '228 Reexamination Request, Samsung alleged that the cited references presented three SNQs with respect to the claim 21of the '228 Patent:

1) Unpatentability under 35 U.S.C. § 103 over Snell in view of Yamano, and Kamerman (relying on the incorporation by reference of Harris 4064.4 and Harris AN9614) ["SNQ 1"];

2) Unpatentability under 35 U.S.C. § 103 over Snell in view of Harris 4064.4, Harris AN9614, Yamano, and Kamerman ["SNQ 2"]; and

3) Unpatentability under 35 U.S.C. § 103 over Snell in view of Harris 4064.4, the Admitted Prior Art, Upender, Yamano, and Kamerman ["SNQ 3"].

Request for *Ex Parte* Reexamination, U.S. Patent No. 8,457,228 ("'228 Reexam Request"), at iv, 7.[15]

[14] For the Office's easy reference, claim 21, including claim 1 on which it depends, is reproduced in the attached Exhibit 1.

[15] Samsung presented the same art to support the same SNQs in its challenge to U.S. Patent No. 8,023,580 (parent of the '228 Patent). Request for *Ex Parte* Reexamination, U.S. Patent No. 8,023,580 ("'580 Reexam Request"), at iv.

As explained below, Samsung presented the art in each SNQ in substantially the same way it previously presented the alleged Admitted Prior Art ("APA") and Boer in Samsung's IPR Petitions challenging the '228 Patent. While Snell, Yamano, Kamerman, Harris 4064.4, and Harris AN9614 were not previously cited in any of the '228 or '580 IPRs, their allegedly relevant disclosures are at most cumulative of the APA, Boer, and Siwiak, as is demonstrated through a comparison of Samsung's arguments based on these allegedly "new" references with those made based on the APA, Boer, and Siwiak in at least the '555 IPR Petition.

With respect to SNQ 1, Rembrandt has made an exhaustive comparison of Samsung's claim charts presented in its '228 Reexamination Request to support its alleged SNQ 1 for claim 21 of the '228 Patent (pp.44-62) with Samsung's claim charts presented to support its '555 IPR Petition for claim 21 of the '228 Patent (pp. 45-57).[16] That comparison is included in Exhibit 3 and shows that Samsung's present arguments were previously presented to the Office and are based on substantially the same art.

SNQ 2 relies on the same art as SNQ 1, and thus the comparisons with respect to SNQ 1 apply equally to SNQ 2. SNQ 3 additionally relies on the APA and Upender – art that was previously presented to and considered by the Office. Thus, it will not be discussed further.

[16] Except for the added reliance on Siwiak in its '555 IPR Petition, substantially the same claim charts were presented in its '892 IPR Petition. *See* '892 IPR Petition, at 40-48 (claim 1) & 60 (claim 21). Thus, just like in the '555 IPR Petition, in the '892 IPR Petition, Samsung relied heavily on Boer's Figure 4. Its heavy reliance on Snell's Figure 3 to support its '228 Reexam Request and the striking similarity between Boer's Figure 4 and Snell's Figure 3 supports Rembrandt's position that the Snell and Boer teachings are substantially the same.

2. Samsung's Arguments Presented to Support its Alleged SNQs Compared to those it Previously Presented in its IPR Petitions, Including its '555 IPR Petition

In its '228 Reexamination Request, Samsung relied on Snell as its primary reference to support all of its proposed SNQs. Snell is at best cumulative of Boer, which Samsung previously and repeatedly presented to the PTAB in numerous IPR Petitions. *See* Samsung's Petitions in IPR2014-00889, -00890, -00891, -00892, -00893, -00895; IPR2015-00555 (summarized in Exhibit 2).[17] Both references propose similar extensions to the IEEE 802.11 standard[18] (or WiFi),[19] namely adding two higher data rates to the 1MB/s and 2MB/s data rates in the standard. Both references use the WiFi packet structure defined by the standard (shown in Fig. 4 in Boer and in Fig. 3 in Snell), including packet headers with the same fields, and Samsung relies heavily on these common aspects as a basis for presenting an alleged SNQ in each case.

In its '228 Reexamination Request, Samsung relied on Snell's Fig. 3 *forty times* in its attempt to establish the existence of SNQs.[20] In fact, Snell's Fig. 3 is *substantially identical* to Boer's Fig. 4 – a figure fully considered by the PTAB in numerous IPRs and found unlikely to render unpatentable claim 21 of the '228 Patent. *See* the PTAB Institution Decision in IPR2014-

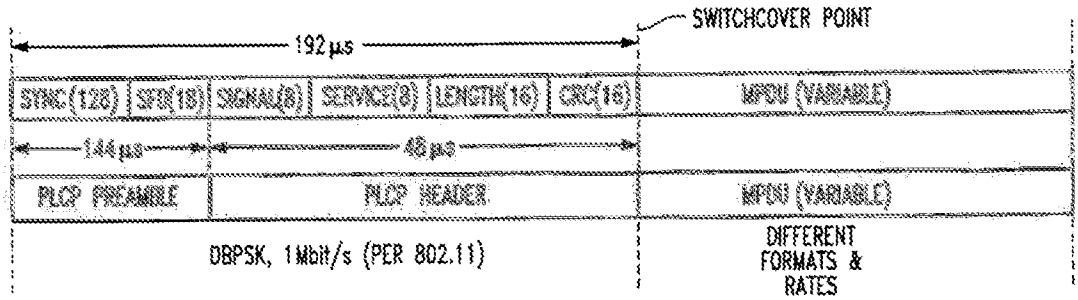
[17] Similarly, in its challenges to the '580 Patent, Samsung previously presented Boer in its petitions in IPR2014-00518, -00519; IPR2015-00114, -00118.

[18] *See* Snell, col. 4, lines 43-46 ("The transceiver 30 may be readily used … in accordance with the *proposed IEEE 802.11 standard*" (emphasis added)); Boer, col. 1, lines 17-20 ("… there is being produced *IEEE standard 802.11, currently in draft form*, which specifies appropriate standards for use in wireless LANs" (emphasis added)). Both Boer and Snell were members of the committee responsible for drafting the standard, and both had access to the packet structure before the standard was approved and published.

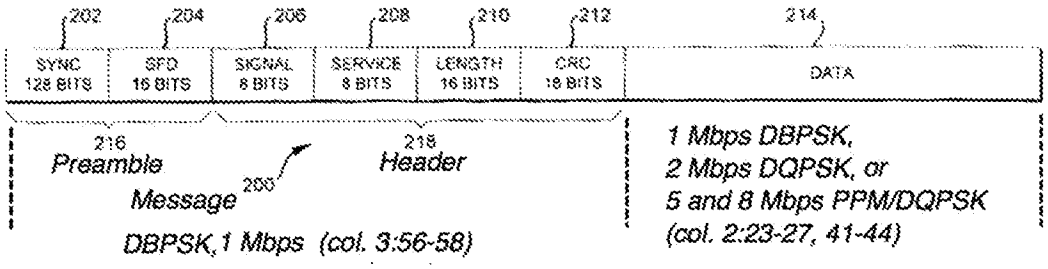
[19] Starting in 2000, the WiFi Alliance initiated programs to certify devices as operating in accordance with the standard. Certified devices are permitted to use the "WiFi" trademark. As a result, "WiFi" and IEEE 802.11 are often used interchangeably.

[20] Similarly, in its '580 Reexamination Request, Samsung relied on Snell's Fig. 3 *forty-five times*.

00555, at 5-6. Snell's Fig. 3 (as it appears in Snell without Samsung's commentary) is compared below with Boer's Fig. 4 (annotated in italics to identify the numbers in Fig. 4 and the Boer teachings coinciding to those shown in Snell's Fig. 3):



(Snell) *FIG. 3*



(Boer) FIG.4

With respect to the additional "first message address data" limitation found in claim 21 of the '228 Patent, Samsung is making the *same* arguments against patentability (albeit based on Yamano instead of Siwiak) that it advanced unsuccessfully in at least its '555 IPR Petition. As shown below, in both cases, Samsung argued that the "first message", or "first transmission portion", included "first message address data," or "a destination address." *Compare* the '555 IPR Petition, at 18, 23-25, *with* the '228 Reexam Request, at 36-37.

Tellingly, in its '228 Reexamination Request, Samsung does not identify a single disclosure from the cited references more relevant to the patentability of claim 21 than those

previously presented to the Office, i.e., the APA, Boer, and Siwiak. In fact, Snell is even less relevant than Boer,[21] which explains why Samsung did not cite Snell during the multitude of IPRs Samsung earlier filed against Rembrandt's '228 and '580 Patents.

Samsung's Arguments: Snell Compared to Boer

Samsung's arguments in its '228 Reexamination Request based on Snell are the same or substantially the same arguments previously presented based on Boer in its earlier IPR Petitions, including its '555 IPR Petition. Notably, Samsung's heavy reliance on Snell's Figure 3 and on Boer's Figure 4 exposes their striking similarity and lack of any significant differences.[22] Snell's references to these two figures have been bolded to emphasize this point.

In its "Overview of Snell," Samsung begins:

> Snell discloses a transceiver that serves as an access point for communicating data with other transceivers connected to a wireless local area network (WLAN). Snell at 1:34-46; see id. at 1:47-50, 4:42-47, 5:18-21. Snell's transceiver transmits data packets intended for another transceiver, where the communication may switch on-the-fly between a "first modulation method" *(e.g.,* BPSK) and a "second modulation method" *(e.g.,* QPSK) that is "of a different type than the first modulation method." *Id* at 2:61-63 ..., 1:55-57 …, 2:27-30 …, 7:10-14 …, 1:58-61 … , 2: 15-17 …. *See id* at Abstract, 1:55-61, 2:56-59, Fig. 2, **Fig. 3**, Fig. 5.

'228 Reexamination Request, at 23-24 (citation parentheticals omitted).[23]

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[21] Boer is more relevant than Snell in that Boer additionally discloses a destination address and a modulation method that was relied on by the PTAB, i.e., PPM/DQPSK. *See, e.g.,* '892 IPR Final Decision, at 12-13.

[22] In the attached Exhibit 3, Rembrandt has placed side by side Samsung's claim chart comparison in its '228 Reexamination Request and that in its '555 IPR Petition Request.

[23] The parentheticals and footnotes have been omitted. Emphases (except that of Figs. 3 and 4) are Samsung's.

In its '555 IPR Petition, Samsung previously presented substantially the same arguments with respect to Boer:

> [A]s seen in Figure 1 of Boer, …Boer discloses an access point 12 that communicates with a plurality of mobile stations 18-1, 18-2, 22-1 & 22-2 ….

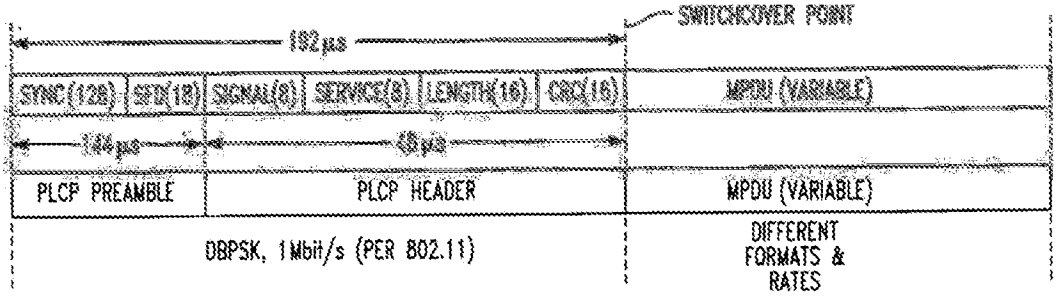
'555 IPR Petition, at 19.

> Boer discloses transceivers in stations 12, 18 & 22 that can communicate with each other using different modulation methods, just as in the `228 patent. Boer teaches that the then draft IEEE 802.11 wireless LAN standard specified two different data rates. Ex. 1304, 1:17-22. Boer then states that "[i]t is an object of the present invention to provide a method of operating a wireless local area network station which enables communication between stations operating at different data rates." *Id.* at 1:27-30. Boer teaches that the manner in which different data rates are achieved is through use of different modulation methods. Boer discloses the use of differential binary phase shift keying ("DBPSK") modulation when operating at one Megabit per second ("Mbps"), and differential quadrature phase shift keying ("DQPSK") modulation for two Mbps data rate transmission. *Id.* at 2:23-27. Boer also discloses 5 Mbps and 8 Mbps pulse position modulation-differential quadrature phase shift keying ("PPM/DQPSK"). *Id.* at 2:41-44.

'555 IPR Petition, at 17.

In its '228 Request, Samsung continues:

> Snell discloses that each data packet transmission is structured with a PLCP preamble and PLCP header and a "payload portion" *(e.g.,* MPDU data). *Id* at 6:35-36, 6:64-66, 7:5-14, **Fig. 3**. The PLCP preamble contains SYNC and SFD fields, and the PLCP header contains SIGNAL, SERVICE, LENGTH, and CRC fields. *Id* at **Fig. 3**, 6:48-7:14. The MPDU data is the data to be transmitted to the receiving transceiver. *Id* at 7:5-6 ...; *see also id* at 7:6-14, **Fig. 3**.



(Snell) **FIG. 3**

Id at **Fig. 3**.

'228 Reexamination Request, at 24-25 (citation parentheticals omitted).

Again, Samsung made substantially the same arguments in its '555 Petition based on Boer's Fig. 4:

> In particular, Boer describes a message 200, reprinted below, having a Preamble 216, a Header 218 and a Data field 214. Ex. 1304, 3:42-43 ("Referring now to **FIG. 4**, there is shown the format of a **typical message 200** used in the LAN 10").

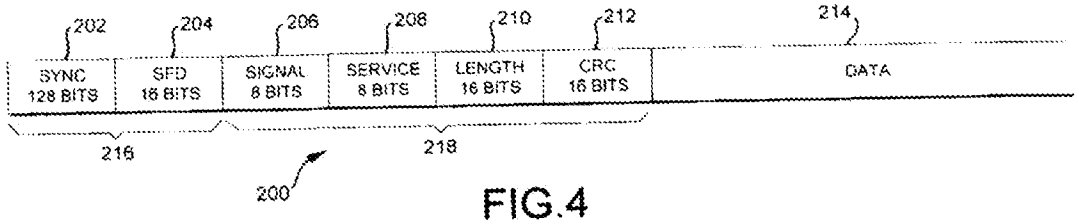


FIG.4

> As described below …, message 200 of Boer corresponds to the "first message" of claim 1 of the `228 patent, while Header 218 corresponds to the "first information modulated according to a first modulation method." Ex. 1304, 3:43-55 ….

'555 IPR Petition, at 29 (citation parentheticals omitted).

Samsung argued in its '228 Request:

> Snell teaches that the PLCP preamble and PLCP header are always modulated using the "first modulation method" *(e.g.,* BPSK). Snell at 6:35-36 ("The header may always be BPSK"), Fig. 3. Snell further discloses that the SIGNAL

> field in the PLCP header "indicates" which of the "first modulation method" *(e.g.,* BPSK) and "second modulation method" *(e.g.,* QPSK) is used for modulating the "payload portion" *(e.g.,* MPDU data).

'228 Reexamination Request, at 25.

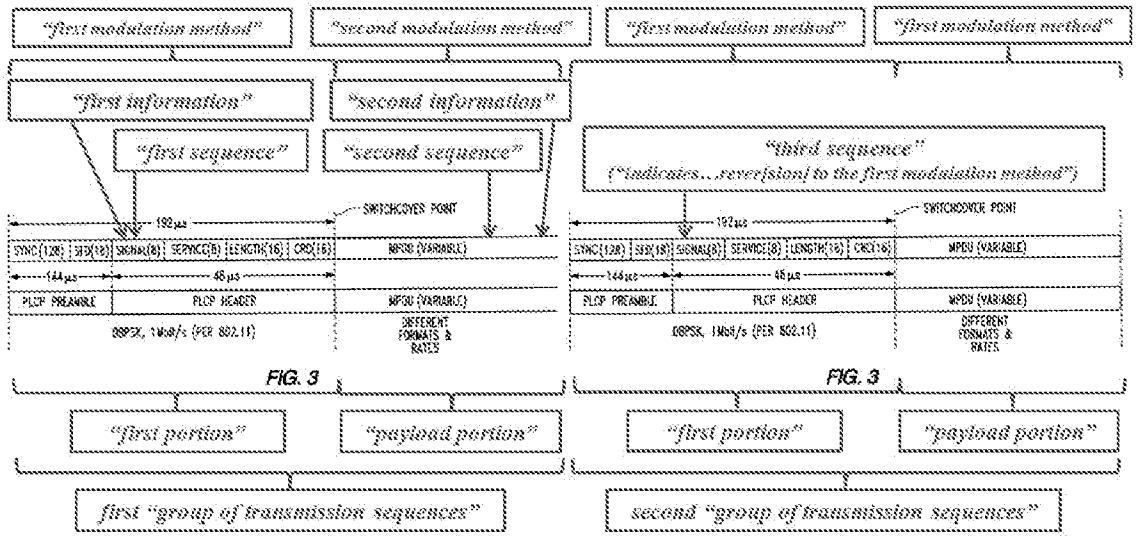
Again, substantially the same arguments were made with respect to Boer in Samsung's '555 IPR Petition:

> Header 218 is "modulated according to a first modulation method" since Boer teaches that the Header 218 is always modulated with DBPSK modulation. Ex. 1304, 3:56-58 …. Thus, in Boer, Header 218 is the "first information modulated according to a first modulation method." Data field 214 corresponds to claim 1's "second information," as the Board previously found in the `892 Inst. Dec. Ex. 1325, ¶18.

'555 IPR Petition, at 29-30 (citation parentheticals omitted).

In its '228 Reexamination Request, Samsung continued:

> …Snell discloses "[n]ow relating to the *PLCP header* 91, *the SIGNAL* is:
>
> | | |
> |---|---|
> | 0Ah | 1Mbits/s BPSK |
> | 14h | 2Mbits/s QPSK |
> | 37h | 5.5 Mbits/s BPSK, and |
> | 6Eh | 11Mbits/s QPSK. |
>
> Snell at 6:52-59. Thus, Snell teaches that the SIGNAL field in the PLCP header includes the symbol "OAh" to indicate when the MPDU data is modulated using the "first modulation method" *(e.g.,* BPSK at 1 Mbit/s). *Id* at 6:52-59, 7:1-2, 7:5-14, **Fig. 3**. Snell also teaches that the SIGNAL field in the PLCP header includes the symbol "14h" to indicate when the MPDU data is modulated using the "second modulation method" (*e.g.,* QPSK at 2 Mbit/s). ***Id.*** Snell thus teaches that "[t]he variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in **FIG. 3**, occurs on-the-fly." *Id* at 7: 10-14; *see also, e.g., id* at **Fig. 3**, 2:27-30.



Id at **Fig. 3** (annotated by Samsung).

Snell teaches communicating multiple data packets with the ability to "switch on-the-fly between different data rates and/or formats." *Id* at 2:29-30. Based on this disclosure, a person of ordinary skill in the art would have understood that Snell teaches that a series of packets may be sent that switch from using a first modulation method to using a second modulation method for the payload portion of the data packet, as shown in the annotated Figure 3 above. For example, Snell's transceiver transmits a "first message" comprising "first information" *(e.g.,* PLCP preamble and PLCP header) that is "modulated according to a first modulation method" *(e.g.,* BPSK) where the "first information" *(e.g.,* "SIGNAL" field in PLCP header) indicates *(e.g.,* using "OAh") the modulation type *(e.g.,* BPSK) used for modulating "second information" *(e.g.,* MPDU data). For example, in the "first message," the "SIGNAL" field in the PLCP header uses a code *(e.g.,* "OAh") that indicates that the "second information" *(e.g.,* MPDU data) is modulated "according to the first modulation method" *(e.g.,* BPSK at I Mbit/s).

Snell's transceiver then transmits a "second message" comprising "third information" *(e.g.,* PLCP preamble and PLCP header) "modulated according to the first modulation method" *(e.g.,* BPSK) where the "third information comprises information" *(e.g.,* "SIGNAL" field in PLCP header) "that is indicative of an impending change in modulation" *(e.g.,* using "14h") "to a second modulation method" *(e.g.,* QPSK) used for modulating "fourth information." For example, in the "second message," the "SIGNAL" field in

the PLCP header uses a code *(e.g.,* "14h") that indicates that the "fourth information" *(e.g.,* MPDU data) is modulated "according to the second modulation method" *(e.g.,* QPSK at 2 Mbit/s), wherein the "second modulation method" is of a "different type than the first modulation method." This "SIGNAL" is "indicative of an impending change" from the "first modulation method" to the "second modulation method" because it is indicating a change from, for example, BPSK modulation to QPSK modulation. In addition, transmitting the data using the "second modulation method"- QPSK-results in a data rate of 2 Mbit/s which is higher than transmitting the data using the "first modulation method"- BPSK at I Mbit/s.

While Snell describes that the "first modulation method" may be BPSK and the "second modulation method" may be QPSK (which are two different types of modulation methods, …, Snell alternatively discloses that the "first modulation method" may be differential BPSK ("DBPSK") and the "second modulation method" may be differential QPSK ("DQPSK") (which, again, are two different types of modulation methods, *see id).* For example, Snell teaches that the PLCP preamble and PLCP header may be modulated using differential BPSK. Snell at 2:56-3 :5 … , 6:64-66 … , **Fig. 3**. Snell also teaches that the MPDU data may be modulated using either differential BPSK or differential QPSK. *See, e.g.,* Snell at 7:6-8 …, Figs. 2, 5; *see also, e.g.,* Harris 4064.4 (incorporated by reference into Snell at 5:13-17) at 14 … , 15 …, 16 … *").*

'228 Reexamination Request, at 27-29 (citation parentheticals omitted).

Previously, Samsung made substantially the same arguments in its '555 IPR Petition:

Boer also teaches transmission of messages over a wireless communication medium. Ex. 1304, 2:13-22 … . In Boer, each message is formatted as in **Fig. 4**. Ex. 1304, 3:42-43 …. A transmitted message 200 is the claimed "first message," and is reprinted here:

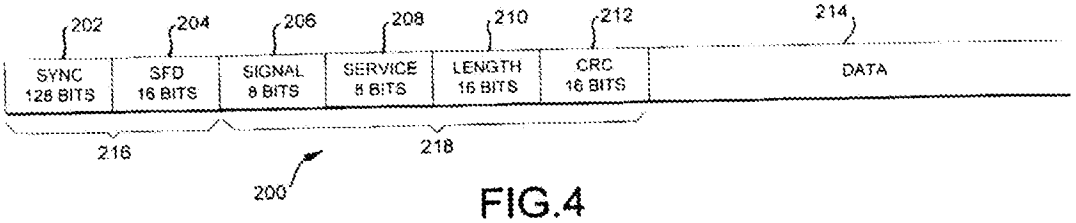


FIG.4

….

Claim 1 requires the "first message" have "first information modulated according to a first modulation method." The recited "first information" in Boer is Header 218. Ex. 1304, 3:43-55 …. Header 218 is "modulated according to a first modulation method." Boer teaches that the Header 218 is always modulated with DBPSK modulation, which is a "first modulation method." Ex. 1304, 3:56-58 ….

….

Claim 1 also requires that the "first message" comprise "second information, including a payload portion" that is "modulated according to the first modulation method." Message 200 in Boer has a data field 214, which is the recited "second information including a payload portion." Ex. 1304, 3:42-55 …. As discussed, Boer teaches that the DATA field 214 can be transmitted at 1 Mbps, 2 Mbps, 5 Mbps and 8 Mbps. Ex. 1304, 2:19-44. When transmitting at 1 Mbps, DBPSK, the "first modulation method," is used. Ex. 1304, 3:56-65. Ex. 1304, 2:23-27 ….

Claim 1 further requires that "the second information comprises data intended for one of the one or more slave transceivers." Firstly, Boer discloses that the "second information," i.e., DATA field 214, comprises data. Ex. 1304, 1:33-37. ….

… Boer is similar to the APA, in that it teaches that DATA field 214 contains address fields indicative of the intended recipient. Ex. 1304, 6:28-31 …. Ex. 1323, ¶147.

….

Claim 1 requires that the "first message" have "first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information. As discussed immediately above, both the APA and Boer disclose messages having addresses of their intended recipient(s) placed therein, thus demonstrating that this claimed feature is also disclosed in the prior art. *See e.g.*, Ex. 1301, 4:19-21 & Ex. 1304, 6:28-31. *See also* Ex. 1323, ¶148. ….

Claim 1 further requires that the master transceiver "transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers." The APA teaches that multiple messages can be transmitted to slaves. *See e.g.*, Fig. 2. Likewise, Boer teaches that an access

point can transmit multiple messages. Ex. 1304, 2:5-14 …. The recited "second message" is a subsequently transmitted message 200. A person having ordinary skill in the art would understand that a system like Boer could transmit to slaves, just as in the APA. Ex. 1323, ¶149.

Claim 1 requires that the "second message" comprise "third information" that is "modulated according to the first modulation method." In Boer, the subsequently transmitted message can have the same format as the other messages, as Boer teaches that message 200 shown in Figure 4 is a "typical message used in the LAN 10"). Ex. 1304, 3:42-43. The "third information" is Header 218. Ex. 1304, 3:42-55. As discussed, Header 218 is always DBPSK modulated (the "first modulation method"). Ex. 1304, Abstract & 1:33-37 (quoted above).

Claim 1 further requires that the "third information comprise[] information that is indicative of an impending change in modulation to a second modulation method." The "third information," i.e., Header 218, comprises *inter alia* SIGNAL field 206 and SERVICE field 208. The SIGNAL and SERVICE fields 206 & 208 indicate which type of modulation method is used to modulate data in DATA field 214. Ex. 1304, 4:4-11 …. *See also id.*, 6:5-17. Boer teaches that DBPSK is used for 1 Mbps, DQPSK is used for 2 Mbps, and variants of PPM/DQPSK are used for 5 and 8 Mbps rates. *See e.g.*, *id.*, Abstract …. Thus, when data in the SIGNAL and SERVICE field 206 & 208 indicates either DQPSK or PPM/DQPSK, the "third information" is "indicative of an impending change in modulation to a second modulation method" since, as will be discussed, DQPSK, 5 Mbps PPM/DQPSK and 8 Mbps PPM/DQPSK can each be the "second modulation method."

….

Claim 1 further requires that the "second message" comprise "fourth information" having "a payload portion, transmitted after transmission of the third information." As discussed above, Boer discloses that message 200 includes a DATA field having user data therein. Ex. 1304, 3:43-52 …. Likewise, Boer's **Figure 4** also shows that DATA field 214 is transmitted after Header 218, just as required by claim 1.

Claim 1 also requires that the "fourth information" be "modulated according to the second modulation method, the second modulation method being of a different type than the first modulation method." Boer teaches that

DATA field 214 can be transmitted using DQPSK, 5 Mbps PPM/DQPSK or 8Mbps PPM/DQPSK, in addition to DBPSK. Ex. 1304, 3:59-62 …. [T]wo Mbps transmissions are modulated using DQPSK while five and eight Mbps transmissions are modulated using variants of PPM/DQPSK. *See also* Ex. 1304, 2:23-27 … & 2:37-44 ….

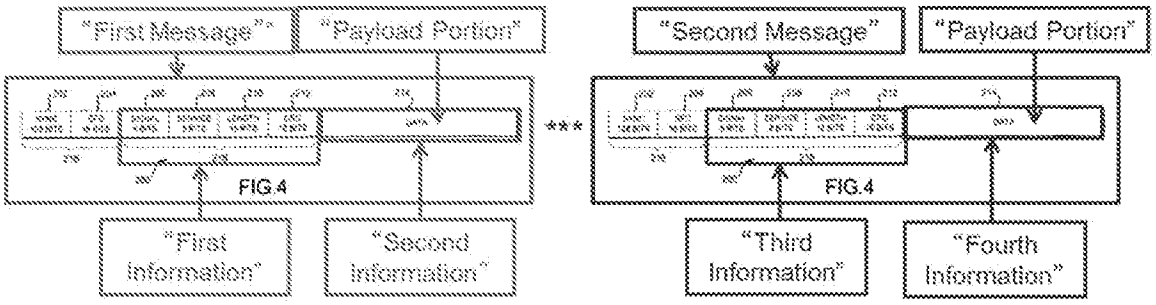
DBPSK is the "first modulation method" and DQPSK may be the "second modulation method" since neither are compatible with each other. Ex. 1323, ¶155. … [E]ither one of 5 Mbps PPM/DQPSK and 8 Mbps PPM/DQPSK meets the "second modulation method" claim limitation. Ex. 1323, ¶155. …

Claim 1 next requires that the "fourth information comprises data intended for a single slave transceiver of the one or more slave transceivers." Patentee plainly admitted that this limitation is in the prior art, since it teaches that "[i]n a multipoint system, the address of **the trib** with which the master is establishing communication is also transmitted during the training interval." Because the trib (in the singular) is addressed, the data is plainly intended for a single slave transceiver. Ex. 1323, ¶165. Boer is similar, in that it also teaches that transmissions can be addressed to a specific station. Ex. 1304, 6:28-31 ….

Next, claim 1 requires that the "fourth information" have "second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information." As discussed, the APA, Boer and Siwiak disclose messages having addresses of their intended recipient(s) placed therein, thus demonstrating that this claimed feature is also disclosed in the prior art. *See e.g.*, Ex. 1301 (APA), 4:19-21; Ex. 1304 (Boer), 6:28-31; and Ex. 1324 (Siwiak), 2:53-57 & 4:34-39. *See also* Ex. 1323, ¶167 & Ex. 1325, ¶11-13.

Finally, claim 1 requires that the "second modulation method results in a higher data rate than the first modulation method." Boer teaches that DBPSK, the first modulation method, has a 1 Mbps data rate. Boer also teaches that DQPSK and the variants of PPM/DQPSK, any of which can qualify as the second modulation method, have a 2, 5 or 8 Mbps data rate, all of which are higher than 1 Mbps. ….

The annotated drawing below illustrates where each of the various transmissions recited in claim 1 can be found in Boer:



Ex. 1325, ¶ 28.

'555 IPR Petition, at 37-45 (citation parentheticals omitted). *See also* the citations to Boer in attached Exhibit 3 (matching them to those in Snell).

Samsung's Arguments: Harris 4064.4 Compared to Boer

In its "Overview of Harris 4064.4 (Incorporated by Reference into Snell)," Samsung argued that Harris 4064.4 discloses DBPSK and DQPSK. '228 Reexam Request, at 29-31. So does Boer, as Samsung repeatedly argued in its '555 IPR Petition, for example, at 17 ("Boer discloses the use of differential binary phase shift keying ('DBPSK') modulation when operating at one Megabit per second ('Mbps'), and differential quadrature phase shift keying ('DQPSK') modulation for two Mbps data rate transmission. *Id.* at 2:23-27.").

More specifically, in its '228 Reexam Request, Samsung relied on Harris 4064.4 for its disclosure of a preamble and header that are always transmitted as *DBPSK* waveforms, a data portion transmitted as either DBPSK or DQPSK, and a SIGNAL field that indicates whether the data portion is modulated as DBPSK or DQPSK. *See, e.g.,* '228 Reexamination Request at 50-51, 52, 56-57, 59-60, 61 (citing Harris 4064.4 at Fig. 10, 14-16 in claim chart re alleged SNQ 1).

Samsung's arguments based on Harris 4064.4 add nothing of relevance when compared to those previously made based on Boer, which discloses a preamble 216 and header 218 that always are sent using DBPSK and a data field 214 transmitted in DBPSK, DQPSK, or

PPM/QPSK, and SIGNAL and SERVICE fields that indicate whether the data field 214 is modulated in DBPSK, DQPSK, or PPM/QPSK. *See*, *e.g.*, IPR2014-00555 Petition at 29-30, 37-45 (quoted above).

Samsung's other arguments based on Harris 4064.4 are substantially the same arguments made with respect to Snell. *See* '228 Reexamination Request, at 23-29 (quoted above). And, in turn, those arguments made with respect to Snell were made at least in Samsung's '555 IPR Petition with respect to Boer (quoted above). *See also* the citations to Boer in attached Exhibit 3 (matching them to those in Snell and Harris 4064.4).

Samsung's Arguments: Harris AN9614 Compared to the APA and Boer

In its "Overview of Harris AN9614 (Incorporated by Reference into Snell)," Samsung argued in its '228 Reexam Request that "Harris AN9614 discloses that Snell can operate in a polled (master/slave) protocol" such that "power consumption can beneficially be reduced by more than an order of magnitude." '228 Reexamination Request, at 32. To the extent that the "polling scheme" in Harris AN9614 can be equated to a master/slave protocol (which Rembrandt vigorously contests), this reference adds nothing to what Samsung previously argued regarding the APA disclosure. *See* '555 IPR Petition, at 34 ("Claim 1 recites a 'master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship,' which is plainly disclosed in the APA."). *See also* the citations to the APA in Exhibit 3 (matching them to those in Harris AN9614).

With respect to Samsung's "power consumption" argument, Samsung previously argued along the same lines that "simplicity and determinacy are motivations to combine Boer with the master/slave communication system" of the APA. '555 IPR Petition, at 20. It also previously made power consumption arguments based on Siwiak. *See* the discussion of Siwiak below.

Samsung's Arguments: Yamano Compared to Siwiak

In its "Overview of Yamano," Samsung argued that Yamano discloses that its "preamble includes a destination address for an intended destination of the payload portion. Yamano at 19:63-64." '228 Reexamination Request, at 36. More specifically, Samsung argued:

> Yamano discloses transmitting a first message, including a preamble and main body, and that the preamble includes a destination address for an intended destination of the payload portion. Yamano at 19:63-64 ("Packet 700 includes a preamble 701 and a main body 702."); Yamano at 20:1-7 ("For example, preamble 701 can include information which identifies: ... (2) packet source and destination addresses."). Yamano also discloses that the preamble precedes the main body (containing data), as shown in Figure 8:

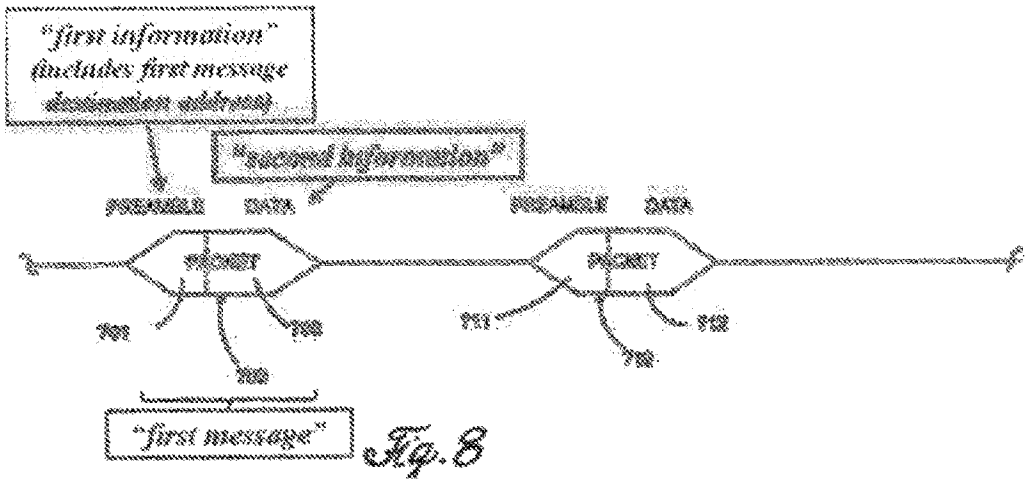


Fig. 8

Yamano at Fig. 8 (annotated).

> Further, Yamano discloses that including the destination address in the preamble is advantageous because the receiver can demodulate only those packets that are addressed to it, thereby reducing its processing requirements. *Id* at 20:54-59.

'228 Reexamination Request, at 36-37.

In its '555 IPR Petition, Samsung previously argued that Siwiak disclosed the claimed destination address in the header and thus satisfied the additional limitation in claim 21, i.e., that

"the first information that is included in the first message comprises the first message address data." Its arguments were as follows:[24]

> Siwiak discloses placing address fields in the first portion of a packetized message, where the first portion uses one modulation method and the second portion uses another modulation method. *See* Ex. 1324, 4:31-39 & Fig. 2 [reproduced below]. *See also* Ex. 1325, ¶¶11-14.
>
> ….
>
> One advantage of choosing to place the address in the header is power savings. For example, a transceiver may stop demodulating a message once it determines the packet is addressed to a different receiver, thereby saving the power that would be required to decode the remainder of the packet. By placing the address early in the packet (i.e. in the header), receivers can sleep sooner, thereby saving power. Further, in systems that change modulation methods after the header (e.g. Boer and Siwiak), this power savings may be amplified because the power required to change modulations and to demodulate the DATA field may be significantly more than the power required to demodulate the header's modulation method. Ex. 1325, ¶22.
>
> Siwiak explicitly describes this motivation. In Siwiak, a unit only demodulates the portion of a message header that follows the "addresses" field when one of the addresses is "assigned to the particular unit" performing the demodulation. Siwiak at 3:61-65 …. Ex. 1325, ¶23.
>
> Units that are not addressed do not demodulate the remainder of the message either. Indeed, the "message vectors 108," which are not demodulated, contain the information needed to receive the remainder of the message. *Id.* at 3:65-4:2; *See also id.* at 4:3-12. Thus, not only does an unaddressed unit save the power needed to receive the remainder of the header, it also saves the power needed to receive the subsequent data field. In the example of Siwiak, this additional power savings may be particularly large. *See* Ex. 1324, 2:63-65 …. Ex. 1325, ¶23.
>
> ….

[24] Samsung also continued to argue that the APA disclosed placing the address in the header. *See, e.g.,* '228 IPR Petition, at 21 ("the APA and Siwiak place the address data in the header"). The Board rejected this argument.

As discussed, Siwiak discloses a "high speed simulcast multi-rate data messaging and paging system." Ex. 1324, 1:6-8. Siwiak utilizes a message format having header and data fields. Siwiak illustrates this message format in Fig. 2:

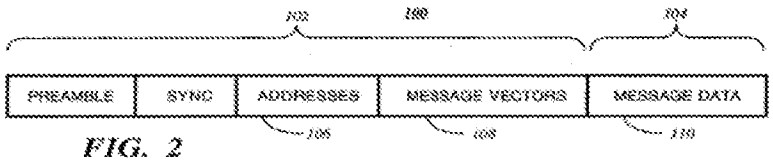


FIG. 2

Ex. 1324, Fig. 2.

As is seen in its Fig. 2, Siwiak discloses a message 100 having a "first transmission portion" 102 (i.e. a header) and "second transmission portion" 104 (which contains "message data 110"). Ex. 1324, 2:57-65 ….

….

…. The first transmission portion 102 of Siwiak includes the address of an intended destination of the transmission 100. Ex. 1325, ¶13. *See also* Ex. 1324, 2:30-57 ... ; *see also*, *id.* at 4:31-39 …. Ex. 1325, ¶13.

'555 IPR Petition, at 18-25 (citation parentheticals omitted). *See also* the citations to Siwiak in attached Exhibit 3 (matching them to those in Yamano). Thus, Samsung previously presented substantially the same arguments based on Siwiak as it now has presented in its '228 Reexamination Request based on Yamano.

Samsung's Arguments: Kamerman Compared to Boer

In its '228 Reexamination Request, Samsung fails to even acknowledge that *Kamerman was Boer's co-inventor.*[25] Significantly, the rate control algorithm in Kamerman's presentation (the primary aspect of that reference relied on in the '228 Reexamination Request) was described

[25] The Kamerman paper is dated August, 1996, a few months after he, Boer and others filed the Boer patent. It appears Kamerman was permitted to talk about the invention disclosed in the Boer patent once the application was filed. Such a procedure is typical with companies, particularly large companies like Lucent Technologies (assignee of the Boer patent and Kamerman's employer).

in detail in the Boer patent which was previously presented and fully considered in numerous IPRs. *See* the summary of IPRs in Exhibit 2. Samsung alleged that "Kamerman has not been previously cited to or considered by the Office." '228 Reexam Request at 37. This statement is misleading because it does not disclose Kamerman's close relationship to the Boer patent and the substantial identity of the two disclosures. In fact, Kamerman's automatic rate control algorithm is nothing more than a less detailed version of the automatic rate control algorithm in the Boer patent repeatedly relied on by Samsung.

In its '228 Reexamination Request, Samsung argued:

> Kamerman, like Snell, relates to DSSS transceivers designed according to the then-draft IEEE 802.11 standard, and discloses an automatic rate selection scheme for transmitting a first data packet where the data is modulated using a first modulation method *(e.g.,* BPSK at 1 mbps) and next transmitting a second data packet where the data is modulated using a second modulation method *(e.g.,* QPSK at 2 mbps) to adjust the data transfer rate based on channel conditions. *Id* at 11 .... Kamerman discloses that the data transfer rates can fall forward *(i.e.,* increase) with reliable connections and fall back *(i.e.,* revert) when there is strong cochannel interference. *Id* at 12 ....
>
> Kamerman discloses adjusting the data transfer rates by switching between modulation types, including between a first modulation method, such as BPSK (which corresponds to a lower data transfer rate) and a second modulation method of a different type, such as QPSK (which corresponds to a higher data transfer rate). *Id* at 11. Kamerman teaches that the automatic rate selection scheme can maximize the data transfer rate by transmitting the data using the first modulation method (which corresponds to a lower data transfer rate) during higher load conditions when a more robust signal is needed due to "mutilation of transmissions by interference," and switching to transmitting the data using the second modulation method (which corresponds to the higher data transfer rate) when there is a reliable connection.
>
> > At lower load in the neighbor cells the highest bit rate can be used more often. At higher load the transmissions from the accesspoint to stations at the outer part of the cells, will be done often at fallback rates due to mutilation of transmissions by interference. In practice

> the network load for LANs at nowadays client-server applications is very bursty, with sometimes transmission bursts over an individual links and low activity during the major part of the time. Therefore the higher bit rate can be used during the most of the time, and at high load in the neighbor cells (as will evoked by test applications) there will be switched to fall back rates in the outer part of the cell.

Id at 11.

> Accordingly, Kamerman discloses an automatic rate selection scheme for transmitting a first data packet where the data is modulated using a first modulation method *(e.g.,* BPSK at 1 mbps) when there is a high load in neighbor cells causing cochannel interference which requires a more robust signal, and, after a number of successive correctly acknowledged packet transmissions (for instance, where there is a low load in neighbor cells and a reliable connection) next transmitting a second data packet where the data is modulated using a second modulation method *(e.g.,* QPSK at 2 mbps) to maximize the data transfer rate. This automatic rate selection scheme is advantageous because it maximizes the data transfer rate when possible while preserving reliability during periods of strong cochannel interference.

'228 Reexamination Request, at 38-39 (citation parentheticals omitted).

In the '555 IPR Petition, Samsung previously made substantially the same arguments based on Boer. *See, e.g.,* the '555 IPR Petition, at 37-45 (quoted above). *See also* the citations to Boer in attached Exhibit 3 (matching them to those in Kamerman).

B. The '809 Reexamination Must be Terminated in Conformity with the Office's Consistent Agency Practice

In light of the comparison above, it is undeniable that the art presented in the '228 Reexamination Request is "the same or substantially the same prior art or arguments previously … presented to the Office" in Samsung's earlier filed IPRs. 35 U.S.C. § 325(d). It is the Office's consistent practice to refuse to institute or terminate follow-on proceedings, such as the '809 Reexamination, pursuant to § 325(d). *See, e.g., Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25; *Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at

11-12; *Unified Patents, Inc., v. PersonalWeb Techs., LLC,* IPR2014-00702, paper 13; *Medtronic Inc., v. Nuvasive, Inc.,* IPR2014-00487, paper 8; *Prism Pharma Co. Ltd., v. Choongwae Pharma Corp.,* IPR2014-00315, paper 14; *Medtronic Inc., v. Robert Bosch Healthcare Systems, Inc.,* IPR2014-00436, paper 17; *Intelligent Bio-Systems, Inc., v. Illumina Cambridge Ltd.,* IPR2013-00324, paper 19; *ZTE Corp. v. ContentGuard Holdings, Inc.*, IPR2013-00454, paper 12. To reach any other conclusion would be unfair to Rembrandt, would be in violation of the core function of the post-grant review and reexamination statutory framework, would reward Samsung for belatedly filing a reexamination request, and would undermine the integrity of the Office. *See, e.g., Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63, at 11-12.

Specifically, the Office has consistently denied "follow-on" petitions for post-grant review as representing impermissible "second bites at the apple," which use the prior proceedings "to bolster challenges that were advanced, unsuccessfully, in [an earlier proceeding]," *Unilever Inc. v. Proctor & Gamble*, IPR2014-00506, paper 17 at 8 (July 7, 2014), "as a roadmap to remedy [petitioner's] prior, deficient challenge," *Butamax v. Gevo, Inc.,* IPR2014-00581, Paper 8 at 12-13 (Oct. 14, 2014), or "as an entry ticket, and a how-to guide … to challenge those claims which [petitioner] unsuccessfully challenged in the first petition," *ZTE Corp. v. ContentGuard*, IPR2013-00454, paper 12 at 6 (Sept. 25, 2013). As illustrated above, the '809 Reexamination of the '228 Patent resulted from such a "follow-on" request, provided Samsung with yet another "second bite at the apple," and used the related *thirteen* previously filed *inter partes* reviews as a road map for Samsung's request. Accordingly, the '809 Reexamination should be terminated in conformity with the Office's consistent practice with respect to follow-on requests for review, as reflected in the PTAB's "informative" decisions.

See, e.g., Unilever v. Proctor & Gamble, IPR2014-00506, paper 25; *Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63; *Unified Patents, Inc., v. PersonalWeb Techs., LLC,* IPR2014-00702, paper 13; *Medtronic Inc., v. Nuvasive, Inc.,* IPR2014-00487, paper 8; *Prism Pharma Co. Ltd., v. Choongwae Pharma Corp.,* IPR2014-00315, paper 14; *Medtronic Inc., v. Robert Bosch Healthcare Systems, Inc.,* IPR2014-00436, paper 17; *Intelligent Bio-Systems, Inc., v. Illumina Cambridge Ltd.,* IPR2013-00324, paper 19; *ZTE Corp. v. ContentGuard Holdings, Inc.*, IPR2013-00454, paper 12. Taking an inconsistent approach with respect to the '809 Reexamination would be arbitrary and thus unlawful.

C. Policy Considerations Favor Terminating the '809 Reexamination

OPLA argues that "To prevent the use of the reexamination process to harass the patent owner, Congress included the requirement that a substantial new question of patentability based on patents and printed publications must be raised by the request." '228 Petition Dismissal, at 6-7. While this may have been Congress's intent for the substantial new question standard, after more than two decades since the substantial new question standard was implemented, Congress has reached the conclusion that the substantial new question standard has been inadequate to achieve its intended purpose:

> In the second sentence of 325(d), the present bill also authorizes the Director to reject any request for *ex parte* reexamination or petition for post-grant or *inter partes* review on the basis that the same or substantially the same prior art or arguments previously were presented to the Office. This will prevent parties from mounting attacks on patents that raise issues that are substantially the same as issues that were already before the Office with respect to the patent. The Patent Office has indicated that it currently is **forced to accept may requests for *ex parte* and *inter partes* reexamination** that raise challenges that are cumulative of or substantially overlap with issues previously considered by the Office with respect to the patent.
>
> **The second sentence of 325(d) complements the protections against abuse of *ex parte* reexamination** that are created by sections 315(e) and 325(e).

157 Cong. Rec S1360-S1394, S1376 (emphasis added).

OPLA cannot ignore that § 325(d) was added to the America Invents Act for, *inter alia*, the express purpose of curing the inability of the substantial new question standard to prevent abuse of *ex parte* reexamination. Allowing the '809 Reexamination to proceed, as the Office has permitted thus far and as the CRU has done, would frustrate that purpose and would permit the type of harassment that § 325(d) was designed to curb. *See* H.R. Rep. No. 112-98, pt.1, at 48 (2011) ('While this amendment is intended to remove current disincentives to current administrative processes, the changes made by it are not to be used as tools for harassment or a means to prevent market entry through repeated litigation and administrative attacks on the validity of a patent. Doing so would frustrate the purpose of the section as providing quick and cost-effective alternatives to litigation.')"). *See also Conopco, Inc. dba Unilever v. Proctor & Gamble*, IPR2014-00628, paper 21 at 11 ("the interests of fairness, economy, and efficiency support declining ….").

Further, allowing the '809 Reexamination to proceed incentivizes patent challengers to file serial petitions and requests and increases the burden on both the Office and patent owners in having to respond to renewed attacks from unhappy challengers seeking a reconsideration of the Office's decisions denying institution and/or reexamination, based on arguments that the challenger could have set forth from the beginning. Clearly, this was not the intent of Congress.

The PTAB has consistently and effectively used §325(d) to curb attempts by challengers to game the Office through follow-on challenges. *See, e.g., Unilever v. Proctor & Gamble,* IPR2014-00506, paper 25; *Ariosa Diagnostics v. Verinata Health, Inc.,* IPR2013-00276 and -00277, paper 63; *Unified Patents, Inc., v. PersonalWeb Techs., LLC,* IPR2014-00702, paper 13;

Medtronic Inc., v. Nuvasive, Inc., IPR2014-00487, paper 8; *Prism Pharma Co. Ltd., v. Choongwae Pharma Corp.,* IPR2014-00315, paper 14; *Medtronic Inc., v. Robert Bosch Healthcare Systems, Inc.,* IPR2014-00436, paper 17; *Intelligent Bio-Systems, Inc., v. Illumina Cambridge Ltd.,* IPR2013-00324, paper 19; *ZTE Corp. v. ContentGuard Holdings, Inc.*, IPR2013-00454, paper 12. Treating reexaminations differently – in spite of the statutory language – would serve as both an indication and a road map for future and current challengers that it is now "open season" on patent owners at the Office through reexamination attacks. Allowing the '809 Reexamination to proceed will serve as an invitation for every party unhappy with a denial of an *inter partes* review to file a request for *ex parte* reexamination on substantially the same or cumulative art and arguments. That is an invitation that the Office should decline to extend.

Finally, there can be no question that the Samsung's request for reexamination of the '228 patent (and its parent) represent the type of harassment that § 325(d) was intended to curb. In the Patent Office's October 24, 2017 "Chat with the Chief," Chief Administrative Patent Judge David P. Ruschke discussed the Board's analysis of multiple petitions in AIA Trials,[26] and indicated that patents challenged by seven or more petitions are "extreme outliers." *Exhibit 4* at 36; *see also* note 14, *supra*. To date, Samsung has filed *seven* IPRs against the '228 Patent (IPR2014-00889, 00890, 00891, 00892, 00893, 00895, and IPR2015-00555), with the '809 reexamination request representing the *eighth* post grant review of the '228 Patent filed by Samsung. *Exhibit 2* at 2-4. The Board determined that these "extreme outliers" are generally driven by large numbers of claims, large numbers of defendants, and/or large numbers of

[26] Patent Owner is submitting the slide deck from Judge Ruschke's presentation concurrently herewith as Exhibit 4.

joinders. *Exhibit 4* at 37. None of those drivers are present here. *All* of the IPR petitions filed against the '228 Patent were filed by Samsung, and many of Samsung's petitions sought review of identical sets of claims, with no petition seeking review of more than 18 claims. *Exhibit 2* at 2-4. Furthermore, claim 21 has been challenged in two rounds of IPR petitions,[27] something experienced by only 5% of claims generally. *Exhibit 4* at 21. The '809 reexamination request would represent a third round of post-grant review of claim 21, something experienced by less than 0.1% of claims. *Id.* There can be no denying that the '809 reexamination request represents that exact type of abuse that § 325(d) was implement to curb – the post-grant reviews sought by Samsung against the '228 patent are "extreme outliers" experienced by less than 0.1% of claims challenged in post-grant reviews. That the Office has exercised its discretion pursuant to § 325(d) in much less "extreme" cases simply highlights the arbitrary nature of the Office's conclusion in the '228 Petition Dismissal.

D. Conclusion

In light of the above, Rembrandt respectfully requests that the '228 Petition Dismissal be reconsidered, the Order for reexamination be vacated, and the '809 Reexamination be terminated. Rembrandt further requests that the Office's decision on this Request for Reconsideration be made a final agency action. *See, e.g.,* MPEP § 1002.02.

[27] The Board defines a round of petitions as a group of petitions filed prior to an institution decision. Exhibit 4 at 10. Accordingly, IPR2014-00889 and IPR2014-00892 represent a first round of petitions filed against claim 21 of the '228 Patent. IPR2015-00555 represents a second round petition as it was filed after the institution decisions in IPR2014-00889 and IPR2014-00892.

To the extent the Office believes any rules prevent consideration of this petition, Rembrandt further petitions the Director to suspend such rules under the power granted to the Director by 37 C.F.R. § 1.183.

Any fee required for submission of this Petition may be charged to Counsel's Deposit Account Number 02-2135.

Respectfully submitted,

Date: October 27, 2017

By: /Michael V. Battaglia/

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CERTIFICATE OF SERVICE

It is hereby certified that on this 27th day of October, 2017, the foregoing **PETITION REQUESTING RECONSIDERATION OF OPLA'S NOVEMBER 28, 2016 DISMISSAL OF REMBRANDT'S SEPTEMBER 30, 2016 PETITION UNDER RULE 181/182 REQUESTING THE DIRECTOR TO EXERCISE HER DISCRETIONARY AUTHORITY UNDER 35 U.S.C. § 325(D) AND A FINAL PETITION DECISION IN ACCORDANCE WITH PTAB PRACTICE** was served, by first-class U.S. Mail, on the attorney of record for the third-party Requesters Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., at the following address:

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EXHIBIT 1

Claim 21 of the '228 Patent

1. A master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device, the master communication device comprising:

a master transceiver configured to transmit a first message over a communication medium from the master transceiver to the one or more slave transceivers, wherein the first message comprises:

first information [126] modulated according to a first modulation method,

second information [132], including a payload portion, modulated according to the first modulation method, wherein the second information comprises data intended for one of the one or more slave transceivers and

first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information; and

said master transceiver configured to transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers wherein the second message comprises:

third information [106] modulated according to the first modulation method, wherein the third information comprises information that is indicative of an impending change in modulation to a second modulation method, and

fourth information [108], including a payload portion, transmitted after transmission of the third information, the fourth information being modulated according to the second modulation method, the second modulation method being of a different type than the first modulation method, wherein the fourth information comprises data intended for a single slave transceiver of the one or more slave transceivers, and

second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information; and

wherein the second modulation method results in a higher data rate than the first modulation method.

21. The master communication device as in claim 1, wherein the first information that is included in the first message comprises the first message address data.

EXHIBIT 2

Timeline of Rembrandt Litigation, IPRs and Reexaminations

District Court Litigation:

March 15, 2013: Rembrandt sued Samsung for infringement of the '580 Patent. *Rembrandt Wireless Tech., LP v. Samsung Elect. Co. Ltd.*, No. 2:13-cv-00213 (E.D. Tex. 2013).

June 5, 2013: Rembrandt filed an Amended Complaint alleging infringement of the '228 Patent.

July 10, 2014: The district court judge issued his claim construction memorandum and order.

February 9-13, 2015: *Rembrandt Wireless Tech. v. Samsung Elect. Co.* was tried before a jury. In the case, Rembrandt asserted claims 2 and 59 of the '580 Patent and claim 21 of the '228 Patent. On February 13, 2015, the jury rendered its verdict finding that all asserted claims were infringed and had not been proven invalid.

February 17, 2016: The district court denied Samsung's motion for JMOL (liability issues).

April 17, 2017: The Federal Circuit affirmed the district court's claim construction in the *Rembrandt Wireless Tech. v. Samsung Elect. Co.* case and affirmed the jury's determination that claims 2 and 59 of the '580 Patent and claim 21 of the '228 Patent are not invalid. Samsung did not challenge the jury's infringement findings on appeal. The case was remanded on an issue of damages. *Rembrandt Wireless Techs., LP v. Samsung Elect. Co. Ltd.*, No. 16-1729 (Fed. Cir. 2016).

***Inter Partes* Review Proceedings:**

March 20, 2014: Samsung filed 4 IPRs against the '580 Patent, IPR2014-00514, -00515, -00518, -00519.

In IPR2014-00514, Samsung asserted that claims 1, 2, 4, 5, 10, 13, 19-22, 49, 52-54, 57-59, 61, 62, 66, 70, and 76-79 of the '580 Patent were unpatentable under § 102(b)/103 based on a draft version of the 802.11 standard (the "Draft Standard") and under § 103(a) based on the Draft Standard and U.S. 5,706,428 ("Boer"). On September 9, 2014, the PTAB denied the petition because Samsung did not establish that the Draft Standard was a printed publication, and the "Petition fails to demonstrate a reasonable likelihood of prevailing on the grounds that the challenged claims are anticipated by, or obvious over, Draft Standard or obvious over Draft Standard and Boer." On October 24, 2014, the PTAB denied Samsung's Rehearing Request.

In IPR2014-00515, Samsung asserted that claims 23, 25, 29, 30, 32, 34, 38, 40, 41, 43, 44, and 47 of the '580 Patent were anticipated by or obvious in view of the Draft Standard. On September 9, 2014, the PTAB denied the petition because Samsung did not establish that the Draft Standard was a printed publication. On October 24, 2014, the PTAB denied Samsung's Rehearing Request.

In IPR2014-00518, Samsung asserted that claims 1, 2, 4, 5, 10, 13, 19-22, 49, 52-54, 57-59, 61, 62, 66, 70, and 76-79 of the '580 Patent were unpatentable under 35 U.S.C. § 103(a) over Admitted Prior Art ("APA") and Boer (also in view of Upender). On September 23, 2014, the PTAB instituted the IPR to review claims 1, 4, 5, 10, 13, 20-22, 54, 57, 58, 61, 62, 66, 70, and 76-79 but did *not* institute review of claims 2, 19, 49, 52, 53, and 59. With respect to claims 2, 49, and 59, the PTAB was "not persuaded there is a reasonable likelihood that Petitioner would prevail in its challenge." On September 17, 2015, in its final decision, the PTAB concluded that claims 1, 4, 5, 10, 13, 20-22, 54, 57, 58, 61, 62, 66, 70, and 76-79 were unpatentable under § 103(a) over APA and Boer (combination motivated by Upender).

In IPR2014-00519, Samsung asserted that claims 23, 25, 30, 32, 34, 40, 41, 43, and 44 of the '580 Patent were unpatentable under § 102(e) based on Boer and that claims 29, 38, and 47 were unpatentable under § 103(a) based on Boer and APA (also in view of Upender). On September 23, 2014, the PTAB instituted the IPR to review claims 32, 34, 38, 40, 43, 44, and 47 but *not* claims 23, 25, 29, 30, and 41 because Samsung "ha[d] not shown a reasonable likelihood that it would prevail in demonstrating" that those claims are unpatentable on any ground." On September 17, 2015, in its final decision, the PTAB terminated the trial with respect to claims 32, 34, 40, 43, and 44 (disclaimed) and concluded that claims 38 and 47 of the '580 Patent were unpatentable over APA and Boer (combination motivated by Upender).

June 4, 2014: Samsung files 6 IPRs against the '228 Patent, IPR2014-00889, 00890, 00891, 00892, 00893, 00895

In IPR2014-00889, Samsung asserted that claims 1-3, 5, 10, and 11-21of the '228 Patent were unpatentable based on the Draft Standard, Boer, and U.S. 5,537,398 ("Siwiak"). On December 10, 2014, the PTAB denied the petition because Samsung did not establish that the Draft Standard was a printed publication and thus had not shown a reasonable likelihood of prevailing on the grounds asserted.

In IPR2014-00890, Samsung asserted that claims 22, 23, and 25 of the '228 Patent were unpatentable based on the Draft Standard and Boer. On December 10, 2014, the PTAB denied Samsung's petition because Samsung failed to establish that the Draft Standard was a "printed publication" and, thus, had not shown a reasonable likelihood of prevailing on the grounds asserted based on the Draft Standard alone or in combination with Boer.

In IPR2014-00891, Samsung alleged that claims 26-29, 31, 36-41, 43, and 47-52 of the '228 Patent were unpatentable. To support its allegations, Samsung relied on the Draft Standard alone, combined with Boer, combined with the APA, and combined with Boer and APA. On December 10, 2014, the PTAB denied Samsung's petition concluding that Samsung "has not shown a reasonable likelihood that it would prevail in demonstrating that: (1) claims 26-29, 37-41, 43, and 47-52 of the '228 Patent are unpatentable as anticipated or obvious in view of Draft Standard; (2) claims 26-29, 36- 41, 43, and 47-52 of the '228 Patent are unpatentable as obvious in view of Draft Standard and Boer; (3) claims 29, 31, 36, and 51 of the '228 Patent are unpatentable as obvious in view of Draft Standard and APA; or (4) claims 29, 31, 36, and 51 of the '228 Patent are unpatentable as obvious in view of Draft Standard, Boer, and APA."

In IPR2014-00892, Samsung alleged that claims 1-3, 5, and 10-21 of the '228 Patent were unpatentable under 35 U.S.C. § 103(a) over the APA and Boer. Upender was cited as Ex. 1322 to provide motivation to combine. On December 10, 2014, the PTAB instituted the IPR to review claims 1-3, 5, and 10-20 but *not* claim 21 because the petition did not demonstrate a reasonable likelihood of prevailing on the obviousness ground of unpatentability as to claim 21. In its final decision, the PTAB concluded that claims 1-3, 5, and 10-20 were unpatentable for obviousness over APA and Boer (using Ex. 1322 to find motivation to combine APA and Boer). On January 27, 2015, the PTAB denied Samsung's Rehearing Request with respect to claim 21.

In IPR2014-00893, Samsung alleged that claims 22, 23, and 25 of the '228 Patent were unpatentable under § 103(a) based on the APA and Boer (using Upender (now Ex. 1422) to combine APA and Boer). Samsung relied on Upender to support its allegation that there was motivation to combine. On December 10, 2014, the PTAB instituted the IPR. In its final decision, the PTAB concluded that claims 22, 23, and 25 were unpatentable for obviousness over APA and Boer (using Upender to find motivation to combine APA and Boer).

In IPR2014-00895, Samsung alleged that claims 26-29, 31, 36-41, 43, and 47-52 of the '228 Patent were unpatentable under § 103(a) based on the APA and Boer. Samsung also relied on Upender (Ex. 1522) to provide motivation to combine APA and Boer. The PTAB instituted the IPR to review all challenged claims. In its final decision, the PTAB concluded that these claims were unpatentable under § 103(a) based on the APA and Boer (and relying on Upender to make the claimed combination).

October 21, 2014: Samsung filed two additional IPRs against the '580 Patent, namely, IPR2015-00114 and IPR2015-00118. These IPRs challenged the claims for which the PTAB failed to institute in IPR2104-00518 and IPR2015-00519. Since the IPRs were outside the 1 year window, they were accompanied by motions seeking to join the new IPRs to IPR2014-00518 and IPR2014-00519 respectively.

In IPR2015-00114, Samsung again challenged claims 2, 19, 49, 52, 53, 59 of the '580 Patent under § 103(a) based on APA and Boer (and citing Upender for motivation to combine these references). On January 28, 2015, the PTAB denied institution under § 325(d) and denied the joinder motion.

In IPR2015-00118, Samsung again challenged claims 23, 25, 29, 30, and 41 of the '580 Patent under § 103(a) based on the APA and Boer (and citing Upender for motivation to combine these references). On January 28, 2015, the PTAB denied institution under § 325(d) and denied the joinder motion.

January 9, 2015: Samsung filed an additional IPR against the '228 Patent, namely, IPR2015-00555. In this IPR, Samsung challenged claim 21, i.e., the claim for which the PTAB failed to institute in IPR2014-00892, under § 103(a) based on the APA, Boer, and Siwiak. Samsung also sought joinder with IPR2014-00892. On June 19, 2015, the PTAB denied institution under Section 325(d) and denied the joinder motion.

***Ex Parte* Reexaminations:**

September 12, 2016: Samsung filed 2 requests for reexamination, 90/013,808 attacking claims 2 and 59 of the '580 Patent and 90/013,809 attacking claim 21 of the '228 Patent.

September 27, 2016: The Office ordered reexamination in the '808 case ('580 Patent).

September 30, 2016: Rembrandt filed petitions in both reexaminations asking the Director to exercise her authority under Section 325(d) and pointing to the PTAB's numerous refusals under Section 325(6) to consider additional IPRs.

October 17, 2016: The Office ordered reexamination in the '809 case ('228 Patent).

November 28, 2016: Rembrandt's two Section 325(d) petitions were dismissed based on the Office's position that Rembrandt had not established there was no substantial new question of patentability.

January 24, 2017: The Office issued a non-final Office Action in the '808 case ('580 Patent) which, *inter alia*, raised issues beyond the scope of reexamination.

February 9, 2017: Rembrandt filed a petition in the '808 case ('580 Patent) asking the Director to withdraw the January 24, 2017 non-final Office Action and revise and reissue another non-final Office Action.

March 9, 2017: The Office issued a non-final Office Action in the '809 case ('228 Patent) which, *inter alia*, raised issues beyond the scope of reexamination.

March 27, 2017: The CRU Director issued a "Decision Sua Sponte Vacating Non Final Office Action" in the '808 case ('580 Patent) because it "include[d] a discussion of issues outside the scope of ex parte reexamination …." The Decision also indicated the Office Action "will form no part of the record and will not be available to the public."

March 31, 2017: The Office issued another non-final Office Action in the '808 case ('580 Patent). Rembrandt's response is due June 30, 2017.

April 3, 2017: Rembrandt's February 9, 2017 petition in the '808 case ('580 Patent) was dismissed as "moot" in view of the CRU Director's withdrawal of the January 24, 2017 Office Action and issuance of another Office Action on March 31, 2017.

April 3, 2017: Rembrandt filed a petition in the '809 case ('228 Patent) asking the Director to withdraw the March 9, 2017 non-final Office Action and revise and reissue another non-final Office Action.

April 5, 2017: The CRU Director issued a "Decision Sua Sponte Vacating Examiner's Answer [*sic*: Non Final Office Action]" in the '809 case ('228 Patent) because it "include[d] a discussion of issues outside the scope of ex parte reexamination …." The Decision also indicated the Office Action "will form no part of the record and will not be available to the public."

May 2, 2017: Rembrandt filed a petition in the '808 case ('580 Patent) asking the Director to either (a) terminate the reexamination proceeding because the Office views the claims as indefinite and proceeding would necessarily be based on speculative assumption as to the meaning of the claims or (b) vacate the March 31, 2017 non-final Office Action and revise and reissue another non-final Office Action because the Office Action exceeds the limited scope of *ex parte* reexamination and fails to adequately detail the pertinence and manner of applying the cited art.

May 3, 2017: The Office issued another non-final Office Action in the '809 case ('228 Patent). That same day, Rembrandt's April 3, 2017 petition was dismissed as "moot" in view of the CRU Director's withdrawal of the March 9, 2017 Office Action and issuance of another Office Action on May 3, 2017. Rembrandt's response is due August 3, 2017.

June 8, 2017: Rembrandt filed a petition in the '809 case ('228 Patent) asking the Director to vacate the May 3, 2017 non-final Office Action as *ultra vires* because the Office has not made

the threshold finding that the rejection based on Boer, the so-called Admitted Prior Art ("APA"), and Yamano ("the Boer Rejection") presented a substantial new question of patentability. In addition, the petition asked the Director to terminate the portion of the reexamination relating to the Boer Rejection under 35 U.S.C. §325(d) because it merely rehashes prior art and arguments substantively identical to those presented previously in IPR2015-00555. This petition is pending.

June 22, 2017: The Office issued a decision on Rembrandt's May 2, 2017 Petition in the '808 case ('580 Patent) asking the Directed to terminate the '808 reexamination or vacate and revise the March 31, 2017 non-final Office Action. In the decision, the Office dismissed Rembrandt's petition finding the examiner did not abuse her discretion in the March 31, 2017 Office Action. The decision also indicated that some of the issues raised in the petition were appealable, not petitionable, issues.

June 30, 2017: The Office issued a Final Office Action in the '808 case ('580 Patent). Rembrandt's response is due September 18, 2017.

July 7, 2017: Rembrandt requested an extension of time to respond to the May 3, 2017 non-final Office Action in the '809 case ('228 Patent).

July 10, 2017: The Office granted Rembrandt's request for an extension of time to respond to the May 3, 2017 non-final Office Action in the '809 case ('228 Patent), extending the due date from August 3, 2017 to August 13, 2017.

August 14, 2017: Rembrandt filed its response to the to the May 3, 2017 non-final Office Action in the '809 case ('228 Patent). The response was filed on August 14, 2017 as August 13, 2017 was a Sunday.

September 18, 2017: Rembrandt filed its Response to the Final Office Action in the '808 case ('580 Patent) accompanied by the Supplemental 37 CFR § 1.132 Declaration of Dr. Robert Akl.

September 18, 2017: Rembrandt also filed three petitions in the '808 case, i.e. Petition Requesting Termination of Grounds of Rejection Pursuant to 37 CFR § 1.181 (based on the Harris documents); Petition Requesting Reconsideration of OPLA's November 28, 2016 Dismissal of Rembrandt's September 30, 2016 Petition Under Rule 181/182 Requesting the Director to Exercise Her Discretionary Authority Under § 325(d) …"; and "Petition Requesting The Director To Exercise His Supervisory Authority Pursuant To 37 C.F.R. § 1.181 And/Or § 1.182." These petitions are pending.

October 16, 2017: The Office issued an Advisory Action in the '808 case ('580 Patent) that maintained all of the pending grounds of rejection against the '580 Patent and set a December 18, 2017 due date for Rembrandt's Notice of Appeal in the '808 case.

EXHIBIT 3

The following table compares Samsung's claim charts presented in its '228 Reexamination Request (Reexamination Control No. 90/013,809, Request for *Ex Parte* Reexamination, filed on September 12, 2016, pp. 44-54) to support its alleged SNQ 1 of claim 21 of the '228 Patent with Samsung's claim charts presented to support its '555 IPR Petition (IPR2014-00555, Petition for *Inter Partes* review, Paper 1, filed January 9, 2015, pp. 45-57) directed to claim 21 of the '228 Patent. The claim limitations in the left-hand column are reproduced from the '228 Reexamination Request. To address the fact that Samsung divided up the claim elements differently in the IPR claim charts than it did in the reexamination request claim charts, the center column indicates in double brackets the element in the '555 IPR Petition claim chart from which the text was taken. Unless otherwise indicated, all emphasis is original to the respective claim charts from the '228 Reexamination Request and the '555 IPR Petition. The following comparison omits footnotes internal to the claim chart from the '228 Reexamination Request as the footnotes merely repeat arguments addressed by Patent Owner in section II.A of the Petition accompanying the present Exhibit.

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
1. [preamble] A master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication	[[1a]]: *"Master communication device:"* Ex. 1301 (APA), Figs. 1 & 2; 3:30-33 ("FIG. 1 is a block diagram of a prior art multipoint communication system including a **master transceiver** and a plurality of tributary transceivers.") Ex. 1301 (APA), 3:64-4:1 ("With reference to FIG. 1, a prior art multipoint communication system 22 is shown to comprise a **master modem or transceiver** 24, which communicates with a plurality of tributary modems (tribs) or transceivers 26-26 over communication medium 28.")	**To the extent this preamble is considered a limitation of the claim, Snell in view of Harris AN9614 discloses a master communication device configured to communicate with one or more slave transceivers according to a master/slave relationship in which a slave communication from a slave device to the master communication device occurs in response to a master communication from the master communication device to the slave device. *See, e.g.,* Snell at 1:34-46, 1:47-50, 1:55-57, 2:27-30, 4:42-47, 5:18-21; Harris AN9614 at 3.** For example, Snell discloses a "transceiver" that serves as an access point for communicating data with

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
from the master communication device to the slave device, the master communication device comprising:	Ex. 1304 (Boer), Figs. 1-3 and 8. *"Master/slave relationship…:"* Ex. 1301 (APA), 4:30-33 ("This system uses polled multipoint communication protocol. That is, a master controls the initiation of its own transmission to the tribs and permits transmission from a trib only when that trib has been selected.") Ex. 1304 (Boer), Figs. 1-3 and 8.	other transceivers connected to a wireless local area network (WLAN). "In a typical WLAN, *an access point provided by a transceiver,* that is, a combination transmitter and receiver, connects to the wired network from a fixed location. Accordingly, the access transceiver receives, buffers, and transmits data between the WLAN and the wired network. *A single access transceiver can support a small group of collocated users within a range of less than about one hundred to several hundred feet. The end users connect to the WLAN through transceivers* which are typically implemented as PC cards in a notebook computer, or ISA or PCI cards for desktop computers. Of course the transceiver may be integrated with any device, such as a hand-held computer." Snell at 1:34-46. "Like the HSP3824 baseband processor, the high data rate baseband processor 40 of the invention contains all of the functions necessary for a full or half duplex packet baseband *transceiver."* Snell at 5:18-21. "The PRISM 1 chip set provides all the functions necessary for full or half duplex, direct sequence spread spectrum, *packet communications* at the 2.4 to 2.5 GHz ISM radio band." Snell at 1:55-57. *See also, e.g.,* Snell at 2:27-30 ("It is another object of the invention to provide *a spread spectrum transceiver*

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
		and associated method to permit operation at higher data rates and which may switch on-the-fly between different data rates and/or formats."); Snell at 1:47-50 ("The assignee of the present invention has developed and manufactured a set of integrated circuits for a WLAN under the mark PRISM 1 which is compatible with the proposed IEEE 802.11 standard."); Snell at 4:42-47 ("Referring to FIG. 1, a *wireless transceiver 30* in accordance with the invention is first described. The *transceiver 30 may be readily used for WLAN applications* in the 2.4 GHZ ISM band in accordance with the proposed IEEE 802.11 standard. Those of skill in the art will readily recognize other applications for the transceiver 30 as well."). Snell incorporates by reference Harris AN9614, which discloses that the communications between transceivers can operate according to a polled *(i.e.,* master/slave) protocol, which is a master/slave communication system. *See e.g.,* Harris AN9614 at 3. "[T]he controller can keep adequate time to operate either a polled or a time allocated scheme. In these modes, the radio is powered off most of the time and only awakens when communications is expected. This station would be awakened periodically to listen for a beacon transmission. The beacon serves to reset the timing and to alert the radio to traffic. If traffic is waiting, the radio is instructed when to listen and for how long. In a polled scheme, the remote radio can respond to the poll with its traffic if it has any. With

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
		these techniques, the average power consumption of the radio can be reduced by more than an order of magnitude while meeting all data transfer objectives." Harris AN9614 at 3.
[1.A] a master transceiver configured to transmit a first message over a communication medium from the master transceiver to the one or more slave transceivers,	[[1b]]: *"Master Transceiver…:"* For APA teachings, see claim element [1a]. Ex. 1304 (Boer), Figures 1-3, 8; Ex. 1304 (Boer), 2:6-22 ("Referring first to FIG. 1, there is shown a preferred embodiment of a wireless LAN (local area network) 10 in which the present invention is implemented. The LAN 10 includes an **access point 12**, which serves as base station, and is connected to a cable 14 which may be part of a backbone LAN (not shown), connected to other devices and/or networks with which stations in the LAN 10 may communicate. The **access point 12 has antennas 16 and 17 for transmitting and receiving messages over a wireless communication channel.** The network 10 includes mobile stations 18, referred to individually as mobile stations 18-1, 18-2, and having antennas 20 and 21, referred to individually as antennas 20-1, 20-2 and 21-1, 21-2. The mobile stations 18 are capable of transmitting and receiving messages selectively at a data rate of 1 Mbps (Megabit per	**Snell discloses a master transceiver configured to transmit a first message over a communication medium from the master transceiver to the one or more slave transceivers.** *See* Element 1.preamble.

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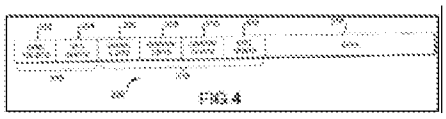
	second) or 2 Mbps, using DSSS (direct sequence spread spectrum) coding."); and Ex. 1304 (Boer), 2:34-37 ("Also included in the LAN 10 are further mobile stations 22, referred to individually as stations 22-1 and 22-2, and having antennas 24 and 25, referred to individually as antennas 24-1, 24-2 and 25-1, 25-2.") *"First message:"* Ex. 1301 (APA), 4:28-50 ("The master transceiver 24 transmits a training sequence 34 that includes the address of the trib that the master seeks to communicate with. In this case, the training sequence 34 includes the address of trib 26a. As a result, trib 26b ignores training sequence 34. After completion of the training sequence 34, master transceiver 24 transmits data 36 to trib 26a followed by trailing sequence 38, which signifies the end of the communication session.") Ex. 1304 (Boer), 3:42-43 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10")  Ex. 1324 (Siwiak), 2:57-65 ("As illustrated in FIG. 2, the paging system includes a transmission format protocol 100 which has two	

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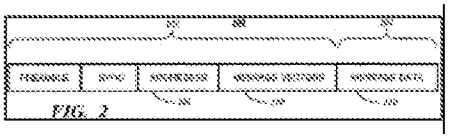
	portions. The first transmission portion 102 is sent in a first modulation format, for example FM. The first transmission portion allows the subscriber unit receivers to work in a lower power consumption mode which enhances battery life. The second transmission portion 104 is sent in a second modulation format, preferably OFDM, which requires the receiver to work in a higher power mode.") 	
[1.B] wherein the first message comprises: first information modulated according to a first modulation method, second information, including a payload portion, modulated according to the first modulation method, wherein the second information comprises data	[[1c]]: *"First information:"* Ex. 1304 (Boer), Abstract ("A wireless LAN includes first stations adapted to operate at a 1 or a 2 Mbps data rate and second stations adapted to operate at a 1,2,5 or 8 Mbps data rate. The 1 and 2 Mbps rates use DBPSK and DQPSK modulation, respectively. . . . **All transmitted messages start with a preamble and header at the 1 Mbps rate**.") Ex. 1304 (Boer), 1:33-40 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein **said messages**	**Snell discloses that the first message comprises first information modulated according to a first modulation method, second information, including a payload portion, modulated according to the first modulation method, wherein the second information comprises data intended for one of the one or more slave transceivers.** ***See, e.g.,*** **Snell at Abstract, 1:34-46, 1:47-50, 1:55-57, 1:58-61, 2:27-30, 2:56-59, 2:61-3:5, 4:42-47, 5:18-2, 6:35-36, 6:52-59, 6:64-66, 7:1-2, 7:5-14, 7:6-8, Figs. 2, 3; Harris AN9614 at 3; Harris 4064.4 at 14, 15, 16, Fig. 10.** For example, Snell discloses a "transceiver" that serves as an access point for communicating "data intended for one of the one or more [other] transceivers" connected to a wireless local area network (WLAN).

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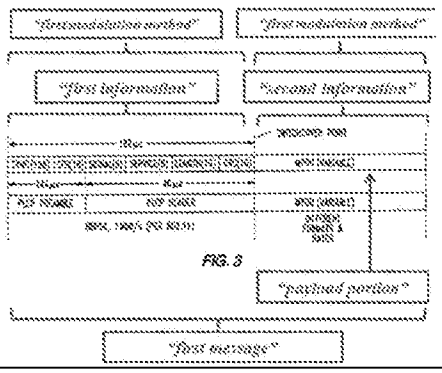
intended for one of the one or more slave transceivers and	**include an initial portion** and a data portion, including the steps of: transmitting the initial portion of a message to be transmitted by a station at a first predetermined one of a first plurality of data rates; . . . ") Ex. 1304 (Boer), 3:42-55 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 includes … an 8-bit SIGNAL field 206 (to be explained), an 8-bit SERVICE field 208 (to be explained)… The fields 202 and 204 are together conveniently referred to as a preamble 216 and **the fields 206, 208, 210 and 212 are together conveniently referred to as a header 218**.") Ex. 1324 (Siwiak), Fig. 2 & 2:57-65 ("As illustrated in FIG. 2, the paging system includes **a transmission format protocol 100 which has two portions. The first transmission portion 102** is sent in a first modulation format, for example FM. The first transmission portion allows the subscriber unit receivers to work in a lower power consumption mode which enhances battery life. The second transmission portion 104 is sent in a second modulation format, preferably OFDM, which requires the receiver to work in a higher power mode.") *"Modulated according to a first modulation method:"*	*See* Element 1.preamble. "In a typical WLAN, *an access point provided by a transceiver,* that is, a combination transmitter and receiver, connects to the wired network from a fixed location. Accordingly, the access transceiver receives, buffers, and transmits data between the WLAN and the wired network. *A single access transceiver can support a small group of collocated users within a range of less than about one hundred to several hundred feet. The end users connect to the WLAN through transceivers* which are typically implemented as PC cards in a notebook computer, or ISA or PCI cards for desktop computers. Of course the transceiver may be integrated with any device, such as a hand-held computer." Snell at 1:34-46. "The PRISM 1 chip set provides all the functions necessary for full or half duplex, direct sequence spread spectrum, *packet communications* at the 2.4 to 2.5 GHz ISM radio band." Snell at 1:55-57. Snell further discloses transmitting a "first message" comprising "first information" *(e.g.,* PLCP preamble 

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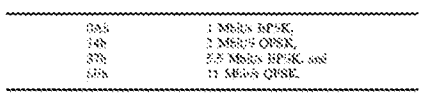
	Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein said messages include an initial portion and a data portion, including the steps of: **transmitting the initial portion of a message to be transmitted by a station at a first predetermined one of a first plurality of data rates;** . . . ") Ex. 1304 (Boer), 3:56-58 ("With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and **header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation**.") Ex. 1324 (Siwiak), 2:57-65 ("As illustrated in FIG. 2, the paging system includes a transmission format protocol 100 which has two portions. **The first transmission portion 102 is sent in a first modulation format, for example FM**. The first transmission portion allows the subscriber unit receivers to work in a lower power consumption mode which enhances battery life. The second transmission portion 104 is sent in a second modulation format, preferably OFDM, which requires the receiver to work in a higher power mode.") [[1d]]:	and PLCP header) "modulated according to a first modulation method" *(e.g.,* BPSK) and "second information, including a payload portion" *(e.g.,* MPDU data) "modulated according to the first modulation method" *(e.g.,* BPSK) (as depicted in Figure 3 below). Snell alternatively discloses modulating the "first information" *(e.g.,* PLCP preamble and PLCP header) and "second information, including a payload portion" *(e.g.,* MPDU data) according to DBPSK, which also is a "first modulation method." Snell at Fig. 3 (annotated). "The *header may always be BPSK."* Snell at 6:35-36. Snell discloses that the "SIGNAL" in the PLCP header indicates *(e.g.,* using "OAh") the modulation type *(e.g.,* BPSK) used for modulating the MPDU data portion. 0"Now relating to the PLCP header  91, the SIGNAL is: Snell at 6:52-59. "SIGNAL is indicated by 2 control bits and then formatted as described." Snell at 7:1-2. "MPDU is serially provided by Interface 80 and is the variable data scrambled for normal operation. The reference phase for the first symbol

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	"Second information:" Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein said messages include an initial portion and **a data portion** . . . .") Ex. 1304 (Boer), 3:42-55 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 includes … a **DATA field 214 which comprises a variable number of data "octets", that is 8-bit data segments, sometimes referred to as "bytes"**. The fields 202 and 204 are together conveniently referred to as a preamble 216 and the fields 206, 208, 210 and 212 are together conveniently referred to as a header 218.") *"Modulated according to the first modulation method:"* Ex. 1304 (Boer), 2:23-27 ("**When operating at the 1 Mbps data rate, DBPSK (differential binary phase shift keying) modulation of the RF carrier is utilized**, and when operating at the 2 Mbps data rate DQPSK (differential quadrature phase shift keying) modulation of the RF carrier is utilized.") Ex. 1304 (Boer), 3:56-65 ("With	of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at 7:5-14. "The modulator preferably comprises means for *operating in one of a bi-phase PSK (BPSK) modulation mode at a first data rate defining a first format,* and a quadrature PSK (QPSK) mode at a second data rate defining a second format." Snell at 2:56-59. "In particular, the HSP3824 baseband processor manufactured by Harris Corporation *employs quadrature or bi-phase phase shift keying (QPSK or BPSK) modulation schemes."* Snell at 1:58-61. *See also, e.g.,* Snell at Abstract ("The modulator and demodulator are each preferably operable *in one of a bi-phase PSK (BPSK) mode* at a first data rate and *a quadrature PSK (QPSK) mode* at a second data rate. These formats may also be switched on-the-fly in the demodulator."), 2:15-17 ("Moreover, a WLAN application, for example, may require a change between *BPSK and QPSK* during operation, that is, on-the-fly."). *"The PLCP preamble and PLCP header are always* at 1 Mbit/s, *Diff*

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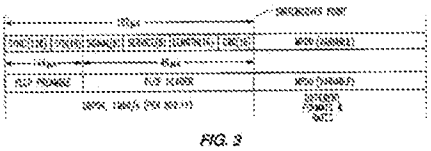
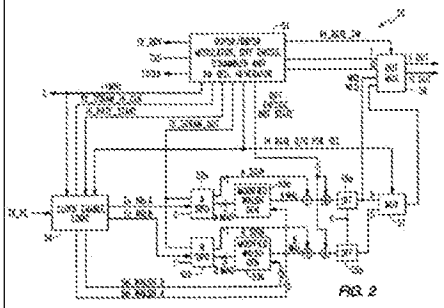
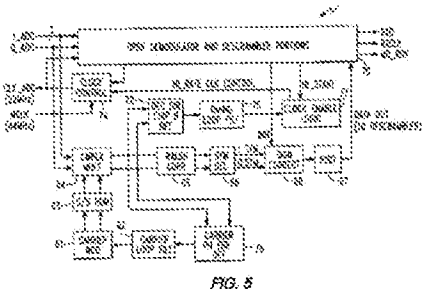
	regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent **DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove**. Of course, the stations 18 are capable of transmitting at the 1 and 2 Mbps rates only, whereas the stations 22 can transmit the DATA field 214 at a selected one of the four data rates.") [[1e]]: *"Second information comprises data…:"* Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein said messages include an initial portion and **a data portion** . . . .") Ex. 1304 (Boer), 3:42-55 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 … a **DATA field 214 which comprises a variable number of data "octets", that is 8-bit data segments, sometimes referred to as "bytes"**. The fields 202 and	*encoded,* scrambled and spread with an 11 chip barker." Snell at 6:64-66. "The modulator may also preferably include header modulator means for modulating data packets to include *a header at a predetermined modulation and a third data rate defining a third format.... The third format is preferably differential BPSK."* Snell at 2:61-3:5. "The reference phase for the first symbol of the *MPDU* is the output phase of the last symbol of the header *for Diff Encoding."* Snell at 7:6-8  FIG. 3 Snell at Fig. 3.  FIG. 2 Snell at Fig. 2.  FIG. 5 Snell at Fig

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	204 are together conveniently referred to as a preamble 216 and the fields 206, 208, 210 and 212 are together conveniently referred to as a header 218.") Ex. 1324 (Siwiak), Fig. 2 & Abstract ("The second transmission portion (104) **includes message data (110)** transmitted in frames representing a time sequence of N data bits at the predetermined frame rate and provides a plurality of carrier frequencies related to a frequency domain representation of the time sequence of data bits.") *"Intended for one of the one or more slave transceivers:"* Ex. 1301 (APA), 4:10-21 ("These sequences are **commonly referred to as training signals** … In a multipoint system, **the address of the trib** with which the master is establishing communication is also transmitted during the training interval.") Ex. 1304 (Boer), 2:19-22 ("The mobile stations 18 are capable of **transmitting** and receiving **messages selectively** at a data rate of 1 Mbps (Megabit per second) or 2 Mbps, using DSSS (direct sequence spread spectrum) coding.") Ex. 1304 (Boer), 6:28-31 ("The C-MST 132 determines if an incoming message is addressed to its own station, using a **destination address included in**	. 5. Snell incorporates by reference Harris 4064.4, which discloses: *"The preamble and header are always transmitted as DBPSK* waveforms while the *data packets can be configured to be either DBPSK* or DQPSK." Harris 4064.4 at 14. "The *preamble is always transmitted as a DBPSK* waveform with a programmable length of up to 256 symbols long." Harris 4064.4 at 15. *"Signal Field (8 Bits) - This field indicates whether the data packet that follows the header is modulated as DBPSK* or DQPSK. In mode 3 the HSP3824 receiver looks at the signal field to determine whether it needs to switch from DBPSK demodulation into DQPSK demodulation at the end of the always DBPSK preamble and header fields." Harris 4064.4 at 15. "Mode 3 - In this mode the preamble is programmable up to 256 bits (all 1's). The header in this mode is using all available fields. *In mode* 3 *the signal field defines the modulation type of the data packet (DBPSK* or DQPSK) so the receiver does not need to be preprogrammed to anticipate one or the other. In this mode the device checks the Signal field for the data packet modulation and it switches to DQPSK if it is defined as such in the signal field. *Note that the preamble and header are always DBPSK* the modulation definition applies only for the data packet." Harris 4064.4 at 16.

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	the DATA field 214 of the message 200.") Ex. 1324 (Siwiak), 2:53-57 ("**The address uniquely identifies the data communication receiver** (or a group of data communication receivers) to which the message is directed, and the message characterization information identifies an information service, among other things.") Ex. 1324 (Siwiak), 4:31-39 ("As shown in FIG. 2, when a message transmission is initiated on the channel, the first transmission portion 102, modulated in the well-known FM format, is transmitted on the channel. The first transmission portion 102 includes a preamble and synchronization bits, **followed by the pager address in the address block 106** and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104.")	*See also, e.g.,* Harris 4064.4 at 14 ("The HSP3824 transmitter is designed as a Direct Sequence Spread Spectrum DBPSK/DQPSK modulator."), Harris 4064.4 at 14 ("The modulator is capable of switching rate automatically in the case where the preamble and header information are DBPSK modulated, and the data is DQPSK modulated."), Harris 4064.4 at FIGURE 10.
[1.C] first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second	[[1f]]: Ex. 1301 (APA), 4:10-21 ("These sequences are **commonly referred to as training signals**… In a multipoint system, **the address of the trib with which the master is establishing communication is also transmitted during the training interval**.") See Ex. 1304 (Boer), 6:28-31 ("The C-MST 132 determines if an	**Snell in view of Yamano discloses that the first message comprises first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information.** ***See, e.g.,*** **Snell at 6:35-36, 6:64-66, 7:5-10, Fig. 3, Harris 4064.4 at 14; Yamano at 16:63-64, 20:1-7, 20:54-59. Fig. 8.**

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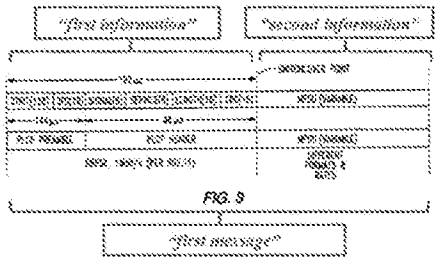
information; and	incoming message is addressed to its own station, using a **destination address included in the DATA field 214** of the message 200.") Ex. 1324 (Siwiak), 4:34-39 ("The first transmission portion 102 includes a preamble and synchronization bits, **followed by the pager address in the address block 106** and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104.")	For example, Snell discloses transmitting "a first message including a PLCP preamble and PLCP header, and MPDU data, as shown in Figure  3, below. Snell at Fig. 3 (annotated). "The *header* may always be BPSK." Snell at 6:35-36. "The *PLCP preamble and PLCP header* are always at 1 Mbit/s, Diff encoded, scrambled and spread with an 11 chip barker." Snell at 6:64-66. *"MPDU* is serially provided by Interface 80 and *is the variable data* scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU." Snell at 7:5-10. Snell incorporates by reference Harris 4064.4, which discloses: "The *preamble and header* are always transmitted as DBPSK waveforms while the *data packets* can be configured to be either DBPSK or DQPSK." Harris 4064.4 at 14.

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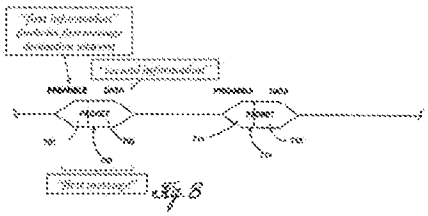
		Yaman discloses that the first message comprises first message address information that is indicative of the one of the one or more slave transceivers being an intended destination of the second information. *See, e.g.,* Yamano at 19:63-64, 20:1-7, 20:54-59, Fig. 8. For example, Yamano discloses transmitting a "first message" *(e.g.,* data packet including a preamble and main body) that includes "first message address information that is indicative" *(e.g.,* "destination address" in the preamble) of the transceiver that is the "intended destination of the second information." *"Packet 700* includes a *preamble 701* and a *main body 702."* Yamano at 19:63-64. "For example, *preamble 701* can include information which identifies: (1) a version or type field for the preamble, *(2) packet source and destination addresses,* (3) the line code (i.e., the modem protocol being used), (4) the data rate, (5) error control parameters, (6) packet length and (7) a timing value for the expected reception slot of a subsequent packet."  Yamano at 20:1-7. Yamano at Fig. 8 (annotated).

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		"When the preamble in a burst-mode packet *includes the destination address of the packet,* the receiver circuits can monitor the destination address of the packet, and in response, filter packets which do not need to be demodulated, thereby reducing the processing requirements of the receiver circuits." Yamano at 20:54-59.
[1.D] said master transceiver configured to transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers wherein the second message comprises: third information modulated according to the first modulation method, wherein the third information comprises information that is indicative of an impending change in	[[1g]]: *"Transmit a second message over the communication medium:"* Ex. 1301 (APA), Fig. 2. Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to **transmit** and receive messages at a plurality of data rates, wherein said **messages** include an initial portion and a data portion . . . .") Ex. 1304 (Boer), 2:13-15 ("The **access point 12** has antennas 16 and 17 for **transmitting** and receiving **messages** over a wireless communication channel.") Ex. 1304, 3:42-43 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10.")	**Snell in view of Kamerman discloses that the master transceiver is configured to transmit a second message over the communication medium from the master transceiver to the one or more slave transceivers wherein the second message comprises: third information modulated according to the first modulation method, wherein the third information comprises information that is indicative of an impending change in modulation to a second modulation method, and fourth information, including a payload portion, transmitted after transmission of the third information, the fourth information being modulated according to the second modulation method, the second modulation method being of a different type than the first modulation method, wherein the fourth information comprises data intended for a single slave transceiver of the one or more slave transceivers. *See, e.g.,* Snell at 1:34-46, 1:47-50, 1:55-57, 2:27-30, 2:61-3:5, 4:42-47, 5:18-2, 6:35-36, 6:52-59, 6:64-66, 7:1-2, 7:5-14, Figs. 2, 3, 5; Harris AN9614 at 3; Harris**

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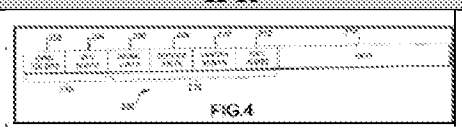
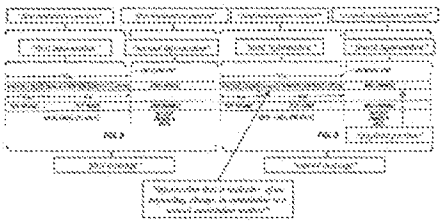
modulation to a second modulation method, and fourth information, including a payload portion, transmitted after transmission of the third information, the fourth information being modulated according to the second modulation method, the second modulation method being of a different type than the first modulation method, wherein the fourth information comprises data intended for a single slave transceiver of the one or more slave transceivers, and	 FIG.4 *"From the master transceiver to the one or more slave transceivers:"* Ex. 1301 (APA), Figs. 1-3 & 8; 4:30-33 ("This system uses polled multipoint communication protocol. That is, a master controls the initiation of its own transmission to the tribs and permits transmission from a trib only when that trib has been selected.") Ex. 1304 (Boer), Figs. 1, 2, 3. [[1h]]: *"Third information:"* Ex. 1304 (Boer), Abstract ("A wireless LAN includes first stations adapted to operate at a 1 or a 2 Mbps data rate and second stations adapted to operate at a 1,2,5 or 8 Mbps data rate. The 1 and 2 Mbps rates use DBPSK and DQPSK modulation, respectively. . . . **All transmitted messages start with a preamble and header at the 1 Mbps rate**.") Ex. 1304 (Boer), 1:33-40 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein **said messages**	**4064.4 at 14-16, Fig. 10; Kamerman at 6, 11, 12.** For example, Snell discloses "a transceiver" that serves as an access point for communicating "data intended for a [transceiver]" connected to a wireless local area network (WLAN). *See* Element 1. Preamble. Snell also discloses that the transceiver transmits data packets to another transceiver, where the communication may be switched on-the-flu between a "first modulation method" (*e.g.,* BPSK) and a "second modulation method" (*e.g.,* QPSK) that is "of a different type than the first modulation method." Snell thus teaches transmitting a "first message" and a "second message" as show in  Figure 3 below. Snell at Fig. 3 (annotated). "The modulator may also preferably include header modulator means for modulating *data packets."* Snell at 2:61-63. "The PRISM 1 chip set provides all the functions necessary for full or half duplex, direct sequence spread spectrum, *packet communications* at the 2.4 to 2.5 GHz ISM radio band." Snell at 1:55-57.

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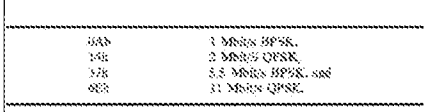
	include an initial portion and a data portion, including the steps of: transmitting the initial portion of a message to be transmitted by a station at a first predetermined one of a first plurality of data rates; . . . ") Ex. 1304 (Boer), 3:42-55 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 includes … an 8-bit SIGNAL field 206 (to be explained), an 8-bit SERVICE field 208 (to be explained), a 16-bit LENGTH field 210 (to be explained), a 16-bit CRC check field 212, which provides a CRC check for the portions 206, 208 and 210… The fields 202 and 204 are together conveniently referred to as a preamble 216 and **the fields 206, 208, 210 and 212 are together conveniently referred to as a header 218**.") "Modulated according to a first modulation method:" Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein said messages include an initial portion and a data portion, including the steps of: **transmitting the initial portion of a message to be transmitted by a station at a first predetermined one of a first**	"It is another object of the invention to provide a spread spectrum transceiver and associated method to permit operation at higher data rates and *which may switch on-the-fly between different data rates and/or formats."* Snell at 2:27-30. *"The variable data may be modulated and demodulated in different formats than the header portion* to thereby increase the data rate, and *while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly."* Snell at 7:10-14. "The *header* may always be *BPSK."* Snell at 6:35-36. "Now relating to the *PLCP header* 91, *the SIGNAL* is:  Snell at 6:52-59. "SIGNAL is indicated by 2 control bits and then formatted as described." Snell at 7:1-2. *"MPDU* is serially provided by Interface 80 and *is the variable data* scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. *The variable data may be modulated and demodulated in different formats* than the header portion to thereby increase the data

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	plurality of data rates; . . . ") Ex. 1304 (Boer), 3:56-58 ("With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and **header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation**.") *"Comprises information that is indicative of an impending change in modulation to a second modulation method:"* Ex. 1304 (Boer), 4:4-11 ("The **SIGNAL field 206 has a first predetermined value if the DATA field 214 is transmitted at the 1 Mbps rate** and a second predetermined value if the DATA field 214 is transmitted at the 2, 5 or 8 Mbps rates. **The SERVICE field 208 has a first predetermined value (typically all zero bits) for the 1 and 2 Mbps rates, a second predetermined value for the 5 Mbps rate and a third predetermined value for the 8 Mbps rate.**") Ex. 1324 (Siwiak), 4:34-39 ("The first transmission portion 102 includes a preamble and synchronization bits, followed by the pager address in the address block 106 and **message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104**.")	rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at 7:5-14. Snell describes that the "first modulation method" may be BPSK and the "second modulation method" may be QPSK, which is of a different "type" than the first modulation method, and alternatively describes that the "first modulation method" may be differential BPSK ("DBPSK") and that the "second modulation method" may be differential QPSK ("DQPSK"), which is also of a different "type" than the first modulation method. Thus, Snell alternatively describes modulating the "first information" *(e.g.,* PLCP preamble and PLCP header) according to a "first modulation method" *(e.g.,* DBPSK) and "second information" *(e.g.,* MPDU data) according to either a "first modulation method" *(e.g.,* DBPSK) or "second modulation method" *(e.g.,* QBPSK). *"The PLCP preamble and PLCP header are always* at 1 Mbit/s, *Diff encoded,* scrambled and spread with an 11 chip barker." Snell at 6:64-66. "The modulator may also preferably include header modulator means for modulating data packets to include *a header at a predetermined modulation and a third data rate defining a third format.... The third format is preferably differential BPSK."* Snell at 2:61-3:5.

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	[[1i]]: *"Fourth information, including a payload portion:"* Ex. 1304 (Boer), 1:33-37 ("Therefore, according to the present invention, there is provided a method of operating a wireless local area network station adapted to transmit and receive messages at a plurality of data rates, wherein said messages include an initial portion and **a data portion** . . . .") Ex. 1304 (Boer), 3:42-55 ("Referring now to FIG. 4, there is shown the format of a typical message 200 used in the LAN 10. The message 200 includes … a **DATA field 214 which comprises a variable number of data "octets", that is 8-bit data segments, sometimes referred to as "bytes"**.") *"Fourth information being modulated according to the second modulation method…:"* Ex. 1304 (Boer), Abstract ("A wireless LAN includes first stations adapted to operate at a 1 or a 2 Mbps data rate and second stations adapted to operate at a 1,2,5 or 8 Mbps data rate. The 1 and 2 Mbps rates use DBPSK and **DQPSK modulation**, respectively. The 5 and 8 Mbps rates use **PPM/DQPSK modulation**.") Ex. 1304 (Boer), 2:23-27 ("When	"The reference phase for the first symbol of the *MPDU* is the output phase of the last symbol of the header for *Diff Encoding."* Snell at 7:6-8. *See also, e.g.,* Snell at Figs. 2, 3, 5. Snell incorporates by reference Harris 4064.4, which discloses: *"The preamble and header are always transmitted as DBPSK* waveforms while the *data packets can be configured to be either DBPSK or DQPSK."* Harris 4064.4 at 14. "The *preamble is always transmitted as a DBPSK* waveform with a programmable length of up to 256 symbols long." Harris 4064.4 at 15. *"Signal Field (8 Bits) - This field indicates whether the data packet that follows the header is modulated as DBPSK or DQPSK.* In mode 3 the HSP3824 receiver looks at the signal field to determine whether it needs to switch from DBPSK demodulation into DQPSK demodulation at the end of the always DBPSK preamble and header fields." Harris 4064.4 at 15. "Mode 3 - In this mode the preamble is programmable up to 256 bits (all l's). The header in this mode is using all available fields. *In mode 3 the signal field defines the modulation type of the data packet (DBPSK* or *DQPSK)* so the receiver does not need to be preprogrammed to anticipate one or the other. In this mode the device checks the Signal field for the data packet modulation

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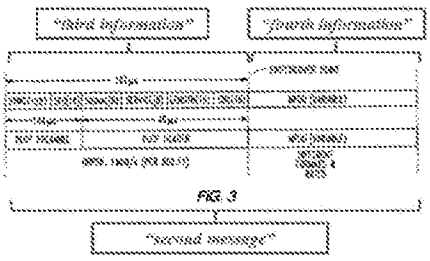
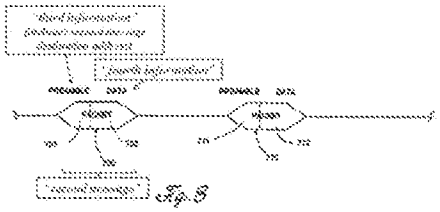
	operating at the 1 Mbps data rate, DBPSK (differential binary phase shift keying) modulation of the RF carrier is utilized, and **when operating at the 2 Mbps data rate DQPSK (differential quadrature phase shift keying) modulation of the RF carrier is utilized**.") Ex. 1304 (Boer), 2:37-44 ("The stations 22 can operate at a 1 Mbps or a 2 Mbps data rate, using the same modulation and DSSS coding as the stations 18, and in addition can also operate at two higher data rates, namely 5 Mbps and 8 Mbps. **These 5 and 8 Mbps data rates utilize PPM/DQPSK (pulse position modulation--differential quadrature phase shift keying**) in combination with the 11-chip Barker code mentioned hereinabove.") Ex. 1304 (Boer), 3:56-65 ("With regard to the message 200, FIG. 4, it should be understood that the preamble 216 and header 218 are always transmitted at the 1 Mbps rate using DBPSK modulation. The subsequent **DATA field 214, however, may be transmitted at a selected one of the four possible rates 1, 2, 5 or 8 Mbps, using the modulation and coding discussed hereinabove**. Of course, the stations 18 are capable of transmitting at the 1 and 2 Mbps rates only, whereas the stations 22 can transmit [[1j]]:	and it switches to DQPSK if it is defined as such in the signal field. *Note that the preamble and header are always DBPSK* the modulation definition applies only for the data packet." Harris 4064.4 at 16. *See also, e.g.,* Harris 4064.4 at 14 ("The HSP3824 transmitter is designed as a Direct Sequence Spread Spectrum *DBPSK/DQPSK* modulator."), Harris 4064.4 at 14 ("The modulator is capable of switching rate automatically in the case where the preamble and header information are DBPSK modulated, and the data is *DQPSK* modulated."), Harris 4064.4 at FIGURE 10. **Kamerman discloses transmitting a first message including second information modulated at a first modulation method and transmitting a second message including fourth information modulated at a second modulation method. *See, e.g.,* Kamerman at 6, 11, 12.** For example, Kamerman discloses an automatic rate selection scheme for falling forward from a "first modulation method" *(e.g.,* BPSK) corresponding to a lower data rate *(e.g.,* 1 Mbit/s) to a "second modulation method" *(e.g.,* QPSK) corresponding to a higher data rate *(e.g.,* 2 Mbit/s) after a number of successive correctly acknowledge packet transmissions, for instance, where there is a low load in neighbor cells and a reliable connection. "Then there is looked to *automatic*

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	Ex. 1301 (APA), 3:64-4:21 ("With reference to FIG. 1, a prior art multipoint communication system 22 is shown to comprise a master modem or transceiver 24, which communicates with a plurality of tributary modems (tribs) or transceivers 26-26 over communication medium 28… If a common modulation method is found, the master transceiver 24 **and a single trib 26 will then exchange sequences of signals** that are particular subsets of all signals that can be communicated via the agreed upon common modulation method. These sequences **are commonly referred to as training signals** … In a multipoint system, the **address of the trib with which the master is establishing communication is also transmitted during the training interval**.") Ex. 1304 (Boer), 2:19-22 ("The mobile stations 18 are capable of transmitting **and receiving messages selectively** at a data rate of 1 Mbps (Megabit per second) or 2 Mbps, using DSSS (direct sequence spread spectrum) coding.") Ex. 1304 (Boer), 6:28-31 ("The C-MST 132 determines if an incoming message is **addressed to its own station, using a destination address included in the DATA field 214 of the message 200**.") Ex. 1324 (Siwiak), 2:53-57 ("**The**	*rate control* to keep the cochannel interference at a tolerable level." Kamerman at 6. "IEEE 802.11 DS specifies bit rates of 1 and 2 Mbps. The allowable SNR and CSIR values for reliable transmission of data packets are dependent on the bit rate." Kamerman at 11. "IEEE 802.11 DS specifies BPSK and QPSK, in addition there could be applied proprietary modes with M-PSK and QAM schemes that provide higher bit rates by encoding more bits per symbol. . . . An automatic rate selection scheme based on the reliability of the individual uplink and downlink could be applied. The basic rate adaptation scheme could be: after unacknowledged packet transmissions the rate falls back, and *after a number (e.g. 10) of successive correctly acknowledged packet transmissions the bit rate goes up."* Kamerman at 11. *"At lower load in the neighbor cells the highest bit rate can be used more often.* At higher load the transmissions from the accesspoint to stations at the outer part of the cells, will be done often at fallback rates due to mutilation of transmissions by interference. In practice the network load for LANs at nowadays client-server applications is very bursty, with sometimes transmission bursts over an individual links and low activity during the major part of the time. *Therefore the higher bit rate can be used during the most of the time, and at high load in the neighbor cells (as will evoked by test*

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	address uniquely identifies the data communication receiver (or a group of data communication receivers) to which the message is directed, and the message characterization information identifies an information service, among other things.")	*applications) there will be switched to fall back rates in the outer part of the cell."* Kamerman at 11. "The application of proprietary bit rates of 3 and 4 Mbps in addition to the basic 1 and 2 Mbps, can be combined with an automatic rate selection. This automatic rate selection gives *fall forward at reliable connections* and fall back at strong cochannel interference." Kamerman at 12.
[1.E] second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information; and	[[1k]]: Ex. 1301 (APA), 4:10-21 ("These **sequences are commonly referred to as training signals**… In a multipoint system, **the address of the trib with which the master is establishing communication is also transmitted during the training interval**.") Ex. 1304 (Boer), 6:28-31 ("The C-MST 132 determines if an incoming message is addressed to its own station, using a **destination address included in the DATA field 214** of the message 200.") Ex. 1324 (Siwiak), 2:53-57 ("**The address uniquely identifies the data communication receiver** (or a group of data communication receivers) to which the message is directed, and the message characterization information identifies an information service, among other things.")	**Snell in view of Yamano discloses that the second message comprises second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information.** *See, e.g.,* **Snell at 1:55-57, 2:61-63, 6:35-36, 6:64-66, 7:5-14, Fig. 3; Harris 4064.4 at 14; Yamano at 19:63-64, 20:1-7, 20:54-59, Fig. 8.** For example, Snell discloses transmitting a "second message" including a PLCP preamble and PLCP header, and MPDU data, as shown in  Figure 3 below. Snell at Fig. 3 (annotated). "The modulator may also preferably

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	Ex. 1324 (Siwiak), 4:34-39 ("The first transmission portion 102 includes a preamble and synchronization bits, followed by the **pager address in the address block 106** and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104.")	include header modulator means for modulating *data packets."* Snell at 2:61-63. "The PRISM 1 chip set provides all the functions necessary for full or half duplex, direct sequence spread spectrum, *packet communications* at the 2.4 to 2.5 GHz ISM radio band." Snell at 1:55-57. "The *header* may always be BPSK." Snell at 6:35-36. "The *PLCP preamble and PLCP header* are always at 1 Mbit/s, Diff encoded, scrambled and spread with an 11 chip barker." Snell at 6:64-66. *"MPDU* is serially provided by Interface 80 and *is the variable data* scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. *The variable data* may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at 7:5-14. Snell incorporates by reference Harris 4064.4, which discloses: "The *preamble and header* are always transmitted as DBPSK waveforms while the *data packets* can be configured to be either DBPSK or

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
		DQPSK." Harris 4064.4 at 14. **Yamano discloses that the second message comprises second message address information that is indicative of the single slave transceiver being an intended destination of the fourth information. *See, e.g.,* Yamano at 19:63-64, 20:1-7, 20:54-59, Fig. 8.** For example, Yamano discloses that a packet includes a preamble and main body, and that the preamble can include a destination address. "*Packet 700* includes a *preamble 701* and a *main body 702."* Yamano at 19:63-64. "For example, *preamble 701* can include information which indentifies: (1) a version or type field for the preamble, (2) *packet source and destination addresses*, (3) the line code (i.e., the modem protocol being used), (4) the data rate, (5) error control parameters, (6) packet length and (7) a timing value for the expected reception slot of a subsequent packet."  Yamano at 20:1-7 (emphasis added). Yamano at Figure 8 (annotated). "when the preamble in a burst-mode packet *include the destination address of the packet,* the receiver circuits can

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
		monitor the destination address of the packet, and in response, filter packets which do not need to be demodulated, thereby reducing the processing requirements of the receiver circuits." Yamano at 20:54-59.
[1.F] wherein the second modulation method results in a higher data rate than the first modulation method.	[[1L]]: Ex. 1304 (Boer), Abstract ("A wireless LAN includes first stations adapted to operate at a 1 or a 2 Mbps data rate and second stations adapted to operate at a 1,2,5 or 8 Mbps data rate. The **1 and 2 Mbps rates use DBPSK and DQPSK modulation, respectively. The 5 and 8 Mbps rates use PPM/DQPSK modulation**.")	**Snell discloses that the second modulation method results in a higher data rate than the first modulation method. See, e.g., Snell at 5:31-33, 6:52-59, 6:64-66, 7:1-2, 7:5-14, Fig. 3; Harris 4064.4 at 16 (Table 7).** For example, Snell discloses that the second modulation method *(e.g.,* QPSK, or alternatively, DQPSK) results in a higher data rate *(e.g.,* 2 Mbit/s) than the first modulation method *(e.g.,* BPSK, or alternatively, DBPSK) which results in a data rate of 1 Mbit/s. "The present invention provides an extension of the PRISM 1 product from 1 *Mbit/s BPSK and 2 Mbit/s QPSK* to 5.5 Mbit/s BPSK and 11 Mbit/s QPSK." Snell at 5:31-33 *"The PLCP preamble and PLCP header are* always at 1 *Mbit/s,* Diff encoded, scrambled and spread with an 11 chip barker." Snell at 6:64-66. "Now relating to the PLCP header 91, the SIGNAL is: 0Ah 1 Mbit/s BPSK, 14h 2 Mbit/S QPSK, 37h 5.5 Mbit/s BPSK, and 6Eh 11 Mbit/s QPSK. Snell at 6:52-59.

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
		"SIGNAL is indicated by 2 control bits and then formatted as described." Snell at 7:1-2. "MPDU is serially provided by Interface 80 and is the variable data scrambled for normal operation. The reference phase for the first symbol of the MPDU is the output phase of the last symbol of the header for Diff Encoding. The last symbol of the header into the scrambler 51 must be followed by the first bit of the MPDU. The variable data may be modulated and demodulated in different formats than the header portion to thereby increase the data rate, and while a switchover as indicated by the switchover point in FIG. 3, occurs on-the-fly." Snell at 7:5-14. *See also, e.g.,* Snell at Fig. 3; Harris 4064.4 at 16 (Table 7).
21. The master communication device as in claim 1, wherein the first information that is included in the first message comprises the first message address data.	Ex. 1301 (APA), 4:10-21 ("These sequences are **commonly referred to as training signals**… In a multipoint system, the address of the trib with which **the master is establishing communication is also transmitted during the training interval**.") Ex. 1301 (APA), 4:28-50 ("**The master transceiver 24 transmits a training sequence 34 that includes the address of the trib that the master seeks to communicate with**. In this case, the training sequence 34 includes the address of trib 26a. As a result, trib 26b ignores training sequence 34. After completion of the training sequence 34, master transceiver 24 transmits data 36 to	**Snell in view of Yamano discloses that the first information that is included in the first message comprises the first message address data.** *See* claim 1, Element 1.C.

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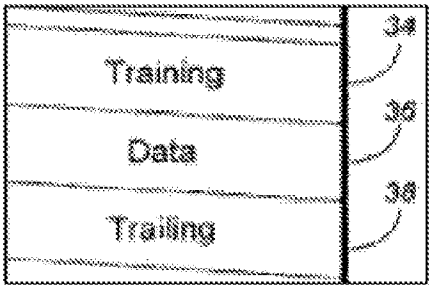
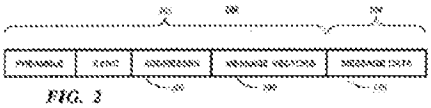
	trib 26a followed by trailing sequence 38, which signifies the end of the communication session.") Ex. 1301(APA), Fig.2:  Ex. 1324 (Siwiak), 2:42-57 ("Each of the plurality of data communication receivers includes receiver circuitry for receiving and demodulating the radio frequency signal transmitted in the first modulation format; **means for decoding the selective call address information** and the message characterization information transmitted in the first modulation format; receiver circuitry, responsive to the message characterization information transmitted during the first transmission portion, for receiving and demodulating the radio frequency signal transmitted in the second modulation format; and means for decoding the message data transmitted in the second modulation format. The **address uniquely identifies the data communication receiver** (or a group of data communication receivers) to which the message is	

'228 Patent Claim 21	Samsung's Argument in the '555 IPR	Samsung's Argument in the '228 Reexam
	directed, and the message characterization information identifies an information service, among other things.") Ex. 1324 (Siwiak), 4:31-39 ("As shown in FIG. 2, when a message transmission is initiated on the channel, the first transmission portion 102, modulated in the well-known FM format, is transmitted on the channel. The first transmission portion 102 includes a preamble and synchronization bits, followed by the pager address in the address block 106 and message vectors 108 which contain the information as to the modulation format of the message data 110 in the second transmission portion 104.") See also Ex. 1324 (Siwiak), Fig. 2:  FIG. 3	

Chat with the Chief

An Analysis of Multiple Petitions in AIA Trials

David P. Ruschke
Chief Administrative Patent Judge

William V. Saindon
Lead Administrative Patent Judge

October 24, 2017

Overview

- Study methodology
- Study results
- New precedential opinion: *General Plastic*
- New informative decisions on 35 U.S.C. §325(d)
- Case studies
- Board case management

Multiple Petition Study Methodology

UNITED STATES PATENT AND TRADEMARK OFFICE

uspto

Exhibit 1 – Page 1 of 11

Methodology

- Comprehensive review of all IPR, PGR, and CBM petitions filed on or before 6/30/2017

- Covers 7,168 petitions and their associated:
  - 4,376 patents;
  - 1,633 patent owners; and
  - 1,423 petitioners

- Relied upon metadata from a PTAB database that identified parties, filings, and milestones

- Additional data was gathered manually to identify claim information (e.g., challenged, instituted) and to determine if the petitioner was a defendant in an associated district court litigation

Methodology (cont.)

- Counting the numbers of petitions and identifying the parties tells only part of the story

- Further identifies the context of a petition, i.e., how the petition relates to other petitions challenging the same patent by examining:
  - Who came first?
  - How long after?
  - Same party?

- Considers a "net" challenge to the patent
  - Example 1:
    - *Petition 1*: Challenges claims 1-10
    - *Petition 2*: Challenges claims 11-20
    - *Net challenge* is to claims 1-20

  - Example 2:
    - *Petition 1*: Settled
    - *Petition 2*: Denied institution
    - *Petition 3*: Some claims unpatentable
    - *Net result* is some claims unpatentable

Multiple Petition Study Results

UNITED STATES PATENT AND TRADEMARK OFFICE

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Exhibit 1 – Page 1 of 11

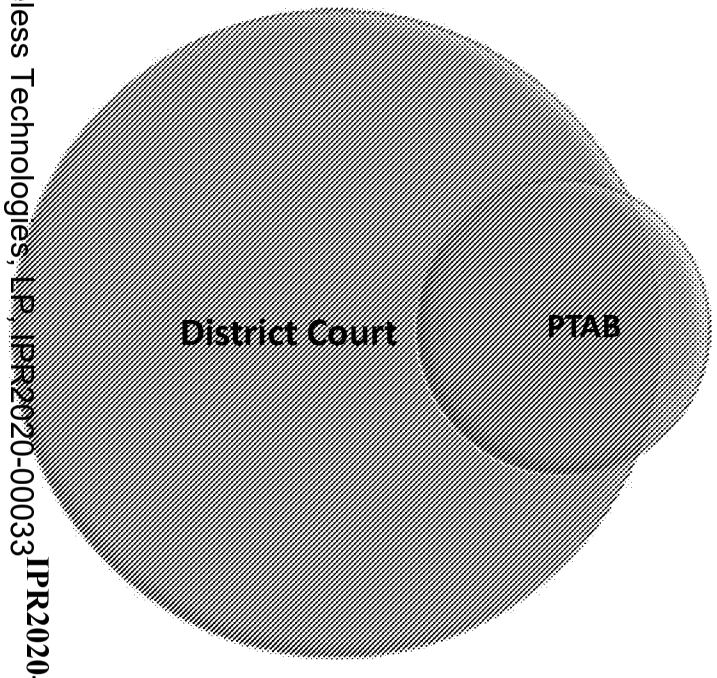
Multiple Petition Study Questions

- ***Question 1***: Do IPRs represent a significant proportion of the U.S. patent litigation landscape?
- ***Question 2***: How many petitioners challenge patents?
- ***Question 3***: How many petitions are filed against each patent?
- ***Question 4***: Do petitioners often "wait and see" what the Patent Owner says in its Preliminary Response or the Board says in a decision on institution?
- ***Question 5***: Who are the petitioners filing petitions after the Board issues a decision on institution?
- ***Question 6***: How often have petitioners been able to use the Board's institution decision to inform another petition?
- ***Question 7***: What is the institution rate counting by patent versus counting by petition?
- ***Question 8***: What is the ultimate outcome by patent versus the ultimate outcome by petition?

Question 1: Where does the PTAB fit into the U.S. patent litigation landscape?

Jurisdiction of Patent Challenges

Jurisdiction of Patent Challenge



- Approximately 85% of IPRs in Fiscal Year 2017 have a co-pending district court case
- Less than a fifth of district court cases involve patents that are challenged in an IPR

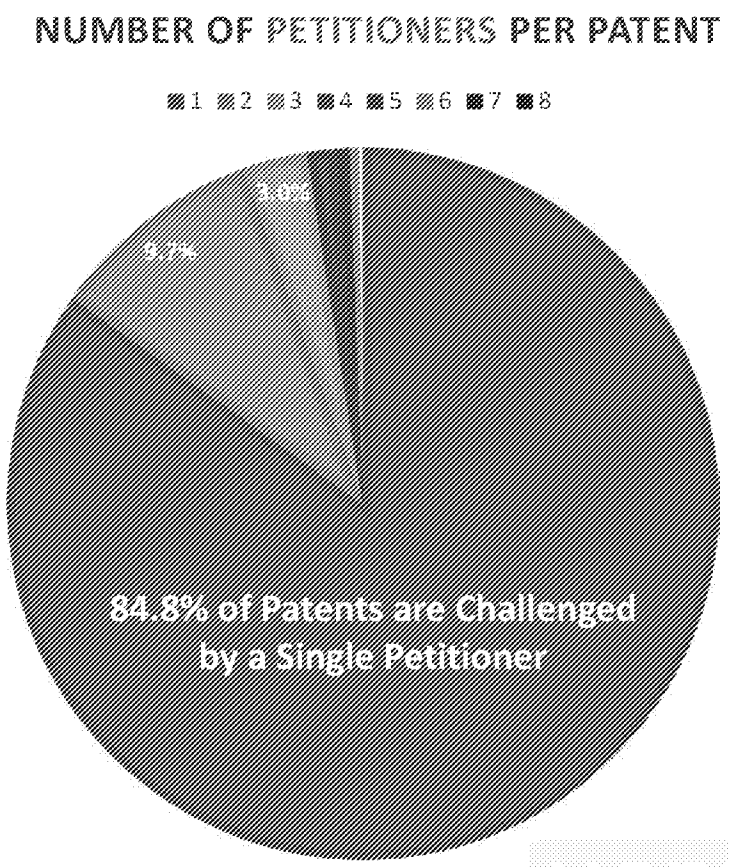
Data sourced from Lex Machina PTAB Report 2017

Question 2: How many petitioners file challenges against each patent?

Multiple Petition Study

Petitioners Per Patent

No. of Petitioners vs. Patent	No. of Patents	% Patents
1	3711	84.8%
2	424	9.7%
3	132	3.0%
4	59	1.3%
5	28	0.6%
6	17	0.4%
7	2	<0.1%
8	3	<0.1%
Total	4376	100%



Data Through 6/30/17
Percentages may not add to 100% due to rounding

Question 3: How many *petitions* are filed against each patent?

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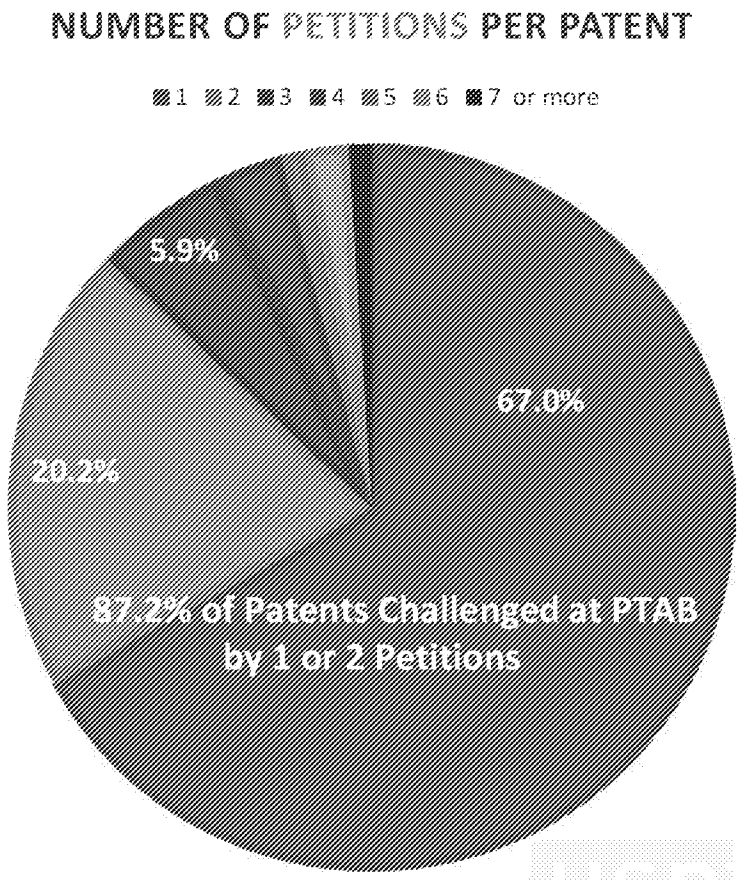
Exhibit 1 – Page 13 of 43

Multiple Petition Study

Petitions Per Patent

No. of Petitions per Patent	Patents	% of Total
1	2932	67.0%
2	885	20.2%
3	256	5.9%
4	142	3.2%
5	54	1.2%
6	52	1.2%
7 or more	55	1.3%
Total	4376	100%



Data Through 6/30/17

Question 4: **If more than one petition is filed against a patent, when are the additional *petitions* filed?**

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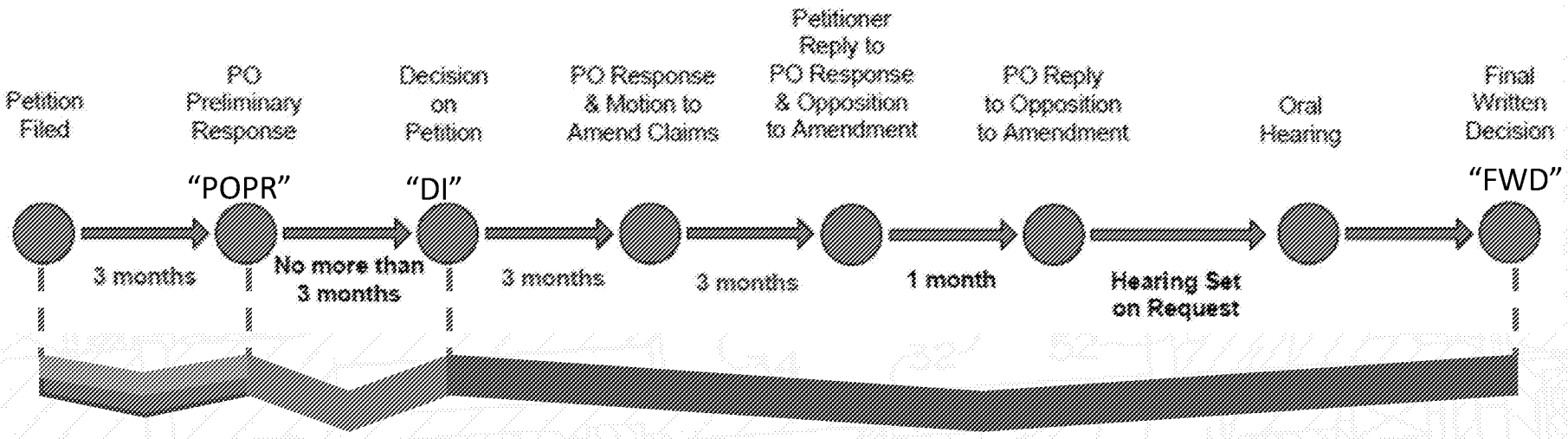
Exhibit 1 – Page 15 of 43

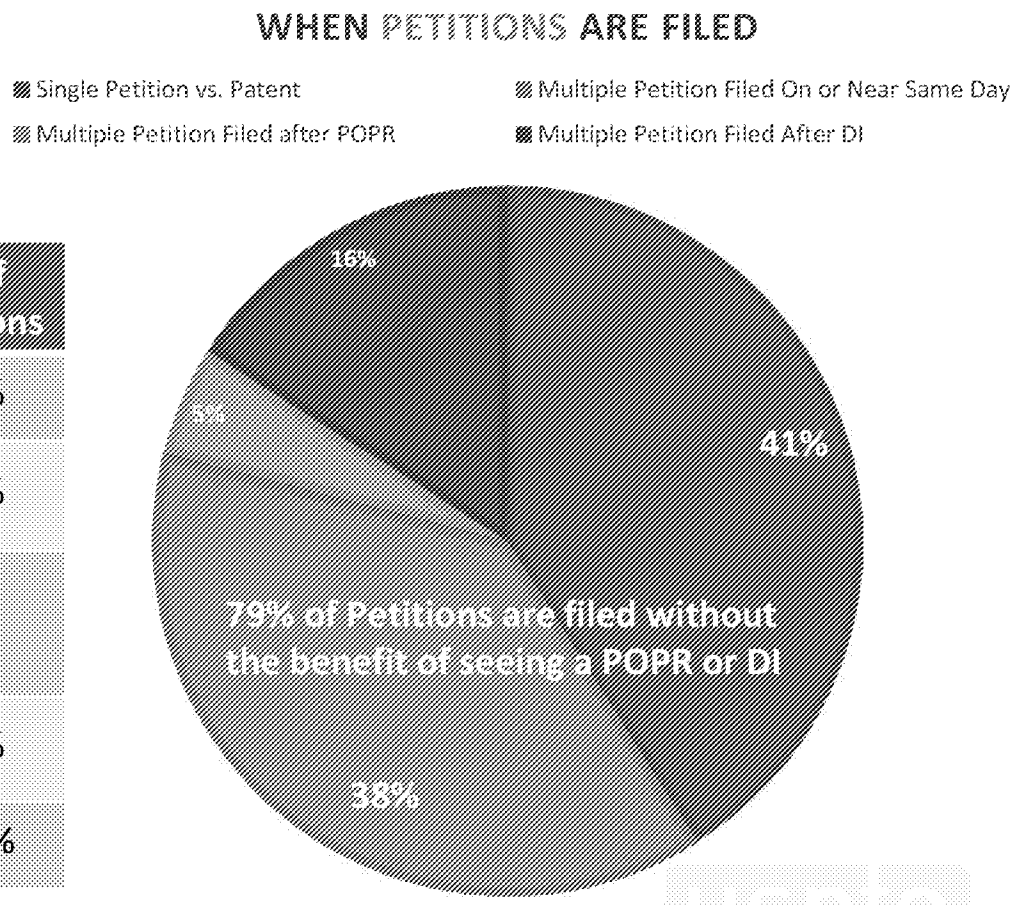
When Petitions Are Filed



Multiple Petition Study

When Petitions are Filed

Timing of Petition	No. of Petitions	% of Petitions
Single Petition Filed	2932	41%
Multiple Petitions Filed On or Near Same Day	2685	38%
Multiple Petitions Filed After POPR, But Before DI	381	5%
Multiple Petitions Filed After DI	1170	16%
Total	7168	100%



Data Through 6/30/17

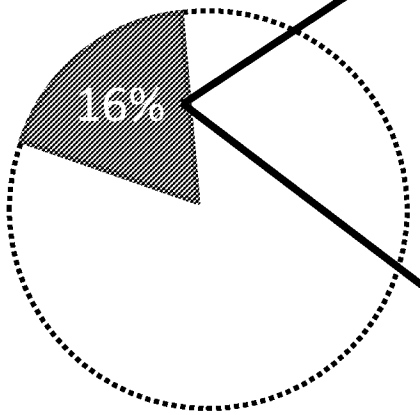
16% of petitions are filed after a decision on institution.

Question 5: Who are the petitioners filing these petitions?

Multiple Petition Study

Who are post-DI Petitioners?

- 16% of all petitions are filed after a DI
- A random sample of the 1054 petitions filed after DI as of 3/1/17* was taken
- The sample included 169 petitions, and the results were found to be statistically significant, such that we can use the sample (169 petitions) as an estimate of the whole (1054 petitions).

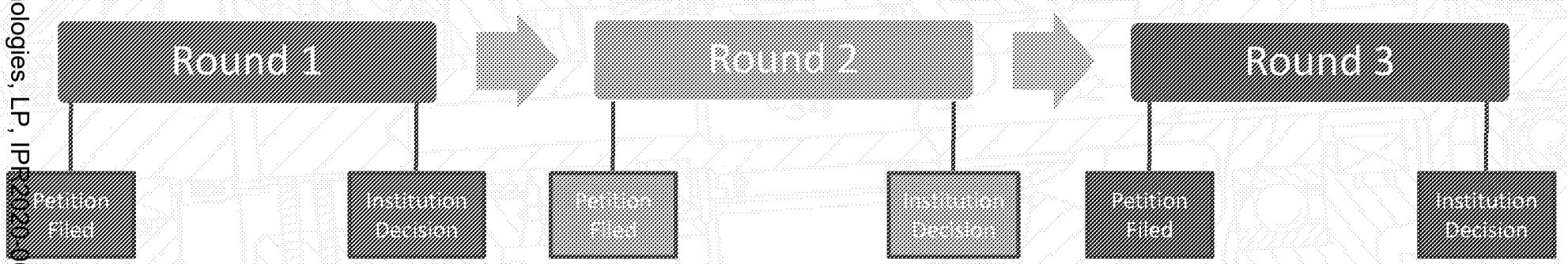


9-10% of petitions filed by:
- Defendant-Petitioner; or
- Same or Different Petitioner
  - Filing due to a change in litigation; or
  - Seeking to join existing trial as a party

6-7% of petitions filed by:
- Non-Defendant Petitioner; or
- Same Petitioner
  - Filing not due to change in litigation; and
  - Not seeking party joinder

*random sample taken on 3/1/17 using data through 2/28/17

Question 6: How often do individual Petitioners file additional rounds of petitions after receiving a decision on institution?



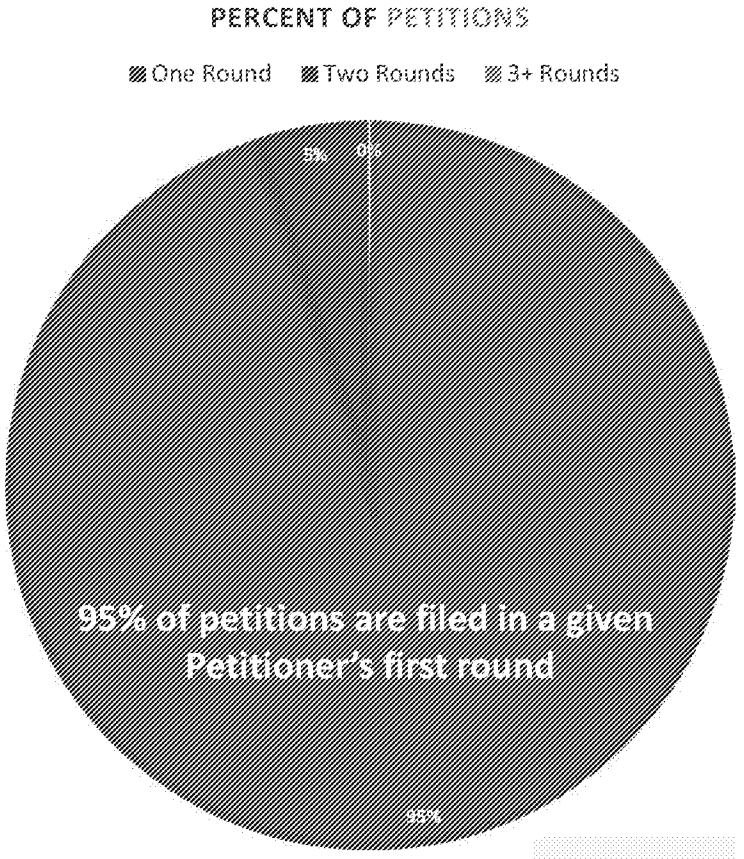
- *A "round" is all petitions filed before receiving a DI on one of those petitions*

Multiple Petition Study

Rounds of Petitions

- *95% of petitions are filed in a given petitioner's first round*
- *A "round" is all petitions filed before receiving a DI on one of those petitions*

Rounds of Petitions	No. of Petitions	% of Petitions
First Round of Petitions	6481	95%
Second Round of Petitions	369	5%
Third or Fourth Round of Petitions	7	<0.1%
Total	6857*	



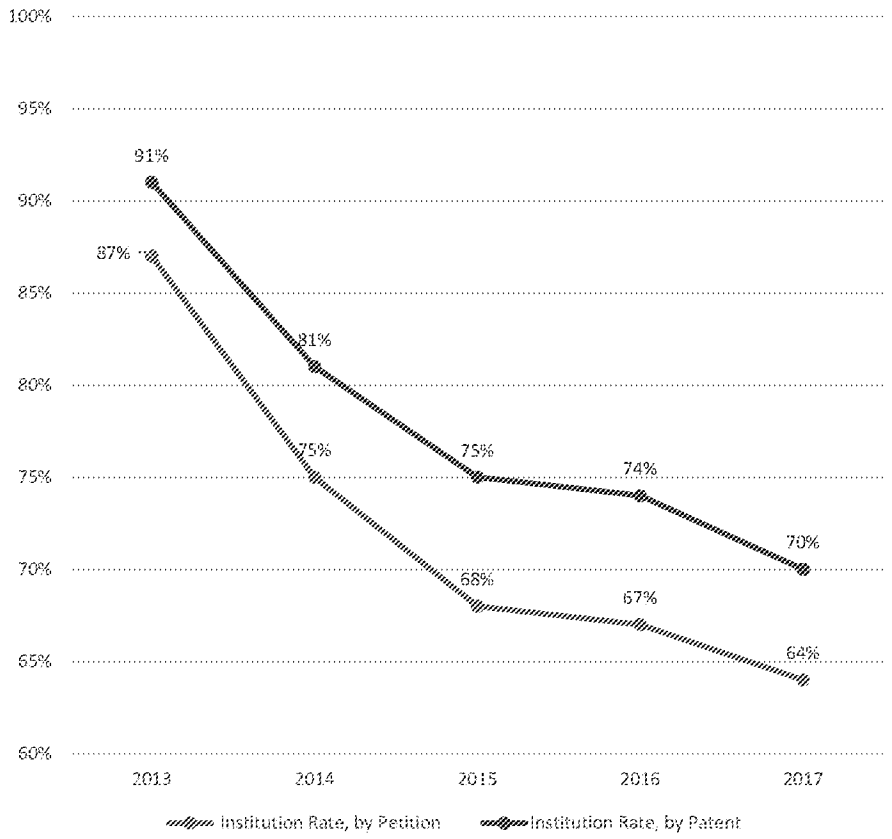
Data Through 6/30/17
*Not included are 311 Petitions filed where a request to join as a party to another proceeding was granted

Question 7: What is the institution rate counting by patent versus counting by petition?

Multiple Petition Study

Institution Rate

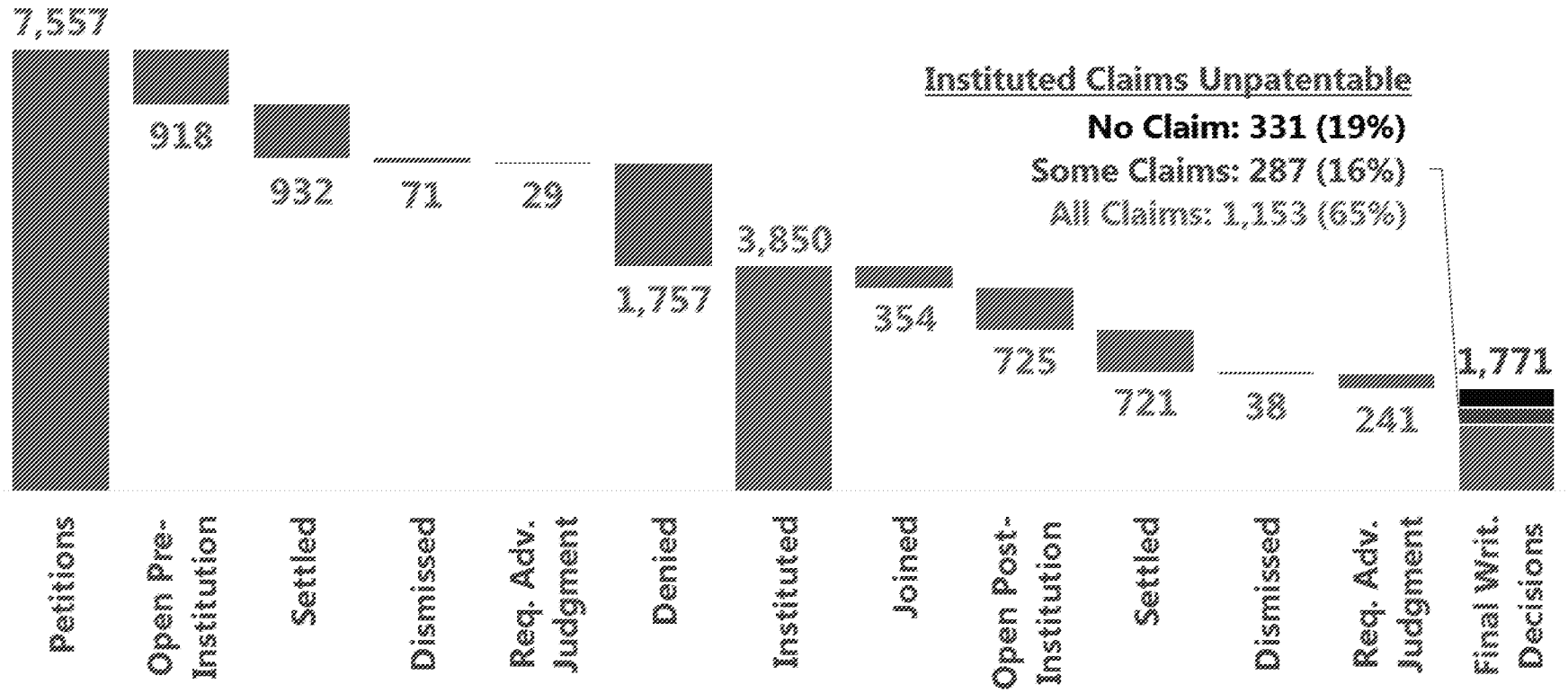
- *Institution rate as measured by patent is only slightly higher than the institution rate as measured by petition*
- *"By patent" accounts for whether any one petition against particular patent is instituted*
  - *Example against Patent A:*
    - *Petition 1 instituted*
    - *Petition 2 not instituted*
    - *Net result = 100% institution rate*
- *"By petition" accounts for whether a particular petition was instituted; publicly reported monthly*
  - *Example against Patent A*
    - *Petition 1 instituted*
    - *Petition 2 not instituted*
    - *Net result = 50% institution rate*



Data Through 6/30/17

Question 8: What is the ultimate outcome by patent versus the ultimate outcome by petition?

Status of Petitions
(All Time: 9/16/12 to 9/30/17)



These figures reflect the latest status of each petition. The outcomes of decisions on institution responsive to requests for rehearing are incorporated. Once joined to a base case, a petition remains in the Joined category regardless of subsequent outcomes.

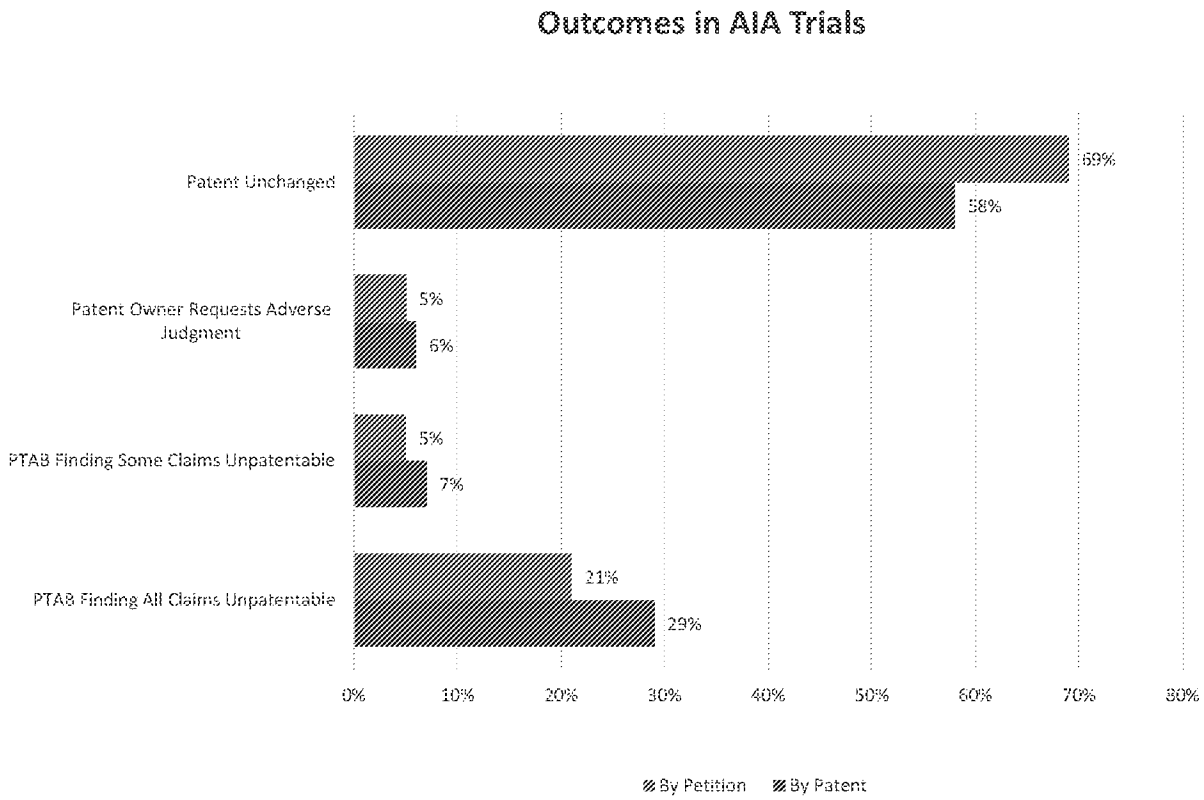
Multiple Petition Study

Ultimate Outcome

69% of all petitions result in a patent being unchanged; 58% of patents are unchanged at the end of one or more AIA proceedings

"By patent" accounts for whether any one petition against particular patent results in any unpatenable claims

"By petition" accounts for whether a particular petition results in any unpatentable claims



Data Through 6/30/17

Multiple Petition Study Highlights

- ***Studied***: 7168 petitions addressing 4376 patents
- ***Who:*** 84.8% of patents are challenged by a single petitioner
- ***What:*** 87% of patents are challenged by 1 or 2 petitions
- ***Where***: 85% of IPRs have a co-pending district court case
- ***When***:
  - 79% of petitions are filed before any Patent Owner Response or a Decision on Institution
  - 95% of petitions are filed in a given petitioner's first round
- ***Why:*** Often a petitioner could not have filed a petition earlier or may be prompted to file later because of the litigation circumstances
- ***How***:
  - Institution rate by patent (FY17: 70%) is only slightly higher than by petition (FY17: 64%)
  - 58% of patents challenged at the PTAB are unchanged

Multiple Petition Study Next Steps

- Slides available on the USPTO PTAB website
- Data under continued review and future installments of study results anticipated

New Precedential Opinion: *General Plastic Industrial Co. v. Canon Kabushiki Kaisha* IPRs: 2016-01357, 2016-01358, 2016-01359, 2016-01360, 2016-01361

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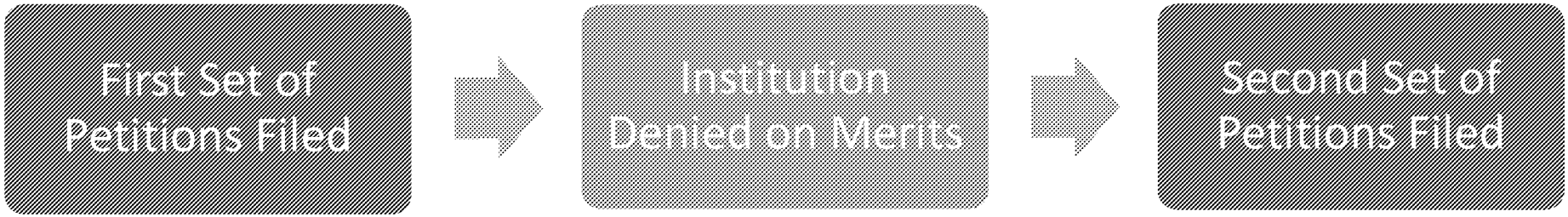
Timeline for *General Plastic*



Multiple Petition Study

When Petitions are Filed

Timing of Petition	No. of Petitions	% of Petitions
Single Petition Filed	2932	41%
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Multiple Petitions Filed After POPR, But Before DI	381	5%
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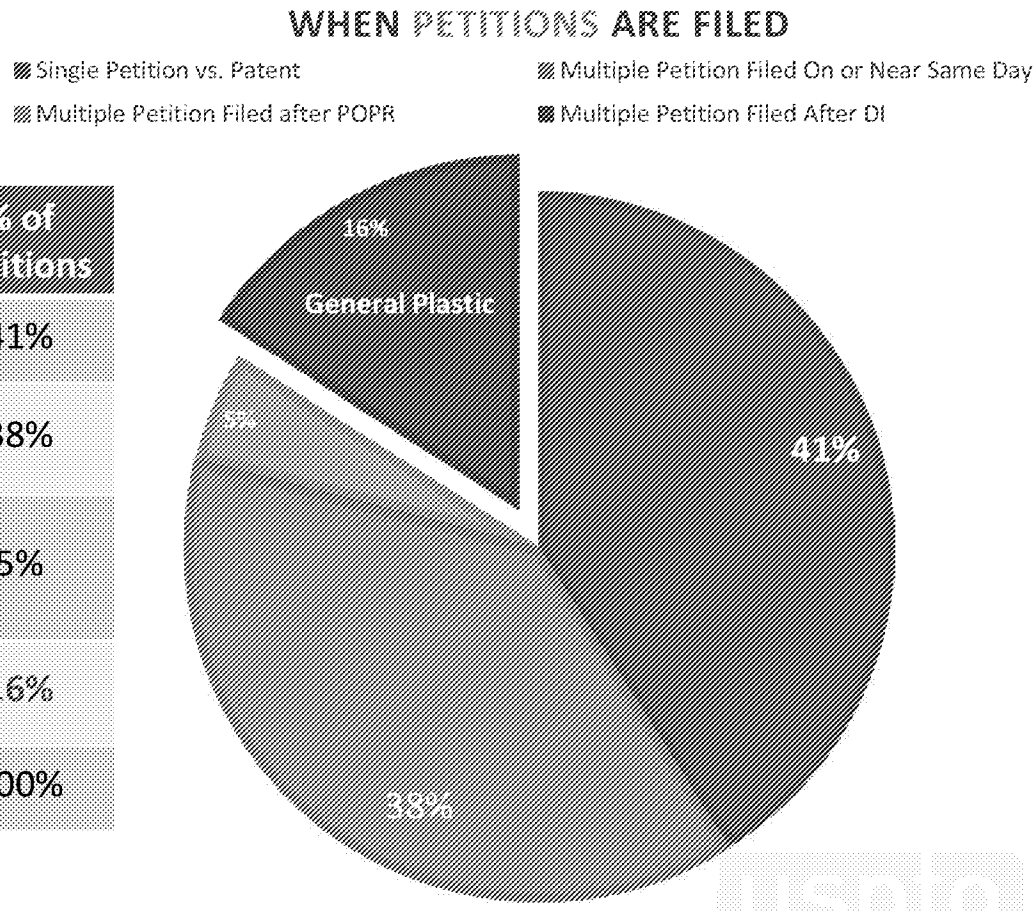

Data Through 6/30/17

Factors Considered

1. whether the same petitioner previously filed a petition directed to the same claims of the same patent;

2. whether at the time of filing of the first petition the petitioner knew or should have known of the prior art asserted in the second petition;

3. whether at the time of filing of the second petition the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition;

4. length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;

5. whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;

6. finite resources of the Board; and

7. requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

New Informative Decisions Under 35 U.S.C. § 325(d)
Patent Trial and Appeal Board
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Informative Decisions

- *IPR2016-01571 - Unified Patents, Inc. v. Berman*
- *IPR2017-00739 - Hospira, Inc. v. Genentech*
- *IPR2017-00777 - Cultec, Inc. v. Stormtech LLC*

Multiple Petition Case Studies

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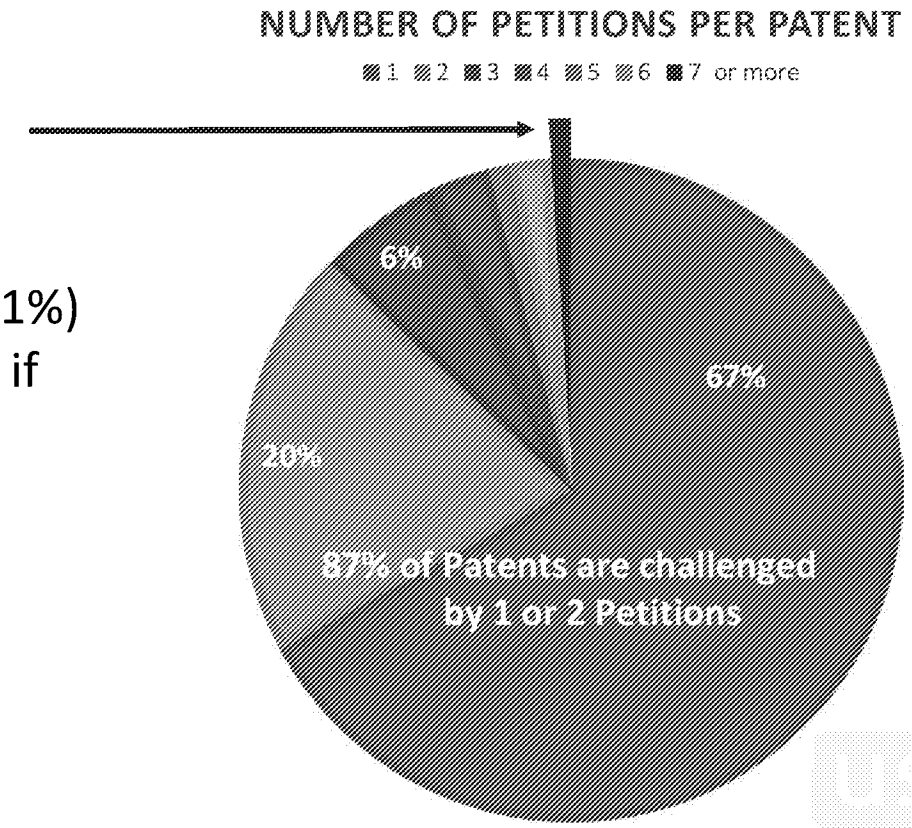
Exhibit 1 – Page 15 of 43

Case Studies

- Approximately 1% of patents are challenged by 7 or more petitions
- PTAB investigated the "extreme outliers" (aka, the last third of this 1%) to determine what commonalities, if any, exist



Extreme Outliers

- Very unusual:
  - Almost 90% of patents face 1 or 2 petitions
  - 16 patents out of 4376 challenged patents (appx. third of 1%) have faced more than 10 petitions

- Driven by extreme conditions:
  - Large numbers of claims;
  - Large numbers of defendants; and/or
  - Large numbers of joinders

Extreme Outlier #1: Largest Family

- 125 petitions filed against 10 patents totaling more than 370 claims
  - (per patent: 23, 21, 19, 16, 15, 11, 10, 4, 4, 2)
- All petitions filed by defendants
  - District Court required a petition for a stay
- 65 petitions were merely requesting joinder to other petition – effectively a copy
- Each claim faced only 1 ground total
- No follow up petitions
- All claims found unpatentable after PTAB trial
- Federal Circuit Rule 36 opinions affirming all appealed cases

Extreme Outlier #2: Most Petitions

- 26 petitions filed against a single patent having 306 claims
- Petitions filed by 3 different petitioners
  - District court litigation filed in waves
  - 2 petitioners were current defendants; 1 was prior defendant
  - 13 petitions (includes 5 requests for joinder)
    - Two petitioners
    - Each petitioner filed all of their petitions on same day
    - All settled prior to DI
  - 13 petitions
    - One petitioner
    - Petitions filed to address over 200 claims

Multiple Petition Case Management

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Exhibit 1 – Page 10 of 13

How Judges Coordinate Multiple Petitions

- Generally, utilize the same panel on all cases, with one judge taking "point" on interlocutory matters
- Coordinate briefing among petitioners – e.g., have one petitioner take "point"
  - Require meet and confer
- Coordinate oral hearing schedules
  - Option of waiving oral hearings or limiting scope to reduce overlap
- Stagger major due dates to allow attorneys more time to prepare briefs

Upcoming Boardside Chats

Month	Topic
Dec 7, 2017	Presenting Prior Art and Proving a Document is a Printed Publication in an Appeal or AIA Trial
Feb 1, 2018	Design Patent Appeals
April 5, 2018	AIA Motion Practice
June 7, 2018	Motions to Exclude and Motions to Strike in AIA Trials
Oct 4, 2018	Motions to Seal, Protective Orders, and Confidential Information in AIA Trials
Dec 6, 2018	Hearsay and Authentication
Feb 7, 2019	Supplemental Information vs. Supplemental Evidence

Electronic Patent Application Fee Transmittal

Application Number:	90013809
Filing Date:	12-Sep-2016
Title of Invention:	SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS
First Named Inventor/Applicant Name:	8457228
Filer:	Michael Vincent Battaglia/Judith Pennington
Attorney Docket Number:	3277-0114US-RXM2

Filed as Large Entity

Filing Fees for ex parte reexam

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
PETITION IN REEXAM PROCEEDING	1824	1	1940	1940
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1940**

Electronic Acknowledgement Receipt

EFS ID:	30784817
Application Number:	90013809
International Application Number:	
Confirmation Number:	7821
Title of Invention:	SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS
First Named Inventor/Applicant Name:	8457228
Customer Number:	6449
Filer:	Michael Vincent Battaglia/Judith Pennington
Filer Authorized By:	Michael Vincent Battaglia
Attorney Docket Number:	3277-0114US-RXM2
Receipt Date:	27-OCT-2017
Filing Date:	12-SEP-2016
Time Stamp:	14:56:30
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1940
RAM confirmation Number	103017INTEFSW00001311022135
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PetitionReqReconsideration1.pdf	1585572 914fb00add3a46cacfb36fbafab7cb72509fcb37	yes	48
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Receipt of Petition in a Reexam		1	47	
	Reexam Certificate of Service		48	48	
Warnings:					
Information:					
2	Reexam Miscellaneous Incoming Letter	Exhibit1.pdf	24308 c8fc6287906bed7bd601d4ccaf193496decebb44c	no	1
Warnings:					
Information:					
3	Reexam Miscellaneous Incoming Letter	Exhibit2.pdf	54435 e3050fbe4a6b30d28af9f77e28befa5d49827aca	no	7
Warnings:					
Information:					
4	Reexam Miscellaneous Incoming Letter	Exhibit3.pdf	865128 6aa20bcea06df825cac7da2f475b7eca73272ec7	no	28
Warnings:					
Information:					
5	Reexam Miscellaneous Incoming Letter	Exhibit4.pdf	3209691 cf85128324d9baa849807a191dda5cd0feaf3ad7	no	43
Warnings:					
Information:					

6	Fee Worksheet (SB06)	fee-info.pdf	30662 96a6f3a6f17ed4314be6dc90fc3ad494ec35dc81	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	5769796	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,809	09/12/2016	8457228	3277-0114US-RXM2	7821

6449 7590 06/15/2018

ROTHWELL, FIGG, ERNST & MANBECK, P.C.
607 14th Street, N.W.
SUITE 800
WASHINGTON, DC 20005

EXAMINER
WEAVER, SCOTT LOUIS

ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
06/15/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS

ROPES & GRAY LLP
PRUDENTIAL TOWER IPRM DOCKETING - FLOOR 43
800 BOYLSTON STREET
BOSTON, MA 02199-3600

Date: June 15, 2018

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90013809
PATENT NO. : 8457228
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Rothwell, Figg, Ernst & Manbeck, P.C. (For Patent Owner)
607 14th Street, N.W.
Suite 800
Washington, D.C. 20005

Ropes & Gray LLP (For Requester)
IPRM Docketing—Floor 43
Prudential Tower
800 Boylston Street
Boston, MA 02199-3600

In re Gordon F. Bremer :
Ex Parte Reexamination Proceeding : **DECISION**
Control No. 90/013,809 : **DISMISSING**
Filed: September 12, 2016 : **PETITION**
For: U.S. Patent No.: 8,457,228 :

This is a decision on patent owner's October 27, 2017 petition entitled "Petition Requesting Reconsideration of OPLA's November 28, 2016 Dismissal of Rembrandt's September 30, 2016 Petition under Rule 181/182 Requesting the Director to Exercise Her Discretionary Authority under 35 U.S.C. § 325(D) [*sic*] and a Final Petition Decision in Accordance with PTAB Practice", which is taken as a combined petition (patent owner's October 27, 2017 combined petition) including:

- a petition under 37 CFR 1.183 to waive the provisions of 37 CFR 1.181(f); and
- a request for reconsideration of the November 28, 2016 petition decision, including a request to vacate the order and all subsequently-mailed Office actions, and issue an order denying reexamination (patent owner's October 27, 2017 request for reconsideration).

Patent owner's October 27, 2017 combined petition and the record as a whole, are before the Office of Patent Legal Administration for consideration.

TABLE OF CONTENTS

SUMMARY

Patent owner's October 27, 2017 petition under 37 CFR 1.183 requesting waiver of the provisions of 37 CFR 1.181(f) is **dismissed**.

Patent owner's October 27, 2017 request for reconsideration of the Office's November 28, 2016 decision, including patent owner's request that the Office vacate the order and "terminate" reexamination, i.e., vacate all subsequently-mailed Office actions and issue an order denying reexamination on the basis set forth in 35 U.S.C. 325(d) that the request is limited to the same or substantially the same prior art or arguments previously presented to the Office, is **dismissed as untimely**.

As an alternate basis for dismissal, patent owner's October 27, 2017 request for reconsideration **would have been dismissed, even if timely filed**, in view of the prior art and arguments presented in the request for reexamination.

The October 17, 2016 order granting reexamination, and all subsequently-mailed Office actions, **will not be vacated**. Prosecution in the present reexamination proceeding **will continue**.

REVIEW OF THE RELEVANT FACTS

- On June 4, 2013, U.S. Patent No. 8,457,228 (the '228 patent) issued to Gordon F. Bremer.

- On June 4, 2014, a third party requester, Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., Samsung Telecommunications America, LLC, and Samsung Austin Semiconductor, LLC filed a petition for *inter partes* review of claims 1-3, 5, and 10-21 the '228 patent. With respect to claims 1-3, 5, and 10-20, the petition was based on the Draft Standard reference[1] alone or in view of Boer[2]. With respect to claim 21, the petition was based on the Draft standard reference in view of the APA or Siwiak,[3] alone or further in view of Boer. The *inter partes* review was assigned case number IPR2014-00889 (the '889 IPR).

- Also on June 4, 2014, the same third party requester filed a second petition for *inter partes* review of claims 1-3, 5, and 10-21 of the '228 patent, based on the admitted prior art (APA) in view of Boer. The *inter partes* review was assigned case number IPR2014-00892 (the '892 IPR).

- On December 10, 2014, the Patent Trial and Appeal Board (PTAB) issued a decision in the '889 IPR denying institution of *inter partes* review of all of the challenged claims of

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[1] *Draft Standard for Wireless LAN, Medium Access Control (MAC) and Physical Layer (PHY) Specification* P802.11D4.0, May 20, 1996 (Draft Standard).

[2] U.S. Patent No. 5,706,428 to Boer et al. (Boer).

[3] U.S. Patent No. 5,537,398 to Siwiak (Siwiak).

the '228 patent, i.e., claims 1-3, 5, and 10-21. The PTAB determined that the IPR petitioner had not met its burden in establishing that the Draft Standard reference is a printed publication; and for this reason, the IPR petitioner had not shown a reasonable likelihood of prevailing on the grounds asserted (no RLP).

- Also on December 10, 2014, the PTAB mailed a decision in the '892 IPR granting institution with respect to claims 1-3, 5, and 10-20 of the '228 patent, and denying institution with respect to claim 21 of the '228 patent.

- On January 9, 2015, the same third party requester filed a third petition for *inter partes* review of claim 21 of the '228 patent, based on the APA in view of Boer and Siwiak. The *inter partes* review was assigned case number IPR2015-00555 (the '555 IPR).

- On June 19, 2015, the PTAB mailed a decision in the '555 IPR denying institution of *inter partes* review of claim 21 of the '228 patent, in which the PTAB exercised its discretion under 35 U.S.C. 325(d) to deny institution of *inter partes* review of claim 21. The PTAB stated that difference between what was presented in the '892 IPR and the '555 IPR with respect to claim 21 is that Siwiak is now offered "as support for the asserted obviousness of placing address data in a message header as taught by Boer"; that no argument or evidence is presented that Siwiak was not known or available to petitioner at the time of filing the '892 IPR; that Siwiak was relied upon in the '889 IPR, which was filed on the same day as the '892 IPR; and that the petitioner "simply presents arguments now that it could have made in IPR '892."

- On September 24, 2015, the PTAB issued a Final Written Decision in the '892 IPR, in which the PTAB held that claims 1-3, 5, and 10-20 of the '228 patent are unpatentable. No appeal was filed.

- On September 12, 2016, a third party requester Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. (Samsung)[4] filed a request for *ex parte* reexamination of claim 21 of the '228 patent. The reexamination proceeding was assigned control number 90/013,809 (the present reexamination proceeding) and was accorded a filing date of September 12, 2016.[5]

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[4] Samsung Telecommunications America, LLC and Samsung Austin Semiconductor, LLC were listed as co-petitioners in the '514, '518, and '114 IPRs, but were not listed as co-requesters in the present reexamination proceeding.

[5] Four other previously-filed petitions for *inter partes* review of the '228 patent, which did not involve claim 21, the sole claim under reexamination, were simultaneously filed with the '889 and '892 IPR petitions. Specifically, on June 4, 2014, the same date that the petitions in the'889 and '892 IPRs were filed, the following four petitions were also filed:

- IPR2014-00890 (the '890 IPR) (relying on the Draft Standard reference alone or in view of Boer) and IPR2014-00893 (the '893 IPR) (relying on the APA in view of Boer), both of which requested review of claims 22, 23 and 25; and
- IPR2014-00891 (the '891 IPR) (relying on the Draft Standard reference alone, or in view of Boer and/or the APA), and IPR2014-00895 (the '895 IPR) (relying on the APA in view of Boer), both of which requested review of claims 26-29, 31, 36-41, 43, and 47-52.

- On September 30, 2016, the patent owner filed a petition in the present reexamination proceeding entitled "Petition Requesting the Director to Exercise Her Discretionary Authority under 35 U.S.C. § 325(d) Pursuant to 37 C.F.R. § 181(a)(2) and/or § 1.182", which was taken as a combined petition (patent owner's September 30, 2016 combined petition), including: 1) a petition under 37 CFR 1.183 to waive the rules and enter patent owner's petition under 37 CFR 1.182; and 2) a petition under 37 CFR 1.182 to vacate the order granting reexamination and issue an order denying reexamination.

- On October 13, 2016, the third party requester Samsung filed, in the present reexamination proceeding, an opposition to patent owner's September 30, 2016 petition, entitled "Third Party Requester's Opposition to Patent Owner's Petition to Reject Reexamination Request" (requester's October 13, 2016 opposition).

- Also on October 13, 2016, the third party requester Samsung filed, in the present reexamination proceeding, a petition entitled "Third Party Requester's Petition to Respond to Patent Owner's Petition to Reject Reexamination Request" (requester's October 13, 2016 petition).

- On October 17, 2016, reexamination of claim 21 of the '228 patent was ordered in the present reexamination proceeding.

- On November 28, 2016, the Office mailed a decision in the present reexamination proceeding dismissing patent owner's September 30, 2016 petition under 37 CFR 1.182 to vacate the order granting reexamination and issue an order denying reexamination (the November 28, 2016 petition decision). The November 28, 2016 petition decision also granted patent owner's September 30, 2016 petition under 37 CFR 1.183, and requester's October 13, 2016 petition, to the extent that patent owner's September 30, 2016 combined petition, and requester's October 13, 2016 petition and opposition, have been entered and considered.

- On December 13, 2016, the PTAB issued an Inter Partes Review Certificate reflecting the results of the '892, '893 and '895 IPRs (the December 13, 2016 Inter Partes Review Certificate). The December 13, 2016 Inter Partes Review Certificate cancels claims 1-3, 5, 10-20, 22, 23, 25, 26-29, 31, 36-41, 43 and 47-52 of the '228 patent.

Petitions in trial proceedings at the PTAB are subject to a word count or page limit. See 37 CFR 42.24. Where, as here, the petition involves a substantial number of claims, it is not unexpected that a petitioner may choose to split a substantial number of claims into two or more groups, and file multiple petitions *simultaneously* in order to separately challenge each group of claims. It is also not unexpected that a petitioner may choose to challenge these claims over more than one combination of references, and file multiple petitions *simultaneously* in order to separately challenge each set of claims in view of each separate set of references. *Simultaneous* filings of IPRs for these reasons is not necessarily evidence of harassment.

- On May 3, 2017, a non-final Office action rejecting claim 21 of the '228 patent was mailed in the present reexamination proceeding.

- On June 8, 2017, the patent owner filed, in the present reexamination proceeding, a petition entitled "Petition Requesting the Director to Exercise Her (I) Supervisory Authority Pursuant to 37 C.F.R. § 1.181(a)(1) and/or § 1.182, and (II) Discretion Pursuant to 35 U.S.C. 325(d)" (patent owner's June 8, 2017 petition). Patent owner's June 8, 2017 petition will be addressed under separate cover.

- On August 14, 2017, the patent owner filed a response to the May 3, 2017 non-final Office action in the present reexamination proceeding.

- On October 27, 2017, the patent owner filed a petition in the present reexamination proceeding entitled "Petition Requesting Reconsideration of OPLA's November 28, 2016 Dismissal of Rembrandt's September 30, 2016 Petition under Rule 181/182 Requesting the Director to Exercise Her Discretionary Authority under 35 U.S.C. § 325(D) [*sic*] and a Final Petition Decision in Accordance with PTAB Practice" (patent owner's October 27, 2017 combined petition).

STATUS OF CLAIMS

Of the original 52 claims of the '228 patent, claims 1-3, 5, 10-20, 22, 23, 25, 26-29, 31, 36-41, 43 and 47-52 have been cancelled by the December 13, 2016 Inter Partes Review Certificate.

Dependent claim 21 is the sole claim under reexamination in the present proceeding. Claim 21 depends from cancelled independent claim 1. Claim 21 stands rejected.

DECISION

The patent owner requests the Office to: i) reconsider the Office's petition decision mailed on November 28, 2016; ii) vacate the October 17, 2016 order for reexamination; and iii) "terminate" reexamination, i.e., vacate all subsequently-mailed Office actions and issue an order denying reexamination, on the basis set forth in 35 U.S.C. 325(d) that the request is limited to the same or substantially the same prior art or arguments previously presented to the Office. The present petition is taken as a combined petition including:

1) a petition under 37 CFR 1.183 requesting waiver of 37 CFR 1.181(f), and entry and consideration of patent owner's October 27, 2017 combined petition (patent owner's October 27, 2017 petition under 37 CFR 1.183 to waive the provisions of 37 CFR 1.181(f)); and

2) a request for reconsideration of the Office's petition decision mailed on November 28, 2016, including a request to vacate the October 17, 2016 order for reexamination and all subsequently-mailed Office actions, and issue an order denying reexamination on the basis set forth in 35 U.S.C. 325(d) that the request is limited to the same or substantially

the same prior art or arguments previously presented to the Office (patent owner's October 27, 2017 request for reconsideration).

I. Patent Owner's October 27, 2017 Petition under 37 CFR 1.183 to Waive the Provisions of 37 CFR 1.181(f) is Dismissed

Patent owner's October 27, 2017 petition under 37 CFR 1.183 requests the Office to waive the provisions of 37 CFR 1.181(f) and enter and consider patent owner's October 27, 2017 combined petition. 37 CFR 1.181(f) provides, in pertinent part:

> Any petition under this part not filed within two months of the mailing date of the action or notice from which relief is requested may be dismissed as untimely, except as otherwise provided. This two-month period is not extendable.

Patent owner's October 27, 2017 request for reconsideration, however, was filed eleven months after the November 28, 2016 decision, well after the two-month period set forth in 37 CFR 1.181(f) had elapsed. Furthermore, prosecution in the present proceeding progressed during this eleven-month period, during which a non-final Office action has issued.

For these reasons, patent owner's October 27, 2017 petition under 37 CFR 1.183 to waive the provisions of 37 CFR 1.181(f) is **dismissed**.

II. Patent Owner's October 27, 2017 Request for Reconsideration is Dismissed as Untimely

Patent owner's October 27, 2017 request for reconsideration was filed eleven months after the November 28, 2016 decision, well after the two-month period set forth in 37 CFR 1.181(f) had elapsed, as set forth above.

Because the provisions of 37 CFR 1.181(f) have not been waived, patent owner's October 27, 2017 request for reconsideration is **dismissed as untimely**.

The October 17, 2016 order granting reexamination, and all subsequently-mailed Office actions, **will not be vacated**. Prosecution in the present reexamination proceeding **will continue**.

III. To Be Considered, a Petition Limited to Issues Involving 35 U.S.C. 325(d) Must be Filed *Before* an Order for Reexamination Has Issued

The Office stated, in its November 28, 2016 petition decision, that patent owner's original petition submitted on September 30, 2016 (patent owner's original petition) was not timely filed, and that a petition requesting the Office to exercise its discretion and "reject" the request pursuant to 35 U.S.C. 325(d) would not be considered to be timely if the petition were filed before the order granting reexamination. These statements, however, were in error,[6] and have not

[6]A similar erroneous statement was made in the petition decision mailed on November 28, 2016 in related reexamination proceeding control number 90/013,808 (the '808 reexamination proceeding). The patent owner in the '808 proceeding was not harmed because patent owner's original petition in the '808 proceeding was, in any event, entered and considered.

been followed.[7] Patent owner's original petition submitted on September 30, 2016 was properly filed before the order for reexamination was mailed on October 17, 2016. The patent owner was not harmed because patent owner's original petition was, in any event, entered and considered.

35 U.S.C. 325(d) provides the Office with the discretion to "reject" a request for reexamination prior to the order. It does not, however, provide the Office with the discretion to terminate an ongoing reexamination proceeding on the basis set forth in 35 U.S.C. 325(d) if no petition requesting such relief is filed until *after* reexamination has been ordered.

35 U.S.C. 325(d) provides, in pertinent part (emphasis added):

> In determining whether to . . . **order a proceeding under** . . . **chapter 30**, . . . the Director **may** take into account whether, and **reject the . . . request** because, the same or substantially the same prior art or arguments previously were presented to the Office.

As an initial matter, the provisions of 35 U.S.C. 325(d) are discretionary, not mandatory. The statute states that "the Director **may** take into account whether, and reject the . . . request because . . ." The statute does not require the Director to make a determination whether to reject a request for *ex parte* reexamination pursuant to 35 U.S.C. 325(d).

The provisions of 35 U.S.C. 325(d) clearly refer to the determination whether to order a reexamination proceeding or whether to reject the request, which occurs *prior* to the order. In addition, 35 U.S.C. 305 *requires* the Office to conduct reexamination *once the order has been issued* pursuant to 35 U.S.C. 304. See 35 U.S.C. 305, which provides, in pertinent part:

> After the times for filing the statement and reply provided for by section 304 have expired, **reexamination will be conducted** . . .

Therefore, once an order granting reexamination has issued, the Office is required to conduct reexamination pursuant to 35 U.S.C. 305.

In summary, pursuant to provisions of 35 U.S.C. 304, 305, and 325(d), the Office does not have the discretion to terminate an ongoing reexamination on the basis set forth in 35 U.S.C. 325(d), if no petition requesting such relief is filed until *after* reexamination has been ordered. For these reasons, the *discretionary* determination by the Office under 35 U.S.C. 325(d) whether to reject the request is not petitionable once the order granting reexamination has issued.[8]

Accordingly, a petition limited to issues involving 35 U.S.C. 325(d) must be filed before an order for reexamination has issued in order to be considered. Because the petition is filed

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[7]See, *e.g.,* the petition decisions in *ex parte* reexamination proceeding control nos. 90/013,811; 90/013,812; and 90/013,813, which were mailed on March 27, 2017.

[8] In contrast, a petition requesting the Office to vacate an order granting reexamination on the basis that the request does not raise a substantial new question of patentability may be entertained by the Office after the order has issued. The basis for such a petition is that, because no substantial new question of patentability is raised by the request, the Office was not authorized under 35 U.S.C. 304 to order reexamination, i.e., the issuance of the order was an *ultra vires* action on the part of the Office. See MPEP 2246, subsection II.

before the order, the petition must be limited to issues involving 35 U.S.C. 325(d), and must not involve any other issues. The petition should also request waiver under 37 CFR 1.183 of the provisions of 37 CFR 1.530(a) and the second sentence of 37 CFR 1.540, on the basis that the petition is limited to issues involving 35 U.S.C. 325(d).

In any event, the patent owner was not harmed because patent owner's original petition filed on September 30, 2016 was entered and considered, as pointed out previously.

IV. As an Alternate Basis for Dismissal, Patent Owner's October 27, 2017 Request for Reconsideration Would Have Been Dismissed, Even If Timely Filed, in View of the Prior Art and Arguments Presented in the Request for Reexamination

The patent owner agrees that the prior art relied upon in the present request, including Snell,[9] Yamano, and Kamerman, were not previously presented to the Office. The patent owner asserts, however, that the arguments presented in the request for reexamination are substantially the same as those previously presented to the Office.

The patent owner provides, in the present petition, a detailed discussion explaining why the patent owner believes that the prior art and arguments presented in the request for reexamination are substantially the same as the prior art and arguments that were presented in the previous IPR petitions.[10] The requester, however, newly relies on the teachings of Yamano in the present request and also presents arguments with respect to those teachings, which present evidence of unpatentability that was not previously evaluated by the Office.

A. Claim 21 Was Requested to be Reexamined

Dependent claim 21 is the only claim which was requested to be reexamined in the present proceeding:

> 21. The master communication device as in claim 1, wherein the first information that is included in the first message comprises the first message address data.

B. The Determinations by the PTAB in Previous IPRs with Respect to Claim 21

Claim 21 of the '228 patent was challenged by the same petitioner (the requester in the present reexamination proceeding) in three previous petitions for *inter partes* review: i) the '889 and '892 IPRs, both of which were filed on June 4, 2014; and ii) the '555 IPR, filed on January 9, 2015.

In the '889 IPR, the petitioner proposed rejections of claim 21 based on the Draft standard reference in view of the APA or Siwiak, alone or further in view of Boer. The PTAB determined that the IPR petitioner had not met its burden in establishing that the Draft Standard reference is a printed publication; and for this reason, the IPR petitioner had not shown a reasonable

[9] See U.S. Patent 5,982,807 (Snell), which incorporates by reference the Harris 4064.4 and Harris AN9614 references.

[10] See pages 20-34 of the present petition.

likelihood of prevailing on the grounds asserted (no RLP). The remaining prior art, including Siwiak, was not analyzed on the merits with respect to any of the challenged claims, including claim 21.[11]

In the '892 IPR, the PTAB determined that independent claim 1, from which claim 21 depends, is unpatentable.[12] Institution was denied with respect to claim 21. The PTAB stated, with respect to claim 21:[13]

> Petitioner maps the claimed "first information" as corresponding to header 218 of message 200 depicted in Figure 4 of Boer . . . Petitioner does not identify any teaching of placing address data in the message header . . . Nor has Petitioner provided evidence sufficient to demonstrate that the ordinary artisan would have considered placing the address data as claimed to be a mere matter of "design choice."

In the '555 IPR, the PTAB exercised its discretion under 35 U.S.C. 325(d) to deny institution of *inter partes* review of claim 21, the only asserted claim. The PTAB stated:[14]

> The difference between what Petitioner presents in this proceeding and what Petitioner presented in IPR '892 with respect to claim 21 of the '228 patent is that Petitioner now offers Siwiak as support for the asserted obviousness of placing address data in a message header . . . Petitioner, however, presents no argument or evidence that Siwiak was not known or available to it at the time of filing IPR '892. In fact, Petitioner applied Siwiak in proposed grounds of rejection against claim 21 of the '228 patent in another petition filed the same day as that in the IPR '892 proceeding. See IPR2014-00889, Paper No. 2 at 58-60.

In the '555 IPR, the PTAB further stated that "Petitioner simply presents arguments now that it could have made in the '892 IPR, had it chosen to do so."[15]

The PTAB in the '892 IPR denied institution with respect to claim 21, but granted institution with respect to all of the other challenged claims. However, in *SAS Institute v. Iancu*, 138 S.Ct. 1348 (decided April, 24, 2018), the Supreme Court later held that, unlike the *ex parte* reexamination statute, 35 U.S.C. 314(a) does not authorize the Director to determine, on a claim-by-claim basis, whether to institute *inter partes* review (see slip op., pages 7-8):

> Rather than contemplate claim-by-claim institution, then, the language [if 35 U.S.C. 314(a)] anticipates a regime where a reasonable prospect of success on a single claim

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[11] See *Samsung Electronics Co. Ltd. et al. v. Rembrandt Wireless Technologies LP*, IPR2014-00889 (the '889 IPR), Paper No. 8 (PTAB December 10, 2014).

[12] See *Samsung Electronics Co. Ltd. et al. v. Rembrandt Wireless Technologies LP*, IPR2014-00892 (the '892 IPR), Paper No. 47 (PTAB September 17, 2015).

[13] *Id.*, Paper No. 8 at pages 13-15.

[14] See *Samsung Electronics Co. Ltd. et al. v. Rembrandt Wireless Technologies LP*, IPR2015-00555 (the '555 IPR) Paper No. 20, pages 7-8.

[15] *Id.*

> justifies all . . . [The ex parte reexamination] statute allows the Director to institute proceedings on a claim-by-claim, and ground-by-ground basis.

In response to *SAS*, the PTAB issued a memorandum on April 26, 2018, which provides guidance on how the PTAB may address any pending *inter partes* review in which a trial was not instituted on all of the challenges raised in the petition.[16] The '892 and '555 IPRs, however, have been concluded, and are not pending.

Pursuant to *SAS* and the April 26, 2018 memorandum by the PTAB, however, the PTAB would likely have instituted *inter partes* review of claim 21, had the '892 or the '555 IPR been pending at the time the Supreme Court's opinion in *SAS* had been rendered. In addition, claim 21 is the only claim requested to be reexamined in the present proceeding. These facts weigh in favor of ordering reexamination in the present reexamination proceeding.

C. The Prior Art and Arguments Presented in the Request for Reexamination

In the present request for reexamination, the requester asserts that the Snell reference[17] in view of Yamano[18] and Kamerman,[19] alone or in further in view of other references, renders obvious the limitations of claim 21. The patent owner does not dispute, in the present petition, that these references, including the Yamano reference, were not previously presented to the Office.

The requester, in the present request, newly relies on Yamano to teach the limitation of claim 21, i.e., "wherein the first information that is included in the first message comprises the first message address data".

With respect to this limitation, the PTAB in the '892 IPR stated (emphasis added): "Petitioner maps the claimed 'first information' as corresponding to header 218 of message 200 depicted in Figure 4 of Boer . . . **Petitioner does not identify any teaching of placing address data in the message header** . . ."

In the present request for reexamination, however, the requester newly relies on Yamano to teach the placing of address data in the message header. The requester explains in the present request that Yamano expressly teaches that the preamble in the header of Yamano can include destination addresses:[20]

> Yamano discloses transmitting a first message, including a preamble and main body, and that the preamble includes a destination address for an intended destination of the payload

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[16] See "Guidance on the Impact of SAS on AIA Trial Proceedings", released on April 26, 2018 at www.uspto.gov/patents-application-process/patenttrialandappealboard.

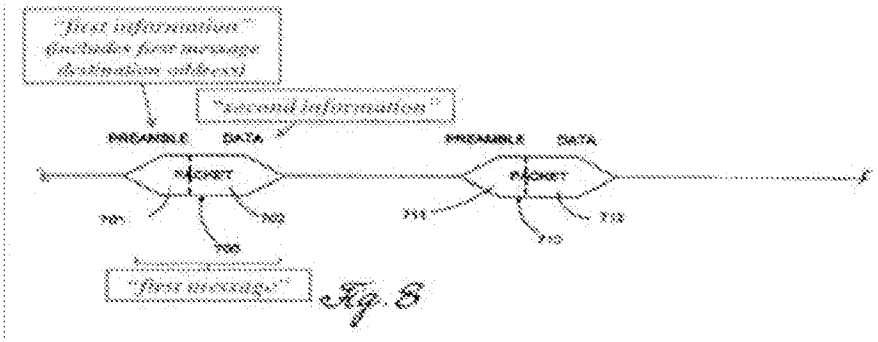
[17] See U.S. Patent 5,982,807 (Snell), which incorporates by reference the Harris 4064.4 and Harris AN9614 references.

[18] U.S. Patent No. 6,075,814 to Yamano et al. (Yamano).

[19] Kamerman, A., *Throughput Density Constraints for Wireless LANs Based on DSSS*, IEEE 4th International Symposium on Spread Spectrum Techniques and Applications Proceedings, Electoral Palace, Mainz, Germany, Sept. 22-25, 1996, vol. 3, pp. 1344-1350 (Kamerman).

[20] See pages 36-37 of the present request.

portion. Yamano at 19:63-64 ("Packet 700 includes a preamble 701 and a main body 702."); Yamano at 20:1-7 ("For example, preamble 701 can include information which identifies: . . . (2) packet source and destination addresses."). Yamano also discloses that the preamble precedes the main body (containing data), as shown in Figure 8:



Yamano at Fig. 8 (annotated).

Further, Yamano discloses that including the destination address in the preamble is advantageous because the receiver can demodulate only those packets that are addressed to it, thereby reducing its processing requirements. *Id.* at 20:54-59.

The requester also argues that Yamano teaches the advantages of including a destination address in the preamble portion of the data packet:[21]

> Yamano expressly teaches that including a destination address in the preamble portion of the data packet, which precedes the data portion, will advantageously reduce processing requirements of receiving devices because the receiving device can filter out packets which it does not need to demodulate. Yamano at 20:54-59 ("When the preamble in a burst-mode packet includes the destination address of the packet, the receiver circuits can monitor the destination address of the packet, and in response, filter packets which do not need to be demodulated, thereby reducing the processing requirements of the receiver circuits.").

The requester further explains how this teaching provides the motivation to combine Snell and Yamano. For example:[22]

> In addition, Snell teaches structuring its data packet to include a preamble, header, and MPDU data portion (*see, e.g.,* Snell at 6:35-36, 6:64-66; 7:5-14, Fig. 3), and Yamano teaches structuring its data packet to also include a preamble and a data portion, and to place the destination address in the preamble portion (Yamano at 19:63-20:7, Fig. 8) . . . a POSITA would have been motivated and found it obvious and straightforward to use

[21] See page 40 of the present request.

[22] See generally pages 39-41, and particularly pages 40-41, of the request for reexamination.

> Yamano's advantageous teachings of including a destination address in the preamble of a data packet in implementing Snell's communication system.

The requester explains that for these reasons, Yamano teaches the limitation "wherein the first information that is included in the first message comprises the first message address data", and also provides the motivation to combine Snell and Yamano.

In the present case, the Office determined that these arguments by the requester have merit, i.e., the presentation of these arguments warrant an order for reexamination.

D. The Office Balances the Protection of the Patent Owner Against Harassment with the Public Interest in Ensuring the Validity of Patent Claims

When determining whether to exercise its discretion under 35 U.S.C. 325(d) in an *ex parte* reexamination proceeding, the Office reviews the entire record of the patent requested to be reexamined, including the original prosecution of the patent and any post grant Office proceedings involving the patent, including reexamination proceedings, reissue applications, and PTAB trial proceedings such as *inter partes* reviews. Where, as here, multiple challenges have been filed with the Office against the patent requested to be reexamined, the Office balances the protection of the patent owner against harassment with the public interest in ensuring the validity of patent claims. [23]

As evidence of harassment by the requester, the patent owner points to thirteen previous *inter partes* reviews filed by the requester.[24] However, the record shows that ten (10) of the thirteen previous *inter partes* reviews pointed out by the patent owner as evidence of harassment either did not involve the '228 patent (6), or involved the '228 patent but did not involve claim 21 (4), the only claim requested to be reexamined in the present proceeding. Of the remaining three previous *inter partes* reviews, which did involve claim 21, the petitions for *inter partes* review in two of them were filed on the same day.[25] Petitions in trial proceedings at the PTAB, such as *inter partes* reviews, are subject to a word count or page limit. See 37 CFR 42.24. For this reason, the *simultaneous* filing of *inter partes* review petitions is not necessarily evidence of harassment.[26]

The patent owner asserts that seven *inter partes* reviews were filed by the requester against the '228 patent. The patent owner further asserts that the Office has indicated that patents challenged by seven or more petitions for review in a trial proceeding at the PTAB are "extreme outliers", pointing to page 36 of Exhibit 4 as support for its assertion.[27] The Office, however,

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[23] See, e.g., *In re Etter*, 225 USPQ 1 (Fed. Cir. 1985), in which the Federal Circuit, when discussing whether the § 282 presumption of validity has application in reexamination proceedings, stated: "Reexamination is thus neutral, the patentee and the public having an equal interest in the issuance and maintenance of valid patents."

[24] See, for example, page 8 of the present petition.

[25] The petitions in the '889 and '892 IPRs were simultaneously filed on June 4, 2014.

[26] See footnote 5 of this decision.

[27] See Exhibit 4, which accompanied the present petition, and which is entitled "Chat with the Chief, An Analysis of Multiple Petitions in AIA Trials", presented by David P. Ruschke, Chief Administrative Patent Judge, and William v. Saindon, Lead Administrative Patent Judge, (USPTO October 24, 2017). See particularly pages 17 and 31.

did not indicate that patents challenged by seven or more petitions are "extreme outliers", contrary to patent owner's assertions. Page 36 of Exhibit 4 states that "[a]pproximately 1% of patents [which were the subject of the study] are challenged by 7 or more petitions" and expressly indicates that the "extreme outliers" *are the last third of this 1%*: "PTAB investigated the 'extreme outliers' (aka, the last third of this 1%)". Pages 37-39 of Exhibit 4 explain that the "extreme outliers" are driven by extreme conditions such as a large number of claims. As an example of an "extreme outlier", the PTAB pointed to one family of petitions in which 125 petitions were filed against 10 patents totaling more than 370 claims, where all claims were found unpatentable after a PTAB trial. As another example, the PTAB pointed to another family of petitions in which 26 petitions were filed against a single patent having 306 claims.

In contrast, in the present case, only three of the seven petitions for *inter partes* review filed against the '228 patent involved claim 21, the claim requested to be reexamined. Two of the three petitions were filed on the same day. Furthermore, of the four petitions for *inter partes* review against the '228 patent that did not involve claim 21, all four were filed on the same day. The PTAB has found that in cases where more than one petition for a PTAB trial proceeding was filed, 38% of them were filed on or near the same day.[28] The *simultaneous* filing of *inter partes* review petitions is not necessarily evidence of harassment.

Furthermore, this is not a case where the requester's previous challenges to the '228 patent claims have been unsuccessful. In fact, the record shows that *all* of the claims challenged in the previous petitions for *inter partes* review of the '228 patent, with the sole exception of claim 21, were ultimately held to be unpatentable by the PTAB. Of the original 52 claims of the '228 patent, 34 claims were cancelled by the December 16, 2016 Inter Partes Review Certificate.

In view of these facts, the patent owner cannot expect the Office, in a reexamination proceeding, to ignore requester's arguments in the request for reexamination where, as here: i) requester's arguments in the request specifically apply to a limitation recited in the only claim requested to be reexamined; ii) that claim limitation is the focus of the reexamination proceeding; iii) the prior art relied upon in the request to teach that limitation, i.e., Yamano, was not previously presented to the Office; iv) requester's arguments in the request with respect to how the prior art, i.e., Yamano, *specifically* teaches that claim limitation and also teaches a motivation to combine Yamano with Snell, were not previously presented to the Office; v) requester's arguments clearly set forth how the prior art relied upon in the request, i.e., Yamano, is believed to teach that claim limitation and the motivation to combine; and vi) the Office determines that requester's arguments with respect to that claim limitation and the motivation to combine have merit, such that order for reexamination is warranted.

For all of these reasons, there is insufficient evidence in the record of harassment, such that this evidence would outweigh the interests of the public in maintaining valid patent claims.

Accordingly, the Office declined to exercise its discretion and reject the request under 35 U.S.C. 325(d) in the present reexamination proceeding.

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[28] *Id.*

E. The Evidence Presented in the Request of the Asserted Unpatentability of Claim 21 Weighs in Favor of Ordering Reexamination

The record shows that the PTAB in the '555 IPR exercised its discretion under 35 U.S.C. 325(d) to deny institution of *inter partes* review of claim 21 over Siwiak. The patent owner argues that the teachings of Yamano are substantially the same as those of Siwiak. However, Siwiak was never analyzed on the merits by the PTAB. Furthermore, even if the disclosure of Siwiak were considered to be substantially the same as the disclosure of Yamano with respect to the limitation recited in claim 21, the evidence in the request for reexamination of the asserted unpatentability of claim 21 weighs in favor of ordering reexamination.

1. Comparison of the Teachings of Yamano with the Teachings of Siwiak

While requester's arguments in the present request regarding the advantages of placing the address data in the preamble may be viewed to be similar to requester's arguments in the '555 IPR petition regarding the advantages of placing the address in the header,[29] the disclosure of Yamano more clearly teaches these advantages. Compare the disclosure of Yamano at column 20, lines 54-59 ("When the preamble in a burst-mode packet includes the destination address of the packet, the receiver circuits can monitor the destination address of the packet, and in response, filter packets which do not need to be demodulated, thereby reducing the processing requirements of the receiver circuits"), with the disclosure of Siwiak at column 3, lines 61-65 and column 4, lines 1-2, also referred to by the patent owner on page 38 of the present petition:

> When an address from the sent addresses 106 is detected in the demodulated information which corresponds to the predetermined address information assigned to the particular unit, then the unit demodulates the message vectors 108, which contain the parameters that inform the unit of the speed and modulation format with which the remaining message characterization information is to be transmitted and the location within the message block 110 which contains the start of the message.

For these reasons, Yamano more clearly teaches the advantages of having "the first information that is included in the first message comprise[] the first message address data" as recited in claim 21, by teaching the advantages of placing the address data in the preamble.[30]

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[29] See *Samsung Electronics Co. Ltd. et al. v. Rembrandt Wireless Technologies LP*, IPR2015-00555 (the '555 IPR) Paper No. 1, pages 20-21.

[30] Siwiak does not teach placing address data in the preamble. Rather, Siwiak teaches placing address data after the preamble – the preamble of Siwiak does not include address data. See, e.g., Figure 2 if Siwiak:

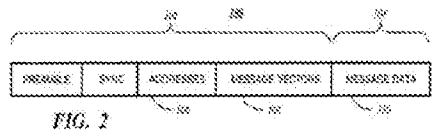

FIG. 2

In contrast, Yamano teaches placing address data in the preamble, as discussed in detail above.

2. Siwiak Was Not Previously Analyzed on the Merits

Even if the disclosure of Siwiak were considered to be substantially the same as the disclosure of Yamano with respect to the limitation recited in claim 21, however, the Siwiak reference was never analyzed on the merits by the Office with respect to any of the claims of the '228 patent, let alone the limitations of claim 21.

Siwiak was cited in an information disclosure statement which was filed in the application which became the '228 patent, but was never applied in a rejection and/or analyzed on the merits in the earlier examination of the '228 patent. In the '889 IPR (in which Siwiak was raised), the PTAB determined that the Draft Standard reference is not a printed publication, and for this reason, the IPR petitioner had not shown a reasonable likelihood of prevailing on the grounds asserted (no RLP). The remaining prior art, including Siwiak, was not analyzed on the merits by the PTAB with respect to any of the challenged claims, including claim 21. In the '555 IPR, the PTAB exercised its discretion under 35 U.S.C. 325(d) not to institute review of claim 21, without analyzing Siwiak on the merits:[31]

> We do not reach the merits of Petitioner's additional reasoning in the instant Petition as to why Petitioner asserts that the subject matter of claim 21 would have been obvious over the combination of APA, Boer, and Siwiak.

In view of the fact that the Siwiak reference was not previously analyzed on the merits by the Office with respect to the limitation of claim 21, the evidence presented in the request of the asserted unpatentability of claim 21, discussed in detail earlier in this decision, greatly weighs in favor of ordering reexamination, even if the disclosure of Yamano were considered to be substantially the same as the disclosure of Siwiak with respect to the limitation recited in claim 21.

The patent owner argues that a newly cited reference is substantially the same as a reference originally considered by the Office when both references provide the same teachings, citing *Unified Patents v. Berman*, IPR2016-01571, Paper No. 10, page 11 (PTAB December 14, 2016).[32] In *Unified Patents*, however, the PTAB noted that the reference originally cited by the Office, Russell, was analyzed on the merits and applied in a rejection in the original prosecution of the patent, which is not the case here. In the present case, Siwiak was never analyzed on the merits in the original prosecution of the patent, or later by the PTAB.

The patent owner further asserts that "§ 325(d) does not require a complete adjudication of a reference in order for the Office to deny a subsequent request for review based on that reference pursuant to § 325(d)", citing *Unified Patents*, and also citing *Cultec, Inc. v. Stormtech, LLC*, IPR2017-00777, Paper No. 7, page 11 (PTAB August 22, 2017) (references raised in the *inter partes* review petition were determined to have been previously presented to the Office in a third-party submission submitted during the original prosecution of the patent).[33] However, each

[31] See the '555 IPR, Paper No. 20, page 6.

[32] See page 8 of the present petition.

[33] See pages 8-9 of the present petition.

case is decided on its own facts, both in PTAB trial proceedings[34] and in *ex parte* reexamination proceedings. For example, the PTAB, in reviewing the original prosecution of the patent in *Unified Patents*, noted that: i) the originally recited claims were rejected over the Russell reference; and ii) although the issued claims were never rejected over the Russell reference, the examiner's interview summary evidences consideration of Russell for the newly added claims.[35] In contrast, in the present case, Siwiak was never analyzed on the merits in the original prosecution of the patent, or later by the PTAB. See also the PTAB's informative opinion in *Becton, Dickinson and Company v. B. Braun Melsungen AG*, IPR2017-01586, Paper No. 8, page 23 (PTAB December 15, 2017), where the PTAB analyzed whether the petition for *inter partes* review "presents persuasive new evidence of unpatentability that *was not evaluated previously by the Office*" (emphasis added).

In any event, however, the present proceeding is an *ex parte* reexamination proceeding, not an *inter partes* review. The statutory framework of *inter partes* review proceedings differs significantly from the statutory framework for *ex parte* reexamination proceedings. As a result, the application of 35 U.S.C. 325(d) to the facts with respect to a request for reexamination may result in a different outcome than when applied to a petition for *inter partes* review, due to the different nature of the two proceedings, as discussed in Section VI of this decision.

The patent owner is essentially arguing in its present petition that, even though the focus of the reexamination proceeding is a claim limitation which is not thought by the Office to render the claim patentable in view of the new prior art and arguments presented in the request for reexamination, and that claim limitation is recited in the only claim requested to be reexamined, the Office should nevertheless exercise its discretion and reject the request pursuant to 35 U.S.C. 325(d), on the basis that the prior art and/or arguments presented in the request are allegedly substantially the same as the prior art and/or arguments which were previously presented to the Office, even though the prior art previously presented to the Office (Siwiak), as well as the prior art presented in the request, were never addressed on the merits by the Office with respect to that claim limitation.

The provisions of 35 U.S.C. 325(d), however, are *discretionary*, not mandatory. The statute states that "the Director **may** take into account whether, and reject the . . . request because . . ." (emphasis added). The statute does not *require* the Director to reject a request for *ex parte* reexamination. Even if the prior art and/or arguments presented in the request are considered to be substantially the same as the prior art and arguments presented in the '555 IPR, the Office is not *required* to reject the request under 35 U.S.C. 325(d), particularly where, as here, the evidence of the unpatentability of claim 21 was not previously evaluated by the Office.

In the present case, the evidence in the request for reexamination of the asserted unpatentability of claim 21 weighs in favor of ordering reexamination. The Office reviewed the record and declined to exercise its option to reject the request under 35 U.S.C. 325(d).

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[34] See *General Plastic Industrial Co. v Canon Kabushiki Kaisha*, IPR2016-01357, Paper No. 19, page 21 (PTAB September 6, 2017).

[35] See *Unified Patents*, Paper No. 10, page 11.

F. The Determination by the Office Not to Exercise its Discretion under 35 U.S.C. 325(d) in the Present Proceeding is Not Inconsistent with the Determination to Deny Institution in the '555 IPR

The patent owner argues that the Office's determination not to exercise its discretion under 35 U.S.C. 325(d) in the present *ex parte* reexamination proceeding is inconsistent with the determination to deny institution of *inter partes* review pursuant to 35 U.S.C. 325(d) in the '555 IPR. Specifically, the patent owner asserts that the Office has "declined to consider factors" that the PTAB has applied when making determinations pursuant to 35 U.S.C. 325(d), such as the factors applied by the PTAB in the '555 IPR.[36] The patent owner further suggests that the Office consider the factors identified in the PTAB's precedential opinion, *General Plastic Industrial Co. v Canon Kabushiki Kaisha*, IPR2016-01357, Paper No. 19 (PTAB September 6, 2017), [37] as a baseline when determining whether to exercise its discretion under 35 U.S.C. 325(d) in the present *ex parte* reexamination proceeding.

The determination by the Office not to exercise is discretion under 35 U.S.C. 325(d) in the present *ex parte* reexamination proceeding, however, is not inconsistent with the determination in the '555 IPR to deny institution of an *inter partes* review.

As an initial matter, subsequent to the PTAB's decision in *General Plastic*, the Supreme Court has held that, unlike the *ex parte* reexamination statute, 35 U.S.C. 314(a) does not authorize the Director to determine whether to institute *inter partes* review on a claim-by-claim basis. *SAS*, slip op., pages 7-8. Pursuant to *SAS*, the PTAB issued a memorandum on April 26, 2018, stating that, if a pending *inter partes* review trial has been instituted on only some of the challenges raised in the petition, trial may be instituted on all challenges raised in the petition.[38] Pursuant to *SAS* and the April 26, 2018 memorandum by the PTAB, the PTAB would likely have instituted *inter partes* review of claim 21 of the '228 patent, had the '892 or the '555 IPRs been pending at the time the Supreme Court's opinion in *SAS* had been rendered. This fact weighs in favor of granting reexamination in the present proceeding.

In any event, as set forth in *General Plastic*,[39] the PTAB may apply factors relevant to its determination under 35 U.S.C. 314(a) ***in addition to*** analyzing whether the same or substantially the same prior art or arguments previously were presented to the Office pursuant to 35 U.S.C. 325(d). Therefore, in addition to an analysis under 35 U.S.C. 325(d), the PTAB may consider factors relevant to a 35 U.S.C. 314(a) determination. The present proceeding, however, is an *ex parte* reexamination proceeding, not an *inter partes* review. 35 U.S.C. 314(a) governs the institution of *inter partes* review, and does not apply to *ex parte* reexamination proceedings.

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[36] See the present petition, page 11.

[37] The PTAB has designated section II.B.4.i.of the opinion as precedential. Section II.B.4.i. of the opinion, i.e., Paper No. 19, appears on pages 15-19.

[38] See "Guidance on the Impact of SAS on AIA Trial Proceedings", released on April 26, 2018 at www.uspto.gov/patents-application-process/patenttrialandappealboard.

[39] The PTAB's decision in *General Plastic,* when taken with the Supreme Court's opinion in *SAS*, identifies factors which may be applied by the PTAB when determining whether to institute review of all of the claims challenged in the petition for *inter partes* review.

In *General Plastic*, the PTAB stated (citations omitted) (emphasis added):[40]

> The Director has discretion to institute an *inter partes* review under 35 U.S.C. § 314(a) . . . The Board consistently has considered a number of factors in determining whether to exercise that discretion . . . To reiterate, those factors are as follows:
>
> 1. Whether the same petitioner previously filed a petition directed to the same claims of the same patent;
>
> 2. Whether at the time of filing of the first petition, the petitioner knew of the prior art asserted in the second petition or should have known of it;
>
> 3. Whether at the time of filing the second petition, the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition;
>
> 4. The length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;
>
> 5. Whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;
>
> 6. The finite resources of the Board; and
>
> 7. The requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

The PTAB further stated: [41]

> [T]he factors set forth above . . . serve to act as a baseline of factors to be considered in our future evaluation of follow-on petitions.

When determining whether to exercise its discretion under 35 U.S.C. 314(a) in an *inter partes* review proceeding, the PTAB may evaluate the factors identified above. The PTAB may also perform an analysis pursuant to 35 U.S.C. 325(d), where appropriate. An analysis pursuant to 35 U.S.C. 325(d) is *another factor* that may be *additionally* considered by the PTAB when determining whether to exercise its discretion under 35 U.S.C. 314(a). See *General Plastic*, in which the PTAB explained (emphasis added):[42]

> § 325(d) is not intended to be the **sole factor** in the exercise of discretion **under § 314(a).**

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[40] See *General Plastic*, Paper No. 19, pages 15-16.

[41] *Id.*, page 18.

[42] *Id.*

In other words, **an analysis pursuant to 35 U.S.C. 325(d) is a factor that may be considered by the PTAB *in addition to* the § 314(a) factors identified in *General Plastic*.**[43]

The patent owner argues that the Office, in the present reexamination proceeding, declined to consider factors used by the PTAB when denying institution pursuant to 35 U.S.C. 325(d) in the '555 IPR. In the '555 IPR, however, the factors considered by the PTAB, other than its analysis pursuant to 35 U.S.C. 325(d), are factors identified by the PTAB in *General Plastic* to be considered when exercising its discretion under 35 U.S.C. 314(a), not 35 U.S.C. 325(d).

Pursuant to *General Plastic*, an analysis pursuant to 35 U.S.C. 325(d) in an *inter partes* review does not include an analysis pursuant to 35 U.S.C. 314(a). In *General Plastic*, the PTAB explained that its discretion under 35 U.S.C. 314(a) is not "subordinate to or *encompassed by* § 325(d)" (emphasis added).[44] Rather, an analysis under 35 U.S.C. 325(d), i.e., whether the prior art or arguments previously were presented to the Office, is a factor considered by the PTAB *in addition to* the § 314(a) factors when determining whether to institute *inter partes* review. The PTAB's decision in the '555 IPR, when taken with the PTAB's precedential opinion in *General Plastic*, shows that the PTAB used factors relevant to a 35 U.S.C. 314(a) determination in the '555 IPR, in addition to evaluating whether the prior art or arguments previously were presented to the Office pursuant to 35 U.S.C. 325(d), when determining whether to institute *inter partes* review.

One of the factors that the PTAB considered in the '555 IPR when making its determination whether to institute *inter partes* review was the limited resources of the PTAB: [45]

> Petitioner is requesting, essentially, a second chance to challenge the claims. . . Permitting second chances in cases like this one ties up the Board's limited resources; we must be mindful not only of this proceeding, but of "every proceeding."

The limited resources of the PTAB, however, are not relevant to the *factual* issue of whether the same or substantially the same prior art or arguments were previously presented to the Office, pursuant to the language of 35 U.S.C. 325(d). The limited resources of the PTAB is *a factor which is considered by the PTAB when determining whether to institute inter partes review under 35 U.S.C. 314(a).* See, e.g., factor no. 6 listed above. The PTAB was using factors relevant to a 35 U.S.C. 314(a), in addition to its evaluation pursuant to 35 U.S.C. 325(d), when making its determination whether to institute *inter partes* review. An *ex parte* reexamination proceeding, however, is not an *inter partes* review proceeding. 35 U.S.C. 314(a) does not apply to *ex parte* reexamination proceedings. The limited resources of the PTAB is not a consideration which would weigh heavily when determining whether to exercise the Office's discretion under 35 U.S.C. 325(d) in an *ex parte* reexamination proceeding.

The PTAB also considered, in the '555 IPR, whether the newly cited prior art, Siwiak, was known by the petitioner or was available to the petitioner at the time of filing the petition in an

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[43] The factors identified in *General Plastic* were first set forth in *NVIDIA Corp. v. Samsung Elec. Co.*, IPR2016-00134, Paper No. 9 (PTAB May 4, 2016).

[44] *Id.,* page 19.

[45] The '555 IPR, Paper no. 20, page 8.

earlier *inter partes* review, i.e., the '892 IPR. There is no mention in the language of 35 U.S.C. 325(d), however, of a determination whether the prior art newly cited in a later *inter partes* review petition was known by the petitioner or was available to the petitioner at the time of filing an earlier *inter partes* review petition. Rather, whether newly cited art was known by or available to the petitioner in an *inter partes* review at time of filing an earlier petition for *inter partes* review is a *factor considered by the PTAB when determining whether to institute inter partes review under 35 U.S.C. 314(a).* See, e.g., factor no. 2 listed above. The PTAB was using factors relevant to a 35 U.S.C. 314(a) determination, in addition to its evaluation pursuant to 35 U.S.C. 325(d), when making its determination whether to institute *inter partes* review. An *ex parte* reexamination proceeding, however, is not an *inter partes* review proceeding.

35 U.S.C. 314(a) does not apply to *ex parte* reexamination proceedings. It is not inconsistent for the Office, in an *ex parte* reexamination proceeding, to decline to consider factors relevant to an analysis under 35 U.S.C. 314(a), since that statute that does not apply to *ex parte* reexamination proceedings.

Furthermore, 35 U.S.C. 314(a) governs the institution of *inter partes* review, and the factors identified in *General Plastic* were specifically formulated to apply to those proceedings:[46]

> The factors set forth above, in our view, represent a formulation of relevant considerations that permit the Board to assess the potential impacts on . . . the efficiency of the *inter partes* review process . . .

The efficiency of the *inter partes* review process, however, is not relevant to an *ex parte* reexamination proceeding. The legislative history of the America Invents Act (AIA) distinguishes a reexamination proceeding from an *inter partes* review by describing an *inter partes* review as an adjudicative proceeding:[47]

> The Act converts inter partes reexamination from an examinational to an adjudicative proceeding, and renames the proceeding "inter partes review".

In an adjudicative proceeding, the judge is concerned not only with the interests of the parties and the interests of the public, but also with the efficiency of the judicial process, or, in this case, the efficiency of the *inter partes* review process. An *ex parte* reexamination proceeding, however, is not an adjudicative proceeding, let alone a trial proceeding such as an *inter partes* review. The efficiency of the *inter partes* review process is not relevant to an *ex parte* reexamination proceeding.

In fact, the Supreme Court distinguishes *ex parte* reexamination proceedings from *inter partes* review proceedings by describing an *ex parte* reexamination proceeding as "an agency-led, inquisitorial process" for reconsidering patents, in contrast to an *inter partes* review, which is "a party-directed, adversarial process". *SAS Institute v. Iancu*, 138 S.Ct. 1348 (decided April 24, 2018), slip op., page 6.

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[46] Id., page 18.

[47] See H.R. Report No. 112-98, part 1, pages 46-47.

Therefore, it is not inconsistent for the Office, in an *ex parte* reexamination proceeding, to decline to consider factors that were formulated not with respect to an *ex parte* reexamination proceeding, but with respect to an entirely different type of proceeding.

Furthermore, even if the PTAB's decision in the '555 IPR to deny *inter partes* review were considered to be solely due to an analysis under 35 U.S.C. 325(d), the statutory framework of *inter partes* review proceedings differs significantly from the statutory framework for *ex parte* reexamination proceedings. As a result, the application of 35 U.S.C. 325(d) to the facts with respect to a request for reexamination may result in a different outcome than when applied to a petition for *inter partes* review, due to the different nature of the two proceedings, as discussed in Section VI of this decision.

This is not to say that some of the factors that happen to be relevant to a determination under 35 U.S.C. 314(a) in an *inter partes* review may never be considered in an *ex parte* reexamination proceeding. While some of the factors (such as, e.g., the first factor) may be considered in an *ex parte* reexamination proceeding, it is not *inconsistent* for the Office to decline to use these factors in an *ex parte* reexamination proceeding for all of the reasons set forth above.

The determination pursuant to 35 U.S.C. 325(d) in an *ex parte* reexamination proceeding is conducted on a case-by-case basis.

In the present case, the Office balanced the interests of the patent owner with the interests of the public. The Office reviewed the evidence presented in the request of the asserted unpatentability of claim 21 and any evidence in the record of harassment of the patent owner, including whether the teachings of the prior art such as Yamano with respect to the limitation recited in claim 21 were previously presented to the Office. The Office determined that the evidence presented in the request of the asserted unpatentability of claim 21 outweighs any evidence in the record of alleged harassment, as discussed in detail earlier in this decision.

For all of the reasons set forth above, the determination by the Office not to exercise its discretion under 35 U.S.C. 325(d) in the present *ex parte* reexamination proceeding is not inconsistent with the determination in the '555 IPR to deny institution of an *inter partes* review.

G. Patent Owner's Request for Reconsideration Would Have Been Dismissed, Even If Timely Filed

For all of the reasons set forth above, patent owner's October 27, 2017 request for reconsideration would have been dismissed, even if it were timely filed, in view of the prior art and arguments presented in the request.

In view of the specific facts and circumstances of the present case, however, the Office provides additional comments below in order to clarify Office policy with respect to issues involving 35 U.S.C. 325(d) in reexamination proceedings.

V. Clarification of Office Policy Regarding 35 U.S.C. 325(d) Issues in Reexamination Proceedings

A. The November 28, 2016 Decision

The patent owner argues that in the November 28, 2016 decision, the Office treated the second sentence of 35 U.S.C. 325(d) as a nullity because the Office pointed out, in that decision, that the patent owner did not discuss whether the references at issue raised a substantial new question of patentability. The patent owner also asserts that "OPLA takes the position that § 325(d), which was implemented *after* § 304, only permits the Office to deny reexamination requests that do not present a substantial new question of patentability" (emphasis in original).[48] The patent owner further argues that "OPLA has taken the position that § 325(d)'s instruction to take into account whether or not 'the same or substantially the same prior art or arguments previously *were presented to the Office*' is limited to considering issues which have been considered after an *inter partes* review trial has begun and has been completed" (emphasis in original).[49]

The patent owner misunderstands the November 28, 2016 decision. In that decision, the Office treated patent owner's original September 30, 2016 petition as a petition to vacate the order, which is filed *after* the order for reexamination. Patent owner's original petition was treated in the same manner as a petition alleging that the reexamination order is *ultra vires,* i.e., the Office was not authorized under 35 U.S.C. 304 to order reexamination because no substantial new question of patentability is raised by the request. See MPEP 2246, subsection II. In order to challenge the order for reexamination, such a petition addresses whether a substantial new question of patentability is raised by the request.

In the November 28, 2016 decision, the Office first pointed out that the patent owner, while claiming that the same or substantially the same arguments were previously presented to the Office, did not provide any explanation of why the patent owner believed that the arguments were the same or substantially the same as those previously presented to the Office, as set forth in 35 U.S.C. 325(d). The Office also pointed out that while the determination under 35 U.S.C. 325(d) is discretionary, 35 U.S.C. 304 *requires* the Office to order reexamination if a substantial new question of patentability is raised by the request. This was not to say, however, that 35 U.S.C. 304 "does not permit the Office to deny a request for reexamination pursuant to 35 U.S.C. 325(d)" when a substantial new question of patentability is found, contrary to patent owner's assertions. Rather, the Office intended to point out that the patent owner, in addition to omitting an explanation of patent owner's position regarding a discretionary determination by the Office pursuant to 35 U.S.C. 325(d), also omitted any discussion of a determination under 35 U.S.C. 303(a) that the Office is required to make prior to the order for reexamination pursuant to 35 U.S.C. 304.[50] 35 U.S.C. 303(a) provides, in pertinent part (emphasis added):

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[48] See the present petition, page 6.

[49] See the present petition, page 7.

[50] Because the Office treated patent owner's original petition in the same manner as a petition alleging that the reexamination order was *ultra vires,* the Office was pointing out that the patent owner not only failed to provide a *specific* basis under 35 U.S.C. 325(d) to reject the request, but also did not provide a *specific* basis to vacate the order as *ultra vires* by showing that no substantial new question of patentability was raised by the request, pursuant to 35 U.S.C. 303(a) and 35 U.S.C. 304. In other words, the patent owner could have provided at least one of the

> Within three months following the filing of a request for reexamination under the provisions of section 302, **the Director will determine whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request**.

Contrary to patent owner's assertions, there is no mention in the November 28, 2016 decision that 35 U.S.C. 325(d) "only permits the Office to deny reexamination requests that do not present a substantial new question of patentability", or that "§ 325(d)'s instruction to take into account whether or not 'the same or substantially the same prior art or arguments previously were presented to the Office' is limited to considering issues which have been considered after an *inter partes* review trial has begun and has been completed".[51]

In any event, the Office's statement in the November 28, 2016 decision that a petition addressing issues involving 35 U.S.C. 325(d) is not considered to be timely if filed before the order for reexamination, was in error, and has not been followed as discussed previously in this decision. To be considered, a petition limited to issues involving 35 U.S.C. 325(d) must be filed *before* the order for reexamination has issued. In addition, because the petition is filed *before* the order, the petition must be limited to issues involving 35 U.S.C. 325(d), and may not address any other issues, including whether a substantial new question of patentability is raised by the request. The petition should also request waiver under 37 CFR 1.183 of the provisions of 37 CFR 1.530(a) and the second sentence of 37 CFR 1.540, on the basis that the petition is limited to issues involving 35 U.S.C. 325(d).

B. Office Policy With Respect to 35 U.S.C. 325(d) in *Ex Parte* Reexamination Proceedings

35 U.S.C. 304 requires the Office to issue an order granting reexamination in an *ex parte* reexamination proceeding if the Office determines that a substantial new question of patentability affecting any claim of the patent is raised by the reexamination request. 35 U.S.C. 325(d) was promulgated after the enactment of 35 U.S.C. 304. For this reason, the Office considers the provisions of 35 U.S.C. 325(d), taken together with the provisions of 35 U.S.C. 304, as permitting the Office to exercise its discretion and issue an order denying reexamination on the basis that the same or substantially the same prior art or arguments previously were presented to the Office, even if a substantial new question of patentability is determined to be raised by the request.

In the present case, reexamination was ordered on October 17, 2016.

The patent owner argues in its present petition that the requester "failed to provide", in the request, a comparison of the art and arguments presented in the request with those previously presented to the Office. The patent owner also asserts that the Office did not make a

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following: i) a specific basis under 35 U.S.C. 325(d) to reject the request; and/or ii) a specific basis under 35 U.S.C. 303(a) and 35 U.S.C. 304 to vacate the order. Neither was provided.

[51] Rather, the Office summarized the outcome, with respect to claim 21, of the *inter partes* reviews raised by the patent owner in its original petition.

determination pursuant to 35 U.S.C. 325(d) prior to the order, presumably because 35 U.S.C. 325(d) was not directly addressed in the order.[52]

There is no requirement, however, for a requester in an *ex parte* reexamination proceeding to address the provisions of 35 U.S.C. 325(d) in the request. There is also no requirement for the examiner to discuss, in an order granting reexamination, why the Office did not exercise its discretion pursuant 35 U.S.C. 325(d) and "reject" the request.

When drafting an order or an Office action, the Office generally refers only to those statutes that the Office finds necessary to discuss in that order or Office action. For example, the issuance of an Office action that only includes rejections under 35 U.S.C. 103 does not mean that the provisions of 35 U.S.C. 102 were not also considered. Similarly, the issuance of an order that refers only to 35 U.S.C. 303 and 35 U.S.C. 304 does not mean that the provisions of 35 U.S.C. 301, 35 U.S.C. 302, and 35 U.S.C. 325(d) were not also considered.

In the present case, the Office reviewed the provisions of 35 U.S.C. 325(d) in addition to the provisions of all other applicable statutes when determining whether to order reexamination. The Office, in its discretion, determined not to reject the request under 35 U.S.C. 325(d). Instead, reexamination was ordered.[53]

VI. The Determination Whether to Reject a Reexamination Request Pursuant to 35 U.S.C. 325(d) May Differ from the Analysis under 35 U.S.C. 325(d) Used by the PTAB to Deny Institution in an *Inter Partes* Review

The patent owner argues in its present petition that the analysis pursuant to 35 U.S.C. 325(d), when conducted in an *inter partes* review, should not differ from the analysis performed in an *ex parte* reexamination proceeding with respect to 35 U.S.C. 325(d).[54]

The statutory framework of *inter partes* review proceedings, however, differs significantly from the statutory framework for *ex parte* reexamination proceedings, and as a result, the considerations with respect to issues involving 35 U.S.C. 325(d) are not identical. The application of 35 U.S.C. 325(d) to the facts with respect to a request for reexamination may result in a different outcome than when applied to a petition for a trial proceeding at the PTAB. It is the nature of the proceedings and the facts and circumstances surrounding these different proceedings that can result in different outcomes.

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[52] See the present petition, pages 3-4; see also footnote 4.

[53] The patent owner argues on pages 19-20 of its present petition that the CRU has determined "in this proceeding" that at least some of the references cited in the "present" proceeding are "the same" as those in the earlier filed IPRs and "relies on this equivalency in an attempt to justify the rejection of claims in Patent Owner's patents. See, e.g., Final Office Action in Ex Parte Reexamination No. 90/013,808 at 40" (emphasis added). However, the patent owner refers to reexamination proceeding control no. 90/013,808 (the '808 proceeding), which is not the present proceeding (the '809 proceeding). Furthermore, the '808 proceeding does not involve the '228 patent. Rather, it involves a related patent, U.S. Patent No. 8,023,580 (the '580 patent).

[54] See the present petition, page 11.

In an *inter partes* review proceeding, both parties have a full right of participation throughout the entire procedure. Both parties also have a right to appeal the PTAB's final decision to the Court of Appeals for the Federal Circuit (Federal Circuit). In an *ex parte* reexamination proceeding, however, the right of participation of a third party requester is limited. The active participation of the third party requester ends with the reply pursuant to 37 CFR 1.535, and no further submissions on behalf of the reexamination requester is acknowledged or considered. See 35 U.S.C. 305 and 37 CFR 1.550(g). **The third party requester in an *ex parte* reexamination proceeding does not have a right to appeal the examiner's decision to the PTAB, or the resulting PTAB decision to the Federal Circuit**. See 35 U.S.C. 141. As a result, unlike *inter partes* review practice, the determination by the Office whether to exercise its discretion and deny *ex parte* reexamination pursuant to 35 U.S.C. 325(d) takes into account the fact that a third party requester does not have a full right of participation in the proceeding, including a right to appeal.

In addition, the *ex parte* reexamination statute "allows the Director to institute proceedings on a claim-by-claim and ground-by-ground basis". *SAS,* slip op., page 7. In contrast, the language of the *inter partes* review statute does not permit institution on a claim-by-claim basis. Rather, the language of the statute "anticipates a regime where a reasonable prospect of success on a single claim justifies review of all." *Id.* The Supreme Court distinguished *ex parte* reexamination proceedings from *inter partes* review proceedings by describing an *ex parte* reexamination proceeding as "an agency-led, inquisitorial process" for reconsidering patents, in contrast to an *inter partes* review, which is "a party-directed, adversarial process." *Id.,* page 6.

Furthermore, the standard used for ordering *ex parte* reexamination differs from the standard used for instituting *inter partes* review. The standard for determining whether to institute *inter partes* review is whether there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition (RLP standard). See 35 U.S.C. 314(a). The standard for determining whether to order *ex parte* reexamination is whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request (SNQ standard). See 35 U.S.C. 303(a). For example, **there is no requirement in the RLP standard that the issue, or question, be "new"**. The SNQ standard, however, requires a substantial **new** question of patentability. **There is no such element in the RLP standard used in *inter partes* review proceedings.** Thus, 35 U.S.C. 325(d) introduces to PTAB proceedings the protection already substantially afforded in *ex parte* reexamination against harassment based on repetitive arguments.

As another example, a substantial new question of patentability may be raised merely because a reasonable examiner would consider the teaching of a reference *important* in determining the patentability of the claims. See MPEP 2242. In contrast, the RLP standard requires a reasonable likelihood that the petitioner would *prevail.*

In addition, the *inter partes* review statute is permissive. It does not *require* institution of *inter partes* review even if the PTAB finds that there is a reasonable likelihood that the petitioner

would prevail with respect to at least one of the claims challenged in the petition (RLP).[55] In contrast, absent the provisions of 35 U.S.C. 325(d), the *ex parte* reexamination statute *requires* the Office to order reexamination if the request is found to raise a substantial new question of patentability (SNQ).[56] In other words, if the Office does not find that the same or substantially the same prior art or arguments previously were presented to the Office, or if the Office declines to exercise its discretion under 35 U.S.C. 325(d) in view of, for example, evidence of unpatentability that was not previously evaluated by the Office, the Office is *required* to order reexamination if the request is found to raise a substantial new question of patentability, unlike *inter partes* review.

Furthermore, once an order granting *ex parte* reexamination has been issued, the Office is *required* to conduct reexamination. See 35 U.S.C. 305. There is no such statutory requirement for *inter partes* review proceedings. In fact, an *inter partes* review proceeding may be terminated upon the joint request of the petitioner and the patent owner pursuant to 35 U.S.C. 317.

In addition, unlike the *inter partes* review statute, the *ex parte* reexamination statute does not provide for the filing of a response by the patent owner *prior to* an order granting reexamination. Instead, 35 U.S.C. 304 specifies that a response by the patent owner may be filed *after* the order has issued.

For all of the reasons discussed above, the determination whether to exercise the Office's discretion and deny *ex parte* reexamination under 35 U.S.C. 325(d) differs from the analysis used by the PTAB to refuse to institute *inter partes* review, due to the significant differences in the statutory framework of the two proceedings. The application of 35 U.S.C. 325(d) to the facts with respect to a request for reexamination may result in a different outcome than when applied to a petition for a trial proceeding at the PTAB.

This is not to say that a request for reexamination filed subsequent to multiple concluded trial proceedings, such as *inter partes* reviews, involving the same claims of the same patent, and filed by the same party, is always permitted. The determination whether to exercise the Office's discretion under 35 U.S.C. 325(d) in an *ex parte* reexamination proceeding is performed on a case-by-case basis.

VII. The Provisions of 35 U.S.C. 325(d) *Complement* the Protections Provided by the Substantial New Question of Patentability Standard

The patent owner asserts in its present petition that "§ 325(d) was added to the America Invents Act [AIA] for, *inter alia*, the express purpose of curing the inability of the substantial new

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[55] 35 U.S.C. 314(a) provides, in pertinent part (emphasis added):

> The Director **may not authorize** an inter partes review to be instituted **unless** the Director determines that the information presented in the petition . . . shows that there is a reasonable likelihood that the petition would prevail with respect to at least 1 of the claims challenged in the petition.

[56] 35 U.S.C. 304 provides, in pertinent part (emphasis added):

> If . . . the Director finds that a substantial new question of patentability is raised, the determination **will include an order for reexamination** of the patent for resolution of the question.

question of patentability standard to prevent the abuse of *ex parte* reexamination."[57] However, there is no evidence in the record which shows that the provisions of 35 U.S.C. 325(d) were drafted solely to cure a widespread "inability" in the substantial new question of patentability standard to prevent the abuse of *ex parte* reexamination. Rather, the record shows that the provisions of 35 U.S.C. 325(d) were intended to prevent an AIA proceeding from being used as a tool for harassment, and to *complement* the protections already provided by the substantial new question of patentability standard set forth in 35 U.S.C. 303(a).

To support its argument, the patent owner points to the legislative history of the AIA in H.R. Rep. No. 112-98, part 1 (June 1, 2011) (the House report), at page 48. However, there is no mention on page 48 of the House report of 35 U.S.C. 325(d) or, for that matter, of the purpose for promulgating the provisions of 35 U.S.C. 325(d). The House report at page 48 merely states that "the *changes made by* [the amendment establishing AIA proceedings] are not to be used as tools for harassment" (emphasis added). In other words, *the AIA proceedings themselves* are not to be used as tools for harassment. There is nothing on page 48 that states that previously established Office proceedings, such as reexamination proceedings, do not prevent abuse, as presently asserted. In fact, the House report expressly states (emphasis in bold added):[58]

> . . . However, we have significant concerns about the limitations that H.R. 1249 imposes on *inter partes* review . . . The limitations imposed by H.R. 1249 and the managers [sic] amendment are motivated by assertions that **the *inter partes* procedure may be abused to harass patent owners** and interfere with the enforcement of valid patents. **However, no empirical evidence, even anecdotally, was proffered to the Committee to demonstrate such abuses occur in the current reexamination system. On the contrary,** of the 253 *inter partes* reexaminations decided since the procedure was created in 1999, 224 (89%) resulted in the modification or nullification of at least one patent claim, which means that **the challenges were ultimately found meritorious. This suggests that further limitations and deterrents against *inter partes* petitions, beyond those already in place in current law, are unnecessary and counterproductive.** (Footnotes omitted).

Contrary to patent owner's assertions, Congress expressly stated that there was no empirical evidence that abuses occur in the current reexamination system.[59]

The patent owner points out that the legislative history of the AIA refers to the "abuse of ex parte reexamination" by stating that "[t]he second sentence of section 325(d) complements the protections against abuse of ex parte reexamination that are created by sections 315(e) and

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[57] See page 44 of the present petition.

[58] See H.R. Rep. No. 112-98, part 1 (June 1, 2011) (the House report), at page 164.

[59] The standard for *inter partes* reexaminations which was in effect at the time of H.R. Rep. 112-98, part I, *prior to* the effective date of the relevant provisions of the AIA, was the same standard used in *ex parte* reexamination proceedings, i.e., the SNQ standard. The standard used in *inter partes* reexaminations, however, was later amended by the AIA, effective September 15, 2011, which was *after t*he June 1, 2011 date of H.R. Rep. 112-98, part 1. The standard for *inter partes* reexamination proceedings filed on or after September 16, 2011 and before September 16, 2012 is similar to the standard used in *inter partes* review proceedings, i.e., whether "the information presented in the request shows that there is a reasonable likelihood that the requester would prevail with respect to at least one of the claims challenged in the request" (RLP). See 35 U.S.C. 312 (transitional provision).

325(e)." In fact, the legislative history of the second sentence of 35 U.S.C. 325(d) specifically provides (emphasis added):[60]

> In the second sentence of section 325(d), the present bill also authorizes the Director to reject any request for ex parte reexamination or petition for post-grant or inter partes review on the basis that the same or substantially the same prior art or arguments previously were presented to the Office. This will prevent parties from mounting attacks on patents that raise issues that are substantially the same as issues that were already before the Office with respect to that patent . . . The second sentence of section 325(d) complements the protections against abuse of ex parte reexamination that are created by sections 315(e) and 325(e). The estoppels in subsection (e) will prevent inter partes and post-grant review petitioners from seeking ex parte reexamination of issues that were raised or could have been raised in the inter partes or post-grant review**. The Office has generally declined to apply estoppel . . . to an issue that is raised in a request for inter partes reexamination if the request was not granted with respect to that issue. Under section 325(d), second sentence, however, the Office could nevertheless refuse a subsequent request for ex parte reexamination with respect to such an issue, even if it raises a substantial new question of patentability, because the issue previously was presented to the Office in the petition for inter partes or post-grant review**.

The legislative history of the second sentence of 35 U.S.C. 325(d) specifically shows that these statutory provisions apply to reexaminations because Congress intended to provide the Office with the *option* to reject a request for *ex parte* reexamination in the particular case where an issue raised in the request was previously raised, for example, in an earlier-filed request for reexamination or petition for *inter partes* review, *and reexamination was not ordered, or review was not instituted, with respect to that issue.*

The patent owner may argue that the present case is one which the second sentence of 35 U.S.C. 325(d) is designed to address, i.e., the request in the present case proposes a rejection of claim 21, and a rejection of claim 21 was also proposed in a previous *inter partes* review, but review was not instituted with respect to that claim. In the present case, however, the Office carefully reviewed the record and declined to reject the request under 35 U.S.C. 325(d).

35 U.S.C. 325(d) does not *require* the Office to reject the request. As discussed previously, the Office declined to reject the request because, *inter alia*, i) requester's arguments in the request specifically apply to a limitation recited in the only claim requested to be reexamined; ii) that claim limitation is the focus of the reexamination proceeding; iii) the prior art relied upon in the request to teach that limitation, i.e., Yamano, was not previously presented to the Office; iv) requester's arguments in the request with respect to how the prior art, i.e., Yamano, specifically teaches that claim limitation and also teaches a motivation to combine Yamano with Snell, were not previously presented to the Office; v) requester's arguments clearly set forth how the prior art relied upon in the request, i.e., Yamano, is believed to teach that claim limitation and the motivation to combine; vi) the Office determined that requester's arguments with respect to that claim limitation and the motivation to combine have merit, such that order for reexamination

[60] 157 Cong. Rec. S1376 (daily ed. March 8, 2011) (statement of Sen. Kyl).

was warranted; and vii) there was insufficient evidence in the record of harassment such that it would outweigh the interests of the public in ensuring the validity of patent claims.

The patent owner further asserts that "the purpose behind the second sentence of § 325(d) is to permit the Office to reject reexamination requests that it was previously "forced to accept".[61] The legislative history shows, however, that the purpose behind the second sentence § 325(d) is to prevent AIA proceedings from being used as tools for harassment, and not merely "to reject reexamination requests that it was previously 'forced to accept'", as discussed previously. To support its argument, the patent owner points to the legislative history of the AIA which states:[62]

> The Patent Office has indicated that it currently is forced to accept many requests for ex parte and inter partes reexamination that raise challenges that are cumulative to or substantially overlap with issues previously considered by the Office with respect to the patent.

This statement is accurate in the particular case where a request for reexamination raises an issue that was previously raised, for example, in an earlier-filed request for reexamination or petition for *inter partes* review, and reexamination was not ordered, or review was not instituted, in the earlier-filed proceeding with respect to that issue. In all other instances, however, where the substantial new question of patentability standard is used, the Office determines whether the teaching of a reference is cumulative to the prior art of record as a matter of standard procedure. See MPEP 2216 and 2242.

Furthermore, Congress did not amend the provisions of 35 U.S.C. 303(a) when promulgating the provisions of 35 U.S.C. 325(d). The fact that Congress left the provisions of 35 U.S.C. 303(a) intact shows that Congress intended to *complement* the protections already provided by the substantial new question of patentability standard. For example, the legislative history of the *ex parte* reexamination statute reflects an intent by Congress that the *ex parte* reexamination process would not create new opportunities to harass the patent owner. See, e.g., H.R. Rep. No. 1307 (part I), 96th Cong., 2d Sess. 7 (Statement of Congressman Kastenmeier, September 9, 1980):

> This "substantial new question" requirement would protect patentees from having to respond to, or participate in unjustified reexaminations.

The legislative history of the 2002 amendment to the reexamination statute also states that the amendment "preserves the 'substantial new question standard' that is an important safeguard to protect all inventors against frivolous action and against harassment," and "also preserves the discretion of the Patent and Trademark Office in evaluating these cases."[63] See also *Industrial Innovation & Patent & Copyright Law Amendments: Hearings on H.R. 6933, 6934, 3806, & 214 Before the Subcommittee on Courts, Civil Liberties and the Administration of Justice of the House Committee on the Judiciary*, 96th Cong., 2nd Sess. 594 (1980) (statement of Sidney Diamond, Commissioner of Patents & Trademarks, April 24, 1980):

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[61] See the present petition, page 5.

[62] See 157 Cong. Rec. S1376 (daily ed. March 8, 2011) (statement of Sen. Kyl).

[63] 147 Cong. Rec H 5358, 107th Congress, (September 5, 2001).

> [The proposed *ex parte* reexamination statute] carefully protects patent owners from reexamination proceedings brought for harassment or spite. The possibility of harassing patent holders is a classic criticism of some foreign reexamination systems and we made sure it would not happen here.

To prevent the use of the reexamination process to harass the patent owner, Congress included the requirement that a substantial new question of patentability based on patents and printed publications must be raised by the request. See also *Patlex v. Mossinghoff*, 771 F.2d 480, 483-484 (Fed. Cir. 1985)(italics in original), where the Federal Circuit, in quoting the statement of Commissioner Diamond immediately above, stated:

> Study of the genesis of the reexamination statute leaves no doubt that the major purpose of the threshold determination whether or not to reexamine is to provide a safeguard to the patent holder . . . That is the only purpose of the procedure established by *35 U.S.C. § 303*: "carefully" to protect holders of issued patents from being subjected to unwarranted reexaminations.

In addition, the purpose of *ex parte* reexamination is to permit the Office to reexamine the patent on the basis of prior art which was not previously considered, or was not fully considered with respect to the specific claims of the patent, during an earlier examination or review of the patent. There is a strong public interest that all of the prior art be considered. See *In re Etter*, 225 USPQ 1 (Fed. Cir. 1985), in which the Federal Circuit, when discussing whether the § 282 presumption of validity has application in reexamination proceedings, stated:

> Reexamination is thus neutral, the patentee and the public having an equal interest in the issuance and maintenance of valid patents.

The patent owner points out that it is more than two decades since the substantial new question of patentability standard was implemented. The time lapse since implementation, however, does not render the substantial new question of patentability standard less valid, or less effective.

For all of the reasons set forth above, the record shows that Congress intended the provisions of 35 U.S.C. 325(d) to *complement* the protections provided by the substantial new question of patentability standard.

VIII. The Decision in *Ariosa* to Terminate a Reexamination Proceeding Was Made in the Context of Deciding a Co-Pending *Inter Partes* Review

The patent owner points out, in its present petition, that in *Ariosa v. Verinata Health*, IPR2013-00276 and IPR2013-00277, Paper 63 (PTAB May 24, 2016) (*Ariosa*), the PTAB terminated a co-pending ex parte reexamination request pursuant to 35 U.S.C. 325(d). In *Ariosa*, however, an *inter partes* review of the patent under reexamination was ongoing, which is not the case here. In *Ariosa*, the decision by the PTAB to terminate a co-pending *ex parte* reexamination was made in the context of deciding a co-pending *inter partes* review of the same patent. Furthermore, the section of the statute, 35 U.S.C. 315(d), that authorizes the Director to terminate an on-going reexamination proceeding during the pendency of an *inter partes* review is separate and distinct

from the last sentence of 35 U.S.C. 325(d), also as explained by the PTAB: "That section of the statute [35 U.S.C. 315(d)] does not refer to whether 'the same or substantially the same prior art or arguments previously were presented to the Office'. Thus, while we may consider whether the same arguments were before us in the *inter partes* review proceeding, those considerations are not determinative of the analysis." *Ariosa v. Illumina*, IPR2014-01093, Paper 81, page 9 (PTAB May 24, 2016). In addition, even if *Ariosa* may be considered to represent a policy of terminating an *ex parte* reexamination proceeding which is co-pending with an *inter partes* review, there is nothing in *Ariosa* that establishes a policy with respect to ordering reexamination subsequent to a concluded *inter partes* review.

IX. It is Longstanding Petition Practice in Reexamination Proceedings that a Petitioner Requesting the Office to Take (or Not to Take) an Action Has the Burden to Explain Why It Believes that the Action Must (or Must Not) Be Taken

The patent owner asserts that the Office dismissed patent owner's original September 30, 2016 petition "without determining whether the same or substantially the same art or arguments had been previously presented to the Office".[64] The provisions of 35 U.S.C. 325(d), however, were expressly reviewed in the November 28, 2016 decision. Furthermore, in the November 28, 2016 decision, the Office expressly pointed out (emphasis added, footnotes omitted):[65]

> The patent owner, however, does not argue that the same or substantially the same prior art or arguments previously were presented to the Office. **In fact, the patent owner admits that the art relied upon by the third party requester in the present request was not previously presented to the Office**, also as argued by the requester in its October 13, 2016 opposition. **Furthermore, the patent owner does not provide any discussion regarding whether the arguments presented in the request are the same or substantially the same as those previously presented to the Office.**

The patent owner asserts, without basis, that if the patent owner files a petition in an *ex parte* reexamination proceeding requesting the Office to "reject" the request pursuant to 35 U.S.C. 325(d), the burden to compare the art and arguments presented in the request with those previously presented to the Office rests with the Office.[66] Patent owner's original petition, however, requested the Office to "reject" the request pursuant to 35 U.S.C. 325(d) because, according to the patent owner, the same prior art or arguments were previously presented to the Office. In reexamination proceedings as well as in patent applications, it is longstanding practice that a petitioner who is requesting the Office to take an action, particularly a discretionary action, is required to provide any necessary evidence with its petition in order to support its request. It is not reasonable to expect the Office to speculate what the specific basis of patent owner's

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[64] See page 3 of the present petition.

[65] See the November 28, 2016 decision, page 4.

[66] In an *ex parte* reexamination proceeding, the Office analyzes whether the prior art relied upon in the request is cumulative to the prior art of record when making its determination whether a substantial new question of patentability is raised by the request. This determination is reflected in the order granting reexamination. The patent owner, however, does not dispute the Office's determination in the order that a substantial new question of patentability is raised by the request.

request might be, or why the patent owner believes that *in this particular case*, action must (or must not) be taken.

Furthermore, the patent owner filed a petition in an *ex parte* reexamination proceeding, not a preliminary response or other paper in an *inter partes* review. The requester in an *ex parte* reexamination proceeding is not required to address the provisions of 35 U.S.C. 325(d) in the request. In addition, unlike *inter partes* review practice, there is no statutory provision for a "preliminary response" by the patent owner *prior* to the order for reexamination. In fact, the reexamination statute, 35 U.S.C. 304, specifies that a response by the patent owner may be filed *after* the order has issued. The statutory framework of *inter partes* review proceedings differs significantly from the statutory framework for *ex parte* reexamination proceedings, and as a result, the considerations with respect to issues involving 35 U.S.C. 325(d) are not identical, as discussed in detail previously. It is not reasonable to expect the Office, when deciding a petition which requests the Office to exercise its discretion under 35 U.S.C. 325(d) in an *ex parte* reexamination proceeding, to accept a burden that might be procedurally applicable in an entirely different type of proceeding, and ignore longstanding petition practice in reexamination proceedings.

It is also not reasonable to expect the Office to deviate from longstanding practice in this particular case, while maintaining the same longstanding practice in all other reexamination proceedings, including those in which an issue involving 35 U.S.C. 325(d) has been specifically raised by petition.

X. Prosecution in the Present Reexamination Proceeding Will Continue

In summary, patent owner's October 27, 2017 petition under 37 CFR 1.183 to waive the provisions of 37 CFR 1.181(f) and enter and consider patent owner's October 27, 2017 combined petition is dismissed for the reasons set forth in this decision. Furthermore, in view the fact that the provisions of 37 CFR 1.181(f) have not been waived, patent owner's October 27, 2017 request for reconsideration is dismissed as untimely.

Furthermore, as an alternate basis for dismissal, patent owner's October 27, 2017 request for reconsideration would have been dismissed, even if it were timely filed, in view of the prior art and arguments presented in the request, as set forth in this decision.

Accordingly, patent owner's October 27, 2017 request for reconsideration, including patent owner's request that the Office vacate the order and "terminate" reexamination, i.e., vacate all subsequently-mailed Office actions and issue an order denying reexamination on the basis set forth in 35 U.S.C. 325(d) that the request is limited to the same or substantially the same prior art or arguments previously presented to the Office, is dismissed as untimely.

The October 17, 2016 order granting reexamination, and all subsequently-mailed Office actions, **will not be vacated**. Prosecution in the present reexamination proceeding **will continue**.

Because any exercising of the Director's authority pursuant to 35 U.S.C. 325(d) is purely discretionary, any further papers requesting the Office to take any action, or to refrain

from taking any action, in view of the provisions of 35 U.S.C. 325(d) will not be entertained, and will be expunged.

CONCLUSION

- Patent owner's October 27, 2017 petition under 37 CFR 1.183 to waive the provisions of 37 CFR 1.181(f) is **dismissed**.

- Patent owner's October 27, 2017 request for reconsideration, including patent owner's request that the Office vacate the order and "terminate" reexamination, i.e., vacate all subsequently-mailed Office actions and issue an order denying reexamination on the basis set forth in 35 U.S.C. 325(d) that the request is limited to the same or substantially the same prior art or arguments previously presented to the Office, is **dismissed as untimely**.

- Even if patent owner's October 27, 2017 request for reconsideration were timely filed, the request for reconsideration would have been dismissed (alternate basis for dismissal).

- The October 17, 2016 order granting reexamination, and all subsequently-mailed Office actions, **will not be vacated**. Prosecution in the present reexamination proceeding **will continue**.

- The present proceeding is being forwarded to the Central Reexamination Unit to continue prosecution.

- Any inquiry concerning this communication should be directed to the undersigned at (571) 272-7724.

/Cynthia L. Nessler/

Cynthia L. Nessler
Senior Legal Advisor
Office of Patent Legal Administration June 15, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/013,809	09/12/2016	8457228	3277-0114US-RXM2	7821

6449 7590 06/15/2018

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ART UNIT	PAPER NUMBER
3992	

MAIL DATE	DELIVERY MODE
06/15/2018	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Date: June 15, 2018

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90013809
PATENT NO. : 8457228
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

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In re Gordon F. Bremer :
Ex Parte Reexamination Proceeding : **DECISION**
Control No. 90/013,809 : **DISMISSING**
Filed: September 12, 2016 : **PETITION**
For: U.S. Patent No.: 8,457,228 :

This is a decision on patent owner's June 8, 2017 petition entitled "Petition Requesting the Director to Exercise Her (I) Supervisory Authority Pursuant to 37 C.F.R. § 1.181(a)(1) and/or 1.182, And (II) Discretion Pursuant to 35 U.S.C. 325(d)", which is taken as a combined petition (patent owner's June 8, 2017 combined petition) including:

1) a petition under 37 CFR 1.181(a)(3) requesting the Office to vacate the May 3, 2017 non-final Office action as *ultra vires* (patent owner's June 8, 2017 petition under 37 CFR 1.181(a)(3) to vacate the May 3, 2017 Office action as *ultra vires*); and

2) a petition under 37 CFR 1.182 requesting the Office to exercise its discretion pursuant to 35 U.S.C. 325(d).

Patent owner's June 8, 2017 combined petition, and the record as a whole, are before the Office of Patent Legal Administration for consideration.

SUMMARY

Patent owner's June 8, 2017 petition under 37 CFR 1.181(a)(3) to vacate the May 3, 2017 Office action is **dismissed**.

Patent owner's June 8, 2017 petition under 37 CFR 1.182 requesting the Office to exercise its discretion pursuant to 35 U.S.C. 325(d) is **dismissed**.

REVIEW OF THE RELEVANT FACTS

- On June 4, 2013, U.S. Patent No. 8,457,228 (the '228 patent) issued to Gordon F. Bremer.

- On June 4, 2014, a third party requester, Samsung Electronics Co. Ltd., Samsung Electronics America, Inc., Samsung Telecommunications America, LLC, and Samsung Austin Semiconductor, LLC filed a petition for *inter partes* review of claims 1-3, 5, and 10-21 the '228 patent. With respect to claims 1-3, 5, and 10-20, the petition was based on the Draft Standard reference[1] alone or in view of Boer[2]. With respect to claim 21, the petition was based on the Draft standard reference in view of the APA or Siwiak,[3] alone or further in view of Boer. The *inter partes* review was assigned case number IPR2014-00889 (the '889 IPR).

- Also on June 4, 2014, the same third party requester filed a second petition for *inter partes* review of claims 1-3, 5, and 10-21 of the '228 patent, based on the admitted prior art (APA) in view of Boer. The *inter partes* review was assigned case number IPR2014-00892 (the '892 IPR).

- On December 10, 2014, the Patent Trial and Appeal Board (PTAB) issued a decision in the '889 IPR denying institution of *inter partes* review of all of the challenged claims of the '228 patent, i.e., claims 1-3, 5, and 10-21. The PTAB determined that the IPR petitioner had not met its burden in establishing that the Draft Standard reference is a printed publication; and for this reason, the IPR petitioner had not shown a reasonable likelihood of prevailing on the grounds asserted (no RLP).

- Also on December 10, 2014, the PTAB mailed a decision in the '892 IPR granting institution with respect to claims 1-3, 5, and 10-20 of the '228 patent, and denying institution with respect to claim 21 of the '228 patent.

- On January 9, 2015, the same third party requester filed a third petition for *inter partes* review of claim 21 of the '228 patent, based on the APA in view of Boer and Siwiak. The *inter partes* review was assigned case number IPR2015-00555 (the '555 IPR).

- On June 19, 2015, the PTAB mailed a decision in the '555 IPR denying institution of *inter partes* review of claim 21 of the '228 patent, in which the PTAB exercised its discretion under 35 U.S.C. 325(d) to deny institution of *inter partes* review of claim 21. The PTAB stated that difference between what was presented in the '892 IPR and the '555 IPR with respect to claim 21 is that Siwiak is now offered "as support for the asserted obviousness of placing address data in a message header as taught by Boer"; that no argument or evidence is presented that Siwiak was not known or available to

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[1] *Draft Standard for Wireless LAN, Medium Access Control (MAC) and Physical Layer (PHY) Specification* P802.11D4.0, May 20, 1996 (Draft Standard).

[2] U.S. Patent No. 5,706,428 to Boer et al. (Boer).

[3] U.S. Patent No. 5,537,398 to Siwiak (Siwiak).

petitioner at the time of filing the '892 IPR; that Siwiak was relied upon in the '889 IPR, which was filed on the same day as the '892 IPR; and that the petitioner "simply presents arguments now that it could have made in IPR '892."

- On September 24, 2015, the PTAB issued a Final Written Decision in the '892 IPR, in which the PTAB held that claims 1-3, 5, and 10-20 of the '228 patent are unpatentable. No appeal was filed.

- On September 12, 2016, a third party requester Samsung Electronics Co. Ltd. and Samsung Electronics America, Inc. (Samsung)[4] filed a request for *ex parte* reexamination of claim 21 of the '228 patent. The reexamination proceeding was assigned control number 90/013,809 (the present reexamination proceeding) and was accorded a filing date of September 12, 2016.[5]

- On September 30, 2016, the patent owner filed a petition in the present reexamination proceeding entitled "Petition Requesting the Director to Exercise Her Discretionary Authority under 35 U.S.C. § 325(d) Pursuant to 37 C.F.R. § 181(a)(2) and/or § 1.182", which was taken as a combined petition (patent owner's September 30, 2016 combined petition), including: 1) a petition under 37 CFR 1.183 to waive the rules and enter patent owner's petition under 37 CFR 1.182; and 2) a petition under 37 CFR 1.182 to vacate the order granting reexamination and issue an order denying reexamination.

- On October 13, 2016, the third party requester Samsung filed, in the present reexamination proceeding, an opposition to patent owner's September 30, 2016 petition,

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[4] Samsung Telecommunications America, LLC and Samsung Austin Semiconductor, LLC were listed as co-petitioners in the '514, '518, and '114 IPRs, but were not listed as co-requesters in the present reexamination proceeding.

[5] Four other previously-filed petitions for *inter partes* review of the '228 patent, which did not involve claim 21, the sole claim under reexamination, were simultaneously filed with the '889 and '892 IPR petitions. Specifically, on June 4, 2014, the same date that the petitions in the'889 and '892 IPRs were filed, the following four petitions were also filed:

- IPR2014-00890 (the '890 IPR) (relying on the Draft Standard reference alone or in view of Boer) and IPR2014-00893 (the '893 IPR) (relying on the APA in view of Boer), both of which requested review of claims 22, 23 and 25; and
- IPR2014-00891 (the '891 IPR) (relying on the Draft Standard reference alone, or in view of Boer and/or the APA), and IPR2014-00895 (the '895 IPR) (relying on the APA in view of Boer), both of which requested review of claims 26-29, 31, 36-41, 43, and 47-52.

Petitions in trial proceedings at the PTAB are subject to a word count or page limit. See 37 CFR 42.24. Where, as here, the petition involves a substantial number of claims, it is not unexpected that a petitioner may choose to split a substantial number of claims into two or more groups, and file multiple petitions *simultaneously* in order to separately challenge each group of claims. It is also not unexpected that a petitioner may choose to challenge these claims over more than one combination of references, and file multiple petitions *simultaneously* in order to separately challenge each set of claims in view of each separate set of references. *Simultaneous* filings of IPRs for these reasons is not necessarily evidence of harassment.

entitled "Third Party Requester's Opposition to Patent Owner's Petition to Reject Reexamination Request" (requester's October 13, 2016 opposition).

- Also on October 13, 2016, the third party requester Samsung filed, in the present reexamination proceeding, a petition entitled "Third Party Requester's Petition to Respond to Patent Owner's Petition to Reject Reexamination Request" (requester's October 13, 2016 petition).

- On October 17, 2016, reexamination of claim 21 of the '228 patent was ordered in the present reexamination proceeding.

- On November 28, 2016, the Office mailed a decision in the present reexamination proceeding dismissing patent owner's September 30, 2016 petition under 37 CFR 1.182 to vacate the order granting reexamination and issue an order denying reexamination (the November 28, 2016 petition decision). The November 28, 2016 petition decision also granted patent owner's September 30, 2016 petition under 37 CFR 1.183, and requester's October 13, 2016 petition, to the extent that patent owner's September 30, 2016 combined petition, and requester's October 13, 2016 petition and opposition, have been entered and considered.

- On December 13, 2016, the PTAB issued an Inter Partes Review Certificate reflecting the results of the '892, '893 and '895 IPRs (the December 13, 2016 Inter Partes Review Certificate). The December 13, 2016 Inter Partes Review Certificate cancels claims 1-3, 5, 10-20, 22, 23, 25, 26-29, 31, 36-41, 43 and 47-52 of the '228 patent.

- On May 3, 2017, a non-final Office action rejecting claim 21 of the '228 patent was mailed in the present reexamination proceeding.

- On June 8, 2017, the patent owner filed, in the present reexamination proceeding, a petition entitled "Petition Requesting the Director to Exercise Her (I) Supervisory Authority Pursuant to 37 C.F.R. § 1.181(a)(1) and/or § 1.182, and (II) Discretion Pursuant to 35 U.S.C. 325(d)" (patent owner's June 8, 2017 petition).

- On August 14, 2017, the patent owner filed a response to the May 3, 2017 non-final Office action in the present reexamination proceeding.

- On October 27, 2017, the patent owner filed a petition in the present reexamination proceeding entitled "Petition Requesting Reconsideration of OPLA's November 28, 2016 Dismissal of Rembrandt's September 30, 2016 Petition under Rule 181/182 Requesting the Director to Exercise Her Discretionary Authority under 35 U.S.C. § 325(D) [*sic*] and a Final Petition Decision in Accordance with PTAB Practice" (patent owner's October 27, 2017 combined petition). Patent owner's October 27, 2017 combined petition will be addressed under separate cover.

STATUS OF CLAIMS

Of the original 52 claims of the '228 patent, claims 1-3, 5, 10-20, 22, 23, 25, 26-29, 31, 36-41, 43 and 47-52 have been cancelled by the December 13, 2016 Inter Partes Review Certificate.

Dependent claim 21 is the sole claim under reexamination in the present proceeding. Claim 21 depends from cancelled independent claim 1. Claim 21 stands rejected.

DECISION

Patent Owner's June 8, 2017 Combined Petition

The patent owner requests the Office to vacate the May 3, 2017 non-final Office action as *ultra vires*, and further requests the Office to "terminate" one of the rejections applied in the non-final Office action "under 35 U.S.C. 325(d)".

Patent owner's June 8, 2017 petition is taken as a combined petition including:

1) a petition under 37 CFR 1.181(a)(3) requesting the Office to vacate the May 3, 2017 non-final Office action as *ultra vires* (patent owner's June 8, 2017 petition under 37 CFR 1.181(a)(3) to vacate the May 3, 2017 Office action as *ultra vires*); and

2) a petition under 37 CFR 1.182 requesting the Office to exercise its discretion pursuant to 35 U.S.C. 325(d).

I. Patent Owner's June 8, 2017 Petition under 37 CFR 1.181(a)(3) to Vacate the May 3, 2017 Office Action as Ultra Vires

The patent owner argues, in its June 8, 2017 petition under 37 CFR 1.181(a)(3), that the record does not expressly set forth the basis for the substantial new question of patentability for one of the five art rejections which were applied by the examiner in the May 3, 2017 non-final Office action.[6] The patent owner points out that the rejection must be based on a substantial new question of patentability. To support its argument, the patent owner relies on *In re Recreative Technologies Corp.,* 83 F.3d 1394 (Fed. Cir. 1996) ("matters that were decided in the original examination would be barred from reexamination"); and *In re Portola Packaging*, 110 F.3d 785 (Fed. Cir. 1997) ("Even when the door to the reexamination gate is opened, the PTO is not freed from the limitations Congress placed on the reexamination process. Whatever the basis on which reexamination is granted, it was intended to deal only with substantial new questions of patentability"). The patent owner argues that because the Office action did not expressly set forth the basis for the substantial new question of patentability for one of the rejections, the May 3, 2017 Office action is an *ultra vires* action by the Office, and must be vacated.

[6] All five rejections were rejections of claim 21 of the '228 patent. Claim 21 is the only claim under reexamination in the present proceeding.

The patent owner may file a petition under 37 CFR 1.181(a)(3) requesting the Office to vacate the Office action as *ultra vires*, but such a petition will only be granted if the Office acted in "brazen defiance" of its statutory authorization in issuing the Office action. See, e.g., MPEP 2246, subsection II. The patent owner, however, has not provided any specific explanation why the patent owner believes that the disputed rejection is not based on a substantial new question of patentability, or how the Office has acted "in brazen defiance" of its statutory authorization.

In the May 3, 2017 non-final Office action, four of the five art rejections applied by the examiner were based on art newly cited by the requester in the request and discussed by the examiner in the order granting reexamination.[7] The patent owner does not dispute that these four art rejections are based on a substantial new question of patentability, or that *ex parte* reexamination of the '228 patent is proper.

The sole rejection disputed by the patent owner is based on a combination of admitted prior art (APA), art previously raised by the requester in a related *inter partes* review (Boer),[8] and art newly raised by the requester in the request and discussed by the examiner in the order (Yamano)[9] (the disputed rejection). The *specific combination* of the APA, Boer, and Yamano was newly applied against claim 21 by the examiner in the May 3, 2017 non-final Office action, and was not raised in the application which became the patent or in any other post-grant Office proceeding such as an *inter partes* review or another reexamination proceeding.

The patent owner provides no explanation of why the patent owner believes that the disputed rejection is not based on a substantial new question of patentability. At most, the patent owner points out that various rejections of claim 21 over the combination of the APA and Boer alone, or in further combination with other references, were proposed during three previous IPR proceedings. The patent owner provides no explanation why the combination of the APA in view of Boer and the Yamano reference, which was newly cited by the Office in the May 3, 2017 non-final Office action, does not raise a substantial new question of patentability. See, e.g., *In re Hiniker*, 150 F.3d 1362 (Fed. Cir. 1998), in which the court held that the reexamination proceeding was supported by a substantial new question of patentability where the rejection before the court was based on a combination of art that was before the examiner during the original prosecution, and art newly cited during the reexamination proceeding.

The patent owner argues that the rejection is improper because the Office did not "*first* make[] the threshold finding that the . . . rejection [is based on] an SNQ . . . Neither the Grant, nor the May 3 Office Action, makes such a finding" (emphasis in original).

The patent owner, however, has not pointed to any statute or regulation that *requires* the examiner to expressly set forth *in the Office action* the basis for the substantial new question of patentability when rejecting the claims over a *new combination* of references *during*

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[7] One of the four rejections was based on a combination of art new cited by the requester in the request and discussed by the examiner in the order, and on admitted prior art (APA) which was previously discussed by the requester in three petitions for *inter partes* review of claims 21 of the '228 patent (see footnote 1 of this decision).

[8] U.S. Patent No. 5,706,428 to Boer et al.

[9] U.S. Patent No. 6,075,814 to Yamano et al.

reexamination.[10] MPEP 2258.01, for example, sets forth the policy that the examiner "should" (but is not required to) explain the basis for the substantial new question of patentability for a rejection newly applied in an Office action *when the substantial new question of patentability is based solely on "old art"*. The policy encourages, but does not require, the examiner to provide this explanation in the Office action. Furthermore, in the present case, the substantial new question of patentability is not "based solely on old art." The rejection of claim 21 in the May 3, 2017 Office action is based on the combination of the APA in view of Boer and Yamano. The patent owner does not dispute requester's statement in the request that "Yamano has not been previously cited to or considered by the Patent Office in connection with the '228 patent,"[11] i.e., Yamano is newly cited art.

See also, e.g., *In re Hiniker*, where the basis for the substantial new question of patentability was not set forth in the Office action in which the rejection at issue was applied, and where the court declined to vacate the reexamination proceeding, holding that the rejection was nevertheless based on a substantial new question of patentability. Consistent with *Hiniker*, if the examiner newly cites a reference or a reference combination in a rejection, then, *a fortiori*, the examiner believes that a reasonable examiner may consider the teachings of that reference or the references in the reference combination important in determining the patentability of the claims, and that the teachings are noncumulative, i.e., a newly cited reference alone, or a newly cited reference in combination with other references, is determined to raise a substantial new question of patentability.

If the patent owner wishes the Office to clarify the basis for the substantial new question of patentability of one of the rejections applied in an Office action, the patent owner may do so in its response to the Office action.[12] However, a petition requesting clarification of the basis for a substantial new question of patentability for only one of five applied rejections, alone, in the absence of any argument or explanation why the patent owner believes that the rejection is not based on a substantial new question of patentability, is not a basis for a grantable petition to vacate an Office action as *ultra vires*.

In any event, the Yamano reference is newly cited by the requester in the request, and is expressly discussed in both the request and in the order granting reexamination. The *specific combination* of the APA in view of Boer and Yamano was not expressly proposed by the requester or discussed in the order. The Yamano reference, however, nevertheless raises a substantial new question of patentability for the same reasons set forth in the order granting

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[10] 35 U.S.C. 303(a) requires the Office to make a determination whether a substantial new question of patentability affecting any claim of the patent has been raised *by the request*. It does not require the Office to additionally identify all references, or, for that matter, all specific reference combinations, that *might be applied* in any future rejection of each and every original claim *during reexamination*. A rejection is only formulated and applied once reexamination has begun. Reexamination is not conducted until after the time periods for patent owner's statement and requester's reply have expired, as expressly provided by 35 U.S.C. 305.

[11] See page 36 of the present request.

[12] In order to preserve the right to have the PTAB review the substantial new question of patentability issue, the patent owner is required to first request reconsideration before the examiner. See MPEP 2246, subsection II. In the present case, in order to preserve the right to have the PTAB review the substantial new question of patentability issue, the patent owner must first request reconsideration of the basis for the substantial new question of patentability in patent owner's response to the May 3, 2017 non-final Office action.

reexamination. For example, in the order mailed on October 17, 2016,[13] the examiner points out (emphasis in original):

> **Yamano** discloses the placement of address data in the first information portion of a message. Specifically, Yamano discloses a packet structure with a preamble and a data portion, where the preamble includes a destination address of the receiving device.
>
> For example, Yamano discloses transmitting a "first message" (*e.g.,* data packet including a preamble and a main body) that includes "first message address information that is indicative" (*e.g.,* "destination address" in the preamble) of the transceiver that is the "intended destination of the second information." *Packet 700* includes a *preamble 701* and a *main body 702*.) Yamano at 19:63-64.

Furthermore, the examiner makes clear, in the rejection of claim 21 over the APA in view of Boer and Yamano in the May 3, 2017 Office action, that the combination of the APA in view of Boer is applied against claim 21 for the same reasons that it was applied against claim 1 in the '892 IPR[14] (claim 21 depends from claim 1 of the '144 patent). The examiner then states:

> The APA in view of Boer did not teach as pertains to claim 21 "The master communication device as in claim 1, wherein the first information that is included in the first message comprises the first message address data."

The examiner then explains, in the May 3, 2017 Office action, why Yamano teaches this feature.[15] In fact, the vast majority of the discussion of the rejection of claim 21 over the APA in view of Boer and Yamano is devoted to a discussion of the teachings of Yamano. For these reasons, the reliance on Yamano as a basis for a substantial new question of patentability in the rejection of claim 21 over the APA in view of Boer and Yamano in the May 3, 2017 Office action is felt to be clear from a reasonable reading of the May 3, 2017 Office action.

For all of the reasons set forth above, the May 3, 2017 Office action is proper, and is not an *ultra vires* action on the part of the Office.

Accordingly, patent owner's petition under 37 CFR 1.181(a)(3) requesting the Office to vacate the May 3, 2017 non-final Office action as *ultra vires* is **dismissed**.

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[13] See page 10 of the October 17, 2016 order granting reexamination in the present proceeding.

[14] See the last paragraph of page 8 and the first four lines of page 9 of the May 3, 2017 Office action.

[15] See pages 9-10 of the May 3, 2017 Office action.

II. Patent Owner's June 8, 2017 Petition under 37 CFR 1.182 Requesting the Office to Exercise its Discretion Pursuant to 35 U.S.C. 325(d)

The patent owner requests the Office to "terminate" the disputed rejection "pursuant to 35 U.S.C. 325(d)", which is taken as a request that the Office withdraw the disputed rejection. 35 U.S.C. 325(d) provides, in pertinent part (emphasis added):

> In determining whether to . . . **order a proceeding under . . . chapter 30**, . . . the Director may take into account whether, and **reject the . . . request** because, the same or substantially the same prior art or arguments previously were presented to the Office.

As an initial matter, the provisions of 35 U.S.C. 325(d) are discretionary, not mandatory. The statute states that "the Director **may** take into account whether, and reject the . . . request because . . ." The statute does not *require* the Director to reject a request for *ex parte* reexamination pursuant to 35 U.S.C. 325(d).

In any event, the provisions of 35 U.S.C. 325(d) only apply when the Office is determining whether to order reexamination, i.e., "whether to . . . order a proceeding under . . . chapter 30", or whether to deny reexamination, i.e., "reject the . . . request." There is nothing in the statute that states that the statutory provisions apply *after* the order for reexamination has issued, let alone to an individual rejection applied by the examiner.

Furthermore, there is nothing in the statute that states that the statutory provisions apply where, as here, i) reexamination has been ordered; ii) *after* reexamination has been ordered, the Office applied, in a non-final Office action, five art rejections; iii) one of the five art rejections is based on a specific combination of references, where the specific combination is newly raised in the Office action, and was not proposed by the requester in the request or discussed by the Office in the order (the disputed rejection); and iv) the patent owner does not dispute that the remaining four art rejections are based on prior art that is not the same or substantially the same as the prior art which was previously presented to the Office.

In addition, once reexamination has been ordered, the Office is required by statute to conduct reexamination. The provisions of 35 U.S.C. 325(d) clearly refer to the determination whether to order a reexamination proceeding or whether to reject the request, which occurs *prior* to the order. In addition, 35 U.S.C. 305 *requires* the Office to conduct reexamination *once the order has been issued* pursuant to 35 U.S.C. 304. See 35 U.S.C. 305, which provides, in pertinent part:

> After the times for filing the statement and reply provided for by section 304 have expired, **reexamination will be conducted** . . .

Therefore, once an order granting reexamination has issued, the Office is *required* to conduct reexamination pursuant to 35 U.S.C. 305.

Once reexamination is ordered, reexamination is conducted according to the procedures established for initial examination. See 35 U.S.C. 305. The examiner considers patents and printed publications from a variety of sources, including patents and printed publications of record in the patent file from earlier examination, and patents and printed publications

discovered by the examiner during a search of the prior art. See MPEP 2256. Consistent with this policy, the examiner may also consider patents and printed publications of record in any previous *inter partes* review proceedings, as was the case here.

Accordingly, patent owner's June 8, 2017 petition under 37 CFR 1.182 requesting the Office to exercise its discretion pursuant to 35 U.S.C. 325(d) and withdraw the disputed rejection is **dismissed**.

Even if patent owner's petition is taken as a request to withdraw the disputed rejection on the basis that the teaching of Yamano is cumulative to the teaching of Siwiak, which was relied upon in the previously-filed '555 IPR petition, patent owner's petition would be dismissed. The patent owner argues:

> Yamano and Siwiak are both cited to show address information in the packet header, and the purported motivation for modifying Boer based on Yamano . . . is the same as that previously advanced for modifying Boer based on Siwiak in the '555 IPR.

In *ex parte* reexamination practice, however, where the teaching of a reference is relied upon as a basis for a substantial new question of patentability in a first request for reexamination, and reexamination is not ordered based on that teaching, then that teaching of the reference is treated as never having been raised. For this reason, the same teaching of the reference, or a teaching of another reference that is cumulative, may be determined to raise a substantial new question of patentability in a subsequently-filed reexamination proceeding. In the present case, *inter partes* review of claim 21 over the APA in view of Boer and Siwiak was not instituted in the '555 IPR. Therefore, since *inter partes* review was not instituted, the teaching of Siwiak, and any teaching that may be argued to be cumulative to the teaching of Siwiak, such as the teaching of Yamano as argued by the patent owner, may be determined to raise a substantial new question of patentability in an *ex parte* reexamination proceeding.

For this reason, patent owner's June 8, 2017 petition under 37 CFR 1.182 would be dismissed, even if patent owner's petition is taken as a request to withdraw the disputed rejection on the basis that the teaching of Yamano is cumulative to the teaching of Siwiak.

The patent owner further argues that in the November 28, 2016 decision, "OPLA dismissed [patent owner's original petition requesting the Office to exercise its discretion under 35 U.S.C. 325(d)] without making any § 325(d) inquiry." Contrary to patent owner's allegations, however, the Office initially analyzed the language of 35 U.S.C. 325(d) and determined, in the November 28, 2016 decision, that the patent owner did not provide any explanation of why the patent owner believed that the arguments were the same or substantially the same as those previously presented to the Office, as set forth in 35 U.S.C. 325(d): [16]

> The patent owner, however, does not argue that the same or substantially the same prior art or arguments previously were presented to the Office. In fact, the patent owner concedes that the request presents "newly cited references" . . . Furthermore, the patent owner does

[16] See page 4 of the November 28, 2016 petition decision.

> not provide any discussion regarding whether the arguments presented in the request are the same or substantially the same as those previously presented to the Office.

The patent owner also asserts that the Office took the position that "the discretionary provisions of 35 U.S.C. 325(d) do not apply unless the patent owner establishes that there is no substantial new question of patentability." Contrary to patent owner's assertions, however, the Office took no such position. The Office pointed out that while the determination under 35 U.S.C. 325(d) is discretionary, 35 U.S.C. 304 *requires* the Office to order reexamination if a substantial new question of patentability is raised by the request. This was not to say that 35 U.S.C. 304 "does not permit the Office to deny a request for reexamination pursuant to 35 U.S.C. 325(d)" when a substantial new question of patentability is found, contrary to patent owner's assertions. Rather, the Office intended to point out that the patent owner, in addition to omitting an explanation of patent owner's position regarding a discretionary determination by the Office pursuant to 35 U.S.C. 325(d), also omitted any discussion of a determination under 35 U.S.C. 303(a) that the Office is required to make prior to the order for reexamination pursuant to 35 U.S.C. 304.[17] 35 U.S.C. 303(a) provides, in pertinent part (emphasis added):

> Within three months following the filing of a request for reexamination under the provisions of section 302, **the Director will determine whether a substantial new question of patentability affecting any claim of the patent concerned is raised by the request**.

35 U.S.C. 304 requires the Office to issue an order granting reexamination in an *ex parte* reexamination proceeding if the Office determines that a substantial new question of patentability affecting any claim of the patent is raised by the reexamination request. 35 U.S.C. 325(d) was promulgated after the enactment of 35 U.S.C. 304. For this reason, the Office considers the provisions of 35 U.S.C. 325(d), taken together with the provisions of 35 U.S.C. 304, as permitting the Office to exercise its discretion and issue an order denying reexamination on the basis that the same or substantially the same prior art or arguments previously were presented to the Office, even if a substantial new question of patentability is determined to be raised by the request.

In the present case, the Office reviewed the record and declined to exercise its discretion and reject the request under 35 U.S.C. 325(d), in view of the evidence in the record of the asserted

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[17] The Office treated patent owner's original September 30, 2016 petition as a petition to vacate the order, which is filed *after* the order for reexamination. Patent owner's original petition was treated in the same manner as a petition alleging that the reexamination order is *ultra vires,* i.e., the Office was not authorized under 35 U.S.C. 304 to order reexamination because no substantial new question of patentability is raised by the request. See MPEP 2246, subsection II. In order to challenge the order for reexamination, such a petition addresses whether a substantial new question of patentability is raised by the request. Because the Office treated patent owner's original petition in the same manner as a petition alleging that the reexamination order was *ultra vires,* the Office was pointing out that the patent owner not only failed to provide a *specific* basis under 35 U.S.C. 325(d) to reject the request, but also did not provide a *specific* basis to vacate the order as *ultra vires* by showing that no substantial new question of patentability was raised by the request, pursuant to 35 U.S.C. 303(a) and 35 U.S.C. 304. In other words, the patent owner could have provided at least one of the following: i) a specific basis under 35 U.S.C. 325(d) to reject the request; and/or ii) a specific basis under 35 U.S.C. 303(a) and 35 U.S.C. 304 to vacate the order. Neither was provided.

unpatentability of claim 21. 35 U.S.C. 325(d) does not *require* the Office to reject the request. As a result, reexamination was ordered on October 17, 2016.

CONCLUSION

- Patent owner's June 8, 2017 petition under 37 CFR 1.181(a)(3) to vacate the May 3, 2017 Office action is **dismissed**.

- Patent owner's June 8, 2017 petition under 37 CFR 1.182 requesting the Office to exercise its discretion pursuant to 35 U.S.C. 325(d) is **dismissed**.

- The present proceeding is being forwarded to the Central Reexamination Unit to continue prosecution.

- Any inquiry concerning this communication should be directed to the undersigned at (571) 272-7724.

/Cynthia L. Nessler/

Cynthia L. Nessler
Senior Legal Advisor
Office of Patent Legal Administration

June 15, 2017

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In *Ex Parte* Reexamination of	:	Group Art Unit: 3992
Gordon F. BREMER	:	
Patent No.: 8,457,228 B2	:	Control No.: 90/013,809
Issued: June 4, 2013	:	

Reexam Request Filed: September 12, 2016

For: SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS

Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBMISSION PURSUANT TO 37 C.F.R. § 1.565(A)

Pursuant to 37 C.F.R. § 1.565(a), Patent Owner Rembrandt respectfully submits a copy of the District Court's Order Granting Stipulated Motion for Dismissal (attached as Exhibit A) for prompt entry into the record of the reexamination file. The Order resolves all issues between Rembrandt and Samsung in *Rembrandt Wireless Techs., LP, v. Samsung Elecs. Co., Ltd.*, C.A. No. 2:16-CV-00170-JRG (E.D. Tex. August 30, 2018)) involves U.S. Patent No. 8,457,228.

Any fee required for this submission may be charged to Counsel's Deposit Account Number 02-2135.

Respectfully submitted,

Date: August 31, 2018 By: /Michael V. Battaglia/

Michael V. Battaglia, Reg. No. 64,932
ROTHWELL, FIGG, ERNST & MANBECK, P.C.
607 14th Street, N.W., Suite 800
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Attorney for Petitioner
Rembrandt Wireless Technologies, LP

cc: Nancy J. Linck, Ph.D.
Counsel for Rembrandt Wireless Technologies, LP

CERTIFICATE OF SERVICE

It is hereby certified that on this 31st day of August, 2018, the foregoing **SUBMISSION PURSUANT TO 37 C.F.R. § 1.565(A)** was served, by first-class U.S. Mail, on the attorney of record for the third-party Requesters Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc., at the following address:

J. Steven Baughman, Esq.
Ropes & Gray LLP
IPRM – Floor 43
Prudential Tower
800 Boylston Street
Boston, Massachusetts 02199-3600
Phone: 202-508-4606
Facsimile: 202-383-8371

/Michael V. Battaglia/
Michael V. Battaglia
Reg. No. 64,932

cc: Nancy J. Linck, Ph.D.
Counsel for Rembrandt Wireless Technologies, LP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In *Ex Parte* Reexamination of	:	Group Art Unit: 3992
Gordon F. BREMER	:	
Patent No.: 8,457,228 B2	:	Control No.: 90/013,809
Issued: June 4, 2013	:	

Reexam Request Filed: September 12, 2016

For: SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS

Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

STATUS INQUIRY

Patent Owner Rembrandt respectfully seeks information regarding the status of Reexamination 90/013809 ('809 Reexam), a reexamination of U.S. Patent No. 8,457,228 ('228 Patent). On August 14, 2017, Rembrandt timely submitted its Response to a May 3, 2017 non-final Office action. In spite of more than one year passing, Rembrandt has not received any further action from the Office. Given the requirement for special dispatch in reexaminations, the more than one-year time period seems excessive. Thus, Rembrandt seeks information regarding this delay.

Rembrandt notes that the '228 Patent has been the subject of third party Samsung's challenges since June 4, 2014 – for over four years – first through seven IPRs and now in the '809 Reexam. During this time period, the underlying litigation, *Rembrandt Wireless Techs., LP, v. Samsung Elecs. Co., Ltd.*, C.A. No. 2:16-CV-00170-JRG (E.D. Tex. August 30, 2018) was

decided by a jury in Rembrandt's favor, appealed to the Federal Circuit and affirmed, and has now been finally concluded as to all issues in the litigation. See the District Court Order in this case (Exhibit A). See also Exhibit B (a timeline of events related to this inquiry).

Rembrandt further notes that '809 Patent's term will expire in less than four months, i.e., on December 5, 2018. Given that the '228 Patent did not issue until June 4, 2013, it has been the subject of post-grant review for most of its enforceable life.

Please respond to this inquiry promptly, and let Rembrandt know when it can expect further action from the Office.

Any fee required for this submission may be charged to Counsel's Deposit Account Number 02-2135.

Respectfully submitted,

Date: August 31, 2018 By: /Michael V. Battaglia/

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/Michael V. Battaglia/
Michael V. Battaglia
Reg. No. 64,932

cc: Nancy J. Linck, Ph.D.
Counsel for Rembrandt Wireless Technologies, LP

Electronic Acknowledgement Receipt

EFS ID:	33605140
Application Number:	90013809
International Application Number:	
Confirmation Number:	7821
Title of Invention:	SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS
First Named Inventor/Applicant Name:	8457228
Customer Number:	6449
Filer:	Michael Vincent Battaglia/Keiko Shelton
Filer Authorized By:	Michael Vincent Battaglia
Attorney Docket Number:	3277-0114US-RXM2
Receipt Date:	31-AUG-2018
Filing Date:	12-SEP-2016
Time Stamp:	16:10:04
Application Type:	Reexam (Patent Owner)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	submission.pdf	106787 73653cc22501116bf28ba86f26058d5ab4e768f2	no	3

Warnings:

Information:					
2	Miscellaneous Incoming Letter	Exhibit_A.pdf	146303 ce28c7c5bd3a44df57fddb9de1810366fc61f54b	no	2
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	status_inquiry.pdf	106227 f0ca1734a22ac1d4ac401651ae2d3be32df852a7	no	3
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	status_inquiry_Exhibit_A.pdf	146337 9ae666a6c79fcbf505170f8bf22ac434e44ddd5d	no	2
Warnings:					
Information:					
5	Miscellaneous Incoming Letter	status_inquiry_Exhibit_B.pdf	140708 28b90641fbca520df71a3be827cba278c0f417d9	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	646362		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (02-18)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	90013809
Filing Date	2016-09-12
First Named Inventor	Bremer (U.S. Patent No. 8,457,228)
Art Unit	3992
Examiner Name	Scott L. WEAVER
Attorney Docket Number	3277-114US-RXM2

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4630286		1986-12-16	Betts	
	2	5436901		1995-07-25	Koopman	
	3	5450404		1995-09-12	Koopman et al.	
	4	5450456		1995-09-12	Mueller	
	5	5535212		1996-07-09	Koopman et al.	
	6	5537398		1996-07-16	Siwiak	
	7	5574910		1996-11-12	Bialkowski et al.	
	8	5706428		1998-01-06	Boer et al.	

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	9	5809060	B1	1998-09-15	Cafarella et al.	
	10	6208663	B1	2001-03-27	Schramm et al.	
	11	6614838	B1	2003-09-02	Bremer	
	12	8023580	B2	2011-09-20	Bremer	
	13	8457228	B2	2013-06-04	Bremer	
	14	3958191		1976-05-18	Jones, Jr.	
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	20	4807253		1989-02-21	Haganauer	
	21	4833696		1989-05-23	Ichiyoshi	
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	23	5008879		1991-04-16	Fischer et al.	
	24	5010546		1991-04-23	Kato	
	25	5014345		1991-05-07	Comroe et al.	
	26	5103448		1992-04-07	Barnes et al.	
	27	5229992		1993-07-20	Jurkevich et al.	
	28	5289476		1994-02-22	Johnson et al.	
	29	5345439		1994-09-06	Marston	
	30	5347542		1994-09-13	Kurby et al.	

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	31	5363408		1994-11-08	Paik et al.	
	32	5369637		1994-11-29	Richardson	
	33	5394259		1995-02-28	Takahara	
	34	5438686		1994-08-01	Gehri	
	35	5533069		1996-07-02	Fleek	
	36	5535229		1996-07-09	Hain, Jr., et al.	
	37	5584057		1996-12-10	Dent	
	38	5592480		1997-01-07	Carney	
	39	5602669		1997-02-11	Chaki	
	40	5615297		1997-03-25	Davis	
	41	5649295		1997-07-15	Shober et al.	

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	Attorney Docket Number	3277-114US-RXM2

	42	5657317		1997-08-12	Mahany et al.	
	43	5673031		1997-09-30	Meier	
	44	5675611		1997-10-07	Lehtinen et al.	
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	49	5734965		1998-03-31	Kersken et al.	
	50	5757813		1998-05-26	Raith	
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	53	5818826		1998-10-06	Gfeller	
	54	5828695		1998-10-27	Webb	
	55	5845196		1998-12-01	Nawata	
	56	5854979		1998-12-29	Iwajima	
	57	5909469		1999-06-01	Frodigh et al.	
	58	5926500		1999-07-20	Odenwald	
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	60	6104333		2000-08-15	Wood, Jr.	
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	64	6456627		2002-09-24	Frodigh et al.	
	65	6463107		2002-10-08	Lindoff	
	66	5088111		1992-02-11	McNamara et al.	
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	69	8023580		2011-09-20	Bremer	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]

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	1	1081848	CA		1980-07-15	Jones		
	2	2236686	CA		1998-11-29	Fernandez		
	3	0496427	EP	B1	1992-07-29	Kameya		
	4	0562875	EP	B1	1993-09-29	Mitsuaki		
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	6	0700175	EP	A3	1996-03-06	Kimura		
	7	0730251	EP	B1	1996-09-04	Matsubara		
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	10	0845916	EP	B1	1998-06-03	Billstroem		
	11	0869649	EP	B1	1998-10-07	Lauterbach		

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	12	S59113515	JP	A	1984-06-30	Taiji et al.		
	13	9603371A	MX	A	1997-03-29	Strich		
	14	198302379	WO	A1	1983-07-07	Wurzburg		
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	18	199628946	WO	A1	1996-09-16	Carney		
	19	199715131	WO	A3	1997-04-24	Raith		
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	21	199837713	WO	A3	1998-08-27	Labonte		
	22	199859254	WO	A1	1998-12-30	Schurig		

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NON-PATENT LITERATURE DOCUMENTS [Remove]

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1	P802.11 Draft Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification.	
	2	IEEE Std 802.11(Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications).	
	3	Proakis, John G. and Masoud, Salehi, Communication Systems Engineering ("Proakis I").	
	4	Proakis, John G. and Masoud, Salehi, Communication Systems Engineering ("Proakis II").	
	5	Gast, Matthew S., 802,11 Wireless Networks, The Definitive Guide.	
	6	Upender et al, "Communication Protocols for Embedded Systems," Embedded Systems Programming.	
	7	Data Network Evaluation Criteria Handbook, DOT/FAA/AR- 09/24 Final Report.	
	8	Upender, B. & Koopman, P., "Embedded Communication Protocol Options," Proceedings of Embedded Systems Conference 1993, Santa Clara.	
	9	Tanenbaum, A.S. COMPUTER NETWORKS, THIRD ED.	

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	10	D.K. Sharma, et al., "Analog & Digital Modulation Techniques: An Overview," TECHNIA- International Journal of Computing Science and Communication Technologies, vol. 3.	
	11	Lab-Volt, Pulse Modulation and Sampling (PAM/PWM/PPM), Telecommunications Communications Technologies, available at https://www.labvolt.com/downloads/cwa8087.	
	12	Ke-Lin Du & M.N.S. Swami, WIRELESS COMMUNICATION SYSTEMS: FROM RF SUBSYSTEMS TO 4G ENABLING TECHNOLOGIES.	
	13	Ue et al., "Symbol Rate and Modulation Level Controlled Adaptive Modulation/TDMA/TDD for Personal Communication Systems, 1995 IEEE 45th Vehicular Technology Conference, Vol. 1.	
	14	PR Newswire, Bell Labs Unveils 10-Megabit Wirless-Network Technology, Offering Five Times Today's Highest Data-Transmissions Capacity.	
	15	Amundsen, IEEE 802.11 Wireless LAN draft Standard.	
	16	Brenner, A Technical Tutorial on the IEEE 802.11 Protocol.	
	17	Jensen et al., Modeling and Analysis of a Collision Avoidance Protocol using SPIN and UPPAAL, BRICS, RS-96-24.	
	18	Hayes, et al., 802.11 Tutorial IEEE P802.11-96/49 (A-E).	
	19	Otsuki et al., Modulation Level Controlled Adaptive Modulation Systems with Base-Station-Based Transmission/ Reception Diversity Scheme for Personal Communications.	
	20	Sampei and Sunaga, Rayleigh Fading Compensation for QAM in Land Mobile Radio Communications, IEEE Transactions on Vehicular Technology, Vol. 42.	

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	21	Tasaka, Performance Analysis of Multiple Access Protocols.	
	22	ETSI, The ETSI HIPERLAN Standard ("HIPPERLAN") & Amendment.	
	23	P802.11D3.0 Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification.	
	24	Crow et al., Investigation of the IEEE 802.11 Medium Access Control (MAC) Sublayer Functions.	
	25	Chhaya et al., Performance of asynchronous data transfer methods of IEEE 802.11 MAC protocol.	
	26	LaMaire, et al., Wireless LANs and mobile networking: standards and future directions.	
	27	Johnson et al., Standards for wireless LANs.	
	28	The Editors of IEEE 802.11, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications (Draft Standard IEEE 802.11 - P802.11D1.1).	
	29	Hayes, IEEE 802.11 Document Order Form.	
	30	Kamerman et al., WaveLAN®-II: A High Performance Wireless LAN for the Unlicensed Band.	
	31	WaveLAN® IEEE 802.11 OEM PC Card, Lucent Technologies.	

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	Art Unit	3992
	Examiner Name	Scott L. WEAVER
	Attorney Docket Number	3277-114US-RXM2

	32	'Lucent Technologies' New IEEE 802.11 Compliant WaveLan(R) Family Sets the Standard in Reliability, Efficiency for Wireless LANs."

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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	Art Unit	3992
	Examiner Name	Scott L. WEAVER
	Attorney Docket Number	3277-114US-RXM2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Michael V. Battaglia/	Date (YYYY-MM-DD)	2018-09-05
Name/Print	Michael V. Battaglia	Registration Number	64,932

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	33633701
Application Number:	90013809
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Confirmation Number:	7821
Title of Invention:	SYSTEM AND METHOD OF COMMUNICATION USING AT LEAST TWO MODULATION METHODS
First Named Inventor/Applicant Name:	8457228
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	22_A.pdf	10804805 360c8f04f9ed9b1d6926689b6fc472508e760cee	no	112

Warnings:

Information:					
2	Non Patent Literature	22_B.pdf	1643633 c915a870dc1ffa797b8705b968bd7716a9e4befe	no	21
Warnings:					
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3	Non Patent Literature	23_Part1.pdf	25097567 79a162a562c0567203b5895176252f86bb2641f0	no	224
Warnings:					
Information:					
4	Non Patent Literature	23_Part2.pdf	5003241 c5fb9b2d937132e9773f79a68a240d4107f92daf	no	45
Warnings:					
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5	Non Patent Literature	24.pdf	1953518 0958deaac13c471dc073b126f538b38a05cd2844	no	8
Warnings:					
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6	Non Patent Literature	25.pdf	2472170 0cd8e2dc5c2cbf14cbb5bd7ec9fd7fec8d526b87	no	8
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7	Non Patent Literature	26.pdf	2489178 7051ccd207bb4fc1741be57c495c44e34442eb96	no	9
Warnings:					
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8	Non Patent Literature	27.pdf	919923 fc00e8c1c244391828e6d8cb6624af25d4f1af97	no	5
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9	Non Patent Literature	28_Part1.pdf	25076974 4e3f167bbac78ef0524d1ea1201fc3a77bf65fb1	no	282
Warnings:					
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10	Non Patent Literature	28_Part2.pdf	1599489 e15ae700adf2f3bc0a5bcd265431eed69e31983b	no	18
Warnings:					
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11	Non Patent Literature	29.pdf	178723 c1b70a2a89ed31ade1734fe708e50d12ab9aa5e3	no	2
Warnings:					
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12	Non Patent Literature	30.pdf	3277207 2186a2fbe8a203707c3715f7e7932cc0ebf83c7b	no	16
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13	Non Patent Literature	31.pdf	689731 9d6c00019963eef90e43e8664accf19f0fde0476	no	4
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15	Information Disclosure Statement (IDS) Form (SB08)	SB08.pdf	1011075 59700b439a14ed092470fb53e6ddcaf9432a2540	no	15
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16	Reexam Certificate of Service	certificate_of_service.pdf	97320 e102e723a4d89ae5303f4586956e078a518ca9f4	no	1

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(19) (CA) **CANADIAN PATENT** (12)

(54) MULTI-LINE, MULTI-MODE MODULATOR USING BANDWIDTH REDUCTION FOR DIGITAL FSK AND DPSK MODULATION

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U.S.A.

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MULTI-LINE, MULTI-MODE MODULATOR USING BANDWIDTH REDUCTION FOR DIGITAL FSK AND DPSK MODULATION

Abstract

A multi-line multi-mode modulator uses compatible digital modulation techniques for multifrequency (MF), frequency shift keyed (FSK) and differential phase shift keyed (DPSK) modulation to achieve a multi-line multi-mode modulator which is capable of handling a plurality of lines requiring a dynamic mix of the three modulation techniques. The compatible modulation techniques utilize bandwidth reduction schemes which enable the use of simple RC filters on each output line for the sole purpose of removing the quantizing noise introduced by the digital modulation technique.

Field of the Invention

The invention relates to modulators in general and more particularly to novel modulators which directly provide a reduced bandwidth modulated signal and to a multi-line multi-mode modulator capable of simultaneously, on a time shared basis, modulating mutli-frequency, frequency shift keyed and differential phase shift keyed signals from a plurality of sources for transmission over a plurality of lines.

Summary of the Invention

The invention is directed to novel digital FSK and DPSK modulators which are compatible with each other and which produce at their output modulated signals in which out of band energy is reduced thus eliminating the need of any filtering except for simple RC filters for removing quantizing noise introduced by the digital modulation used. These modulators are combined in a novel multi-line multi-mode modulator which is capable of dynamically providing a wide variety of signal modulations on a large number of lines with a substantial reduction of equipment and cost.

Brief Description of the Drawings

Fig. 1 is a schematic diagram of a prior art digital FSK modulator;

Figs. 1A, 1B and 1C are graphs illustrating the signals present at several points in the circuit of Fig. 1;

Fig. 2 is a schematic diagram of a novel FSK modulator according to the invention;

Fig. 2A is a graph for illustrating the operation of the modulator illustrated in Fig. 2;

Fig. 3 is a table showing the relationship between the selection signals applied to the address generator of Fig. 2 and the read only memory contents;

Fig. 4 is a schematic diagram of a novel DPSK modulator according to the invention;

Figs. 4A, 4B and 4C are graphs for illustrating the operation of the modulator shown in Fig. 4;

Fig. 5 is a table showing the relationship between the selection signals applied to the address generator of Fig. 4 and the read only memory contents;

Fig. 6 is a schematic diagram of a multifrequency modulator constructed in accordance with the prior art;

Fig. 7 is a table showing the relationship between the selection signals applied to the address generator of Fig. 6 and the read only memory contents;

Fig. 8 is a block diagram of a novel multiline multimode modulator constructed in accordance with the invention;

Fig. 9 is a schematic diagram, in greater detail, of the clock and line control word memory unit illustrated in Fig. 8; and

Fig. 10 is a schematic block diagram of the novel modulator illustrated in Fig. 8.

Description of the Prior Art

A technique in current use permits the digital synthesis of a sinusoidal wave by directly computing phase angle and performing a phase to amplitude translation by means of a table look-up of previously computed digital values. The digital values may then be converted to analog form by conventional digital to analog conversion techniques. This general digital technique of tone synthesis has been specifically applied to digitally implemented frequency and phase shift keyed modulators. Such a prior art frequency shift keyed modulator is illustrated in Fig. 1. In Fig. 1, a memory 11 contains two values $\Delta\theta 0$ and $\Delta\theta 1$. These digital values represent increments of phase of two waves $\sin\theta 0$ and $\sin\theta 1$ used to represent in analog form the binary 0 and 1 data. The input data is applied to a controller 12 which selects, via a switch 14, $\Delta\theta 0$ or $\Delta\theta 1$ depending on the input data applied. This is shown in Fig. 1A for a serial input data pattern of (010).

The selected value of $\Delta\theta$ is applied via a gate 15, under control of a clock 16 at a frequency fs, to one input of an adder 17 which adds this value to the contents of a buffer 18 which is connected to the output of adder 17. The output of adder 17 is illustrated in Fig. 1B. The output of adder 17 is applied to a read only memory 19 which accepts the digital phase of $\theta(t)$ and by table look up provides a digital amplitude signal $\sin\theta(t)$. This signal is applied to a digital to analog converter 20 which supplies a signal to a filter 21 (Fig. 1C).

The filter 21 is, of necessity, a complex filter since the signal from the modulator includes significant out of band energy introduced by the step-like frequency shifts. In addition, the characteristics of filter 21 must be modified to take into account the specific frequencies used to transmit the binary 1 and 0 values