UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

KAIFI LLC, Plaintiff, vs. AMAZON.COM, INC.; AMAZON.COM SERVICES LLC; and AMAZON WEB SERVICES, INC., Defendants.	Case No. 2:24-cv-00542

DEFENDANTS' INITIAL INVALIDITY CONTENTIONS AND ADDITIONAL DISCLOSURES PURSUANT TO LOCAL PATENT RULES FOR U.S. PATENT NO. 8,040,232

IPR2025-00624
Amazon v. KAIFI
Kaifi Ex. 2001

I. INTRODUCTION

Pursuant to the Court's Discovery Order (Dkt. No. 39), the Court's Docket Control Order (Dkt. No. 37), this District's Patent Local Rules, and Plaintiff KAIFI LLC's ("KAIFI") Initial Infringement Contentions (served November 14, 2024), Defendants Amazon.com, Inc., Amazon.com Services LLC, and Amazon Web Services, Inc. (collectively, "Defendants" or "Amazon") submit the following Initial Invalidity Contentions and additional disclosures relative to U.S. Patent No. 8,040,232 (the "'232 Patent"), claims 1-12 (the claims alleged by KAIFI to be infringed).

KAIFI's Initial Infringement Contentions are deemed to be its final contentions pursuant to Patent Local Rule 3-6. Should KAIFI later amend its asserted claims, or supplement its Initial Infringement Contentions with additional infringement theories with respect to the asserted claims (by Court order or otherwise), Defendants reserve the right to supplement their Initial Invalidity Contentions to assert invalidity of those additional claims and/or to assert invalidity based on the additional infringement theories advanced by KAIFI. Defendants also reserve the right to supplement their Initial Invalidity Contentions in response to information learned in fact or expert discovery, including identification of additional prior art.

These Initial Invalidity Contentions are also submitted in compliance with and in satisfaction of the notice requirements of 35 U.S.C. § 282(c).

II. PRELIMINARY MATTERS

Defendants' Initial Invalidity Contentions are based in whole or in part on its present understanding of the asserted claims and KAIFI's Initial Infringement Contentions, including the priority date of December 26, 2006 for the '232 Patent as asserted by KAIFI in its Initial Infringement Contentions. That said, Defendants dispute that the asserted claims of the '232

Patent are entitled to the priority dates that KAIFI has asserted in its infringement contentions, including because the ’232 Patent is lacking in written description and enablement, as discussed below.

Defendants’ Initial Invalidity Contentions as to the ’232 Patent are responsive at least to the same level of specificity as KAIFI’s Initial Infringement Contentions. Defendants’ Initial Invalidity Contentions may also take into account KAIFI’s apparent claim constructions, to the extent KAIFI’s constructions can be gleaned from KAIFI’s Initial Infringement Contentions or other allegations. Such apparent constructions may be inconsistent with the constructions that Defendants ultimately will proffer in this case. By including prior art that would anticipate or render obvious the asserted claims of the patents-in-suit based on KAIFI’s apparent or disclosed claim constructions, or based on any other particular claim construction, Defendants are not adopting KAIFI’s claim constructions, nor are Defendants admitting to the accuracy of any particular claim construction. Solely for the purpose of these Initial Invalidity Contentions, Defendants may, if necessary, apply alternative, and even inconsistent, claim construction positions. Defendants reserve all rights to further amend these Initial Invalidity Contentions after the Court issues its claim construction ruling, or if the Court permits KAIFI to amend its Initial Infringement Contentions.

Defendants, however, do not concede that KAIFI’s Initial Infringement Contentions provide the requisite level of specificity. On the contrary, it is Defendants’ position that KAIFI’s Initial Infringement Contentions are deficient and fail to comply with the Court’s Docket Control Order, the Local and Patent Rules of the Eastern District of Texas, and/or the Federal Rules of Civil Procedure, including for the reasons identified by Defendants in their letter to KAIFI dated November 25, 2024. Defendants therefore provide these Initial Invalidity Contentions without

waiving any right to receive from KAIFI full and complete specific infringement contentions. Moreover, nothing herein admits in any way that any of the accused devices or methods, or any of Defendant's other devices or methods, infringe any of the asserted claims.

A. Ongoing Investigation

Defendants' discovery and investigation in connection with this lawsuit are continuing. Thus, these Initial Invalidity Contentions are based on information obtained to date. Among other things, discovery is still underway, witnesses remain to be deposed, and the Court has not yet construed any terms of the patents-in-suit. Accordingly, Defendants' Initial Invalidity Contentions are subject to modification, amendment, or supplementation in accordance with the Court's Docket Control Order, the Local and Patent Rules of the Eastern District of Texas, and/or the Federal Rules of Civil Procedure as this action progresses and additional information is obtained.

III. DISCLOSURES PURSUANT TO P.R. 3-3

A. Disclosures Pursuant to P.R. 3-3(a)

Defendants identify the following prior art to the '232 Patent. Defendants contend that the prior art disclosed below relates generally to systems with sensor networks. As such, the below-disclosed prior art, collectively, are all relevant at least as background of the art to the '232 Patent, irrespective of the sub-section(s) in which they are expressly cited. Defendants expressly reserve the right to at least use and rely on any of the prior art cited herein to establish or otherwise support Defendants' contentions as to what was known in the state of the art during the pertinent time frame for the patents-in-suit.

1. Prior Art Patents and Published Patent Applications

The following prior art patents and published patent applications are relevant to the invalidity of '232 Patent:

Reference	Number	Origin	Title	Inventor(s)	Date of Issue or Publication
Garg '114	6789114 B1	US	Methods and Apparatus for Managing Middleware Service in a Distributed System	Garg, et al.	September 7, 2004
Ginter '240	2008/0120240	US	Trusted Infrastructure Support Systems, Methods and Techniques for Secure Electronic Commerce, Electronic Transactions, Commerce Process Control and Automation, Distributed Computing and Rights Managements	Ginter, et al.	May 22, 2008 (claims priority to applications filed Apr. 26, 2006 and Feb. 13, 1995)
Sarma '386	20100174386 A1	US	Method and Apparatus for Routing Data in an Automatic Identification System	Sarma, et al.	July 8, 2010 (claims priority to application filed Jan. 30, 2004)
Park '870	20070073870	US	User Interface Apparatus for Context-Aware Environments, Device Controlling Apparatus and Method Thereof	Park	March 9, 2007 (application filed Dec. 29, 2005)
Seung-min '518	20060068518A	KR	The context aware system and its method with ubiquitous sensor network	Seung-min	June 21, 2006
Kim '791	7825791 B2	US	Distributional Alert System for Disaster Prevention Utilizing Ubiquitous Sensor Network	Kim	November 2, 2010 (application filed Nov. 9, 2006)
Park '905	2006/0149905 A1	US	Service system for providing context information based on ubiquitous sensor network and method thereof	Park	July 6, 2006

Reference	Number	Origin	Title	Inventor(s)	Date of Issue or Publication
Amar '601	2528601A1	FR	Method for monitoring a site to be protected and monitoring installation implementing this method.	Amar	December 24, 1982
Southworth '923	2206923	US	Short Wave Radio System	Southworth	July 9, 1940
Chapin '753	2826753	US	Object Detectors	Chapin	March 11, 1958
Pulkkinen ’733	2002/0165733 A1	US	Method and system for detecting variances in a tracking environment	Pulkkinen *et al.*	November 7, 2002
Markham ’795	2003/0158795 A1	US	Quality Management and Intelligent Manufacturing with Labels and Smart Tags in Event-based Product Manufacturing	Markham *et al.*	August 21, 2003
Saylor '340	6661340B1	US	Systems and method for connecting security systems to a wireless device	Saylor	December 9, 2003
Bamberger '627	7085627B2	US	Integrated System for Controlling Lights and Shades	Bamberger	August 1, 2006
Pope '558	7495558B2	US	Shelf-life Monitoring Sensor-transponder System	Pope, et al.	February 4, 2009 (issued from application filed Apr. 22, 2005)
Pulkkinen '733	20020164733A1	US	Method and System for Detecting Variances in a Tracking Environment	Pulkkinen	November 7, 2002

Reference	Number	Origin	Title	Inventor(s)	Date of Issue or Publication
Markham '795	20030158795A1	US	Quality Management and Intelligent Manufacturing with Labels and Smart Tags in Event-based Product Manufacturing	Markham	August 21, 2003
Govind '517	20070273517A1	US	Apparatus and Method for Integrated Healthcare Management	Govind	November 29, 2007 (application filed May 26, 2006)
Reynolds '030	2004/080030A1	WO	System and Method for Publish/Subscribe Messaging	Reynolds, et al.	September 16, 2004
Chul '806	20060032806A	KR	Epic Assigned RFID Tag For Mobile Terminal, And Method Of Providing Charging Service Using It	Chul	April 18, 2006
Ki '672	20060072672A	KR	System and method of performing context awareness	Ki	June 28, 2006
Song '199	7,730,199 B2	US	Method and system of processing a data stream	Song	June 1, 2010 (claims priority to application filed May 11, 2006)
Jakobson '811	20050222811A1	US	Method and Apparatus for Context-Sensitive Event Correlation with External Control in Situation-Based Management	Jakobson	October 6, 2005
Kim '571	2006/0190571 A1	US	Service framework for home network	Kim	August 24, 2006
Sweeney '444	20060082444A1	US	Management System for Enhanced RFID System Performance	Sweeney	April 20, 2006

Reference	Number	Origin	Title	Inventor(s)	Date of Issue or Publication
Pandey ’786	8,364,786	US	Synthesizing a scalable and incrementally updatable system software infrastructure for sensor networks	Pandey *et al.*	January 29, 2013 (application filed Jan. 19, 2006)

2. Non-Patent Prior Art Publications

The following non-patent prior art publications are relevant to the invalidity of the asserted claims of the ’232 Patent:

Reference	Title	Author	Publication Date	Publisher
Malan 2004	Codeblue: An Ad Hoc Sensor Network Infrastructure For Emergency Medical Care	Malan	January 2004	Division of Engineering and Applied Sciences Harvard University, School of Medicine Boston University
Shnayder 2005	Sensor Networks For Medical Care	Shnayder	November 2, 2005	Division of Engineering and Applied Sciences Harvard University
Kim 2005	Sensor Network Middleware Technology	Dae-Young	2005	Korea Advanced Institute of Science & Technology
Ahamed 2004	Towards Developing Sensor Networks Monitoring As A Middleware Service	Ahamed	August 15, 2004	Institute of Electrical and Electronics Engineers

Reference	Title	Author	Publication Date	Publisher
Alex 2004	Midfusion: Middleware For Information Fusion In Sensor Network Applications	Alex	July 14, 2005	Institute of Electrical and Electronics Engineers
Brumitt 2000	Easyliving: Technologies For Intelligent Environments	Brumitt	September 25, 2000	HUC '00: Proceedings of the 2nd international symposium on Handheld and Ubiquitous Computing
Shi 2002	A Design Of Bridge Structure Health Monitoring And Management System Based On Three-dimensional GIS Model	Shi	Dec. 6, 2002	Advances in Building Technology Elsevier Science
Souto 2004	A Message-oriented Middleware For Sensor Networks	Souto	October 18, 2004	MPAC '04: Proceedings of the 2nd workshop on Middleware for pervasive and ad-hoc computing
Grimm 2004	System Support For Pervasive Applications	Grimm	November 1, 2004	ACM Transactions on Computer Systems
Hadim 2006	Middleware: Middleware Challenges And Approaches For Wireless Sensor Networks	Hadim	March 1, 2006	Institute of Electrical and Electronics Engineers
Heinzelman 2004	Middleware To Support Sensor Network Applications	Heinzelman	January 1, 2004	Institute of Electrical and Electronics Engineers

Reference	Title	Author	Publication Date	Publisher
Hernandez 2002	Object-oriented Technology	Hernandez	January 6, 2002	Springer, Berlin
Kim 2003	SAFE: A Data Dissemination Protocol For Periodic Updates To Sensor Networks	Kim	June 11, 2003	Institute of Electrical and Electronics Engineers
Liu 2003	Impala: A Middleware System For Managing Autonomic Parallel Sensor Systems	Liu	June 11, 2003	SIGPLAN Notices (ACM Special Interest Group on Programming Languages)
Molla 2006	A Survey For Middleware For Sensor Network And Challenges	Molla	September 11, 2006	Institute of Electrical and Electronics Engineers
Román 2002	Application Mobility In Active Spaces	Román	December 11, 2002	University of Illinois at Urbana-Champaign
Román 2002	A Distributed Object-oriented Application Framework For Ubiquitous Computing Environments	Román	August 1, 2002	University of Illinois at Urbana-Champaign
Román 2002	Gaia: A Middleware Platform For Active Spaces	Román	October 1, 2002	ACM SIGMOBILE Mobile Computing and Communications Review
Román 2002	A Middleware Infrastructure For Active Spaces	Román	October 1, 2002	Institute of Electrical and Electronics Engineers
Román 2002	A User-Centric, Resource-Aware, Context-Sensitive, Multi-	Román	July 2002	University of Illinois at

Reference	Title	Author	Publication Date	Publisher
	Device Application Framework for Ubiquitous Computing Environments			Urbana-Champaign, CS Technical Report UIUCDCS
Verissimo 2002	CORTEX: Towards Supporting Autonomous and Cooperating Sentient Entities	Verissimo	February 26, 2002	Proceedings of European Wireless 2002
Wang 2006	Middleware For Real-time Measurement And Control Systems	Wang	April 30, 2006	Institute of Electrical and Electronics Engineers Instrumentation & Measurement Magazine
Li 2004	Event Detection Services Using Data Service Middleware In Distributed Sensor Networks	Li	June 1, 2004	Springer, Berlin
Cerpa 2001	Habitat Monitoring: Application Driver For Wireless Communications Technology	Cerpa	April 1, 2001	ACM SIGCOMM Computer Communication Review
Hadim 2006	Middleware For Wireless Sensor Networks: A Survey	Hadim	August 7, 2006	Institute of Electrical and Electronics Engineers
Zhang 2005	Sensor Data Management In Bridge Health Monitoring Systems	Zhang	May 10, 2005	Dissertation for Southern Illinois University of Carbondale
SAG Meeting 2003	PML Service Working Group Software Action Group Meeting	PML Service Working Group	May 1, 2003	PML Service Working Group
Haller 2002	White Paper - The Need For A Universal Smartsensor Network	Haller	November 1, 2002	Auto-ID Centre

Reference	Title	Author	Publication Date	Publisher
Harrison 2003	White Paper - Development Of A Prototype PML Server For An Auto-id enabled Robotic Manufacturing Environment	Harrison	February 1, 2003	Auto-ID Centre
Harrison 2003	White Paper - PML Server Developments	Harrison	June 1, 2003	Auto-ID Centre
Harrison 2003	White Paper - EPC™ Information Service – Data Model And Queries	Harrison	October 1, 2003	Auto-ID Centre
Chokshi 2004	White Paper - Routes For Integrating Auto-id Systems Into Manufacturing Control Middleware Environments	Chokshi	October 1, 2003	Auto-ID Centre
EPCGlobal 2004	EPC Information Service 1.0	Mealling	November 16, 2004	VeriSign, Inc.
Auto-ID Labs 2005	PML - EPCIS - Middleware (Savant)	Mealling	January 12, 2004	Auto-ID Labs
EPCGlobal 2004	Software Action Group Filtering And Collection WG Charter	Traub	February 14, 2004	EPCGlobal
Floerkemeier 2006	Infrastructure Support For RFID Systems	Floerkemeier	2006	ETH Zurich
Foley 1999	An Infrastructure For Electromechanical Appliances On The Internet	Foley	July 15, 1999	Massachusetts Institute of Technology
Foley 2007	Security Approaches For Radio Frequency Identification Systems	Foley	February 1, 2007	Massachusetts Institute of Technology
Auto-ID Center 2002 – Version 0.1	Technical Manual - The Savant Version 0.1 (Alpha)	Auto-ID Center	February 1, 2002	Auto-ID Center

Reference	Title	Author	Publication Date	Publisher
Auto-ID Center 2002 – Physical Mark-Up	Technical Memo - Physical Mark-up Language Update	Floerkemeier	June 1, 2002	Auto-ID Center
Auto-ID Center 2003 – Savant Guide	Technical Report - Savant™ Guide	Goyal	April 2003	Auto-ID Center
Floerkemeier 2003	Core Physical Mark-up Language - Draft	Floerkemeier	January 30, 2003	Dept of Computer Science ETH Zurich, Switzerland
Floerkemeier 2002	PML Development Requirements Of The Physical Mark-up Language (Pml) version <0.5>	Floerkemeier	August 21, 2002	Auto-ID Center
Auto-ID Center – 2004	The Savant Who's That	Auto-ID Center	2004	Auto-ID Center
Yu 2005	Auto-configuration Of Savants In A Complex, Variable Network	Yu	May 19, 2005	Massachusetts Institute of Technology
Waldrop 2001	Local Control In A Distributed Automated Identification Environment	Waldrop III	February 4, 2001	Massachusetts Institute of Technology
Rehling 2003	Standard Reader/Savant API, Filters & Counters	Rehling	April 29, 2003	Auto-ID Center
Engels 2002	The Networked Physical World: An Automated Identification Architecture	Engels	August 7, 2002	Institute of Electrical and Electronics Engineers
EPCGlobal 2005	The Application Level Events (ALE) Specification, Version 1.0	Traub	January 10, 2005	EPCGlobal

Reference	Title	Author	Publication Date	Publisher
Clark 2003	Auto-ID Savant Specification 1.0	Clark	September 1, 2003	Auto-ID Center
Collins 2004	Microsoft Pilots RFID Middleware	Collins	January 27, 2004	RFID Journal
Man 2008	Checkpoint Systems To Acquire Oatsystems	Man	June 23, 2008	Consumer Goods Technology
Floerkemeier 2005	RFID Middleware Design-Addressing Both Application Needs And RFID Constraints	Floerkemeier	2005	GI Jahrestagung (I)
Floerkemeier 2005	RFID Middleware Design-Addressing Application Requirements And RFID Constraints	Floerkemeier	October 12, 2005	Association for Computing Machinery
Glover 2006	RFID Essentials	Glover	February 28, 2006	O'Reilly Media
Sarma 2000	The Networked Physical World: Proposals For Engineering The Next Generation Of Computing, Commerce And Automatic-identification	Sarma	October 1, 2000	Auto-ID Center
Kundapur 2000	On Integrating Physical Objects With The Internet	Kundapur	September 20, 2000	Massachusetts Institute of Technology
RFID Journal 2006	A Primer On Types Of RFID Middleware	Admin	August 9, 2006	RFID Journal
Savi 2005	Savi Smartchain Middleware Index	Savi	September 1, 2005	Savi.com
Savi 2005	Savi Smartchain References	Savi	June 4, 2004	Savi.com
Nelson 2004	Savi Technology Debuts First Quick, Complete And Cost Effective Compliance Solution	Nelson	September 30, 2004	Savi.com

Reference	Title	Author	Publication Date	Publisher
	For Suppliers Facing The Pentagon's Impending RFID Policy Deadline			
Menges 2005	Seeburger: Not Just Another RFID Middleware Company	Menges	March 14, 2005	RFID Solutions Online
Chawathe 2004	Managing RFID Data	Chawathe	August 31, 2004	VLDB Endowment
Tennyson 2001	Structural Health Monitoring Of Innovative Bridges In Canada With Fiber Optic Sensors	Tennyson	June 2001	ISIS Canada
Liu 2004	Implementing Software On Resource-constrained Mobile Sensors: Experiences With Impala And Zebranet	Liu	June 6, 2004	Association for Computing Machinery
Feng 2006	Study Of RFID Middleware For Distributed Large-scale Systems	Feng	October 16, 2006	Institute of Electrical and Electronics Engineers
Kim 2005	Technical Trend Of Sensor Network Operating System/Middleware	Kim	November 9, 2005	Information & Communication College of Korea
Tsetsos 2006	Towards Commercial Wireless Sensor Networks: business And Technology Architecture	Tsetsos	January 1, 2006	Old City Publishing, Inc.
Corba 2004	Common Object Request Broker Architecture: Core Specification	Corba	March 2004	Corba
Johanson 2002	The Interactive Project: Experiences With Ubiquitous Computing Rooms Version #2	Johanson	August 7, 2002	Institute of Electrical and Electronic Engineers
Polizzi 2004	RFID In The Enterprise	Polizzi	August 1, 2004	WCCN Publishing, Inc.

Reference	Title	Author	Publication Date	Publisher
Al-Muhtadi 2002	Routing Through The Mist: Privacy Preserving Communication In Ubiquitous Computing Environments	Al-Muhtadi	November 7, 2002	Institute of Electrical and Electronics Engineers
Davies 2005	Websphere MQ V6 Fundamentals	Davies	November 1, 2005	IBM
Henricksen 2006	A Survey Of Middleware For Sensor Networks: State-of-the-art And Future Directions	Henricksen	November 28, 2006	Association for Computing Machinery
Molla 2006	A Survey Of Middleware For Sensor Network And Challenges	Molla	September 11, 2006	Institute of Electrical and Electronics Engineers
Hadim 2006	Middleware: Middleware Challenges And Approaches For wireless Sensor Networks	Hadim	April 18, 2006	Institute of Electrical and Electronics Engineers
Ahn 2006	A Case Study On Message-oriented Middleware For Heterogeneous Sensor Networks	Ahn	August 1, 2006	Int'l Conference on Embedded and Ubiquitous Computing, Springer
Sorensen 2004	A Context-aware Middleware For Applications In Mobile Ad Hoc Environments	Sorensen	October 18, 2004	Association for Computing Machinery
Modukuri 2005	Autonomous Middleware Framework For Sensor Networks	Modukuri	September 12, 2005	International Journal of Pervasive Computing and Communications
Kim 2006	Implementation Of Context-aware Middleware For Sensor Network In Ubiquitous Environment	Kim	January 2006	The Journal of the Korea Contents Association

Reference	Title	Author	Publication Date	Publisher
Hung 2003	A Survey On Middleware For Context-awareness In Ubiquitous Computing Environments	Hung	June 1, 2003	Korea Information Processing Society Review
Katsiri 2005	Middleware Support For Context-awareness In Distributed Sensor-driven Systems	Katsiri	October 2005	University of Cambridge Computer Laboratory
Ranganathan 2003	A Middleware For Context-aware Agents In Ubiquitous Computing Environments	Ranganathan	January 1, 2003	Springer, Berlin
Henricksen 2005	Middleware For Distributed Context-aware Systems	Henricksen	November 4, 2005	Springer, Berlin
Terfloth 2006	FACTS-A Rule-based Middleware Architecture For Wireless Sensor Networks	Terfloth	August 7, 2006	Institute of Electrical and Electronics Engineers
Ribeiro 2005	Sensorbus: A Middleware Model For Wireless Sensor Networks	Riberio	October 10, 2005	Association for Computing Machinery
Bernal 2001	An Experimental Benchmark Problem In Structural Health Monitoring	Bernal	September 12, 2001	Third International Workshop on Structural Health Monitoring
Barbosa 2003	Software Architecture For Wireless Sensor Networks: The Prominence Of Middleware	Barbosa	July 22, 2003	XXV Congress of the Brazilian Computing Society
Chamberlain 2006	IBM Websphere RFID Handbook: A Solution Guide	Chamberlain	May 2006	International Technical Support Organization
Kranz 2005	SENSID: A Sensor Network Situation Detector	Kranz	2005	The University of Western

Reference	Title	Author	Publication Date	Publisher
				Australia
Li 2004	Event Detection Services Using Data Service Middleware In Distributed Sensor Networks	Li	June 2004	Information processing in sensor networks
Marron 2005	Middleware Approaches For Sensor Networks	Marron	August 29, 2005	Research Group Distributed Systems
Mousavidin 2004	RFID Technology: An Update ISRC Technology Briefing Series	Mousavidin	2004	Update ISRC Technology Briefing Series
Smith 2005	RFID-Based Techniques For Human-activity Detection	Smith	September 1, 2005	Communications of the ACM
Spencer 2004	Smart Sensing Technology For Structural Health Monitoring	Spencer	August 1, 2004	13th World Conference on Earthquake Engineering
Srinivasan 2005	A Distributed Pub-sub Based Middleware Service For Configuring Multicast Areas In A Sensor Network	Srinivasan	May 10, 2005	PSU
Subramonian 2001	Towards A Pattern Language For Networked Embedded Software Technology Middleware	Subramonian	October 2001	Proceedings of the 16th Annual Conference on Object-Oriented Programming, Systems, Languages, and Applications
Mascolo 2005	Fp6 Ip "Runes" - D5.1 Survey Of Middleware For Networked Embedded Systems	Mascolo	July 1, 2005	Sixth Framework Programme Priority 2
Vitorino 2005	Middleware For Wireless Sensor Networks	Vitorino	2005	Poster session of the Student Forum SBCCI,

Reference	Title	Author	Publication Date	Publisher
Wang 2006	Middleware For Real-time Measurement And Control Systems	Wang	April 1, 2006	Institute of Electrical and Electronics Engineers
Yoneki 2005	A Survey Of Wireless Sensor Network Technologies: Research Trends And Middleware's Role	Yoneki	September 1, 2005	University of Cambridge
Kim 2004	Embedded Software Technologies For Wireless Sensor Networks	Kim	November 1, 2004	Journal of the Institute of Electronics Engineers
Twist 2005	Chemists Escape Labs Via Mobiles	Twist	February 4, 2005	BBC NEWS
BBC NEWS 2004	Top UK Innovation Prize For IBM	BBC	June 11, 2004	BBC NEWS
IEE Review 2005	E-science Frees Researchers From The Lab	IEEE	Mid-February 2005	IEE Review
ZDNet 2004	Software Developers Win Engineering Award	Donoghue	June 11, 2004	ZDNet
IBM CORP 2004	Websphere MQ Solutions In A Microsoft .NET Environment	IBM	January 6, 2004	IBM Corp.
Hasiotis 2005	Sensation: A Middleware Integration Platform For Pervasive Applications In Wireless Sensor Networks	Hasiotis	July 25, 2005	Institute of Electrical and Electronics Engineers
Katsumi 2006	Ubiquitous Sensor Network System	Katsumi	January 1, 2006	NEC Technical Journal
Nakano 2003	Revolutionizing Mobile Communications Through New Interface Technologies	Nakano	November 1, 2003	NTT Technical Review
Romer 2003	Smart Identification Frameworks For Ubiquitous Computing	Romer	April 8, 2003	Kluwer Academic

Reference	Title	Author	Publication Date	Publisher
	Applications			Publishers
Oh 2005	RFID-based Middleware System For Providing Ubiquitous Information Service	Oh	June 10, 2005	IPSJ SIG Technical Report
Shorey 2006	Winrfid - A Middleware For The Enablement Of Radiofrequency Identification (RFID)-based Applications	Shorey	March 23, 2006	Institute of Electrical and Electronics Engineers
Cole 2005	21st Century Supply Chain Technology	Cole	September 1, 2005	Auto-ID Center
Shorey 2006	Mobile, Wireless, And Sensor Networks - Technology, Applications, And Future Directions	Shorey	March 23, 2006	Institute of Electrical and Electronics Engineers
Prabhu 2005	Winrfid – Middleware For Distributed RFID Infrastructure	Prabhu	November 11, 2005	International Workshop on Radio Frequency Identification RFID and Wireless Sensors
Tsetsos 2006	Towards Commercial Wireless Sensor Networks: Business And Technology Architecture	Tsetsos	January 1, 2006	Ad Hoc & Sensor Wireless Networks,
Dummies 2005	RFID For Dummies	Sweeney	April 1, 2005	Wiley Publishing, Inc.
Son 2006	A Design and Implementation of Forest-Fires Surveillance System Based on Wireless Sensor Networks for South Korea Mountains	Son	September 2006	IJCSNS International Journal of Computer Science and Network Security

3. Items Offered for Sale or Publicly Used or Known

Numerous systems are prior art to the patents in suit under at least 35 U.S.C. §§ 102(a), (b), (e), and/or (g), and anticipate and/or render obvious all asserted claims of the patents-in-suit. These systems include physical implementations of prior art patents, patent applications, and publications identified herein that were known, made, used, sold, offered for sale, or imported into this country prior to the effective filing dates of the patents-in-suit, including those described by the prior art patents, patent applications, and publications listed in the previous section.

Defendants further identify the following products that were sold, offered for sale, publicly used, or known that incorporate the claimed elements of the ’232 Patent.

No.	System or Product	Date of First Offer or Public Disclosure	Circumstances
1	Savant	No later than May 1, 2002 (v. 0.1 alpha)	Savant middleware was developed by the Auto-ID Center and versions of Savant became publicly available starting in or around May 1, 2002.
2	SAVI middleware systems and products, including SmartChain/ SAVI RFID-ACT	No later than Feb. 15, 2005	SAVI middleware was developed by SAVI Technology, and versions of SAVI middleware, such as SAVI SmartChain Visibility Tracking System were available at least as early as February 15, 2005. https://www.rfidsolutionsonline.com/doc/savi-technology-unveils-dod-supply-chain-rfid-0001 Further, SAVI’s RFID-ACT middleware systems was available at least as early as September 30, 2004.
3	EPCGlobal middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
4	ConnecTerra middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.

No.	System or Product	Date of First Offer or Public Disclosure	Circumstances
5	GlobeRanger iMotion middleware systems and products	No later than April 1, 2005	GlobeRanger iMotion middleware system was available at least as early as August 2004, as disclosed by Polizzi 2004.
6	OATSystems middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
7	IBM middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
8	Oracle middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
9	SAP middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
10	Sun Microsystems middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
11	RF Code middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
12	Alien Technology middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
13	Applied Wireless Identifications (AWID)	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
14	Intermec Technologies middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
15	ODIN Technologies middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
16	ThingMagic Reader (epcStar System)	No later than August 2004	ThingMagic Reader (epcStar System) was available at least as early as August 2004, as disclosed by Polizzi 2004

No.	System or Product	Date of First Offer or Public Disclosure	Circumstances
17	ISIS (Intelligent Sensing of Intelligent Infrastructure) middleware systems	No later than June 2001	ISIS was utilizing sensor networks with middleware as early as June 2001, as reflected in Tennyson 2001. Defendants are investigating whether these systems were disclosed or used or known in the United States before KAIFI's claimed priority date.
18	Provia Software middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
19	Manhattan Associates middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
20	RedPrarie middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
21	Cougaar Software middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
22	Microsoft middleware systems and products	No later than April 1, 2005	ConnecTerra middleware systems and products were available at least as early as April 1, 2005, as disclosed by Dummies.
23	Checkpoint network management platform	No later than August 2004	Checkpoint's network management platform was available at least as early as August 2004, as disclosed by Polizzi 2004.
24	WhereNet Yard Management System	No later than August 2004	WhereNet's Yard Management Systems were available at least as early as August 2004, as disclosed by Polizzi 2004.

Defendants continue to investigate the identities of individuals or entities involved in the first sale, offer for sale, or public use of prior art products that incorporate the claimed elements of the '232 Patent, and Defendants will continue to produce additional documents relating to the invalidity of the asserted claims by those products as they become available. Defendants reserve the right to provide additional invalidity contention information as additional information

becomes available. Defendants also reserve the right to rely on documents associated with these systems.

B. Disclosures Pursuant to P.R. 3-3(b)

The prior art at issue in these contentions anticipates and/or renders obvious the claims of the ’232 Patent as follows:

Reference/Combination	Claims Anticipated	Claims Rendered Obvious
Ahn (2006)	1-12	1-12
Dummies	1-12	1-12
Feng (2006)	1-12	1-12
Jakobson + Tsetsos		1-12
Li (2004)	1-12	1-12
Son (2006)	1-12	1-12
Katsiri (2005)	1-12	1-12
Polizzi (2004)	1-12	1-12
Savant	1-12	1-12

To the extent the claims of the ’232 Patent are valid and have adequate written description and/or enabling support (which the Defendants dispute), the claims of the ’232 patent are entitled to the following priority date: December 26, 2006.

The prior art combinations identified above render claims of the ’232 Patent obvious. The following obviousness rationales apply.

To the extent KAIFI argues that any of Ahn (2006), Dummies, Feng (2006), Jakobson, Tsetsos, Li (2004), Son (2006), Katsiri (2005), or Savant (collectively, the “Charted References”) do not disclose or (combined with the knowledge and skill of a POSITA) render obvious one or more claim element of asserted Claims 1-12, it would have been obvious to combine any of the Charted References with another Charted Reference that does disclose such element(s). For

example, to the extent any of Ahn (2006), Dummies, Feng (2006), Jakobson, Tsetsos, Li (2004), Son (2006), Katsiri (2005), Polizzi (2004), or Savant discloses a system that otherwise satisfies the claim elements except for one element (or some subset of claim elements in Claims 1-12), then it would have been obvious to combine any such references with any of Ahn (2006), Jakobson, Tsetsos, Li (2004), Son (2006) and/or Katsiri (2005) ("the Sensor Network References") and/or any of Dummies, Feng (2006), Polizzi, and/or Savant ("the RFID References"). In each case, the combination would be nothing more than combining known prior art elements (i.e., the claimed structures and functionality from any of the Sensor Network References or RFID References) according to known methods to achieve a predictable result (i.e. the structures and functions recited in the claims). Such a combination would merely make use of a known technique (using the claimed structures and functionality as disclosed in one of the Sensor Network References or RFID References) to improve the systems shown and described in one of the Charted References. In addition, it would have been obvious to do a simple substitution of one or more elements from any of the Sensor Network or RFID References with any of the Charted References.

It would have been obvious to a person of skill in the art ("POSITA") to combine any of the Sensor Network References together, such that the combined teachings of the references would render the asserted claims obvious. A POSITA would have been motivated to do so in order to arrive at a sensor network system having middleware used to provide useful and digestible information relating to a sensed environment to a downstream application program which could, in turn, provide relevant and useful information to a user. Hence the systems, goals, and problems to be solved for all such references are the same. And given that these references all concern the same subject matter, there is an implied suggestion to read the references together as a whole. Such a combined system would have all the conventional benefits of utilizing a system with middleware,

including shielding the application program from the complexities and/or heterogeneities of the underlying sensor network(s) and conserving resources of the application program. Because all of the Sensor Network References describe middleware used to support networks of sensors, and to process and analyze sensor data and provide useful information to an application program, it would have been well within the capability and skills of a POSITA to combine the teachings of the Sensor Network references, which were all roughly contemporaneous and clearly within the same field and industry.

Similarly, it would have been obvious for a POSITA to combine any of the RFID References, such that the combined teachings of the references would render the asserted claims obvious. A POSITA would have been motivated to do so in order to arrive at a sensor/RFID network system having middleware used to provide useful and digestible information relating to a sensed environment to a downstream application program which could, in turn, provide relevant and useful information to a user. Hence the systems, goals, and problems to be solved for all such references are the same. And given that the RFID references all concern the same subject matter, there is an implied suggestion to read the references together as a whole. Such a combined system would have all the conventional benefits of utilizing a system with middleware, including shielding the application program from the complexities and/or heterogeneities of the underlying sensor/RFID network(s) and conserving resources of the application program. Because all of the RFID References describe middleware used to support networks of RFID tags, readers, and/or sensors, and to process and analyze sensor data and provide useful information to an application program, it would have been well within the capability and skills of a POSITA to combine the teachings of the RFID References, which were all roughly contemporaneous and clearly within the same field and industry.

In addition, it would have been obvious for a POSITA to combine any of the Sensor Network References with any of the RFID References (or vice versa), such that the combined teachings of the references would yield a sensor network system with middleware that could be used to provide useful and easily digestible information related to a sensed environment to an application program that could, in turn, provide relevant and useful information to a user. Again, such a system would have all the conventional benefits of utilizing a system with middleware, including shielding the application from the complexities and/or heterogeneities of the underlying sensor network(s). The systems, goals, and problems to be solved for all such references are highly similar. And given that these references all fundamentally concern the same subject matter and goals, there is an implied suggestion to read the references together as a whole. Furthermore, RFID and sensor network technologies are intimately related and even tied together. As just one example, Dummies describes how RFID and sensor network devices are "kissing cousins," Dummies at 41, and how RFID and sensor networks ultimately were designed with the same vision of deploying networks of sensors and readers for monitoring environments of interest. *See, e.g., id.* at 10, 16-17, 29, 39-41. Further, Dummies makes clear that sensors that communicated by radio—including sensors that sensed environmental information such as temperature—were well known and could be integrated with RFID technology for more intelligent systems and business decision-making. *See, e.g.* Dummies at 39 ("Some active tags can also be made to monitor sensor inputs, such as the temperature or movement …."). Given the shared goals, technical similarities, and overlap between the RFID and sensor network technologies, a POSITA would immediately understand that systems, middleware, and the concepts and techniques applicable to RFID networks would be equally applicable and useful to sensor networks (and vice versa).

C. Disclosures Pursuant to P.R. 3-3(c)

The claim charts in the Appendices identify where in each of the charted prior art references the limitations of the asserted claims of the ’232 Patent are found.

Defendants have endeavored to cite to the most relevant portions of the identified prior art. However, other portions of the identified prior art may additionally disclose, either expressly or inherently, one or more elements or limitations of the asserted claims. In an effort to focus the issues, Defendants identify only exemplary portions of the identified prior art. To the extent it is found a charted reference does not expressly disclose certain claim limitations, such limitations are inherent. Defendants reserve the right to rely on uncited portions of the identified prior art to establish the invalidity of the asserted claims. Moreover, Defendants reserve the right to rely on uncited portions of the identified prior art, rely on other references (irrespective of whether such references themselves qualify as prior art) to show the state of the art, and/or to rely on expert or fact testimony to provide context to, or aid in, understanding the cited portions of the identified prior art. Where Defendants cite to a particular drawing or figure in the attached claim charts, the citation encompasses the description of the drawing or figure, as well as any text associated with the drawing or figure. Similarly, where Defendants cite to particular text concerning a drawing or figure, the citation encompasses that drawing or figure as well.

Relatedly, it is often the case that certain portions of patent disclosures build upon other disclosures – even if they are referred to as a separate or alternative embodiment. Thus, Defendants’ citations to structures or functions incorporate by reference all disclosures to related structures or functions, including any additional detail provided as to the operation or design of those structures or functions. Further, citations in each dependent claim include citations to each claim from which it directly or indirectly depends. And citations as to any recited limitation, step,

or component in the claims apply wherever each such limitation, step, or component is repeatedly recited elsewhere in the claim.

As discussed below, the following claim terms are governed by 35 U.S.C. § 112 ¶ 6: (1) "sensor network data transmitter"; (2) "Ubiquitous Sensor Network (USN) middleware [apparatus]"; (3) "sensor network abstraction unit"; (4) "sensor network intelligence unit"; (5) "service platform management unit"; (6) "sensor network interface"; (7) "sensor network interface protocol storage"; (8) "sensor network monitor"; (9) "sensed data analyzer"; (10) "event processor"; (11) "context information manager"; (12) "directory service manager"; (13) "service process manager"; and (14) "application program interface." However, Amazon understands that KAIFI has argued that § 112 ¶ 6 does not apply to any claim terms of the '232 Patent. The claim charts identify the structure(s), act(s), or material(s) in each item of prior art that performs the claimed function(s).

D. Disclosures Pursuant to P.R. 3-3(d)

Pursuant to Patent Local Rule 3-3(d), Defendants hereby identify grounds of invalidity based on: (1) lack of written description and enablement under 35 U.S.C. § 112, ¶ 1; and (2) indefiniteness under 35 U.S.C. § 112, ¶ 2. These Initial Invalidity Contentions shall not be construed as an admission that any claim construction advanced by Defendants in this case or in related proceedings is in any way inconsistent, flawed, or erroneous. Nor should these contentions prevent Defendants from advancing claim construction and/or noninfringement positions in lieu of, or in addition to, invalidity positions. Further, these Invalidity Contentions shall not be construed as an admission of or acquiescence to KAIFI's purported construction of the claim language or of other positions advanced by KAIFI during the course of this litigation. Indeed,

Defendants' Invalidity Contentions under 35 U.S.C. § 112 may depend on the Court's claim construction, as well as KAIFI's asserted claim scope.

Below, Defendants identify the issues under 35 U.S.C. § 112 of which they are presently aware. Pursuant to the applicable provisions of the Docket Control Order and Local Rules, Defendants reserve the right to supplement or amend their contentions after the Court's *Markman* ruling or if KAIFI amends or alters its infringement contentions in any way.

1. Written Description and Enablement

To satisfy the written description requirement of 35 U.S.C. § 112(a) or pre-AIA 35 U.S.C. § 112, ¶ 1, the specification of a patent must "clearly allow persons of ordinary skill in the art to recognize that the inventor invented what is claimed" and "had possession of the claimed subject matter as of the filing date." *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). In particular, an adequate written description must "demonstrate that the patentee possessed the full scope of the invention recited in [the] claim." *LizardTech*, 424 F.3d at 1345. To satisfy the enablement requirement, "the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation." *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quotations omitted); *see also Amgen v. Sanofi*, 598 U.S. 594, 610 (2023) ("If a patent claims an entire class of processes, machines, manufactures, or compositions of matter, the patent's specification must enable a person skilled in the art to make and use the entire class. In other words, the specification must enable the full scope of the invention as defined by its claims. The more one claims, the more one must enable.").

The specification of the ’232 Patent fails to meet the written description and enablement requirements of 35 U.S.C. § 112 ¶ 1 because it fails to disclose, enable or teach—or fails to disclose, enable or teach the full scope of—the following claim terms/phrases:

“sensor network data transmitter [for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form] (Claims 1, 2).[1]

The ’232 Patent does not provide adequate written description or enable the “sensor network data transmitter” recited in the claims. As an initial matter, the ’232 Patent specification provides relatively little discussion regarding “sensor network data transmitter,” describing it only in very high-level, functional terms and without disclosing specifics for *how* its function(s) is to be performed. Examples of such high-level, functional descriptions from the specification include:

- 232 Patent at Abstract: “Provided are a Ubiquitous Sensor Network (USN) middleware apparatus and method for generating an information service based on heterogeneous sensor networks and a system for providing the information service using the same. In the system, a sensor node constructing a sensor network senses environment information, and a *sensor network data transmitter* collects sensed data sensed by the sensor node in real-time and transmits the collected sensed data in a message form. A USN middleware extracts object and environment information by cleaning, classifying and integrating the message received from the *sensor network data transmitter*, generates conditional events and context aware information from the extracted object and environment information, and provides the information service to an application program, the application program providing a user with information related to environment where the sensor network observes.”

- 232 Patent at 2:17-33: In accordance with one aspect of the present invention, there is provided a system for offering an information service based on heterogeneous sensor networks, including: a sensor node constructing a sensor network to sense its ambient environment; a *sensor network data transmitter* for collecting sensed data sensed by the sensor nodes in real-time and transmitting the collected sensed data in a message form; and a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and

[1] In these headings, Defendants identify the claim(s) that contain the particular term(s) being discussed. It should be understood that all claims that depend from the identified claim(s) are also invalid on the same grounds and for the same reasons, as the dependent claims do not provide any additional written description or enabling disclosure.

> integrating the message received from the <u>*sensor network data transmitter*</u>, generating conditional events, context aware information, circumstantial analysis information, and the other relevant knowledge contents from the extracted object and environment information, and providing the information service to an application program, the application program providing a user with information related to environment where the sensor network observes or is installed.

The ’232 Patent specification does not demonstrate possession of the full scope of “sensor network data transmitter [for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form]” or enable a POSITA to practice the full scope of the same without undue experimentation. The ’232 Patent specification does not demonstrate possession of the full scope of “sensor network data transmitter” or enable the “sensor network data transmitter” to collect sensed data sensed by the sensor in real-time and/or to transmit the collected sensed data in message form without undue experimentation; nor does it provide structural information regarding structures that would do the same. The patent disclosure provides almost no information about how the claimed “sensor network data transmitter” operates. And while KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “sensor network data transmitter” claim limitation, KAIFI apparently may try to argue that “sensor network data transmitter” is broad enough to encompass a wide array IoT-adjacent structures, services, or information, none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 28-68.

Thus, claims 1 and 2 are invalid for lack of proper written description and enablement. The claims depending from these claims also fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

“Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from

the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" (Claims 1, 2, 6, 7, 8, 9, 10).

The '232 Patent does not provide adequate written description or enable the "ubiquitous sensor network (USN) middleware [apparatus]" recited in the claims. As an initial matter, the '232 Patent specification describes "ubiquitous sensor network (USN) middleware" only in very high-level, functional terms and without disclosing specifics for *how* any or all of the functions to be performed by such a USN middleware are actually accomplished. Examples of the high-level, functional descriptions from the specification include:

- 232 Patent at 2:1-13: "It is, therefore, an objective of the present invention to provide a *Ubiquitous Sensor Network (USN) middleware apparatus* for collecting sensed data from sensor nodes of heterogeneous sensor networks, analyzing and processing sensed data, e.g., temperature, humidity, pressure, motion, and acceleration, generating events and context aware information, and providing the information to users through an application program, a method thereof, and an information service providing system employing the same.

- 232 Patent at 1:16-33: In accordance with one aspect of the present invention, there is provided a system for offering an information service based on heterogeneous sensor networks, including: a sensor node constructing a sensor network to sense its ambient environment; a sensor network data transmitter for collecting sensed data sensed by the sensor nodes in real-time and transmitting the collected sensed data in a message form; and *a Ubiquitous Sensor Network (USN) middleware* for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, circumstantial analysis information, and the other relevant knowledge contents from the extracted object and environment information, and providing the information service to an application program, the application program providing a user with information related to environment where the sensor network observes or is installed.

The '232 Patent specification does not demonstrate possession of the full scope of "Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the

sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" or enable the same without undue experimentation. The '232 Patent specification does not demonstrate possession of the full scope of the "ubiquitous sensor network middleware" limitations or enable the full scope of all "ubiquitous sensor network middleware" that can extract object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program / generating an information service based on heterogenous sensor networks; nor does the '232 Patent disclosure provide structural information about structures that would do the same. Likewise, the '232 Patent fails to demonstrate possession of or enable the full scope of a "Ubiquitous Sensor Network (USN) middleware [apparatus]" that generates an information service based on heterogenous sensor networks. The patent disclosure provides almost no information about how "ubiquitous sensor network middleware" operates, beyond generic functional descriptions that fail to describe *how* such functions would be practically accomplished. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "ubiquitous sensor network middleware [apparatus]" claim limitation, KAIFI apparently may try to argue that "ubiquitous sensor network middleware [apparatus]" is broad enough to encompass a wide array IoT-adjacent structures, services, or information, none of which are contemplated, described, or enabled by the

specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 42-252.

Thus, claims 1, 2, 6, 7, 8, 9, and 10 are invalid for lack of proper written description and enablement. The claims depending from these claims also fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

“cleaning, classifying and integrating the message received from the sensor network data transmitter” / “clean, classify and integrate the sensed data [processed]/[extracted] by the sensor network abstraction unit” / “clean, classify and integrate the extracted sensed data” (Claims 1, 2, 4, 6, 8, 10, 11)

The ’232 Patent does not provide adequate written description or enable the “clean[ing], classify[ing] and integrat[ing]” limitations as recited in the claims. The ’232 Patent specification does not disclose or teach *how* the ubiquitous sensor network middleware (or any related structure) cleans, classifies, and/or integrates the message/sensed data; nor is there any discussion of specific, meaningful structures that actually perform these function(s), or any specific techniques, algorithms, or protocols (or even examples of the same) that may be used. The ’232 Patent’s specification provides only a bare-bones descriptions saying that these actions/steps of “cleaning, classifying and integrating” are performed (without specifying or showing how). For example:

- ’232 Patent at 2:49-56: In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation *to clean, classify and integrate the extracted sensed data*; . . . .
- ’232 Patent at 5:5-13: The sensor network intelligence unit **42** includes a sensed data analyzer **421**, an event processor **422**, and a context information manager **423**. The sensed data manager **421** performs an analysis operation *to*

clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**.

- ’232 Patent at 7:30-37: The USN middleware apparatus **40** extracts the operation state of the sensor network **20** and the sensed data from the message received from the sensor network **20** in step S**403**, performs an analysis operation *to clean, classify and integrate the extracted sensed data* in step S**404**, extracts the object and environment information S**405**, and generates the events, i.e., notification and alarm about a certain condition, and the context aware information, according to the rule set by the application program **50** in step S**406**.

The ’232 Patent specification thus does not demonstrate possession of the full scope of “clean[ing], classify[ing] and integrat[ing]” the message/extracted data or enable the full scope of the same without undue experimentation. The patent disclosure provides almost no information about how these actions are to be performed. And while KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/actions purportedly satisfy the “clean[ing], classify[ing] and integrat[ing],” claim limitations, KAIFI apparently may seek to argue that “cleaning, classifying and integrating,” is broad enough to encompass a wide array IoT-adjacent structures, services, tasks, actions, or steps, none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 42-252.

Thus claims 1, 2, 4, 6, 8, 10 and 11 are invalid for lack of proper written description and enablement. Further, the claims depending from these claims fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

“generating [the] conditional events” (Claims 1, 2, 4)

The ’232 Patent does not provide adequate written description or enable “generating [the] conditional events” as recited in the claims. The ’232 Patent specification does not disclose or teaching *how* the ubiquitous sensor network middleware (or any other apparatus or structure)

"generates conditional events." The '232 Patent's specification provides only a bare-bones, high-level functional descriptions for this concept. For example:

- '232 Patent at 2:34-48: In accordance with another aspect of the present invention, there is provided a USN middleware apparatus for offering an information service based on heterogeneous sensor networks, including: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a sensor network intelligence unit for extracting low-level information including the object properties and environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and *generating high-level information including conditional events*, context aware information, and circumstantial analysis information from the extracted low-level information; and a service platform management unit for providing the information to the application program in a form suitable for the application program.

- '232 Patent at 2:49-67: "a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation to clean, classify and integrate the extracted sensed data; c) extracting object and environment information from the analyzed sensed data, and generating context aware information and circumstantial analysis information based on the extracted object and environment information; d) *generating conditional events according to a rule set by an application program*; e) scheduling an operation sequence for providing an information service to the application program; and f) providing the application program with the information service obtained according to the scheduled operation sequence, the information service including *conditional events*, context aware information, and circumstantial analysis information."

- '232 Patent at 3:11-19: "In addition, the interface with a plurality of sensor networks can be supported in the present invention. Therefore, information service about a specific position can be provided by analyzing the sensed data from a corresponding sensor network, while high-level information such as context aware information and *conditional events about a wide area also can be provided* by analyzing the sensed data collection obtained from the relevant multiple sensor networks."

- '232 Patent at 4:21-29: "Then, the USN middleware apparatus **40** provides an information service by *generating high-level information, i.e., conditional events*, context aware information, and circumstantial analysis information from the extracted low-level information. Using the information from the USN middleware apparatus **40** including both the low-level and high-level information, the application program provides the user with information related to the environment where the sensor network **20** observes."

- ’232 Patent at 5:51-60: In order to provide specific information required by the application program **50**, the sensor network intelligence unit **42** classifies the sensed data collected by the sensor nodes **10** of the sensor network **20** and *generates conditional events*, i.e., notification of a specific error and alarm of crucial state, and context aware information, i.e., detection of invasion and the best position for arousing customers' interest. In order to generate more relevant information, the sensor network intelligence unit **42** may use a predetermined rule set by the application program **50**.

- 232 Patent at 6:1-18:

TABLE 1

Classification	Analysis of sensed data and generation of information	Description
Conditional Events generated by USN middleware apparatus	Provide alarm (“low temperature: 13.5”) for average temperature value	Application has already set a predetermined rule: alarm is generated to application program when average temperature for latest 1 hour is below 14° C.

The ’232 Patent specification does not demonstrate possession of the full scope of “generating [the] conditional events” or enable the full scope of “generating [the] conditional events” without undue experimentation. The patent disclosure provides almost no information about how conditional events are to be generated; nor is there any discussion of specific, meaningful structures that actually perform this function, or any specific techniques, algorithms, or protocols (or even examples of the same) that may be used. For example, the ’232 Patent states that “conditional events” can be generated “according to a rule set by an application program” but fails to show possession or enable even a single example of a rule set, much less all possible rule sets that could be used. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information/actions purportedly

satisfy the "generating [the] conditional events" claim limitations, KAIFI apparently may try to argue that "generating [the] conditional events" is broad enough to encompass a wide array IoT-adjacent structures, services, tasks or steps, none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 42-63, 69-75, 91-93, 162-164.

Thus, claims 1, 2 and 4 are invalid for lack of proper written description and enablement. In addition, the claims depending from these claims fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

"generating . . . context aware information" (claims 1, 2, 4, 6, 10, 12).

The '232 Patent does not provide adequate written description or enable generating "context aware information" as recited in the claims. The '232 Patent specification does not disclose or teaching *how* the ubiquitous sensor network middleware (or other apparatus or structure) "generat[es] . . . context aware information," much less describing and/or enabling every possible way of doing so. The '232 Patent's specification provides only a bare-bones, high-level descriptions for this claimed concept, essentially stating that it is done but without any further explanation or teachings. Examples of statements from the specification regarding "context aware information" include:

- '232 Patent at 1:21-33: The present invention relates to a Ubiquitous Sensor network (USN) middleware apparatus and method for generating information based on data transmitted from heterogeneous sensor networks and a system for providing the information service using the same; and, more particularly, to a USN middleware apparatus for collecting sensed data from sensor nodes of heterogeneous sensor networks, analyzing and processing sensed data, e.g., temperature, humidity, pressure, motion, and acceleration, <u>*generating*</u> events and <u>*context aware information*</u>, and providing the information to users through an application program, a method thereof, and an information service providing system employing the same.

- 232 Patent at 3:1-10 : In accordance with another aspect of the present invention, the USN middleware apparatus processes and manages a large amount of sensed data collected from the heterogeneous sensor networks between the sensor network and the application program, *generates* the real-time events and *context aware information* related to the environment condition by analyzing the collected sensed data, and provides the information service suitable for the application program. Therefore, a plurality of sensor networks can be utilized more easily in the USN environment.

- 232 Patent at 3:11-19 : In addition, the interface with a plurality of sensor networks can be supported in the present invention. Therefore, information service about a specific position can be provided by analyzing the sensed data from a corresponding sensor network, while high-level information such as *context aware information* and conditional events about a wide area also can be provided by analyzing the sensed data collection obtained from the relevant multiple sensor networks.

- 232 Patent at 4:16-29: Then, the USN middleware apparatus **40** provides an information service by generating high-level information, i.e., conditional events, *context aware information*, and circumstantial analysis information from the extracted low-level information. Using the information from the USN middleware apparatus **40** including both the low-level and high-level information, the application program provides the user with information related to the environment where the sensor network **20** observes.

- 232 Patent at 4:40-44: In addition, the USN middleware apparatus processes the sensed data to *generate* events and *context aware information* desired by the application program **50**, and provides the information to the application program.

- 232 Patent at 5:5-13: The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and *generates* conditional events, *context aware information*, and the other knowledge contents such as circumstantial analysis information.

- ’232 Patent at 5:51-57: In order to provide specific information required by the application program **50**, the sensor network intelligence unit **42** classifies the sensed data collected by the sensor nodes **10** of the sensor network **20** and *generates* conditional events, i.e., notification of a specific error and alarm of crucial state, and *context aware information*, i.e., detection of invasion and the best position for arousing customers' interest.

- ’232 Patent at 7:59-66: In step S**503**, the context information manager **423** of the sensor network intelligence unit **42** extracts object and environment information from the sensed data analyzed by the sensed data analyzer **421**, and *generates* the

> *context aware information*, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are related with the object and environment.

The ’232 Patent specification does not demonstrate possession of the full scope of “generating . . . context aware information” or enable the full scope of “generating context aware information” without undue experimentation. The patent disclosure provides essentially no information about how such actions are to be performed; and there is no discussion of specific, meaningful structures that actually perform these function(s), or any specific techniques, algorithms, or protocols (or even examples of the same) that may be used. For example, the ’232 Patent states that “context aware information” can be generated by “analyzing the sensed data” or by “processing sensed data,” but fails to show possession or teach even a single way of actually doing so, much less all possible ways of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information/actions purportedly satisfy the “generating . . . context aware information” claim limitations, KAIFI apparently may try to argue that “generating . . . context aware information,” is broad enough to encompass a wide array IoT-adjacent structures, services, tasks or steps, none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 42-63, 69-80, 93-96, 130-151, 164-167, 199-205, 224-232, 244-252.

Thus, claims 1, 2, 4, 6, 10 and 12 are invalid for lack of proper written description and enablement. And the claims depending from these claims also fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

“generating . . . knowledge contents” (Claims 1, 8, 10).

The ’232 Patent does not provide adequate written description or enable generating of “knowledge contents” recited in the claims. As an initial matter, the ’232 Patent specification provides relatively little discussion regarding the generation of “knowledge contents”:

- 232 Patent at 2:24-33: “a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, *generating* conditional events, context aware information, circumstantial analysis information, and the *other relevant knowledge contents* from the extracted object and environment information, and providing the information service to an application program, the application program providing a user with information related to environment where the sensor network observes or is installed.”

- 232 Patent at 5:5-13: The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and *generates* conditional events, context aware information, and *the other knowledge contents* such as circumstantial analysis information.

- 232 Patent at 5:39-42: The sensor network intelligence unit **42** *generates* conditional events, context aware information, and *other knowledge contents* by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**.

The ’232 Patent specification does not demonstrate possession of the full scope of “generating . . . knowledge contents” or enable the generation of “knowledge contents” without undue experimentation. The patent disclosure provides essentially no information about *how* “knowledge contents” are to be generated, and certainly does not demonstrate possession or enablement of generating all conceivable knowledge contents. For example, the ’232 Patent does not contain a discussion of specific, meaningful structures that actually perform these function(s), or any specific techniques, algorithms, or protocols (or even examples of the same) that may be used. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “knowledge contents” claim limitation, KAIFI apparently may try to argue that “knowledge contents” is broad

enough to encompass a wide array IoT-adjacent structures, services, steps, tasks, or information, none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 42-63, 162-164, 205-16.

Thus, claims 1, 8, and 10 are invalid for lack of proper written description and enablement. In addition, the claims depending from these claims fail to provide additional written description or enablement support and are likewise invalid for lack of proper written description and enablement.

"sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]" (Claims 2, 3, 4, 6, 7, 8).

The '232 Patent does not provide adequate written description or enable the "sensor network abstraction unit" recited in the claims. The '232 Patent specification provides relatively little information regarding the "sensor network abstraction unit" and its operation:

- 232 Patent at 2:34-48: "In accordance with another aspect of the present invention, there is provided a USN middleware apparatus for offering an information service based on heterogeneous sensor networks, including: *a* *sensor network abstraction unit* for extracting sensed data from a message received from a sensor network; *a* sensor network intelligence unit for extracting low-level information including the object properties and environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the *sensor network abstraction unit*, and generating high-level information including conditional events, context aware information, and circumstantial analysis information from the extracted low-level information; and a service platform management unit for providing the information to the application program in a form suitable for the application program."

- 232 Patent at 5:1-12: The USN middleware apparatus **40** includes a *sensor network abstraction unit* **41**, a sensor network intelligence unit **42**, and a service platform management unit **43**. The *sensor network abstraction unit* **41** extracts the sensed data from the message received from the gateway **30**. The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the *sensor network abstraction unit* **41**, and generates conditional events, context aware information, and the other knowledge contents such as circumstantial analysis information.

- 5:37-43: The *sensor network abstraction unit* **41** of the USN middleware apparatus **40** extracts the sensed data from the message received from the gateway **30**. The sensor network intelligence unit **42** generates conditional events, context aware information, and other knowledge contents by performing an analysis operation to clean, classify and integrate the sensed data extracted by the *sensor network abstraction unit* **41**.

- 232 Patent at 6:37-40: Referring to FIG. 3, the *sensor network abstraction unit* **41** includes a sensor network interface **411**, a sensor network interface protocol storage **412**, and a sensor network monitor **413**.

- 232 Patent at 6:47-52: The sensor network intelligence unit **42** includes a sensed data analyzer **421**, an event processor **422**, and a context information manager **423**. The sensed data manager **421** performs an analysis operation to clean, classify and integrate the sensed data processed by the *sensor network abstraction unit* **41**.

- 232 Patent at 7:51-55: Referring to FIG. 5, in step S**501**, the sensor network monitor **413** of the *sensor network abstraction unit* **41** performs a monitoring operation for a state management of the sensor network based on the sensed data extracted through the sensor network interface **411**.

- 232 Patent at 7:56-59: In step S**502**, the sensed data analyzer **421** of the sensor network intelligence unit **42** performs an analysis operation to clean, classify and integrate the sensed data processed by the *sensor network abstraction unit* **41**.

The '232 Patent specification does not demonstrate possession of the full scope of "sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]" or enable a POSITA to practice the same without undue experimentation. The patent provides essentially no information about how the "sensor network abstraction unit" extracts sensed data from a message received from the sensor network/sensor network data transmitter; and it does not provide any meaningful information about structures that would do the same. For example, the '232 Patent does not contain a discussion of specific, meaningful structures that actually perform these function(s), or any specific techniques, algorithms, or protocols (or even examples of the same) that may be used. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what

accused structures/instrumentalities/information purportedly satisfy the "sensor network abstraction unit" claim limitation, KAIFI apparently may seek to argue that "sensor network abstraction unit" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 64-74, 80-88, 127-130, 151-159 (citing various structures without identifying which one(s), if any, purportedly satisfy specific elements of the claim).

Thus claims 2, 3, 4, 6, 7 and 8 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"sensor network intelligence unit [for extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information]/ for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information]" (Claims 2, 4, 6, 8).

The '232 Patent does not provide adequate written description or enable the "sensor network intelligence unit" recited in the claims. The '232 Patent specification provides relatively little discussion regarding a "sensor network intelligence unit," and fails to provide more than high-level, functional descriptions of what the sensor network intelligence unit does:

- ’232 Patent at 2:34-48: “In accordance with another aspect of the present invention, there is provided a USN middleware apparatus for offering an information service based on heterogeneous sensor networks, including: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a *sensor network intelligence unit* for extracting low-level information including the object properties and environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating high-level information including conditional events, context aware information, and circumstantial analysis information from the extracted low-level information; and a service platform management unit for providing the information to the application program in a form suitable for the application program.”

- ’232 Patent at 5:1-16: The USN middleware apparatus **40** includes a sensor network abstraction unit **41**, a *sensor network intelligence unit* **42**, and a service platform management unit **43**. The sensor network abstraction unit **41** extracts the sensed data from the message received from the gateway **30**. The *sensor network intelligence unit* **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and generates conditional events, context aware information, and the other knowledge contents such as circumstantial analysis information. The service platform management unit **43** provides the results processed by the *sensor network intelligence unit* **42** to the application program **50** in a form suitable for the application program **50**.

- ’232 Patent at 5:39-50: “The *sensor network intelligence unit* 42 generates conditional events, context aware information, and other knowledge contents by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit 41. The service platform management unit 43 provides the results processed by the *sensor network intelligence unit* 42 to the information service receiving unit 51 of the application program 50 in a form suitable for the application program 50. The processed results include the object and environment information, conditional events and context aware information, and circumstantial analysis information.”

- ’232 Patent at 5:51-60: In order to provide specific information required by the application program **50**, the *sensor network intelligence unit* **42** classifies the sensed data collected by the sensor nodes **10** of the sensor network **20** and generates conditional events, i.e., notification of a specific error and alarm of crucial state, and context aware information, i.e., detection of invasion and the best position for arousing customers' interest. In order to generate more relevant information, the *sensor network intelligence unit* **42** may use a predetermined rule set by the application program **50**. The service platform management unit **43** transfers the information to the application program **50** in a message form suitable for the application program **50**.

- ’232 Patent at 6:47-58: “The *sensor network intelligence unit* **42** includes a sensed data analyzer **421**, an event processor **422**, and a context information manager **423**. The sensed data manager **421** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. The event processor **422** generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50** and manages the generated events. The context information manager **423** senses and generates the context aware information based on the analyzed sensed data information as well as the context rule in store which are related with the object and environment.”

- ’232 Patent at 6:59-65: “In order to generate the events, i.e., notification and alarm about a certain condition, and the context aware information, the *sensor network intelligence unit* **42** may analyze only the sensed data from a single specific sensor network, or analyze a combination of sensed data from a plurality of heterogeneous sensor networks, or analyze the sensed data from the sensor network in association with predefined legacy data.”

- ’232 Patent at 7:56-8:3: In step S**502**, the sensed data analyzer **421** of the *sensor network intelligence unit* **42** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. In step S**503**, the context information manager **423** of the *sensor network intelligence unit* **42** extracts object and environment information from the sensed data analyzed by the sensed data analyzer **421**, and generates the context aware information, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are related with the object and environment. In step S**504**, the event processor **422** of the *sensor network intelligence unit* **42** generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50**.

The ’232 Patent specification does not demonstrate possession of the full scope of “sensor network intelligence unit [for extracting [the] object and environment information],” whether by “analyzing the sensed data extracted by the sensor network abstraction unit” or by “performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit”; nor does the ’232 Patent enable such claim scope. The patent provides insufficient structural disclosure/teachings or other relevant information about how the “sensor network intelligence unit” extracts object and environment information by “analyzing” sensed data extracted by a separate sensor network abstraction unit. It provides no descriptions or teachings of specific analysis operations or data processing steps that could be performed. While KAIFI has

avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "sensor network intelligence unit" claim limitation, KAIFI apparently may seek to argue that "sensor network intelligence unit" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 69-74, 88-96, 130-137, 159-167.

Thus claims 2, 4, 6 and 8 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"service platform management unit [for providing the event and the context aware information to the application program in a form suitable for the application program]" (Claims 2, 5, 6, 9).

The '232 Patent does not provide adequate written description or enable the "service platform management unit" recited in the claims. The '232 Patent specification provides only bare-bones discussions regarding a "service platform management unit," and provides only high-level descriptions of the function(s) that the service platform management unit performs, without disclosing or teaching *how* those functions can be accomplished (or what structures perform them). Further, the '232 Patent's specification disclosures do not describe or teach that the service platform management unit provides event and context aware information to the application program, as is required by the claim language:

- '232 Patent at 2:34-48: In accordance with another aspect of the present invention, there is provided a USN middleware apparatus for offering an information service based on heterogeneous sensor networks, including: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a

sensor network intelligence unit for extracting low-level information including the object properties and environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating high-level information including conditional events, context aware information, and circumstantial analysis information from the extracted low-level information; and a *service platform management unit* for providing the information to the application program in a form suitable for the application program.

- ’232 Patent at 5:1-24: The USN middleware apparatus **40** includes a sensor network abstraction unit **41**, a sensor network intelligence unit **42**, and a *service platform management unit* **43**. The sensor network abstraction unit **41** extracts the sensed data from the message received from the gateway **30**. The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and generates conditional events, context aware information, and the other knowledge contents such as circumstantial analysis information. The *service platform management unit* **43** provides the results processed by the sensor network intelligence unit **42** to the application program **50** in a form suitable for the application program **50**. The processed results include both the extracted information including the object properties and the environment state information, and the generated information including conditional events, context aware information, and circumstantial analysis information. The *service platform management unit* **43** can also provide an information selection and interface function based on a plurality of heterogeneous sensor networks, which is required by the application program **50**.

- ’232 Patent at 5:44-48: The *service platform management unit* **43** provides the results processed by the sensor network intelligence unit **42** to the information service receiving unit **51** of the application program **50** in a form suitable for the application program **50**.

- ’232 Patent at 5:60-62: The *service platform management unit* **43** transfers the information to the application program **50** in a message form suitable for the application program **50**.

- ’232 Patent at 6:66-7:1: The *service platform management unit* **43** includes a directory service manager **431**, a service process manager **432**, and an application program interface **433**.

- ’232 Patent at 7:14-19: The *service platform management unit* **43** may provide the information to the application program only once, or periodically provide the information during a request period of the application program, or provide the information at a specific time point when a requirement from the application program is satisfied.

- ’232 Patent at 8:4-11: In step S**505**, the service process manager **432** of the <u>*service platform management unit*</u> **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, and the context information manager **423** through the application program interface **433** to the application program **50**.

The ’232 Patent specification does not demonstrate possession or enablement of the full scope of “service platform unit.” While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “service platform” claim limitations, KAIFI apparently may seek to argue that “service platform unit” is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 75-80, 96-104, 137-151, 167-176.

Thus claims 2, 5, 6 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

“sensor network interface [for extracting the sensed data by referring to a message transfer protocol]” (Claims 3, 7).

The ’232 Patent does not provide adequate written description or enable the “sensor network interface [for extracting the sensed data by referring to a message transfer protocol]” recited in the claims. The ’232 Patent specification provides only passing references to a “sensor network interface,” with high-level, functional descriptions that the sensor network interface “extracts [] sensed data by referring to a message transfer protocol.” The ’232 Patent does not disclose or teaching *how* the sensor network interface extracts that sensed data; nor is there any

discussion of structures that perform this function, or any specific message transfer protocols (or even examples of protocols) that may be used. The '232 Patent's specification gives only the below bare-bones descriptions of a "sensor network interface":

- '232 Patent at 6:37-46: Referring to FIG. 3, the sensor network abstraction unit **41** includes a *sensor network interface* **411**, a sensor network interface protocol storage **412**, and a sensor network monitor **413**. The *sensor network interface* **411** extracts the sensed data by referring to a message transfer protocol, and the sensor network interface protocol storage **412** manages the message transfer protocol. The sensor network monitor **413** performs a monitoring operation for a state management of the sensor network, based on the data received from the *sensor network interface* **411**.

- '232 Patent at 7:51-55: Referring to FIG. 5, in step S**501**, the sensor network monitor **413** of the sensor network abstraction unit **41** performs a monitoring operation for a state management of the sensor network based on the sensed data extracted through the *sensor network interface* **411**.

The '232 Patent specification does not demonstrate possession or enablement of the full scope of "sensor network interface." The '232 Patent specification does not disclose or teaching *how* the sensor network interface" extracts sensed data by referring to a message transfer protocol, much less describing and/or enabling every possible way of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "sensor network interface" claim limitations, KAIFI apparently may seek to argue that "sensor network interface" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 80-82, 85-88, 151-153, 156-159.

Thus claims 3 and 7 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"sensor network interface protocol storage [for managing a rule for the message transfer protocol] (Claims 4, 7)

The '232 Patent does not provide adequate written description or enable the "sensor network interface protocol storage" recited in the claims. The '232 Patent specification's discussion of the "sensor network interface protocol storage" is extremely limited. It is described in a single paragraph, which simply states that the "sensor network interface protocol storage" "manages the message transfer protocol":

- '232 Patent at 6:37-47: Referring to FIG. 3, the sensor network abstraction unit **41** includes a sensor network interface **411**, *a sensor network interface protocol storage* **412**, and a sensor network monitor **413**. The sensor network interface **411** extracts the sensed data by referring to a message transfer protocol, and the *sensor network interface protocol storage* **412** manages the message transfer protocol. The sensor network monitor **413** performs a monitoring operation for a state management of the sensor network, based on the data received from the sensor network interface **411**.

This lone disclosure in the '232 Patent specification does not describe *how* a message transfer protocol is "managed" by the "message transfer protocol." And there is zero specification support for the concept of the "sensor network interface protocol storage" "*managing a rule* for the message transfer protocol," as is required by the claims. The only descriptions in the specification of "rules" (or other similar terms) relate to other concepts altogether, such as generating events. The '232 Patent specification thus does not demonstrate possession of the full scope of "sensor network interface protocol storage", nor does it enable the full scope of the claimed "sensor network interface protocol storage." The patent provides insufficient structure or information about how the "sensor network interface protocol storage" manages a rule for the message transfer protocol. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "sensor network interface protocol storage" claim limitations, KAIFI apparently may seek to

argue that "sensor network interface protocol storage" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 82-85, 153-156.

Thus claims 4 and 7 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"sensor network monitor [for monitoring a state of the sensor network, based on the data received from the sensor network interface]" (Claims 3, 5, 7, 9).

The '232 Patent does not provide adequate written description or enable the "sensor network monitor" recited in the claims. The '232 Patent specification's discussion of the "sensor network monitor" is minimal, and provides no disclosures, teachings, or practical guidance as to how this "sensor network monitor" structure actually performs the claimed function of "monitoring a state of the sensor network[,] based on the data received from the sensor network interface":

- '232 Patent at 6:37-46: Referring to FIG. 3, the sensor network abstraction unit **41** includes a sensor network interface **411**, a sensor network interface protocol storage **412**, and a <u>*sensor network monitor*</u> **413**. The sensor network interface **411** extracts the sensed data by referring to a message transfer protocol, and the sensor network interface protocol storage **412** manages the message transfer protocol. The <u>*sensor network monitor*</u> **413** performs a monitoring operation for a state management of the sensor network, based on the data received from the sensor network interface **411**.

- '232 Patent at 7:6-13: The application program interface **433** provides the application program **50** with the results processed by the <u>*sensor network monitor*</u> **413**, the sensed data analyzer **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431** in the information service form suitable for the application program **50**.

- ’232 Patent at 7:51-55: Referring to FIG. 5, in step S**501**, the *sensor network monitor* **413** of the sensor network abstraction unit **41** performs a monitoring operation for a state management of the sensor network based on the sensed data extracted through the sensor network interface **411**.

- ’232 Patent at 8:4-11: In step S**505**, the service process manager **432** of the service platform management unit **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the *sensor network monitor* **413**, the sensed data analyzer **421**, the event processor **422**, and the context information manager **423** through the application program interface **433** to the application program **50**.

The ’232 Patent specification does not demonstrate possession of the full scope of “sensor network monitor”, nor does it enable “sensor network monitor.” The patent provides insufficient structure or information about *how* the “sensor network monitor” monitors a state of the sensor network, based on the data received from the sensor network interface, much less showing possession or enabling all possible ways of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “sensor network monitor” claim limitations, KAIFI apparently may seek to argue that “sensor network monitor” is broad enough to encompass all possible ways to monitor a state of a sensor network based on data received. But the ’232 Patent does not teach or describe every possible form or manner of doing so. Based on KAIFI’s contentions, it appears that KAIFI may argue that this claim limitation is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 85-88, 100-104, 156-159, 171-176.

Thus, claims 3, 5, 7 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written

description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"sensed data analyzer [for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit]" (Claims 4, 5, 8, 9).

The '232 Patent does not provide adequate written description or enable the "sensed data analyzer" recited in the claims. The '232 Patent specification provides only high-level descriptions of a "sensed data analyzer," stating that the "sensed data analyzer" "performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit":

- '232 Patent at 6:47-49: The sensor network intelligence unit **42** includes a *sensed data analyzer* **421**, an event processor **422**, and a context information manager **423**.

- '232 Patent at 6:66-7:12: The service platform management unit **43** includes a directory service manager **431**, a service process manager **432**, and an application program interface **433**. The directory service manager **431** identifies and searches resources of the sensor network **20**. The service process manager **432** schedules and manages an operation order of the *sensed data analyzer* **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431**. The application program interface **433** provides the application program **50** with the results processed by the sensor network monitor **413**, the *sensed data analyzer* **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431** in the information service form suitable for the application program **50**.

- '232 Patent at 7:56-66: In step S**502**, the *sensed data analyzer* **421** of the sensor network intelligence unit **42** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. In step S**503**, the context information manager **423** of the sensor network intelligence unit **42** extracts object and environment information from the sensed data analyzed by the *sensed data analyzer* **421**, and generates the context aware information, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are related with the object and environment.

- '232 Patent at 8:4-11: In step S**505**, the service process manager **432** of the service platform management unit **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the *sensed data analyzer* **421**, the event processor **422**, and the context information

> manager **423** through the application program interface **433** to the application program **50**.

The ’232 Patent specification does not disclose, teach, give examples, or suggest any particular analysis operation(s) or explain how the “sensed data analyzer” “clean[s], classif[ies], and integrates” sensed data from the sensor network abstraction unit. And the patent provides insufficient structural disclosures and information about how the “sensed data analyzer” performs the recited function, much less showing possession of or enabling all possible ways of performing this function. Such high-level descriptions in the ’232 Patent specification do not demonstrate possession of the full scope of “sensed data analyzer”, nor do they enable the “sensed data analyzer” of the claims. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “sensed data analyzer” claim limitations, KAIFI apparently may seek to argue that “sensed data analyzer” is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 88-91, 93-96, 99-104, 159-162, 164-167, 170-176.

Thus, claims 4, 5, 8 and 9 are invalid for lack of proper written description and enablement. And further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

“event processor [for generating conditional events including notification and alarm]/[for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event]” (Claims 4, 5, 8, 9).

The ’232 Patent does not provide adequate written description or enable the “event processor” recited in the claims. The ’232 Patent specification includes only bare-bones, high-level descriptions of an “event processor,” describing it only generically and in functional terms:

- ’232 Patent at 6:47-55: The sensor network intelligence unit **42** includes a sensed data analyzer **421**, an *event processor* **422**, and a context information manager **423**. The sensed data manager **421** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. The *event processor* **422** *generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50** and manages the generated events*.

- ’232 Patent at 7:3-13: The service process manager **432** schedules and manages an operation order of the sensed data analyzer **421**, the *event processor* **422**, the context information manager **423**, and the directory service manager **431**. The application program interface **433** provides the application program **50** with the results processed by the sensor network monitor **413**, the sensed data analyzer **421**, the *event processor* **422**, the context information manager **423**, and the directory service manager **431** in the information service form suitable for the application program **50**.

- ’232 Patent at 7:59-8:3: In step S**503**, the context information manager **423** of the sensor network intelligence unit **42** extracts object and environment information from the sensed data analyzed by the sensed data analyzer **421**, and generates the context aware information, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are related with the object and environment. In step S**504**, the *event processor* **422** of the sensor network intelligence unit **42** *generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50**.*

- ’232 Patent at 8:4-11: In step S**505**, the service process manager **432** of the service platform management unit **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the sensed data analyzer **421**, the *event processor* **422**, and the context information manager **423** through the application program interface **433** to the application program **50**.

The ’232 Patent specification does not demonstrate possession of the full scope of “event processor [for generating conditional events including notification and alarm]/[for generating the event including the knowledge contents according to a rule set by the application program and

managing the generated event]", nor does it enable such a scope. The '232 Patent's bare-bones disclosures of the "event processor" only makes clear that it "generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50** and manages the generated events." But the '232 Patent fails to describe, teach, or suggest sufficient structure(s) or other information about how the "event processor" performs the functions of "generating conditional events including notification(s) and alarm" or "generating event[s] including the knowledge contents according to a rule set by the application program and managing the generated event." The '232 Patent provides no description or teachings of *how* these function(s) are performed by the "event processor," much less all ways in which these function(s) could be accomplished. And the '232 Patent contains no disclosure whatsoever with respect to the "event processor" generating events that "include[e] knowledge contents," as required by claim 8—much less any way in which this could be done. Indeed, the '232 Patent fails even to give a practical example of an "event" satisfying the claim language being generated. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "event processor" claim limitations, KAIFI apparently may seek to argue that "event processor" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 91-93, 99-104, 162-164, 170-176.

Thus, claims 4, 5, 8 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"context information manager [for sensing and generating the [context aware information]/[environment condition information], based on the sensed data analyzed by the sensed data analyzer]" (Claims 4, 5, 8, 9).

The '232 Patent does not provide adequate written description or enable the "context information manager" recited in the claims. The '232 Patent's disclosures relating to the "context information manager" are high-level, giving only functional information about the "context information manager," stating that this structure "senses and generates" context-aware information based on analyzed sensed data and some unspecified "context rule":

- '232 Patent at 6:47-58: The sensor network intelligence unit **42** includes a sensed data analyzer **421**, an event processor **422**, and a <u>*context information manager*</u> **423**. The sensed data manager **421** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. The event processor **422** generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50** and manages the generated events. The <u>*context information manager*</u> **423** *senses and generates the context aware information based on the analyzed sensed data information as well as the context rule in store which are related with the object and environment*.

- '232 Patent at 6:66-7:12: The service platform management unit **43** includes a directory service manager **431**, a service process manager **432**, and an application program interface **433**. The directory service manager **431** identifies and searches resources of the sensor network **20**. The service process manager **432** schedules and manages an operation order of the sensed data analyzer **421**, the event processor **422**, the <u>*context information manager*</u> **423**, and the directory service manager **431**. The application program interface **433** provides the application program **50** with the results processed by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, the <u>*context information manager*</u> **423**, and the directory service manager **431** in the information service form suitable for the application program **50**.

- '232 Patent at 7:51-8:3: In step S**502**, the sensed data analyzer **421** of the sensor network intelligence unit **42** performs an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit **41**. In step S**503**, the <u>*context information manager*</u> **423** of the sensor network intelligence unit **42** *extracts object and environment information from the sensed data analyzed by the sensed data analyzer **421**, and generates the context aware information, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are*

related with the object and environment. In step S**504**, the event processor **422** of the sensor network intelligence unit **42** generates the events, i.e., notification and alarm about a certain condition, according to the rule set by the application program **50**.

- ’232 Patent at 8:4-11: In step S**505**, the service process manager **432** of the service platform management unit **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, and the *context information manager* **423** through the application program interface **433** to the application program **50**.

The ’232 Patent specification provides no disclosures, teachings, or suggestions as to *how* the claimed function(s) could be practically accomplished—or what kinds of structure(s) perform these functions. For at least these reasons, the ’232 Patent does not demonstrate possession of the full scope of “context information manager [for sensing and generating the [context aware information]/[environment condition information], based on the sensed data analyzed by the sensed data analyzer]”, nor does it enable such a claim scope. The patent provides insufficient structure or information about how the “context information manager” senses and generates context aware information or environment condition information, based on the sensed data analyzed by the sensed data analyzer. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “context information manager” claim limitations, KAIFI apparently may seek to argue that “context information manager” is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 93-96, 99-100, 164-167, 170-176.

Thus, claims 4, 5, 8 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written

description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"directory service manager [for identifying and searching resources of the sensor network]" (Claims 5, 9).

The '232 Patent does not provide adequate written description or enable the "directory service manager" recited in the claims. The '232 Patent specification's disclosures contain only one paragraph that refers to this "directory service manager," which describes this structure only in terms of its function(s) of "identifying and searching resources of the sensor network":

- '232 Patent at 6:66-7:13: The service platform management unit **43** includes a *directory service manager* **431**, a service process manager **432**, and an application program interface **433**. The *directory service manager* **431** *identifies and searches resources of the sensor network* **20**. The service process manager **432** schedules and manages an operation order of the sensed data analyzer **421**, the event processor **422**, the context information manager **423**, and the *directory service manager* **431**. The application program interface **433** provides the application program **50** with the results processed by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, the context information manager **423**, and the *directory service manager* **431** in the information service form suitable for the application program **50**.

The '232 Patent specification provides no structural disclosures for the "directory service manager"; nor does it provide any disclosure, teaching, or practical suggestions for ways in which the "directory service manager" might actually perform the recited function of "identifying and searching resources of the sensor network." The '232 Patent does not demonstrate possession of the full scope of the "directory service manager" limitation, nor does it enable the full scope of such a "directory service manager" limitation. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "directory service manager" claim limitations, KAIFI apparently may seek to argue that "directory service manager" is broad enough to encompass a wide array IoT-related

structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 96-104, 167-176.

Thus claims 5 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

“service process manager [for scheduling and managing an operation [sequence]/[order] of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program]” (Claims 5, 9).

The ’232 Patent does not provide adequate written description or enable the “service process manager” recited in the claims. The ’232 Patent specification contains minimal references to “directory service manager,” describing it only generically and functionally, stating that it schedules and manages an “operation order” of the sensed data analyzer:

- ’232 Patent at 6:66-7:6: The service platform management unit **43** includes a directory service manager **431**, a <u>*service process manager*</u> **432**, and an application program interface **433**. The directory service manager **431** identifies and searches resources of the sensor network **20**. The <u>*service process manager*</u> **432** *schedules and manages an operation order of the sensed data analyzer* **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431**.

- ’232 Patent at 8:4-11: In step S**505**, the <u>*service process manager*</u> **432** of the service platform management unit **43** *schedules the operation order for providing the information to the application program* **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, and the context information manager **423** through the application program interface **433** to the application program **50**.

However, the ’232 Patent provides no structural information, disclosure, teaching, or practical suggestion for how the “service process manager” actually performs the recited function. The ’232 Patent specification does not demonstrate possession of the full scope of “service process manager”, nor does it enable “service process manager.” While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “service process manager” claim limitations, KAIFI apparently may seek to argue that “service process manager” is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 99-100, 170-171.

Thus claims 5 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

“application program interface [for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program]” (Claims 5, 9).

The ’232 Patent does not provide adequate written description or enable the “application program interface” recited in the claims. The ’232 Patent specification provides relatively little information regarding the “application program interface” and its operation:

- 232 Patent at 6:66-7:13: “The service platform management unit **43** includes a directory service manager **431**, a service process manager **432**, and an *application program interface* **433**. The directory service manager **431** identifies and searches resources of the sensor network **20**.

The service process manager **432** schedules and manages an operation order of the sensed data analyzer **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431**. The *application program interface* **433** provides the application program **50** with the results processed by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, the context information manager **423**, and the directory service manager **431** in the information service form suitable for the application program **50**."

- 232 Patent at 8:4-11: "In step S**505**, the service process manager **432** of the service platform management unit **43** schedules the operation order for providing the information to the application program **50** and provides the results processed based on the scheduled sequence by the sensor network monitor **413**, the sensed data analyzer **421**, the event processor **422**, and the context information manager **423** through the *application program interface* **433** to the application program **50**."

The '232 Patent specification does not demonstrate possession of the full scope of "application program interface [for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program]" or enable the same without undue experimentation. The patent provides essentially no information about *how* the "application program interface" provides an application program with results processed by the sensor network monitor, sensed data analyzer, event processor, context information manager, or the directory service manager in an information service form suitable for the application program, much less showing possession of or enabling all possible ways of doing son While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "application program interface" claim limitation, KAIFI apparently may seek to argue that "application program interface" is broad enough to encompass a wide array IoT-related structures, services, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 100-

104, 171-176 (citing various structures without identifying which one(s), if any, purportedly satisfy specific elements of the claim).

Thus claims 5 and 9 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support for this limitation, such dependent claims are likewise invalid for lack of proper written description and enablement.

"generating the event including the knowledge contents" (Claim 8).

The '232 Patent does not provide adequate written description or enable "generating the event including the knowledge contents" recited in the claims. As a preliminary matter, the second-to-last limitation of claim 8 recites "an event processor for generating the event ***including the knowledge contents*** according to a rule set by the application program and managing the generated event" but no other limitation in any of claims 6-8 provides an antecedent basis for "the knowledge contents." Further, the specification of the '232 Patent does not disclose, teach, explain, suggest, or even give an example of any particular way in which an event including knowledge contents could be generated, much less showing possession or enabling every conceivable way of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information/steps purportedly satisfy the "generating the event including the knowledge contents" claim limitation, KAIFI apparently may seek to argue that "generating the environment condition information" is broad enough to encompass a wide array IoT-related structures, services, steps, processes, or architectures, none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 162-164.

"generating the environment condition information" (Claim 8).

The '232 Patent does not provide adequate written description or enable "generating the environment condition information" recited in the claims. As a preliminary matter, the final limitation of claim 8 recites "a context information manager for sensing and generating ***the environment condition information***, based on the sensed data analyzed by the sensed data analyzer," but no other limitation in the claims provides an antecedent basis for "the environment condition information." Further, "environment condition information" does not appear anywhere in the specification of the '232 Patent; nor does it appear in any claim other than claim 8. Further, the '232 Patent specification does not disclose, teach, explain, suggest, or even give an example of a particular ways in which a "context information manager" could "sens[e] and generat[e] … environment condition information," much less showing possession or enabling every conceivable way of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information/steps purportedly satisfy the "generating the environment condition information" claim limitation, KAIFI apparently may seek to argue that "generating the environment condition information" is broad enough to encompass a wide array IoT-related structures, services, steps, processes, or architectures, none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 164-167.

Thus claim 8 is invalid for lack of proper written description and enablement. Further, because the claims depending from claim 8 fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"monitoring a state management of a sensor network [based on the data received from the sensor network]/[based on the data received from the sensor network interface]/[based on the extracted sensed data]" (Claims 3, 7, 10).

The '232 Patent does not provide adequate written description or enable "monitoring a state management of a sensor network," as recited in the claims. The '232 Patent provides little disclosure with respect to a middleware apparatus "monitoring a state management of a sensor network." The patent's disclosures provide no disclosures, teachings, or suggestions for how such a function might practically be accomplished, other than to say, vaguely and generically that it can be done "based on" data:

- '232 Patent at 2:49-67: In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and *monitoring a state management of a sensor network*, based on the extracted sensed data; b) performing an analysis operation to clean, classify and integrate the extracted sensed data; c) extracting object and environment information from the analyzed sensed data, and generating context aware information and circumstantial analysis information based on the extracted object and environment information; d) generating conditional events according to a rule set by an application program; e) scheduling an operation sequence for providing an information service to the application program; and f) providing the application program with the information service obtained according to the scheduled operation sequence, the information service including conditional events, context aware information, and circumstantial analysis information.

- '232 Patent at 6:37-46: Referring to FIG. 3, the sensor network abstraction unit **41** includes a sensor network interface **411**, a sensor network interface protocol storage **412**, and a sensor network monitor **413**. The sensor network interface **411** extracts the sensed data by referring to a message transfer protocol, and the sensor network interface protocol storage **412** manages the message transfer protocol. The sensor network monitor **413** performs a *monitoring operation for a state management of the sensor network*, based on the data received from the sensor network interface **411**.

- '232 Patent at 7:51-54: Referring to FIG. 5, in step S**501**, the sensor network monitor **413** of the sensor network abstraction unit **41** performs a *monitoring operation for a state management of the sensor network* based on the sensed data extracted through the sensor network interface **411**.

The ’232 Patent provides no disclosures describing *how* one could “monitor a state management of a sensor network.” And the ’232 Patent certainly does not demonstrate possession of the full scope of “monitoring a state management,” whether based on data received from a sensor network, data received from a sensor network interface, or extracted sensed data, nor does the ’232 Patent enable such claim scopes. The patent provides insufficient structure or information about how “state management of a sensor network” can be performed or monitored. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the “monitoring a state management of a sensor network” claim limitations, KAIFI apparently may seek to argue that “monitoring a state management of a sensor network” is broad enough to encompass a wide array IoT-related structures, services, architectures, steps, or processes, none of which are contemplated, described, or enabled by the specification of the ’232 Patent. *See e.g.*, Initial Infringement Contentions at App’x C at pp. 193-199.

Thus, claims 3, 7 and 10 are invalid for lack of proper written description and enablement. Further, because the claims depending from claims 3, 7 and 10 fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

“scheduling an operation sequence for providing an information service to the application program” (Claims 10, 12).

The ’232 Patent does not provide adequate written description or enable “scheduling an operation sequence,” as recited in the claims. The ’232 Patent’s disclosure contains only a single, high-level, functional discussion of “scheduling an operation sequence for providing an

information service to the application program," which simply indicates, without explanation, that it is done:

- '232 Patent at 2:49-67: In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation to clean, classify and integrate the extracted sensed data; c) extracting object and environment information from the analyzed sensed data, and generating context aware information and circumstantial analysis information based on the extracted object and environment information; d) generating conditional events according to a rule set by an application program; e) *scheduling an operation sequence for providing an information service to the application program*; and f) providing the application program with the information service obtained according to the scheduled operation sequence, the information service including conditional events, context aware information, and circumstantial analysis information.

The '232 Patent provides no disclosure, teaching, or suggestion for how this function could be practically accomplished; nor does it provide any meaningful description of structures that would perform this function. The '232 Patent specification does not demonstrate possession of or enable the full scope of "scheduling an operation sequence for providing an information service to the application program"; nor does it describe what "operation sequence(s)" could be scheduled, or what structure(s) would perform this function. The patent provides insufficient structure or description of how the "operation sequence" is used in providing an information service to the application program. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information purportedly satisfy the "operation sequence" claim limitations, KAIFI apparently may seek to argue that the "operation sequence" of the claims is broad enough to encompass a wide array IoT-related structures, services, architectures, structures, or processes, none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions at App'x C at pp. 216-232, 244-252.

Thus claims 10 and 12 are invalid for lack of proper written description and enablement. Further, because the claims depending from these claims fail to provide any additional written description or enablement support, such dependent claims are likewise invalid for lack of proper written description and enablement.

"analyzes sensed data from the sensor network in association with predefined legacy data" (Claim 11).

The '232 Patent does not provide adequate written description or enable the "analyzes sensed data from the sensor network in association with predefined legacy data" limitation recited in the claim 11. As an initial matter, the disclosures of the '232 Patent provide only a single passing reference to the use of "predefined legacy data":

- 232 Patent at 6:59-65: "In order to generate the events, i.e., notification and alarm about a certain condition, and the context aware information, the sensor network intelligence unit **42** may analyze only the sensed data from a single specific sensor network, or analyze a combination of sensed data from a plurality of heterogeneous sensor networks, or *analyze the sensed data from the sensor network in association with predefined legacy data.*"

This single disclosure from the '232 Patent specification with respect to "predefined legacy data" describes analyzing such data in order to generate *events*, but it does not disclose or teach using any such information in "performing an analysis operation to clean, classify and integrate the extracted sensed data," as recited in claim 11. The '232 Patent therefore does not demonstrate possession of the full scope of "analyzes sensed data from the sensor network in association with predefined legacy data" claim limitation, nor does it enable a method for generating an information service in which an analysis operation to clean, classify, and integrate extracted sensed data can be performed to analyze sensed data from the sensor network in association with "predefined legacy data" without undue experimentation. Further, the patent provides no information about how, when, or by whom/what the "legacy data" is "predefined"; nor does it explain how an analysis

operation can be done to analyze sensed data "in association with" predefined legacy data, much less showing possession or enabling all ways of doing so. While KAIFI has avoided taking a position in its Initial Infringement Contentions regarding what accused structures/instrumentalities/information/steps purportedly satisfy the "analyzes sensed data from the sensor network in association with predefined legacy data" claim limitation, KAIFI apparently may seek to argue that "analyzes sensed data from the sensor network in association with predefined legacy data" is broad enough to encompass a wide array IoT-related structures, services, steps, processes, or architectures none of which are contemplated, described, or enabled by the specification of the '232 Patent. *See e.g.*, Initial Infringement Contentions, App'x C at pp. 233-243.

Thus claim 11 is invalid for lack of proper written description and enablement.

2. Indefiniteness

"A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). The patent itself must "describe the exact scope of an invention." *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 373 (1996). "The definiteness requirement must take into account the inherent limitations of language," but at the same time, "a patent must be precise enough to afford clear notice of what is claimed." *Nautilus, Inc.*, 134 S.Ct. at 2128-29.

The following claim terms of the '232 Patent are indefinite because they fail to inform a person of ordinary skill the scope of the invention with reasonable certainty:

"sensor network data transmitter [for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form]" (Claims 1, 2)[2]

Claims 1 and 2 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "sensor network data transmitter [for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "sensor network data transmitter" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph. Although not employing the word "means," "sensor network data transmitter" is a similar generic or nonce term, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "sensor network data transmitter" does not have a known, generally accepted meaning in the art, let alone a known structure. The claim language surrounding "sensor network data transmitter" in the asserted claims describes it in purely functional terms. The "sensor network data transmitter" of the asserted claims performs the function(s) of: "collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form," claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003).

[2] In these headings, Defendants identify the claim(s) that contain the particular term(s) being discussed. It should be understood that all claims that depend from the identified claim(s) are also invalid on the same grounds and for the same reasons, as the relevant dependent claims do not provide additional clarity to these claim term(s), add additional limitations that resolve the indefiniteness, or provide structural information resolving any indefiniteness of the claims.

The ’232 Patent specification fails to provide adequate corresponding structure. At best, the ’232 Patent discloses as corresponding structure a general purpose “computer” running “programs [] stored in a computer-readable recording medium that can execute the programs.” *See* ’232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic “computer” and “programs” could be considered corresponding structure for the “sensor network data transmitter” claim limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the ’232 Patent for the claims reciting a “sensor network data transmitter” to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the ’232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the ’232 Patent claims that recite a “sensor network data transmitter,” either directly or via claim dependencies.

The “sensor network data transmitter [for collecting sensed data sensed by the sensor in real-time and transmitting the collected sensed data in a message form]” is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the ’232 Patent. A person of ordinary skill in the art, considering the ’232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. “Sensor network data transmitter” had no generally accepted or known meaning in the art as of the time of the ’232 Patent, and the ’232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous. For these additional reasons, the

claims reciting "sensor network data transmitter" either directly or via claim dependencies, are indefinite (regardless of whether the "sensor network data transmitter" limitations are means-plus-function limitations).

"Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" (Claims 1, 2, 6, 7, 8, 9, 10).

Claims 1, 2, 6, 7, 8, 9 and 10 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "ubiquitous sensor network (USN) middleware [apparatus]" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph. Although not employing the word "means," "ubiquitous sensor network (USN) middleware" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. Further, claim 6 and its dependent claims recite a "ubiquitous sensor network (USN) middleware *apparatus*." The

Federal Circuit, Eastern District of Texas, and other federal courts have all found "apparatus" to be a non-structural generic placeholder that can replace "means for" to overcome the presumption against apply § 112, sixth paragraph. In addition, "ubiquitous sensor network (USN) middleware [apparatus]" does not have a known, generally accepted meaning in the art, let alone a known structure. The claim language surrounding "ubiquitous sensor network (USN) middleware [apparatus]" in the asserted claims describes it in purely functional terms. The "ubiquitous sensor network (USN) middleware [apparatus]" of the asserted claims performs the function(s) of: "extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program" (claim 1 and dependents) and/or "generating an information service based on heterogenous sensor networks" (claim 6 and dependents), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). The '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding

structure for the "ubiquitous sensor network (USN) middleware [apparatus]" claim limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "ubiquitous sensor network (USN) middleware [apparatus]" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the '232 Patent claims that recite a "ubiquitous sensor network (USN) middleware [apparatus]," either directly or via claim dependencies.

The "Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the

extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe describes it only in high-level, functional terms, which are themselves ambiguous. For these additional reasons, the claims reciting "Ubiquitous Sensor Network (USN) middleware [apparatus] [for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, and knowledge contents from the extracted object and environment information, and providing the information service to an application program] / [for generating an information service based on heterogenous sensor networks]" either directly or via claim dependencies, are indefinite (regardless of whether the "Ubiquitous Sensor Network (USN) middleware [apparatus]" limitations are means-plus-function limitations).

"cleaning, classifying and integrating the message received from the sensor network data transmitter" / "clean, classify and integrate the sensed data [processed]/[extracted] by the sensor network abstraction unit" / "clean, classify and integrate the extracted sensed data" (Claims 1, 2, 4, 6, 8, 10, 11)

Claims 1, 2, 4, 6, 8, 10, 11 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of the "clean[ing], classify[ing] and integrat[ing]" claim terms in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what it means to "clean," "classify," or "integrate" a message or sensed data, nor do they provide any concrete examples of ways in which such actions could be performed.

The ’232 Patent specification provides only high-level discussion of “clean[ing], classify[ing] and integrat[ing]” but without defining or providing context or scope for this claim term/phrase. The relevant statements from the specification regarding “clean[ing], classify[ing] and integrat[ing]” simply indicate that these action(s) are done, without meaningful elaboration or explanation. For example:

- ’232 Patent at 2:49-56: In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation *to clean, classify and integrate the extracted sensed data*; . . . .

- ’232 Patent at 5:5-13: The sensor network intelligence unit **42** includes a sensed data analyzer **421**, an event processor **422**, and a context information manager **423**. The sensed data manager **421** performs an analysis operation *to clean, classify and integrate the sensed data* processed by the sensor network abstraction unit **41**.

- ’232 Patent at 7:30-37: The USN middleware apparatus **40** extracts the operation state of the sensor network **20** and the sensed data from the message received from the sensor network **20** in step S**403**, performs an analysis operation *to clean, classify and integrate the extracted sensed data* in step S**404**, extracts the object and environment information S**405**, and generates the events, i.e., notification and alarm about a certain condition, and the context aware information, according to the rule set by the application program **50** in step S**406**.

A POSITA would not be able to determine what constitutes the outer bounds of the “clean[ing], classify[ing] and integrat[ing]” claim limitations. And “clean[ing], classify[ing] and integrat[ing]” does not have a known, generally accepted meaning in the art. Because a POSITA would be unable to determine the scope and meaning of “clean[ing], classify[ing] and integrat[ing],” or any of the constituent terms therein, the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

“generating [the] conditional events” (claims 1, 2, 4).

Claims 1, 2 and 4 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "generating [the] conditional events" in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what the "conditional events" of the claims encompass. The '232 Patent specification provides only high-level discussion of "conditional events," but without defining providing sufficient information regarding the scope of this term. And "conditional events" does not have a known, generally accepted meaning in the art. Examples of statements from the specification regarding "conditional events" include:

- '232 Patent at 2:34-48: In accordance with another aspect of the present invention, there is provided a USN middleware apparatus for offering an information service based on heterogeneous sensor networks, including: a sensor network abstraction unit for extracting sensed data from a message received from a sensor network; a sensor network intelligence unit for extracting low-level information including the object properties and environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and *generating high-level information including conditional events*, context aware information, and circumstantial analysis information from the extracted low-level information; and a service platform management unit for providing the information to the application program in a form suitable for the application program.

- '232 Patent at 2:49-67: "a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation to clean, classify and integrate the extracted sensed data; c) extracting object and environment information from the analyzed sensed data, and generating context aware information and circumstantial analysis information based on the extracted object and environment information; d) *generating conditional events according to a rule set by an application program*; e) scheduling an operation sequence for providing an information service to the application program; and f) providing the application program with the information service obtained according to the scheduled operation sequence, the information service including *conditional events*, context aware information, and circumstantial analysis information."

- ’232 Patent at 3:11-19: “In addition, the interface with a plurality of sensor networks can be supported in the present invention. Therefore, information service about a specific position can be provided by analyzing the sensed data from a corresponding sensor network, while high-level information such as context aware information and *conditional events about a wide area also can be provided* by analyzing the sensed data collection obtained from the relevant multiple sensor networks.”

- ’232 Patent at 4:21-29: “Then, the USN middleware apparatus **40** provides an information service by *generating high-level information, i.e., conditional events*, context aware information, and circumstantial analysis information from the extracted low-level information. Using the information from the USN middleware apparatus **40** including both the low-level and high-level information, the application program provides the user with information related to the environment where the sensor network **20** observes.”

- ’232 Patent at 5:51-60: In order to provide specific information required by the application program **50**, the sensor network intelligence unit **42** classifies the sensed data collected by the sensor nodes **10** of the sensor network **20** and *generates conditional events*, i.e., notification of a specific error and alarm of crucial state, and context aware information, i.e., detection of invasion and the best position for arousing customers' interest. In order to generate more relevant information, the sensor network intelligence unit **42** may use a predetermined rule set by the application program **50**.

- 232 Patent at 6:1-18:

TABLE 1

Classification	Analysis of sensed data and generation of information	Description
Conditional Events generated by USN middleware apparatus	Provide alarm (“low temperature: 13.5”) for average temperature value	Application has already set a predetermined rule: alarm is generated to application program when average temperature for latest 1 hour is below 14° C.

In view of the ’232 Patent’s disclosures, A POSITA would not be able to determine what constitutes the outer bounds of “generating [the] conditional events.” Because a POSITA would

be unable to determine the scope and meaning of "conditional events," the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

"generating . . . context aware information" (claims 1, 2, 4, 6, 10, 12).

Claims 1, 2, 4, 6, 10, 12 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "generating . . . context aware information" in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what the "context aware information" of the claims encompasses. The '232 Patent specification provides only high-level discussion of "context aware information," but without defining or providing sufficient information regarding the scope of this term. Examples of statements from the specification regarding "context aware information" include:

- '232 Patent at 1:21-33: The present invention relates to a Ubiquitous Sensor network (USN) middleware apparatus and method for generating information based on data transmitted from heterogeneous sensor networks and a system for providing the information service using the same; and, more particularly, to a USN middleware apparatus for collecting sensed data from sensor nodes of heterogeneous sensor networks, analyzing and processing sensed data, e.g., temperature, humidity, pressure, motion, and acceleration, generating events and *context aware information*, and providing the information to users through an application program, a method thereof, and an information service providing system employing the same.

- 232 Patent at 3:1-10 : In accordance with another aspect of the present invention, the USN middleware apparatus processes and manages a large amount of sensed data collected from the heterogeneous sensor networks between the sensor network and the application program, generates the real-time events and *context aware information* related to the environment condition by analyzing the collected sensed data, and provides the information service suitable for the application program. Therefore, a plurality of sensor networks can be utilized more easily in the USN environment.

- 232 Patent at 3:11-19 : In addition, the interface with a plurality of sensor networks can be supported in the present invention. Therefore, information service about a specific position can be provided by analyzing the sensed data from a corresponding sensor network, while high-level information such as *context aware*

information and conditional events about a wide area also can be provided by analyzing the sensed data collection obtained from the relevant multiple sensor networks.

- 232 Patent at 4:16-29: Then, the USN middleware apparatus **40** provides an information service by generating high-level information, i.e., conditional events, *context aware information*, and circumstantial analysis information from the extracted low-level information. Using the information from the USN middleware apparatus **40** including both the low-level and high-level information, the application program provides the user with information related to the environment where the sensor network **20** observes.

- 232 Patent at 4:40-44: In addition, the USN middleware apparatus processes the sensed data to generate events and *context aware information* desired by the application program **50**, and provides the information to the application program.

- 232 Patent at 5:5-13: The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and generates conditional events, *context aware information*, and the other knowledge contents such as circumstantial analysis information.

- '232 Patent at 5:51-57: In order to provide specific information required by the application program **50**, the sensor network intelligence unit **42** classifies the sensed data collected by the sensor nodes **10** of the sensor network **20** and generates conditional events, i.e., notification of a specific error and alarm of crucial state, and *context aware information*, i.e., detection of invasion and the best position for arousing customers' interest.

- '232 Patent at 7:59-66: In step S**503**, the context information manager **423** of the sensor network intelligence unit **42** extracts object and environment information from the sensed data analyzed by the sensed data analyzer **421**, and generates the *context aware information*, i.e., situation recognition information, based on the extracted object and environment information as well as the as the context rule in store which are related with the object and environment.

Further, in at least two places in the specification, the '232 Patent describes "context aware information" and then provides an "*i.e.*" description of what "context aware information" means in the patent, but these descriptions are not internally consistent and provide a POSITA with no guidance as to the meaning of this term. *Compare* "context aware information, i.e., detection of invasion and the best position for arousing customers' interest" *with* "context aware information,

i.e., situation recognition information." '232 Patent at 5:51-57; 7:59-66. Further, "context aware information" does not have a known, generally accepted meaning in the art.

Given this, a POSITA would not be able to determine what constitutes the outer bounds of "generating . . . context aware information." Because a POSITA would be unable to determine the scope and meaning of "generating . . . context aware information," the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

"generating . . . knowledge contents" (Claims 1, 8, 10).

Claims 1, 8, and 10 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "knowledge contents" in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what the "knowledge contents" of the claims actually encompasses. The '232 Patent specification provides only high-level discussion of "knowledge contents," giving some examples of "knowledge contents but without defining or providing sufficient guidance regarding the scope of this term:

- '232 Patent at 2:17-33: "a Ubiquitous Sensor Network (USN) middleware for extracting object and environment information by cleaning, classifying and integrating the message received from the sensor network data transmitter, generating conditional events, context aware information, circumstantial analysis information, and the *other relevant knowledge contents* from the extracted object and environment information, and providing the information service to an application program, the application program providing a user with information related to environment where the sensor network observes or is installed."

- '232 Patent at 5:1-12: "The USN middleware apparatus **40** includes a sensor network abstraction unit **41**, a sensor network intelligence unit **42**, and a service platform management unit **43**. The sensor network abstraction unit **41** extracts the sensed data from the message received from the gateway **30**. The sensor network intelligence unit **42** extracts the object properties and the environment state information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**, and generates conditional events, context aware information, and the other *knowledge contents such as circumstantial analysis information*.

- ’232 Patent at 5:39-43: The sensor network intelligence unit **42** generates conditional events, context aware information, and <u>*other knowledge contents*</u> by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit **41**.

A POSITA would not be able to determine what constitutes the outer bounds of “knowledge contents.” For example, based on these descriptions in the specification, it is unclear whether “knowledge contents” also includes “conditional events,” “context aware information,” and/or “circumstantial analysis information,” claim terms that are themselves vague and indefinite. Because a POSITA would be unable to determine the scope and meaning of “generating . . . knowledge contents,” the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

“sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]” (Claims 2, 3, 4, 6, 7, 8).

Claims 2, 3, 4, 6, 7 and 8 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of “sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]” in light of the specification and prosecution history of the ’232 Patent. As recited in the asserted claims, “sensor network abstraction unit” describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph. Although not employing the word “means,” “sensor network abstraction unit” uses the similar nonce term “unit,” which can—and in this case *does*—operate as a substitute for “means” in the context of § 112, sixth paragraph. The Federal Circuit, Eastern District of Texas, and other federal courts have all found “unit” to be a non-structural generic placeholder that can replace “means for” to overcome the presumption against apply § 112, sixth paragraph. In addition, “sensor network abstraction unit” does not have a known, generally accepted meaning in the art, let alone a

known structure. The claim language surrounding "sensor network abstraction unit" in the asserted claims describes it in purely functional terms. The "sensor network abstraction unit" of the asserted claims performs the function(s) of: "extracting the sensed data from the message received from the sensor network data transmitter" (claim 2 and dependents); and/or "extracting sensed data from a message received from a sensor network" (claim 6 and dependents), claimed function(s) that are themselves vague and ill-defined.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). The '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "sensor network abstraction unit" claim limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "sensor network abstraction unit" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the '232 Patent claims that recite a "sensor

network abstraction unit," either directly or via claim dependencies.

The "sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]" is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Sensor network abstraction unit" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims and file history describe it only in high-level, functional terms, which are themselves ambiguous. For these additional reasons, the claims reciting "sensor network abstraction unit [for extracting the sensed data from [a]/[the] message received from the [sensor network]/[sensor network data transmitter]" either directly or via claim dependencies, are indefinite (regardless of whether the "sensor network abstraction unit" limitations are means-plus-function limitations).

"sensor network intelligence unit [for extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information from the extracted object and environment information]/ for extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information]" (Claims 2, 4, 6, 8).

Claims 2, 4, 6 and 8 (and all claims that depend therefrom) are indefinite because a

POSITA would not be able to determine with reasonable certainty the scope of "sensor network intelligence unit [for extracting [the] object and environment information by [analyzing the sensed data extracted by the sensor network abstraction unit]/[performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "sensor network intelligence unit" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "sensor network intelligence unit" uses the similar nonce term "unit," which operates as a substitute for "means" in the context of § 112, sixth paragraph. The Federal Circuit, Eastern District of Texas, and other federal courts have all found "unit" to be a non-structural generic placeholder that can replace "means for" to overcome the presumption against apply § 112, sixth paragraph. In addition, "sensor network intelligence unit" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. The claim language surrounding "sensor network intelligence unit" in the asserted claims describes it in purely functional terms. As recited in the claims, the "sensor network intelligence unit" performs the function(s) of: "extracting the object and environment information by analyzing the sensed data extracted by the sensor network abstraction unit, and generating the conditional events including notification and alarm about a certain condition, and the context aware information form [sic] the extracted object and environment information" (claim 2 and dependents), and/or "extracting object and environment information by performing an analysis operation to clean, classify and integrate the sensed data extracted by the sensor network abstraction unit, and generating an event, including notification and alarm, and context aware information from the extracted object and environment information" (claim 6 and

dependents), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "sensor network intelligence unit" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "sensor network intelligence unit" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "sensor network intelligence unit," either directly or via claim dependencies.

The "sensor network intelligence unit" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine

the scope of this claim term/limitation with reasonable certainty. "Sensor network intelligence unit" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous. For these additional reasons, the claims reciting "sensor network intelligence unit" either directly or via claim dependencies, are indefinite (regardless of whether the "sensor network intelligence unit" limitations are means-plus-function limitations).

"service platform management unit [for providing the event and the context aware information to the application program in a form suitable for the application program]" (Claims 2, 5, 6, 9)

Claims 2, 5, 6 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "service platform management unit [for providing the event and the context aware information to the application program in a form suitable for the application program]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "service platform management unit" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "service platform management unit" uses the similar nonce term "unit," which operates as a substitute for "means" in the context of § 112, sixth paragraph. The Federal Circuit, Eastern District of Texas, and other federal courts have all found "unit" to be a non-structural generic placeholder that can replace "means for" to overcome the presumption against apply § 112, sixth paragraph. In addition, "service platform management unit" does not have a known, generally accepted meaning in the art, let alone a known structural

meaning. And the language surrounding "service platform management unit" in the asserted claims describes it in purely functional terms. The "service platform management unit" of the asserted claims performs the function(s) of: "providing the events and the context aware information to the application program in a form suitable for the application program" (claims 2, 6), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "service platform management unit" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "service platform management unit" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "service platform management unit," either directly or via claim dependencies.

The "service platform management unit" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Service platform management unit" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous. For these additional reasons, the claims reciting "service platform management unit" either directly or via claim dependencies, are indefinite (regardless of whether the "service platform management unit" limitations are means-plus-function limitations).

"sensor network interface [for extracting the sensed data by referring to a message transfer protocol]" (Claims 3, 7).

Claims 3 and 7 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "sensor network interface [for extracting the sensed data by referring to a message transfer protocol]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "sensor network interface" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," the "sensor network interface" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "sensor network interface" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the

language surrounding "sensor network interface" in the asserted claims describes it in purely functional terms. The "sensor network interface" of the asserted claims performs the function(s) of: "extracting the sensed data by referring to a message transfer protocol" (claims 3, 7), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite. The '232 Patent provides only limited discussion regarding the "sensor network interface," and provides only a functional disclosure without any specific structure:

- '232 Patent at 6:37-46: Referring to FIG. 3, the sensor network abstraction unit **41** includes a *sensor network interface* **411**, a sensor network interface protocol storage **412**, and a sensor network monitor **413**. The *sensor network interface* **411** extracts the sensed data by referring to a message transfer protocol, and the sensor network interface protocol storage **412** manages the message transfer protocol. The sensor network monitor **413** performs a monitoring operation for a state management of the sensor network, based on the data received from the *sensor network interface* **411**.

- '232 Patent at 7:51-55: Referring to FIG. 5, in step S**501**, the sensor network monitor **413** of the sensor network abstraction unit **41** performs a monitoring operation for a state management of the sensor network based on the sensed data extracted through the *sensor network interface* **411**.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "sensor network interface" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent

for the claims reciting a "sensor network interface" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "sensor network interface," either directly or via claim dependencies.

The "sensor network interface" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Sensor network interface protocol storage" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "sensor network interface protocol storage" either directly or via claim dependencies, are indefinite (regardless of whether the "sensor network interface protocol storage" limitations are means-plus-function limitations).

"sensor network interface protocol storage [for managing a rule for the message transfer protocol]" (Claims 4, 7)

Claims 4 and 7 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "sensor network interface protocol storage [for managing a rule for the message transfer protocol]" in light of the

specification and prosecution history of the ’232 Patent. As recited in the asserted claims, “sensor network interface protocol storage” describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word “means,” “sensor network interface protocol storage” is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for “means” in the context of § 112, sixth paragraph. In addition, “sensor network interface protocol storage” does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding “sensor network interface protocol storage” in the asserted claims describes it in purely functional terms. The “sensor network interface protocol storage” of the asserted claims performs the function(s) of: “managing a rule for the message transfer protocol” (claims 3, 7), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must “clearly link or associate” the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the ’232 Patent specification fails to provide adequate corresponding structure. At best, the ’232 Patent discloses as corresponding structure a general purpose “computer” running “programs [] stored in a computer-readable recording medium that can execute the programs.” *See* ’232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic “computer” and “programs” could be considered corresponding structure for the “sensor network interface protocol storage” limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in

the ’232 Patent for the claims reciting a “sensor network interface protocol storage” to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the ’232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite “sensor network interface protocol storage,” either directly or via claim dependencies.

The “sensor network interface protocol storage” limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the ’232 Patent. A person of ordinary skill in the art, considering the ’232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. “Sensor network interface protocol storage” had no generally accepted or known meaning in the art as of the time of the ’232 Patent, and the ’232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting “sensor network interface protocol storage” either directly or via claim dependencies, are indefinite (regardless of whether the “sensor network interface protocol storage” limitations are means-plus-function limitations).

“sensor network monitor [for monitoring a state of the sensor network, based on the data received from the sensor network interface]” (Claims 3, 5, 7, 9).

Claims 3, 5, 7 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of “sensor network monitor [for monitoring a state of the sensor network, based on the data received from the sensor

network interface]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "sensor network monitor" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "sensor network monitor" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "sensor network monitor" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "sensor network monitor" in the asserted claims describes it in purely functional terms. The "sensor network monitor" of the asserted claims performs the function(s) of: "monitoring a state of the sensor network, based on the data received from the sensor network interface," claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "sensor network monitor" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "sensor network monitor" to be definite under 35 U.S.C. § 112, second

paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "sensor network monitor," either directly or via claim dependencies.

The "sensor network monitor" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Sensor network monitor" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "sensor network monitor" either directly or via claim dependencies, are indefinite (regardless of whether the "sensor network monitor" limitations are means-plus-function limitations).

"sensed data analyzer [for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit]" (Claims 4, 5, 8, 9).

Claims 4, 5, 8 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "sensed data analyzer [for performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "sensed data analyzer" describes a

means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "sensed data analyzer" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "sensed data analyzer" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "sensed data analyzer" in the asserted claims describes it in purely functional terms. The "sensed data analyzer" of the asserted claims performs the function(s) of: "performing an analysis operation to clean, classify and integrate the sensed data processed by the sensor network abstraction unit," claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "sensed data analyzer" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "sensed data analyzer" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such

algorithm(s) are disclosed anywhere in the specification disclosure of the ’232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite “sensed data analyzer,” either directly or via claim dependencies.

The “sensed data analyzer” limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the ’232 Patent. A person of ordinary skill in the art, considering the ’232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. “Sensed data analyzer” had no generally accepted or known meaning in the art as of the time of the ’232 Patent, and the ’232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting “sensed data analyzer” either directly or via claim dependencies, are indefinite (regardless of whether the “sensed data analyzer” limitations are means-plus-function limitations).

“event processor [for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events]/[for generating the event including the knowledge contents according to a rule set by the application program and managing the generated event]” (Claims 4, 5, 8, 9).

Claims 4, 5, 8 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of “event processor [for generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events]/[for generating the event including the knowledge contents according to a rule set by the application program and managing the

generated event]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "event processor" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "event processor" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "event processor" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "event processor" in the asserted claims describes it in purely functional terms. The "event processor" of the asserted claims performs the function(s) of: "generating the conditional events including notification and alarm according to a rule set by the application program and managing the generated events" (claim 4 and dependents); and/or "generating the event including the knowledge contents according to a rule set by the application program and managing the generated event" (claim 8 and dependents), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding

structure for the "event processor" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "event processor" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "event processor," either directly or via claim dependencies.

The "event processor" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Event processor" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "event processor" either directly or via claim dependencies, are indefinite (regardless of whether the "event processor" limitations are means-plus-function limitations).

"context information manager [for sensing and generating the [context aware information]/[environment condition information], based on the sensed data analyzed by the sensed data analyzer]" (Claims 4, 5, 8, 9).

Claims 4, 5, 8 and 9 (and all claims that depend therefrom) are indefinite because a

POSITA would not be able to determine with reasonable certainty the scope of "context information manager [for sensing and generating the [context aware information]/[environment condition information], based on the sensed data analyzed by the sensed data analyzer]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "context information manager" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "context information manager" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "context information manager" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "context information manager" in the asserted claims describes it in purely functional terms. The "context information manager" of the asserted claims performs the function(s) of: "sensing and generating the context aware information, based on the sensed data analyzed by the sensed data analyzer" (claim 4 and dependents) and/or "sensing and generating the environment condition information, based on the sensed data analyzed by the sensed data analyzer" (claim 8 and dependents), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running

"programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "context information manager" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "context information manager" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "context information manager," either directly or via claim dependencies.

The "context information manager" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Context information manager" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "context information manager" either directly or via claim dependencies, are indefinite (regardless of whether the "context information manager" limitations are means-plus-function limitations).

"directory service manager [for identifying and searching resources of the sensor network]" (Claims 5, 9).

Claims 5 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "directory service manager [for identifying and searching resources of the sensor network]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "directory service manager" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," "directory service manager" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "directory service manager" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "directory service manager" in the asserted claims describes it in purely functional terms. The "directory service manager" of the asserted claims performs the function(s) of: "identifying and searching resources of the sensor network," claimed function(s) that are themselves vague.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs."

See ’232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic “computer” and “programs” could be considered corresponding structure for the “directory service manager” limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the ’232 Patent for the claims reciting a “directory service manager” to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the ’232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite “directory service manager,” either directly or via claim dependencies.

The “directory service manager” limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the ’232 Patent. A person of ordinary skill in the art, considering the ’232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. “Directory service manager” had no generally accepted or known meaning in the art as of the time of the ’232 Patent, and the ’232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting “directory service manager” either directly or via claim dependencies, are indefinite (regardless of whether the “directory service manager” limitations are means-plus-function limitations).

“service process manager [for scheduling and managing an operation [sequence]/[order] of the sensed data analyzer, the event processor, the context information

manager, and the directory service manager in order to obtain a desired information service according to the application program]" (Claims 5, 9).

Claims 5 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "service process manager [for scheduling and managing an operation [sequence]/[order] of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "service process manager" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," the "service process manager" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "service process manager" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "service process manager" in the asserted claims describes it in purely functional terms. The "service process manager" of the asserted claims performs the function(s) of: "scheduling and managing an operation [sequence]/[order] of the sensed data analyzer, the event processor, the context information manager, and the directory service manager in order to obtain a desired information service according to the application program" (claims 5, 9 and dependents), claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function.

Med. Instrumentation and Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "service process manager" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "service process manager" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "service process manager," either directly or via claim dependencies.

The "service process manager" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine the scope of this claim term/limitation with reasonable certainty. "Service process manager" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "service

process manager" either directly or via claim dependencies, are indefinite (regardless of whether the "service process manager" limitations are means-plus-function limitations).

"application program interface [for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program]" (Claims 5, 9).

Claims 5 and 9 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "application program interface [for providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable for the application program]" in light of the specification and prosecution history of the '232 Patent. As recited in the asserted claims, "application program interface" describes a means-plus-function claim limitation governed by 35 U.S.C. § 112, sixth paragraph.

Although not employing the word "means," the "application program interface" is a similar generic or nonce phrase, lacking in definite structure, which operates as a substitute for "means" in the context of § 112, sixth paragraph. In addition, "application program interface" does not have a known, generally accepted meaning in the art, let alone a known structural meaning. And the language surrounding "application program interface" in the asserted claims describes it in purely functional terms. The "application program interface" of the asserted claims performs the function(s) of: "providing the application program with the results processed by the sensor network monitor, the sensed data analyzer, the event processor, the context information manager, and the directory service manager in an information service form suitable

for the application program," claimed function(s) that are themselves vague and indefinite.

In order for a means-plus-function claim limitation to be definite, the patent specification must disclose adequate corresponding structure to perform the claimed function(s). Further, the specification must "clearly link or associate" the disclosed structure with the claimed function. *Med. Instrumentation and Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1211 (Fed. Cir. 2003). But the '232 Patent specification fails to provide adequate corresponding structure. At best, the '232 Patent discloses as corresponding structure a general purpose "computer" running "programs [] stored in a computer-readable recording medium that can execute the programs." *See* '232 Patent at 8:13-17. This is insufficient, and the affected claims are therefore indefinite.

Even if a generic "computer" and "programs" could be considered corresponding structure for the "application program interface" limitation—and they should not be—algorithms sufficient to perform the claimed function(s) would still need to be disclosed in the '232 Patent for the claims reciting a "application program interface" to be definite under 35 U.S.C. § 112, second paragraph. *See, e.g.*, *NetMoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1329, 1367 (Fed. Cir. 2008); *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-85 (Fed. Cir. 2009). No such algorithm(s) are disclosed anywhere in the specification disclosure of the '232 Patent. The absence of disclosed structure, including one or more algorithms, sufficient to perform the claimed function(s), renders indefinite the claims that recite "application program interface," either directly or via claim dependencies.

The "application program interface" limitation is further indefinite because it is an ambiguous claim term/limitation whose meets and bounds would not have been apparent to a person of ordinary skill in the art as of the time of the purported inventions of the '232 Patent. A person of ordinary skill in the art, considering the '232 Patent, would not be able to determine

the scope of this claim term/limitation with reasonable certainty. "Application program interface" had no generally accepted or known meaning in the art as of the time of the '232 Patent, and the '232 Patent specification, claims, and file history describe it only in high-level, functional terms, which are themselves ambiguous and indefinite. For these additional reasons, the claims reciting "application program interface" either directly or via claim dependencies, are indefinite (regardless of whether the "application program interface" limitations are means-plus-function limitations).

"generating the event including the knowledge contents" (Claim 8).

Claim 8 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "generating the event including the knowledge contents" in light of the specification and prosecution history of the '232 Patent. As a preliminary matter, "generating the event including ***the knowledge contents***" is indefinite and invalid for lack of an antecedent basis, and no antecedent basis can be implied or understood for this term in the context of the claims, specification, and/or prosecution history. A claim is indefinite "if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable." *WAPP Tech Ltd. P'ship v. Bank of Am., N.A.*, 2022 WL 2463569, at *20 (E.D. Tex. July 6, 2022) (citing *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008)). Further, an antecedent basis for "the knowledge contents" is neither implied nor reasonably ascertainable from claim 8 or its dependents. Claims 6-8 do not previously reference "knowledge contents" or any similar claim term. Thus, there is no explicit or implied antecedent basis for "the knowledge contents" in claim 8 and its dependents, and the claim term is indefinite.

Further, even ignoring the lack of antecedent basis for "the knowledge contents," this claim term would still be indefinite. The '232 Patent specification and file history never use, describe, or define any "event[s]" that are generated to include "knowledge contents." This claim phrase also has no well-understood or recognized meaning in the art. A POSITA would not be able to determine what constitutes the outer bounds of "generating the event including the knowledge contents." Moreover, for the reasons stated herein, both "generating [the] conditional event," and "generating . . . knowledge contents" are indefinite and not adequately disclosed.

"generating the environment condition information" (Claim 8).

Claim 8 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "generating the environment condition information" in light of the specification and prosecution history of the '232 Patent. As a preliminary matter, "the environment condition information" is indefinite and invalid for lack of an antecedent basis, and no antecedent basis can be implied or understood for this term in the context of the claims, specification, and/or prosecution history. A claim is indefinite "if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable." *WAPP Tech Ltd. P'ship v. Bank of Am., N.A.*, 2022 WL 2463569, at *20 (E.D. Tex. July 6, 2022) (citing *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008)). Further, an antecedent basis for "[t]he environment condition information" is neither implied nor reasonably ascertainable from claim 8 or its dependents. No other claim in the '232 Patent references "environment condition information" or any similar claim term. Thus, there is no explicit or implied antecedent basis for "the environment condition information" in claim 8 and its dependents, and the claim term is indefinite.

Further, even ignoring the lack of antecedent basis for "the environment condition information," this claim term would still be indefinite. The '232 Patent specification and file history never use or define the claim term "environment condition information." The closest disclosure in the specification relates to "*context aware information related to the environment condition*," and does not define "environment condition information" or provide a reasonably clear scope for this term. *See* '232 Patent at 3:1-11. This claim phrase also has no well-understood or recognized meaning in the art. A POSITA would not be able to determine what constitutes the outer bounds of "generating the environment condition information." For example, based on these descriptions in the specification, it is unclear whether "environment condition information" is limited to being a subset of "context aware information," which is itself an indefinite claim term for the reasons identified above.

"monitoring a state management of a sensor network" [based on the data received from the sensor network]/[based on the data received from the sensor network interface]/[based on the extracted sensed data]" (Claims 3, 7, 10).

Claims 3, 7 and 10 (and all claims that depend therefrom) is indefinite because a POSITA would not be able to determine with reasonable certainty the scope of "monitoring a state management of a sensor network" [based on the data received from the sensor network]/[based on the data received from the sensor network interface]/[based on the extracted sensed data]" in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what is meant by "monitoring a state management of a sensor network," or even the term "state management" itself. The '232 Patent specification contains almost no disclosure with respect to this vague concept, and fails to elucidate or give meaningful scope to what it means to "monitor[] a state

management of a sensor network:

- ’232 Patent at 2:49-54: “In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and *monitoring a state management of a sensor network*, based on the extracted sensed data; . . . .”

- ’232 Patent at 6:43-46: The sensor network monitor **413** performs a *monitoring operation for a state management of the sensor network*, based on the data received from the sensor network interface **411**.

- ’232 Patent at 7:51-55: Referring to FIG. 5, in step S**501**, the sensor network monitor **413** of the sensor network abstraction unit **41** *performs a monitoring operation for a state management of the sensor network* based on the sensed data extracted through the sensor network interface **411**.

The only information provided in the specification relating to “monitoring a state management of a sensor network,” is that such monitoring can be “based on” data, which provides no meaningful information about the scope and meaning of this phrase. This claim phrase also has no well-understood or recognized meaning in the art. A POSITA would not be able to determine what constitutes the outer bounds of “monitoring a state management of a sensor network [based on the data received from the sensor network]/[based on the data received from the sensor network interface]/[based on the extracted sensed data]” For these reasons, the affected claims reciting these claim limitations, either directly or via claim dependencies, are invalid as indefinite.

“scheduling an operation sequence for providing an information service to the application program” (Claims 10, 12).

Claims 10 and 12 (and all claims that depend therefrom) are indefinite because a POSITA would not be able to determine with reasonable certainty the scope of “scheduling an operation sequence for providing an information service to the application program” in light of the specification and prosecution history of the ’232 Patent. Neither the ’232 Patent nor the

prosecution history of the ’232 Patent define or make reasonably clear what is meant by “operation sequence for providing an information service.” The ’232 Patent specification contains only a single sentence with respect to this concept, which fails to elucidate what it means to schedule an “operation sequence for providing and information service”:

- ’232 Patent at 2:49-67: “In accordance with another aspect of the present invention, there is provided a method for generating an information service based on heterogeneous sensor networks in a USN middleware apparatus, including the steps of: a) extracting sensed data and monitoring a state management of a sensor network, based on the extracted sensed data; b) performing an analysis operation to clean, classify and integrate the extracted sensed data; c) extracting object and environment information from the analyzed sensed data, and generating context aware information and circumstantial analysis information based on the extracted object and environment information; d) generating conditional events according to a rule set by an application program; e) *scheduling an operation sequence for providing an information service to the application program*; and f) providing the application program with the information service obtained according to the scheduled operation sequence, the information service including conditional events, context aware information, and circumstantial analysis information.”

This claim phrase also has no well-understood or recognized meaning in the art. A POSITA would not be able to determine what constitutes the outer bounds of “scheduling an operation sequence for providing an information service to the application program.” For example, based on this lone description in the specification, it is unclear how the function of “providing an information service to the application program” can have an “operation sequence.” “Operation sequence” has no reasonably ascertainable meaning or scope in the context of this claim limitation. For these reasons, the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

“analyzes sensed data from the sensor network in association with predefined legacy data” (Claim 11).

Claim 11 is indefinite because a POSITA would not be able to determine with reasonable certainty the scope of “analyzes sensed data from the sensor network in association with

predefined legacy data" in light of the specification and prosecution history of the '232 Patent. Neither the '232 Patent nor the prosecution history of the '232 Patent define or make reasonably clear what is meant by "analyzes sensed data from the sensor network in association with predefined legacy data." The '232 Patent specification contains only a single sentence with respect to this concept, which fails to define or elucidate any meaningful scope for what it means to analyze sensed data "in association with predefined legacy data":

- '232 Patent at 6:59-65: In order to generate the events, i.e., notification and alarm about a certain condition, and the context aware information, the sensor network intelligence unit **42** may analyze only the sensed data from a single specific sensor network, or analyze a combination of sensed data from a plurality of heterogeneous sensor networks, or *analyze the sensed data from the sensor network in association with predefined legacy data*.

This single description does not define or provide sufficient information for a POSITA to understand the scope of "analyzes sensed data from the sensor network in association with predefined legacy data," and/or the included phrase "in association with predefined legacy data." Further, the patent provides no information about what "legacy data" means, what it means for such data to be "predefined," or by whom or what such legacy data is "predefined"; nor does the '232 Patent explain how an analysis operation can be done to analyze sensed data "in association with" such predefined legacy data. For these reasons, the affected claims reciting this claim limitation, either directly or via claim dependencies, are invalid as indefinite.

IV. DISCLOSURES PURSUANT TO P.R. 3-4

Defendants' Patent Local Rule 3-4(a) document production can be found at AMZ_KAIFI_00003726 - AMZ_KAIFI_00048949. Defendants Local Rule 3-4(b) document

production can be found at AMZ_KAIFI_00048950 - AMZ_KAIFI_00068331. Certain of these documents have been designated under the terms of the Protective Order.

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Respectfully submitted,

HUESTON HENNIGAN LLP

By: /s/ Christina V. Rayburn

Christina V. Rayburn (Lead Counsel)
Neil G. Anderson
Thomas B. King
Karen L. Younkins
Christine Woodin
HUESTON HENNIGAN LLP
620 Newport Center Dr., Ste. 1300
Newport Beach, California 92660
Telephone: 949-287-5940
Facsimile: 888-866-4825
Crayburn@hueston.com
Nanderson@hueston.com
Tking@hueston.com
Kyounkins@hueston.com
Cwoodin@hueston.com
Attorneys for Defendants Amazon.com, Inc., Amazon.com Services LLC, and Amazon Web Services, Inc.

Deron R. Dacus
The Dacus Law Firm PC
Ddacus@dacusfirm.com
821 ESE Loop 323
Tyler, Texas 75701
Telephone: 903-705-1117
Facsimile: 903-581-2543

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document has been served on all counsel of record via email on January 16, 2025.

/s/ Christina V. Rayburn

Christina V. Rayburn