

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 December 2007 (21.12.2007)

PCT

(10) International Publication Number
WO 2007/146221 A3

(51) International Patent Classification:
H04J 3/06 (2006.01)

Lane, Iowa City, IA 52245 (US). **VISWANATHAN, Arun**
[US/US]; 9 Rainbow Drive, Nashua, NH 03062 (US).

(21) International Application Number:
PCT/US2007/013676

(74) Agents: **CHAPIN, Barry W.** et al.; Chapin Intellectual
Property Law, LLC, Westborough Office Park 1700 West
Park Drive, Westborough, MA 01581 (US).

(22) International Filing Date: 11 June 2007 (11.06.2007)

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG,
ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL,
IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK,
LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW,
MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA,
ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/813,253 12 June 2006 (12.06.2006) US

(71) Applicant (for all designated States except US): **THING-
MAGIC, LLC** [US/US]; One Broadway, Cambridge, MA
02142 (US).

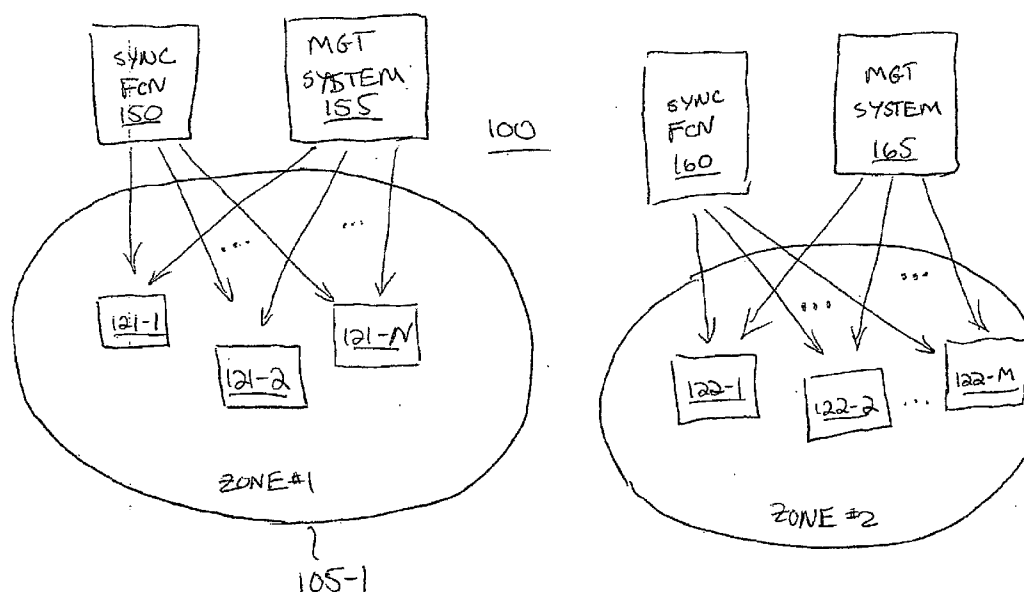
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,
PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **PAPPU, Ravikanth**
Srinivasa [IN/US]; 1 Michael Way, Cambridge, MA 02141
(US). **MAGUIRE, Yael Gregory** [CA/US]; 411 Norfolk
Street, Unit 2J, Cambridge, MA 02141 (US). **SCHONER,**
Bernd [DE/US]; 108 Auburn Street, Cambridge, MA
02139 (US). **FIEGEL, Brian** [US/US]; 4460 Cumberland

[Continued on next page]

(54) Title: RADIO DEVICES AND COMMUNICATIONS



(57) Abstract: Each of multiple radio devices in a region (e.g., a zone) receives time reference information for synchronizing themselves amongst each other. For example, based on the timing reference information, each radio device in a region synchronizes itself with respect to a common time reference, enabling communications according to shared access schedule (e.g., a time slotted access schedule). Each of the radio devices schedules communications to one or more target devices (e.g., RFID tags) in a monitored region based at least in part according to the shared access schedule. For example, each of multiple transmitters of the tag readers are assigned one or more time slots of the shared access schedule in which they are permitted to communicate in the monitored region.

WO 2007/146221 A3



Declaration under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Published:

- *with international search report*
- (88) **Date of publication of the international search report:**
4 December 2008

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/13676

A. CLASSIFICATION OF SUBJECT MATTER

IPC: H04J 3/06(2006.01)

USPC: 370/350

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 370/350

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST, eDan

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/0022800 A1 (KRISHNA et al) 02 February 2006 (02.02.2006), paragraphs: [0034], [0018]-[0020], [0056], [0057], [0067], [0074], [0079], [0081], [0083], [0161], [0168], [0339], [0344], [0350], [0448], [0483],	1, 2, 4-7, 10-13, 20, 22-28, 62, 63, 65-68, 71-74, 81, 83-89, and 123
Y	US 6,614,392 B2 (HOWARD) 02 September 2003 (02.09.2003), Abstract	3 and 64



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

16 July 2008 (16.07.2008)

Date of mailing of the international search report

01 OCT 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Authorized officer

Chuck Huynh

Telephone No. 571-272-7866

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/13676

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
- Remark on Protest**
- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
 - ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
 - ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US07/13676

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

Group I, claim(s) 1-28, 62-89, and 123, drawn to a method and computer system for scheduling and monitoring communications from wireless transceiver device with plurality of wireless identification tags in a monitored region.

Group II, claim(s) 29-61, 90-122, 124-126, drawn to a plurality of methods and systems that specifically synchronizes RFID tag reader with other RFID tag readers, and receiving transmitter information associated with multiple transducers and distributing the antenna assignment information to provide notification of multiple time slots for multiple transducers for transmission.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: group I pertains to the scheduling communications from wireless transceiver device with plurality of wireless identification tags classified in US 455/464 or IPC H04Q 7/20 and group II pertains to more of specific RFID readers and their synchronization classified in US 370/350 or IPC H04J 3/06.