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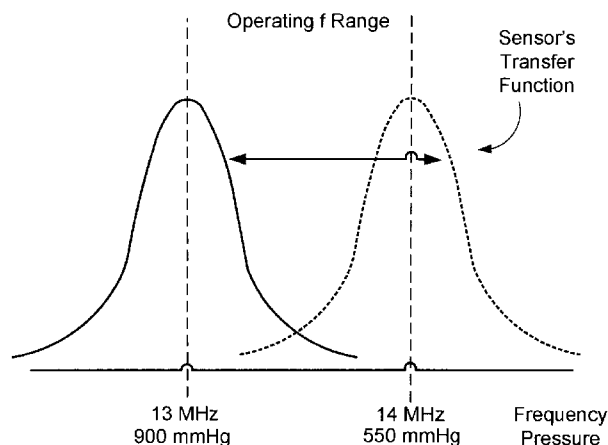
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[Continued on next page]

(54) Title: WIRELESS SENSOR READER



Prior Art

FIG. 1

(57) **Abstract:** A wireless sensor reader is provided to interface with a wireless sensor. The wireless sensor reader transmits an excitation pulse to cause the wireless sensor to generate a ring signal. The wireless sensor reader receives and amplifies the ring signal and sends the signal to a phase-locked loop. A voltage-controlled oscillator in the phase-locked loop locks onto the ring signal frequency and generates a count signal at a frequency related to the ring signal frequency. The voltage-controlled oscillator is placed into a hold mode where the control voltage is maintained constant to allow the count signal frequency to be determined. The reader uses an ambient reading or other information to select a subset of the possible ring signal frequencies, and tunes or adjusts its circuits and algorithms to focus on that subset.



LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

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— *with international search report (Art. 21(3))*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US12/34979

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G08C 19/12, 19/14, 19/16 (2012.01)

USPC - 340/10.1, 10.3, 13.1

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)

IPC(8): G08C 19/12, 19/14, 19/16 (2012.01)

USPC: 340/10.1, 10.3, 13.1, 13.2; 324/633; 600/485, 486

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)

MicroPatent (US-G, US-A, EP-A, EP-B, WO, JP-bib, DE-C,B, DE-A, DE-T, DE-U, GB-A, FR-A); DialogPRO; IEEE; Google/Google Scholar; Phase locked loop, PLL, sensor, wireless, transmit, receive, reader, ambient, atmospheric, outdoor, circuitry, blood pressure, range, passband, value, filter, digital, digital to analog, DAC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2009/0189741 A1 (ROWLAND H et al.) July 30, 2009, figure 1, paragraphs [0019], [0021], [0024], [0026], [0034], [0038], [0041]-[0043]	1, 4, 5, 10 and 11 ----- 2, 3 and 6-9
X --- Y	US 2010/0308974 A1 (ROWLAND H et al.) December 9, 2010, paragraphs [0032], [0036], [0039], [0043], [0063], [0066], [0080]	12, 13, 15-22, 24-28, 31-33, 36-39, 41-49, 52-55 and 57-59 ----- 14, 23, 29, 30, 34, 35, 40, 50, 51 and 56
Y	US 7,566,308 B2 (STAHMANN J) July 28, 2009, column 8, lines 31-47	2, 3, 6-9, 14, 23, 29, 30, 34, 35, 40, 50, 51 and 56

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

12 October 2012 (12.10.2012)

Date of mailing of the international search report

02 NOV 2012

Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US12/34979

-Continued from Box No. III: Observations where unity of invention is lacking-

Group III: Claims 38-48 are directed to defining a range of expected values, transmitting an excitation pulse, holding said frequency of said count signal temporarily constant, and wireless sensor is configured to change its resonant frequency.

Group IV: Claims 49-59 are directed to a circuit configured to define a set of all possible values, an antenna configured to transmit said excitation pulse, a first circuit configured to generate a count signal and a second circuit configured to adjust the frequency of said count signal.

The common technical feature shared by all of Groups I, II, III and IV are a wireless sensor reader including a transmit circuit to generate an excitation pulse and a circuit for identifying a set of possible frequency values.

This common technical feature is previously disclosed by US 2009/0189741 A1 to Rowland et al. (hereinafter 'Rowland'). Rowland discloses a wireless sensor reader (wireless sensor reader 10, figure 1) including a transmit circuit to generate an excitation pulse (abstract and paragraph [0019]), a circuit for identifying a set of possible frequency values (abstract and paragraph [0022]).

Since the common technical feature is previously disclosed by Rowland the common feature is not special and therefore Groups I, II, III and IV lack unity.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US12/34979

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:

Group I: Claims 1-20; Group II: 21-37; Group III: 38-48; Group IV: 49-59

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-20 are directed to a wireless sensor reader including a transmit circuit to generate an excitation pulse, a circuit for identifying a set of possible frequency values and a hold mode to hold the frequency of said count signal constant for a length of time sufficient to determine the frequency.

Group II: Claims 21-37 are directed to identify a set of possible frequency values of a wireless sensor, sampling and holding said received signal and wireless sensor is configured to change its resonant frequency in proportion to at least one sensed parameter.

-Continued Within the Extra Page-

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 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.