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LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

[Continued on next page]

(54) Title: AGENTS FOR MEDICAL RADAR DIAGNOSIS

Fresnel reflection coefficient contrast agents - blood

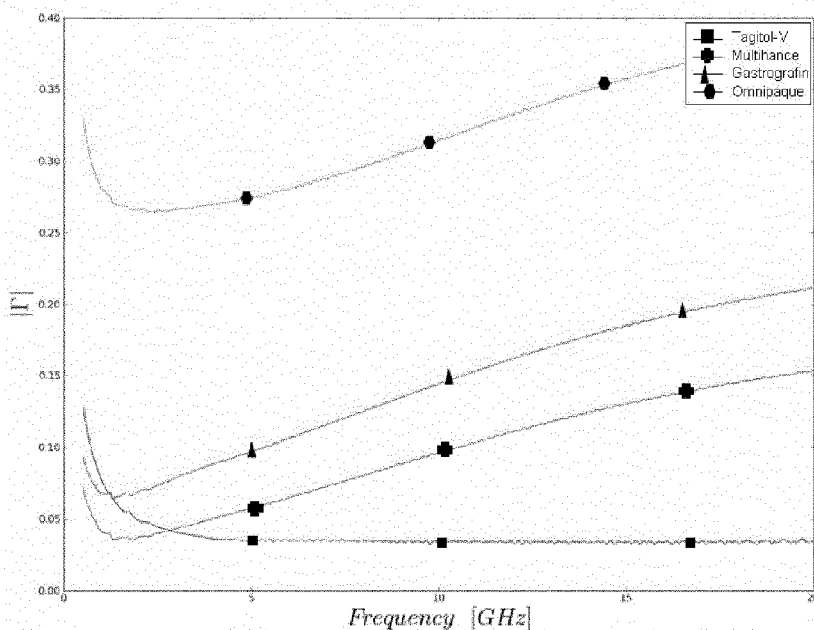


Figure 18

(57) Abstract: The present invention relates to the use of contrast agents in radar based imaging, particularly in medical imaging. The invention also relates to the use of contrast agents in diagnosis of various diseases using radar-based technology. An apparatus for radar-based imaging comprising a contrast agent is also disclosed.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/056363

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K49/00 A61B5/05

ADD. A61K49/04 A61K49/10 A61K49/18 A61K49/22

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)

A61B A61K

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)

EPO-Internal, INSPEC, WPI Data, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	THIEL F ET AL: "Contrast agent based tumour detection by ultra-wideband radar: A model approach", ANTENNAS AND PROPAGATION (EUCAP), 2010 PROCEEDINGS OF THE FOURTH EUROPEAN CONFERENCE ON, IEEE, PISCATAWAY, NJ, USA, 12 April 2010 (2010-04-12), pages 1-3, XP031706089, ISBN: 978-1-4244-6431-9 abstract section II, "Tumor Detection" ----- -/-	1-5, 11-22



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

"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

25 July 2012

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/056363

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ALIREZA MASHAL ET AL: "Toward Carbon-Nanotube-Based Theranostic Agents for Microwave Detection and Treatment of Breast Cancer: Enhanced Dielectric and Heating Response of Tissue-Mimicking Materials", IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, IEEE SERVICE CENTER, PISCATAWAY, NJ, USA, vol. 57, no. 8, 1 August 2010 (2010-08-01) , pages 1831-1834, XP011343301, ISSN: 0018-9294, DOI: 10.1109/TBME.2010.2042597 abstract	1-5, 11-22
X	----- SHAEFFER J ET AL: "Detection of air emboli in radiographic contrast media by microwave radiometry.", EUROPEAN RADIOLOGY 1996 LNKD-PUBMED:8798045, vol. 6, no. 4, 1996, pages 570-573, XP008153753, ISSN: 0938-7994 pages 570-571, section "Methods" figure 1	1-5,13, 14,17,22
X	----- WO 98/57667 A1 (NYCOMED IMAGING AS [NO]; TOWLER PHILIP DEAN [GB]; HENRICHS PAUL MARK []) 23 December 1998 (1998-12-23) examples 8,9,12	20
X	----- WO 2009/146882 A1 (ROHDE & SCHWARZ [DE]; LEIBFRITZ MARTIN [DE]; HECHTFISCHER GERD [DE]; K) 10 December 2009 (2009-12-10) page 1, lines 5-8 page 3, line 6 - page 4, line 2 page 4, lines 26-32	1-5, 11-22
X,P	----- WO 2011/064577 A1 (UNIV BRISTOL [GB]; CRADDOCK IAN JAMES [GB]; KLEMM MACIEK BARTLOMIEJ [G]) 3 June 2011 (2011-06-03) page 3, line 11 - page 6, line 22 page 7, lines 9-10,16,18-22,26	1-5, 11-22

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/056363

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:

see additional 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 an 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.:

see Annex

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 3-5, 11(completely); 1, 2, 12-22(partially)

A method of imaging a sample comprising a radar marker or radar contrast agent selected from organic iodinated agents or an inorganic salt, said method comprising: generating a radar-based signal or image of at least part of said sample, said marker or contrast agent being capable on dissolution or dispersion in water of yielding a fluid having an impact on the radar radiation signal in the sample.

Use of such a radar contrast agent for medical diagnosis based on radar technology. Said contrast agent for use in medical diagnosis based on radar technology. Use of such a radar contrast agent in medical imaging based on radar radiation.

2. claims: 6, 7(completely); 1, 2, 12-22(partially)

A method of imaging a sample comprising a radar marker or radar contrast agent selected from metal chelates, said method comprising: generating a radar-based signal or image of at least part of said sample, said marker or contrast agent being capable on dissolution or dispersion in water of yielding a fluid having an impact on the radar radiation signal in the sample.

Use of such a radar contrast agent for medical diagnosis based on radar technology. Said contrast agent for use in medical diagnosis based on radar technology. Use of such a radar contrast agent in medical imaging based on radar radiation.

3. claims: 8, 9(completely); 1, 2, 12-22(partially)

A method of imaging a sample comprising a radar marker or radar contrast agent selected from gas, said method comprising: generating a radar-based signal or image of at least part of said sample, said marker or contrast agent being capable on dissolution or dispersion in water of yielding a fluid having an impact on the radar radiation signal in the sample.

Use of such a radar contrast agent for medical diagnosis based on radar technology. Said contrast agent for use in medical diagnosis based on radar technology. Use of such a radar contrast agent in medical imaging based on radar radiation.

4. claims: 10(completely); 1, 2, 12-22(partially)

A method of imaging a sample comprising a radar marker or radar contrast agent selected from magnetic iron oxide

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

particles, said method comprising: generating a radar-based signal or image of at least part of said sample, said marker or contrast agent being capable on dissolution or dispersion in water of yielding a fluid having an impact on the radar radiation signal in the sample.

Use of such a radar contrast agent for medical diagnosis based on radar technology. Said contrast agent for use in medical diagnosis based on radar technology. Use of such a radar contrast agent in medical imaging based on radar radiation.

5. claims: 23-26

An imaging apparatus comprising a radar contrast agent; one or more antennas capable of emitting radar radiation to a defined volume and receiving radar radiation that has passed through that volume; and a computer processor for processing the signals received by the one or more antennas to form an image of the defined volume.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/056363

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9857667	A1	23-12-1998	AT 247491 T 15-09-2003
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WO 2011064577	A1	03-06-2011	EP 2384203 A1 09-11-2011
		WO 2011064577 A1 03-06-2011	