Title: MULTIPLE FREQUENCY THROUGH-THE-WALL MOTION DETECTION

Abstract: A multi-tone CW radar (14) is used to project signals from an antenna (22) and to receive returns with the same antenna. The phase differences between the outgoing signals and the returns are analyzed to determine the existence of motion and the range to a moving object (10). A model is made which has range as its major parameter. A waveform associated with the phase difference between outgoing signals and returns for one of the tones is compared to templates produced by the model to determine which has a range that most closely matches. By varying the range parameters, when a match is detected the range to the object can be obtained even if its motion is pseudorandom. If the range is measured with multiple units it is possible to measure the location of the object. This can be done assuming a grid and algorithmically combining the ranges from the units.
Declarations under Rule 4.17:

Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
   IPC(7) : G01S 13/32
   US CL : 342/22
   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)
   U.S. : 342/22
   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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
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<td>X</td>
<td>US20030112142A1 (IZUMI ET AL.) 19 JUNE 2003 (19.06.2003), FIG. 4A and paragraphs 0028-0031</td>
<td>1-3</td>
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☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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