Abstract: A radio-over-fiber (RoF) optical fiber cable system with transponder diversity for a RoF wireless picocellular system that includes at least one optical fiber cable. The at least one optical fiber cable supports one or more groups of two or more transponders, wherein the transponders in a given group are arranged to form substantially co-located picocells. The transponders in each transponder group may also have one of two orthogonal antenna polarizations. A diversity combiner optically coupled to each transponder determines respective signal strengths from each transponder in each transponder group. The transponder with the greatest signal strength in a given transponder group is selected to form the picocell for the given group. This allows for the optical fiber cable system to adjust to changes in the signal strength of each picocell, such as caused by a transponder obstruction or failure.
## INTERNATIONAL SEARCH REPORT

**International application No**
PCT/US 07/19649

**A CLASSIFICATION OF SUBJECT MATTER**
IPC(8) - H04B 10/12 (2007.10)
USPC - 379/56,2

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) - H04B 10/12 (2007 10)
USPC - 379/56 2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) - H04B 10/12 (2007 10) - see keyword below.
USPC - 379/56 2, 398/1 15 - see keyword below.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB), Gog® patent, Google scholar
Search terms - Radio-over-fiber, voting, diversity, antenna, optical receiver, microstrip, slotline, transponder, picocell, optical fiber, optic, link, spatial, polarization, picocell, orthogonal, base station, head end

**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>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 5,644,622 A (RUSSELL et al.) 01 July 1997 (01 07 1997) Figures 17, 41 a-c, and 42, col 4, in 6-13, col 5, in 46-48, col 29, in 6-14, col 30, in 63-66</td>
<td>1, 2, 6, 10, 13, 15-17, 19, and 20</td>
</tr>
<tr>
<td>Y</td>
<td>US 5,943,372 A (GANS et al.) 24 August 1999 (24 08 1999) Figure 7, col 1, in 55-60, col 1, in 61-62</td>
<td>3, 4, 8, and 9</td>
</tr>
</tbody>
</table>

---

**I Further categories of cited documents**

<table>
<thead>
<tr>
<th>Special categories of cited documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot; document defining the general state of the art which is not considered to be of particular relevance</td>
</tr>
<tr>
<td>&quot;E&quot; earlier application or patent but published on or after the international filing date</td>
</tr>
<tr>
<td>&quot;L&quot; document which may throw doubts on priority claims or which is cited to establish the publication date of another citation or other special reason (as specified)</td>
</tr>
<tr>
<td>&quot;D&quot; document referring to an oral disclosure, use, exhibition or other means</td>
</tr>
<tr>
<td>&quot;P&quot; document published prior to the international filing date but later than the priority date claimed</td>
</tr>
</tbody>
</table>

**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**
29 December 2007 (29 12 2007)

**Date of mailing of the international search report**
29 FEB 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

Form PCT/SA/2.10 (second sheet) (April 2007)