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- (71) **Applicant (for all designated States except US):** NOKIA SIEMENS NETWORKS OY [FI/FI]; Karaportti 3, FIN-02610 Espoo (FI).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** WALDINGER, Josef [DE/DE]; Bennobergstrasse 31, 84427 St. Wolfgang (DE). WONKA, Rainer [DE/DE]; Schaidlerstr. 17, 81379 München (DE).
- (74) **Common Representative:** NOKIA SIEMENS NETWORKS OY; COO RTP IPR, 80240 Munich (DE).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

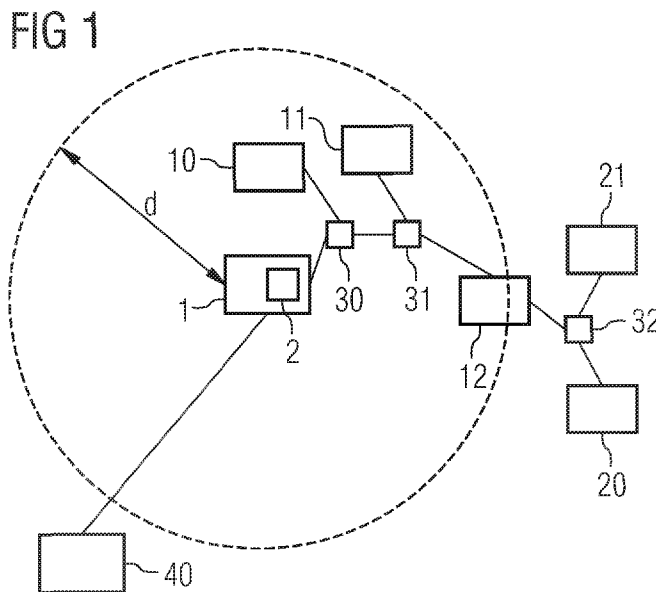
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH,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

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(54) **Title:** PASSIVE OPTICAL NETWORK WITH FLEXIBLE ROUNDTRIP DELAY



(57) **Abstract:** Passive optical network, comprising an optical line termination device and a first and a second optical network unit, the optical line termination device comprising a processor, the processor being configured to send and receive network signals comprised in frames, and the processor being further configured to create a bandwidth map for each of said optical network units, each bandwidth map specifying an allocated upstream data transmission time period, wherein the processor is further configured to include a frame identifier in each of said bandwidth maps, the frame identifier individually specifying a frame for upstream data transmission for the optical network unit, wherein the frame specified for the first optical network unit is different from the frame specified for the second optical network unit.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04J3/06 H04J3/16 H04Q11/00

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)
 H04J H04Q

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 practical, search terms used)
 EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/179769 A1 (SHI HAIXING [US] ET AL) 25 September 2003 (2003-09-25) abstract figures 4A,4B,5,6,18-20 page 3, paragraph 19 - paragraph 22 page 4, paragraph 48 - page 5, paragraph 63 page 6, paragraph 67 - paragraph 70 page 16, paragraph 114 - page 24, paragraph 215 ----- -/--	1,2,8,9

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 document but 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	*G* 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 14 October 2008	Date of mailing of the international search report 10/02/2009
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Carballo da Costa, E
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"Gigabit-capable Passive Optical Networks (G-PON): Transmission convergence layer specification; G.984.3 (02/04)" ITU-T STANDARD IN FORCE (I), INTERNATIONAL TELECOMMUNICATION UNION, GENEVA,, CH, no. G9843 2/4, 22 February 2004 (2004-02-22), XP017401196 6 G-PON system architecture 7.4.1 Media access control flow 7.6.2 Concept for resource allocation 7.7 DBA specifications 8. GTC TC frame 8.1.3.6 BW map fields 8.1.3.6.2 Flags field 10.3.3 OLT methods -----</p>	<p>1-3, 8-10,16</p>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2008/059301

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 allsearchable 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.:

1-3, 8-10 and 16

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: 1-3, 8-10 and 16

A passive optical network, comprising an optical line termination device and a first and a second optical network unit, the optical line termination device comprising a processor, the processor being configured to send and receive network signals comprised in frames and the processor being further configured to create a bandwidth map for each of said optical network units, each bandwidth map specifying an allocated upstream data transmission time period, the processor is further configured to include a frame identifier in each of said bandwidth maps, the frame identifier individually specifying a frame for upstream data transmission for the optical network unit, wherein the frame specified for the first optical network unit is different from the frame specified for the second optical network unit and the processor is configured to create the frame identifier for each of the optical network units based on a transmission delay time between the optical network unit and the optical line termination device.

2. claims: 4-7, 11-15 and 17

A passive optical network, comprising an optical line termination device and a first and a second optical network unit, the optical line termination device comprising a processor, the processor being configured to send and receive network signals comprised in frames and the processor being further configured to create a bandwidth map for each of said optical network units, each bandwidth map specifying an allocated upstream data transmission time period, the processor is further configured to include a frame identifier in each of said bandwidth maps, the frame identifier individually specifying a frame for upstream data transmission for the optical network unit, wherein the frame specified for the first optical network unit is different from the frame specified for the second optical network unit where the first optical network unit is configured to connect to the second optical network unit, the second optical network unit not being directly connected to the optical line termination device, such that the first optical network unit forms a cascading unit.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/059301

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003179769	A1	25-09-2003 TW	576028 B
11-02-2004			