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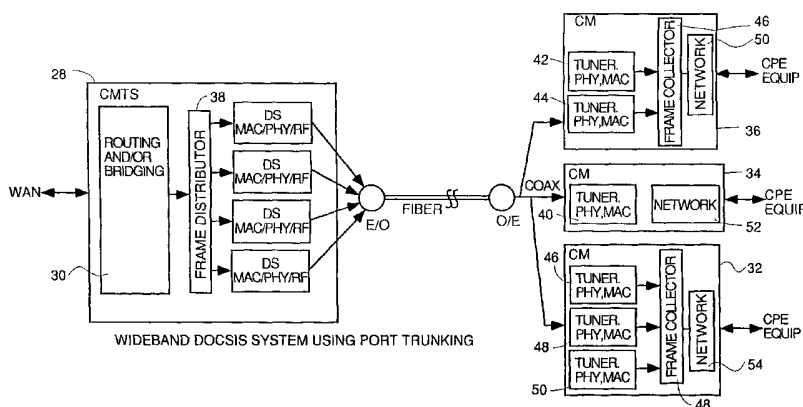
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[Continued on next page]

(54) Title: WIDEBAND DOCSIS ON CATV SYSTEMS USING PORT TRUNKING



(57) Abstract: Method and apparatus to carry out wideband DOCSIS both upstream and downstream in a point-to-multipoint environment of an HFC system using port trunking concepts. For the downstream, each CIVITS has a frame distributor which distributes frames to various transmitters transmitting on downstream channels to be used to transmit downstream data simultaneously to a CM using wideband DOCSIS. The frame distributor adds sequence numbers in some embodiments to guarantee proper order of frames can be restored at the CM, and schedules transmissions according to quality of service considerations to meet guaranteed and committed portions of constant bit rate and variable bit rate flows. The CMTS sends and Extended Channel Enable (ECE) message to wideband capable CMs telling them which downstreams to enable. Each CM has a frame collector to which all frames received on various downstream channels are sent. The frame collector makes sure they are all there, puts them into the proper order and delivers them to a NI. Upstream wideband DOCSIS works the same way with a frame distributor in each CM and a frame collector in the CIVITS. The CIVITS receives bandwidth requests and controls upstream wideband DOCSIS transmissions by sending downstream UCD and MAP and ECE messages to the CMs instructing them which upstream channels to use, describing the parameters of the channel and assigning times for transmission which are simultaneous on multiple channels for upstream wideband capable CMs.

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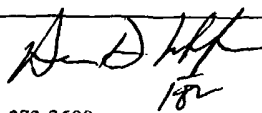
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<p><b>A. CLASSIFICATION OF SUBJECT MATTER</b>                  IPC(7) : H04J 1/00; H04L 12/28                  US CL : 370/464,465,480,486,431,437; 348/552,388; 725/111,117,118,126                  According to International Patent Classification (IPC) or to both national classification and IPC</p>																							
<p><b>B. FIELDS SEARCHED</b>                  Minimum documentation searched (classification system followed by classification symbols)                  U.S. : 370/464,465,480,486,431,437; 348/552,388; 725/111,117,118,126                  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)</p>																							
<p><b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b></p> <table border="1"> <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 2002/0131426 A1 (AMIT et al) 19 September 2002 (19.09.2002), abstract, figure 4, paragraph 46 on page 3 through paragraph 63 on page 5</td> <td>1-3</td> </tr> <tr> <td>Y</td> <td>FELLOWS, et al, "DOCSIS Cable Modem Technology", March 2001, IEEE Communications Magazine, pp 202-209,</td> <td>4</td> </tr> <tr> <td>X</td> <td>US 2002/0131403 (DESAI et al) 19 September 2002 (19.09.2002), abstract, Figure 1, pages 1-2</td> <td>1</td> </tr> <tr> <td>A</td> <td>US 2004/0163129 A1 (CHAPMAN et al) 19 August 2004 (19.08.2004)</td> <td>1-13</td> </tr> <tr> <td>---</td> <td></td> <td></td> </tr> <tr> <td>E</td> <td></td> <td></td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 2002/0131426 A1 (AMIT et al) 19 September 2002 (19.09.2002), abstract, figure 4, paragraph 46 on page 3 through paragraph 63 on page 5	1-3	Y	FELLOWS, et al, "DOCSIS Cable Modem Technology", March 2001, IEEE Communications Magazine, pp 202-209,	4	X	US 2002/0131403 (DESAI et al) 19 September 2002 (19.09.2002), abstract, Figure 1, pages 1-2	1	A	US 2004/0163129 A1 (CHAPMAN et al) 19 August 2004 (19.08.2004)	1-13	---			E		
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<p>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. (703) 305-3230</p>		<p>Authorized officer                  Seema S. Rao                   Telephone No. 571-272-2600</p>																					