

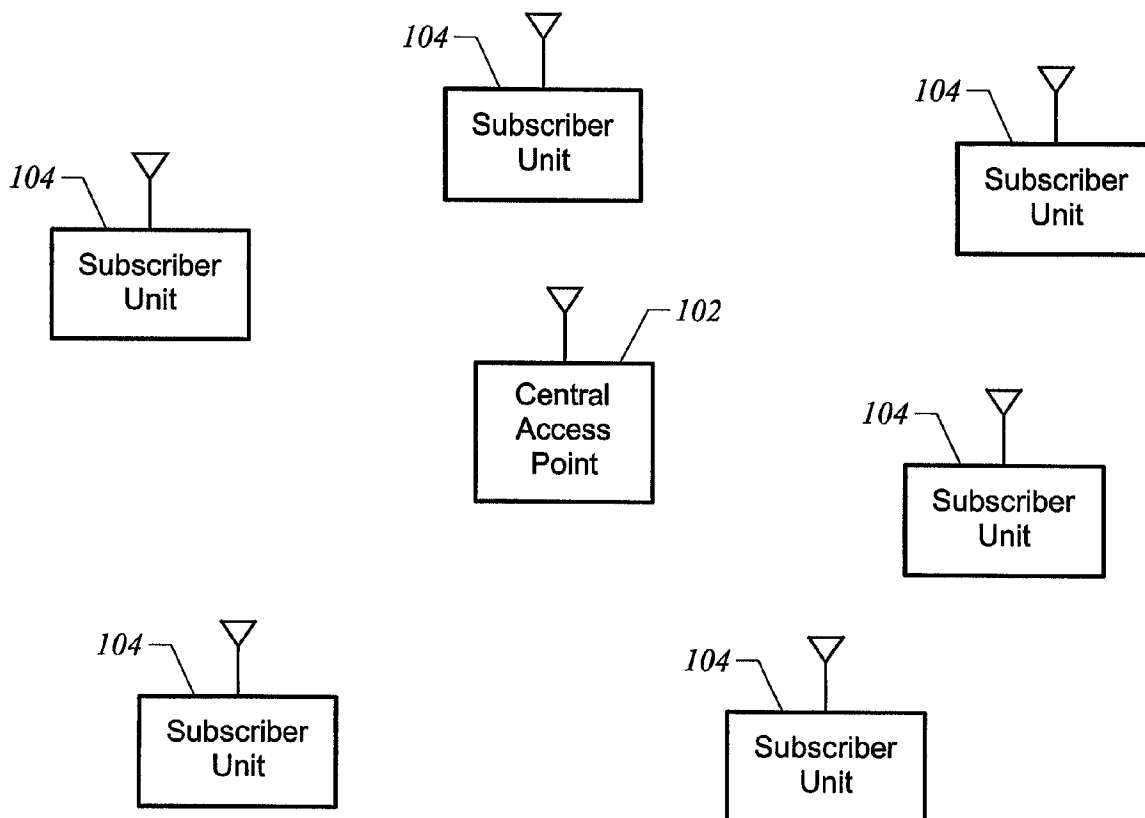
(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0159404 A1****Raissinia et al.**(43) **Pub. Date: Oct. 31, 2002**(54) **POWER REGULATION USING MULTI-LOOP CONTROL****Publication Classification**(51) **Int. Cl.<sup>7</sup> ..... H04Q 7/24**(52) **U.S. Cl. .... 370/318; 370/338**(75) **Inventors:** **Ali Raissinia**, Monte Sereno, CA (US); **Vincent K. Jones IV**, Redwood Shores, CA (US); **Derek Gerlach**, Mountain View, CA (US); **Gregory G. Raleigh**, Woodside, CA (US); **Michael Pollack**, Cupertino, CA (US)(57) **ABSTRACT**

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**SARATOGA, CA 95070 (US)**(73) **Assignee:** **Cisco Technology, Inc., A CALIFORNIA CORPORATION**, San Jose, CA 95134-1706 (US)(21) **Appl. No.: 10/138,238**(22) **Filed: May 3, 2002****Related U.S. Application Data**

(63) Continuation of application No. 09/348,719, filed on Jul. 6, 1999, now Pat. No. 6,408,165.

Improved adjustment of transmission power in a communication system is provided. In one embodiment, in a point to multipoint communication system, transmission power of a subscriber unit is controlled based on power measurements made at a central access point. Power measurement information based on transmissions occurring at irregular intervals may be combined in a beneficial manner to control transmission output power. In one embodiment, a power regulation process determines a series of difference values indicating the differences between desired received power level at the central access point and measured received power level. A smoothing process is applied to the difference values. One or more parameters of the smoothing process vary with elapsed time since a last available power measurement.



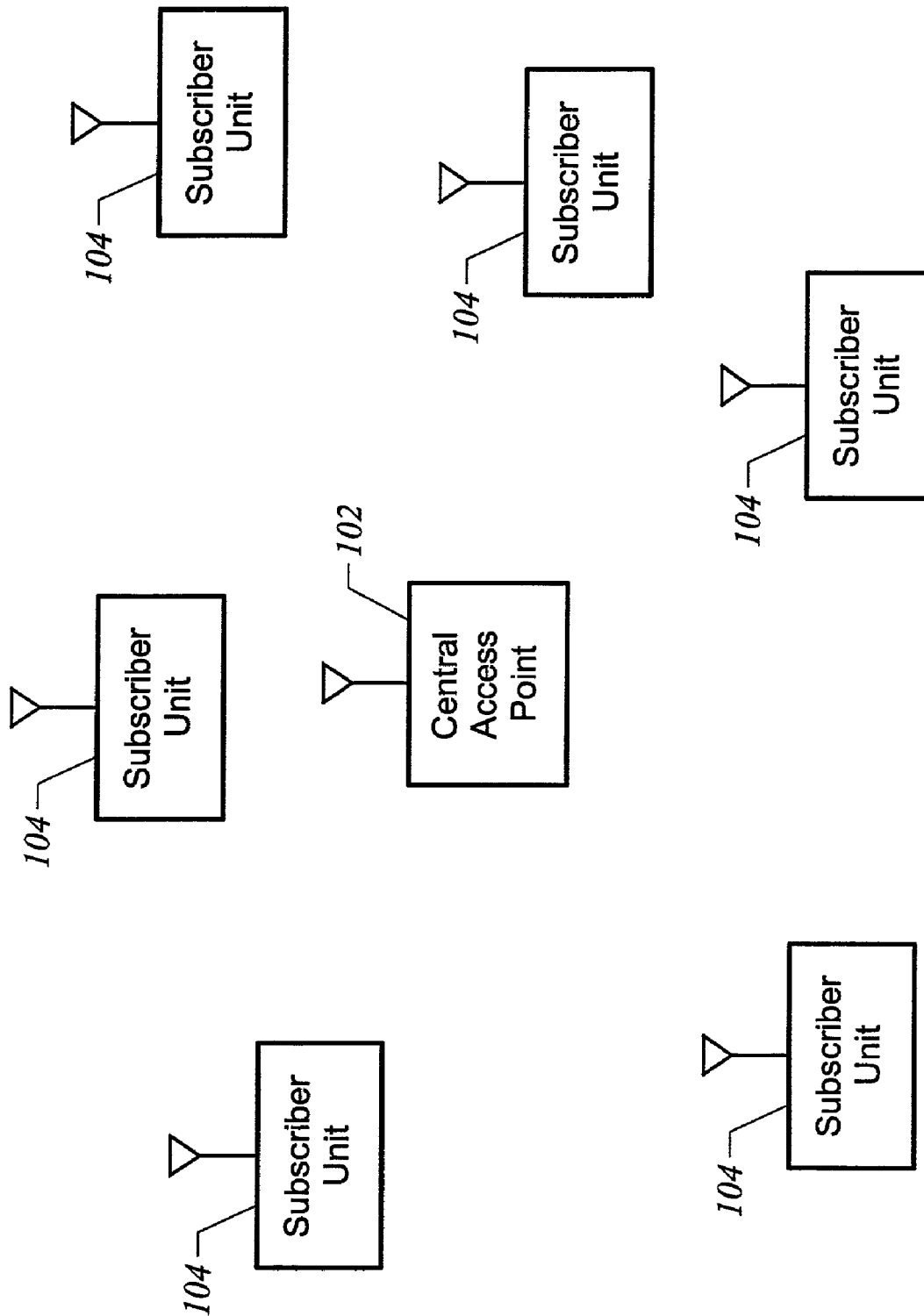


FIG. 1

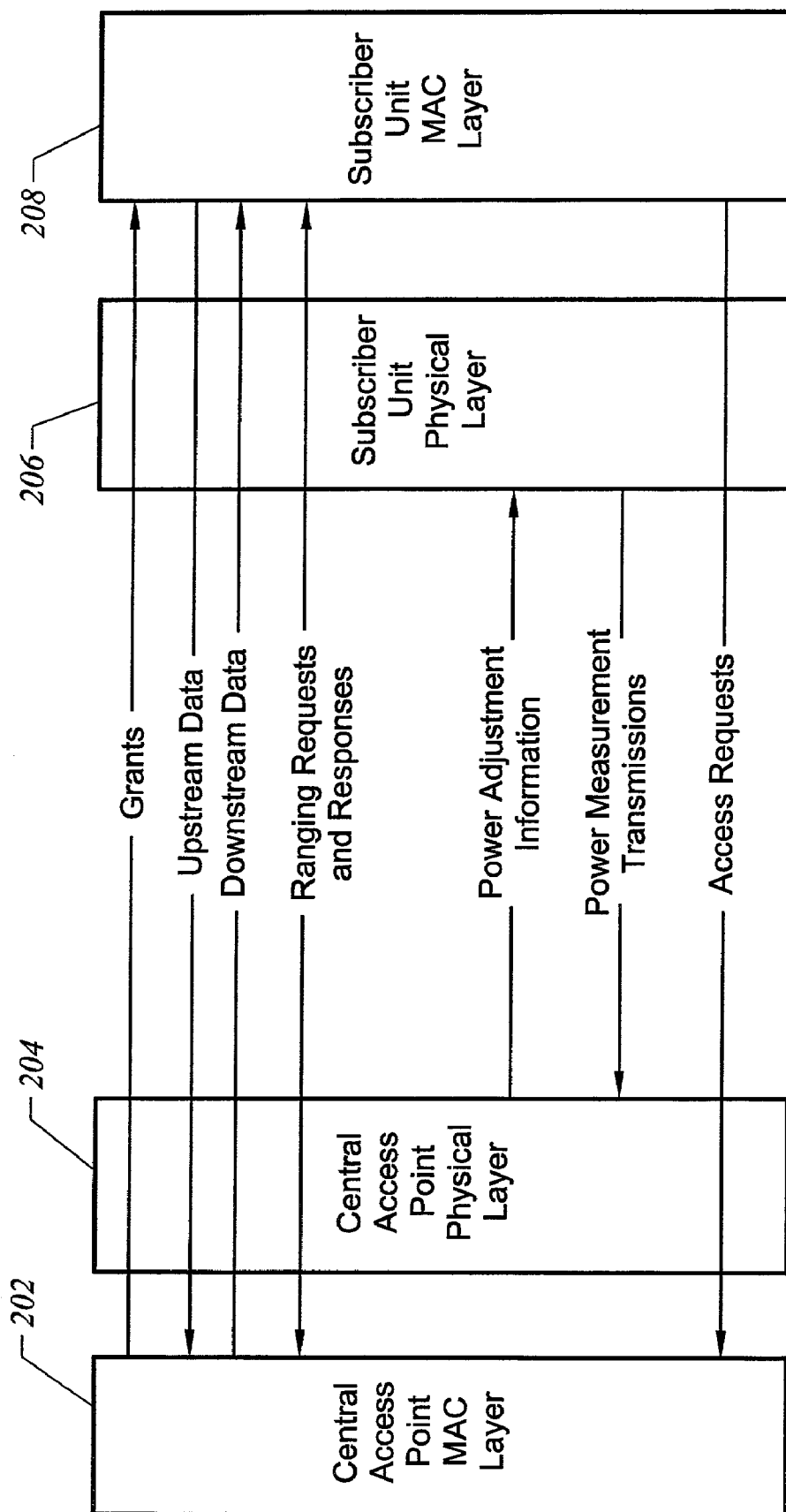
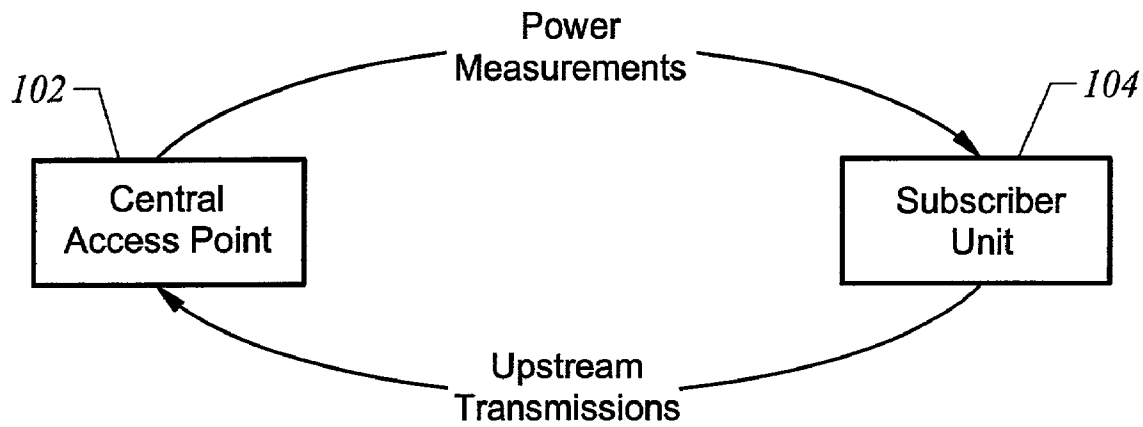
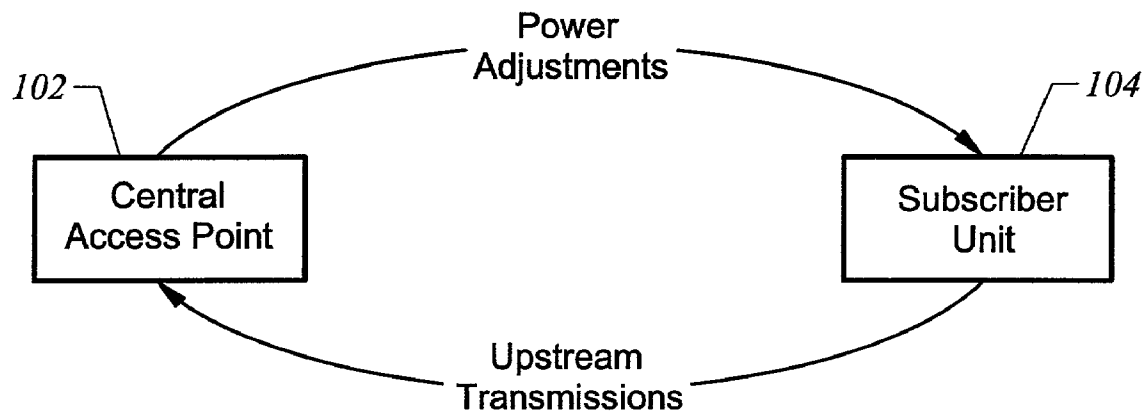


FIG. 2



*FIG. 3A*



*FIG. 3B*

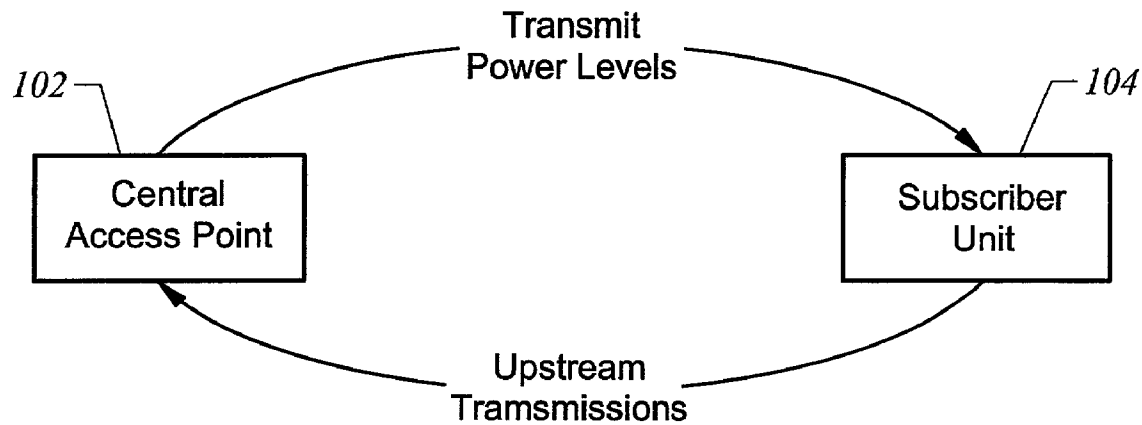


FIG. 3C

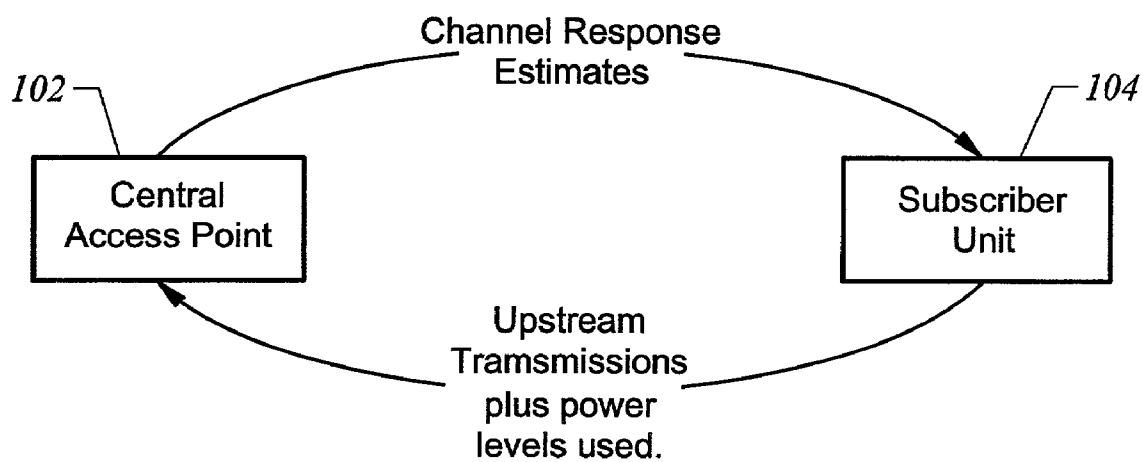


FIG. 3D

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