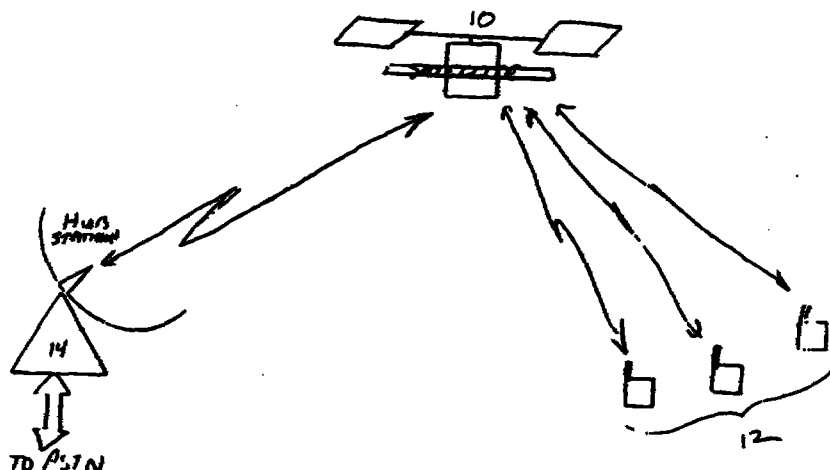




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(54) Title: **MULTIPLE BEAMWIDTH PHASED ARRAY**

(57) Abstract

A system for wireless communication between at least one first station and a plurality of second stations using a relay station is disclosed. The relay station contains, among other features, an antenna array and a multi-channel transponder. The antenna array has a plurality of antenna elements which are divided into two sets. The first set is used to provide transmission or reception using beams having a first beamwidth and the second set is used to provide transmission or reception using beams having a second beamwidth. The multi-channel transponder, which is connected to the antenna array and a feeder link antenna, receives feeder link signals from at least one of the first stations and converts the signals into drive signals for the antenna array elements. The multi-channel transponder has a first channel bandwidth for channels transponding signals for transmissions having the first beamwidth and a second channel bandwidth for channels transponding signals for transmissions having said second beamwidth. The plurality of second stations is divided dynamically by a switching system into at least a first group that use the narrowest beamwidth and a second group that use the widest beamwidth, according to the path loss requirements for each group.

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