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22764 U.S. PTO 060305

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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112941 U.S. PTO 60/687463 060305

INVENTOR(S)		
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Shimon	Scherzer	**Los Gatos, California**

Additional inventors are being named on the _____ separately numbered sheets attached hereto

TITLE OF THE INVENTION (500 characters max)

COLLABORATIVE MOBILE BROAD BAND (CMBB) SERVICE

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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OR

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ENCLOSED APPLICATION PARTS ***(check all that apply)***

☐ Application Data Sheet. See 37 CFR 1.76
☒ Specification *Number of Pages* 20
☒ Drawing(s) *Number of Sheets* 7
☐ CD(s), Number
☒ Other (specify) Appendix - 13 pages

Application Size Fee: If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

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SIGNATURE [signature]
Date: June 3, 2005

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Docket Number: 32354-701.101

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WSGR 32354-701.101

U.S. PROVISIONAL PATENT APPLICATION

COLLABORATIVE MOBILE BROAD BAND (CMBB) SERVICE

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COLLABORATIVE MOBILE BROAD BAND (CMBB) SERVICE

DETAILED DESCRIPTION OF THE INVENTION

[0001] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It should be understood that various alternatives to the embodiments of the invention described herein may be employed in practicing the invention. It is intended that the following claims define the scope of the invention and that methods and structures within the scope of these claims and their equivalents be covered thereby.

INTRODUCTION

The Problem

[0002] Future cellular service will be characterized by the ability to deliver broadband wireless services anytime, anywhere. This statement implies that mobility must be integral part of the offered services. The biggest challenge of broad band mobile service is, with no doubt, insufficient link budget: the ability to deliver enough electromagnetic energy to support the desired data rate. The majority of current wide area networks today are focusing on voice services (cellular and PCS provides like Sprint, Verizon, Singular etc.). While voice service moves about 10Kbits/sec and just recently has managed to reach acceptable coverage, broadband service will require two orders of magnitude more bits/sec! In addition, the frequency range allocated to the newer technologies (3G, WiMax etc.) is generally higher than current the range used by current cellular services, further exasperating the path loss challenge. The traditional solution is increase of infrastructure density (number of base stations) by similar order; not very realistic.

Commonly suggested solutions

[0003] Multiple approaches to solve this problem have been suggested:

- Much higher infrastructure density infrastructure deployment as mentioned above. This approach can solve the problem ("brut-force approach") but may very well be cost prohibitive: Adding many more base stations or fixed repeaters will be very costly (site cost, access rights, service ("truck roll") and management), which may put in question the whole business preposition of mobile broadband wireless service.

- Mesh networks. One approach providing for acceptable link budget is through relays and mesh networks routing. While significantly reducing the cost of base stations backhaul, site cost, access rights, service ("truck roll") and management is similar to "high density" solution above. It became obvious that the cost of the hardware involved with relays is almost insignificant relative to the maintenance cost, hence the cost of a fixed network node (the relay) is not much different from a base station (zoning, access, truck-roll etc.). Furthermore, location of relays may not be optimal for the unpredictable locations of the subscribers, so relays density must be very high.
- Smart antenna technology. While the smart antenna can add few dB's to the link budget, it will not be able to increase the link budget as needed (~20 to 30DB).

Proposed solution

[0004] It becomes clear that traditional methods to improve link budget will not suffice. The mobile broadband wireless service is in need for a new, out-of-box solution. We propose a cross-disciplinary solution that crosses the boundaries of technology to exploit social behavior.

[0005] Instead of fixed, high density deployment of wireless network (cellular, mesh) we propose an ad-hoc network that adjusts its deployment density to expected service demand. We exploit the fact that cars' presence density is highly correlated to expected service volume. Studies have shown that a car owner (potential wireless service consumer) is seldom (<10%) farther than 100 yards from his car. Following this fact one can argue that the more cars in the neighborhood, the higher the probability of wireless service demand. Although in some populations car owners may not be the majority, but the above correlation can still be substantiated. By installing a broadband wireless relays in cars, cellular broadband coverage can be dynamically enhanced where mostly needed. The appearance of dual mode handsets on the market allows the subscriber station to always revert to traditional cellular service when relay connectivity is unavailable. Although significant value is gained by allowing each subscriber connect to the cellular network through a wireless relay in his car, to get the most of this improvement, these wireless relays should be shared between subscribers.

[0006] This approach provides the desired performance for acceptable cost based on a whole new concept: collaborative wireless networking (CWN). This idea exploits the fact that wireless networks connections are normally established between a base station and plurality of clients (subscriber stations). While each individual connection via a car can provide an average improvement in path loss and system gain budget (the car is normally not subjected to building penetration loss, minimal battery power, small antenna), aggregating (or selecting the best of) some of these connections can dramatically improve upon individual, pre-selected connection. For example: while each subscriber station can generate very little transmission power, multiple subscriber's stations with sufficient proximity to each other (and hence one subscriber can easily communicate with its close peers) could "join forces" to aggregate their transmission power in order to overcome the notorious uplink challenge.

[0007] This approach may work well since technically: only small fraction of subscribers is being served at each period, hence for each subscriber we can engage multiple radios (that are free) at a time.

[0008] The proposed solution can span across multiple service providers; a subscriber can use any service provider that offer broadband service, thereby increasing the number of possible connections and further improving the expected network performance. It is likely that a subscriber of one cellular service provider will carry traffic generated by a subscriber of another cellular service provider: files can be moved as attachments or data stream can be tunneled such that service operator cannot distinguish between his own subscriber traffic to "foreign" subscriber traffic. The actual implementation of this idea will be discussed below. Figure 1 provides conceptual system architecture.

[0009] Collaboration can be achieved if there is a compelling purpose. The Internet world has already been introducing collaborative behavior (file sharing, data routing, social networks etc.). A well known example is file sharing activity: In order to be able to access other people data bases, one must share its own. Furthermore, individuals are participating in the process of data minim by hosting various applications including indexing etc. In this case, collaborative behavior enables new and improving existing services. For example: high quality video presentations such as TV, movie clips etc. The proposed solution is an integrated package of technical and social methods to achieve the desired services and performance. We discuss the social aspects in section 5.

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