

Unsubstantiated 159 PL 2K

1) The testing will first occur at our office building in Bedminster N.J. (at Lat: 40 38 45 Lon: 74 38 25). The NYC system trial (Lat: 40 43 15 Lon: 73 59 57) will follow thereafter. It is expected that testing will occur concurrently once the NYC system trial starts. The prototype will still be used to test design refinements even as the NYC system trial proceeds.

2) The NYC testing will involve a maximum of 300 mobile units

3) The unapproved equipment will consist of basestations and mobile units designed by Radio Router and manufactured by either Radio Router or under contract from Radio Router. The quantities of equipment identified for both the prototype trial and system trial have been determined to be necessary to achieve the testing objectives outlined below.

Prototype Trial

The prototype trial, to be conducted in Bedminster N.J., will involve two basestations and a maximum of twenty mobile stations. The objectives of this trial are to validate the system design concept, the operation and functionality of the equipment, and to collect limited performance data in order to refine the design to support the subsequent system trial.

A key aspect of the system design developed by RadioRouter is that the same frequencies are to be utilized in each cell, creating a frequency reuse ratio of one, which results in a highly efficient use of spectrum. It is necessary to have at least two basestations operating in order to demonstrate a frequency reuse of one.

Another key aspect of the system is that it was designed specifically to accommodate data traffic. The CDMA and TDMA mobile networks in place today, and the third generation networks that are derived from them, were designed principally for voice traffic and then adapted for data. Data traffic, such as from the Internet, is characteristically much more bursty and varied than voice traffic. This burstiness can lead to inefficient use of channel resources in networks initially designed for voice. In order to test the system protocols and capacity of a RadioRouter basestation for data traffic, it is necessary to effectively load the basestation with traffic. Given the statistics of the data traffic, it will be necessary to involve up to twenty mobile stations in the testing.

System Trial

The system trial, to be conducted in New York City, will verify the performance of the system under the real world conditions it is expected to operate in, including, interference, multipath, traffic mix and dynamic system loading, mobility, handoff, and in building usage. It is not possible to effectively simulate these real world conditions, or test them in a limited small scale trial such as that for the prototype.

The capacity of a frequency reuse one system is highly dependent on the interference from within a cell and from other cells. This interference, which is a byproduct of all cells using the same frequency on downlink and all mobiles using the same frequency on the uplink, is a statistical process and will depend on the interaction of each mobile and basestation with their specific environments, including the location of the mobiles, their transmitted power, and the

unique propagation characteristics between a mobile and each cell site. To create a representative interference environment, it is necessary to have a sufficient number of cells clustered to form a contiguous coverage area, where each cell will receive interference simultaneously from multiple other cells. Approximately twenty cells are needed to create scenarios where an interior cell in the cluster receives interference from two tiers of adjacent cells, which will typically account for most of the interference received by the cell.

A cluster of cells of this size is also necessary to enable a wide range of handoff scenarios to be encountered. It is necessary to be able to evaluate the protocols and algorithms for handoffs at a variety of vehicle/pedestrian speeds, interference environments, and system loading conditions. A cluster of twenty cells will provide sufficient coverage area to obtain the above environments needed to perform handoff testing.

To evaluate system throughput capabilities, a sufficient number of mobile terminals must be deployed in order to generate a representative traffic load on the system and to introduce realistic levels of interference. The number of mobiles needed in the NYC system trial to generate the real world conditions under which the system is expected to operate, including interference, multipath, dynamic traffic loading, and handoff, has been determined to be 300 units.

User mobility and the dynamic nature of data traffic require that the system throughput performance be evaluated statistically. Packet data traffic, such as that generated by using the Internet, generally involves many short bursts of activity, where the channel is occupied, followed by periods of inactivity, where the channel is free, as the user processes information. This contrasts to circuit switched voice traffic, where the channel is occupied the entire time with one party or the other is generally talking. A packet data system can generally use channel resources more efficiently for data traffic than a circuit switched system, therefore a larger number of data users will be required to load the system than for a circuit switched system (assuming approximately equal throughput requirements).

The system being developed by RadioRouter is unique in that it enables untethered high-speed broadband data communications. Existing models for data user behavior are not adequate to predict traffic generated by broadband mobile users, or the manner and location where they use the services. Although RadioRouter will not be providing service to paying customers, it is anticipated that useful data will be collected on user behavior and application performance during the system trial. Once again, a sufficient number of users need to be involved so that the statistics generated are meaningful. The 300 mobile terminals requested for the trial should satisfy this need.