

conjunction with a communications relay system, and independently, depending on the need at the time of communication.

The statistical analysis of this data yields the following average values:

545 mobile relay stations

1.5 complete point to point "duplex" links (fixed relays) per mobile relay station

45 members of each mobile relay station,

Each member has one fixed (base) station,

Each member has 1.5 mobile stations,

Each member has 1.5 portable stations.

A single theoretical system has one mobile relay, 3 link ends, 45 base stations, 67 mobiles, and 67 handheld stations.

Section 2:

Cost estimates to move the present Amateur Service infrastructure to another band.

The Amateur Service allocations that could accommodate such a large number of stations are few. By statute, these operations must remain above 222 MHz.

222-225 MHz.

This band is already over populated in this region, having recently suffered a loss of 40% of the available band. Even if this band were empty, it could not handle a significant portion of the stations presently occupying 420-430 and 440-450 MHz.

430-440 MHz.

This sub-band is restricted in several ways. The segments 431-433 MHz, and 435-438 MHz are restricted by statute from repeater and auxiliary operations. Furthermore, the sub-band is already filled with digital, weak signal, satellite and amateur television operations. It cannot absorb more than a minute portion of the present activity in the 420-430 and 440-450 MHz sub-bands.

902-928 MHz.

This band should but cannot, accommodate a major portion of the stations occupying the 420-430, 440-450 MHz. The amateur allocation on this band is third non-government, and fourth including government operations, and has a lower layer, the Part 15 allocation. Each of the licensed layers is active in this region, and the licensed users are expanding their operations continuously. Just these licensed users have forced all amateur relay operations to the outer MHz at the top and bottom of the band, and with recent regulatory changes, the top MHz will have to be vacated by amateurs quite soon. The bottom layer, the Part 15, is the worst problem for this band. Virtually unlimited quantities of unlicensed equipment are operating on this band already, and more is being sold every day. Much of this equipment is either co-, or adjacent located to amateur operations. The simple quantity of this Part 15 equipment renders the band useless for any serious amateur operation. The strong presence of licensed users renders the band unusable for most amateurs. The net result is that significant amateur use of this band is essentially impossible.

1.24-1.30 GHz.

This band already is significantly occupied in this region with 5 television repeaters and, 180 mobile and fixed relays. It is possible, with a major re-assignment plan and much loss of flexibility to accommodate much of the 420-430 MHz and 440-540 MHz activity within this band. It is a

documented fact that mobile and portable coverage on this band is quite significantly less than the coverage from an identical facility on the 400 MHz band. It is a documented fact that the maximum usable point to point path length for a fixed relay is much less than from an identical facility operating in the 400 MHz band.

2.30-2.31, 2.39-2.45 GHz.

This badly segmented band is already rapidly filling up with shorter haul point to point fixed relays and amateur television operations. There is some room left for some of the services presently occupying 420-430 MHz and 440-450 MHz, but with much more limited coverage and distance capability, and at a higher cost.

Analysis:

The following analysis is based on the necessary presumption that a new service must pay the relocation costs to displace an existing service, and the new facilities must provide substantially equal service to the that which the system had before displacement. It is presumed that the new service will commercially contract for these technical services. It is patently unfair to consider that the amateurs involved should donate their time, labor and expertise AGAIN, after having done so to construct their system in the first place.

Analysis of the above data shows that the 1.24-1.30 GHz band to be the only one which could accommodate moving the activities off of 420-430 and 440-450 MHz. The equipment and antennas are not compatible, and must be completely replaced. The mobile coverage performance is significantly less, requiring more stations and more fixed relay equipment to accomplish the same mobile coverage.

Task:

Replace the mobile relay transmitter, power amplifier, receiver, duplexer, circulator, filter cavity, preamplifier, antenna and in half the cases, the feedline. Supply the engineering to interface this equipment to the existing controller. Remanufacture the installation in the equipment rack as needed to accommodate the new equipment that undoubtedly will NOT fit in the space assigned to the equipment it is replacing. Supply the installation manpower to drive to the site, and install AND INTERFACE all the equipment, make it work properly.

We estimate the cost for doing all this, for JUST the mobile relay will very nearly approach \$25,000.

Task:

Provide all the same services as above to replace the point to point equipment. The added task will be to supply new antennas designed for point to point service, with the attendant added costs of site rent for dish class antennas, some of which will require re-working the support structure to accommodate dish antennas.

We estimating the installed cost of one end of a duplex link is \$15,000, average.

Task:

Do system engineering to determine how to replace the lost mobile coverage, and the added relay point needed for the point to point service. It should be noted that the average path length on 420 MHz in this region is about 70 miles, with some 20% of the active paths exceeding 110 miles in length, with about 5 % exceeding 135 miles in length. Supply and install this additional equipment, and pay the additional site rental costs.

Estimating the cost of these added needs is very difficult. So much is determined by the case by case facts. We estimate that the fixed equipment costs could easily DOUBLE for this theoretical statistical system we are using to make this analysis, and for any system which has inter-regional links, the cost could easily be triple or more. Any system whose mobile relay is presently serving operations on a region wide basis will require quite a lot of additional equipment simply to maintain its present service area. We estimate that very approximately 40% of the systems in this region are operated under a "wide area" coverage designation.

The additional service and equipment needed will average out to cost additionally approximately equal to the cost of each mobile relay, and approximately an additional 0.75 times the cost of each point to point end station.

Task:

Replace each home station, mobile station and hand held station belonging to the members of these systems.

Such replacement equipment is not currently available. We estimate the average cost, in the long run, after small quantity manufacturing costs, will be approximately \$ 600 per unit.

The equipment needed to accomplish the move to 1.2 GHz is NOT AVAILABLE. Relay grade transmitters, receivers, antennas, circulators, etc., are not manufactured for this band. It will be necessary to cause such equipment to be manufactured.

Summary:

One theoretical system has one mobile relay, 3 link ends, 45 base stations, 67 mobiles, and 67 handheld stations.

\$70,000 for the fixed equipment without factoring the 1.0 coverage replacement factor, plus 0.75 times each link "end.

\$107,400 for the "members" equipment.

Summary total for the Southern California region:

\$ 100 MILLION dollars, Basic costs only.

\$ 50 MILLION dollars MINIMUM additional costs to replace lost performance.