Name: *Alon S. Levin*
Date: *1/29/2020*
Paper Title: Mobile Telephony – Wide Area Coverage - 20564
Author Names: *D. H. Ring*
Year Published: *1947*

Open questions for discussion in class:

1. How similar are today's cellular networks to this proposed framework?
2. Would it be possible to combine different cellular arrangements (i.e. different frequency discrimination systems) into a single network?
3. On a similar note, are different networks able to communicate with each other only due to the established standards?

The topic areas covered by the paper are:

- Establishing a basic framework for a wide-area mobile cellular network
- Discussion of frequency discrimination for minimum interference
- Differences in channel coverage for different radii of primary area coverage

The previous approaches to this problem were:
Previous approaches are not discussed in this paper, as only local coverage had ever been considered. However, this is the first postulation of a wide-area coverage cellular network system, and thus is completely novel in addressing mobile telephony.

Outline the basic new approach or approaches to this problem:

- A hexagonal network of transmitters is set up, with the primary transmission stations operating on one of m frequencies. Frequency discrimination is used to avoid interference between primary coverage areas, with primary stations operating on identical frequencies spaced far enough apart to ensure sufficient attenuation as to not cause interference.

Critical assumptions made include:

- "… in the area within 150 miles radius of New York City we may well encounter almost all the problems involved in country wide coverage… Any system which can take care of [the New York City area] can probably take care of the remainder of the country without any other frequency allocations."

The performance of the techniques discussed in the paper was measured in what manner:
As this paper is a theoretical proposal for a future framework, performance has not been measured. However, several performance metrics have been considered, including:

- Attenuation of the signal to provide amplitude discrimination between stations operating on the same frequency
- Channel coverage based on primary area radius and number of frequency bands used in the network

What background techniques are used in the paper that you are not familiar with:

- Discussion of half-wave dipole antennas
- Relative attenuation as a function of distance ratios

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The following terms were defined:

- Distance ratio – ratio between the service radius of a primary station and the distance from the perimeter of the service area to the nearest station operating on the same frequency.
- Frequency discrimination – method used to avoid interference between adjacent primary areas, based on assigning different frequencies to adjacent stations.
- Amplitude discrimination – method used to avoid interference between stations operating on the same frequency, based on signal attenuation due to distance.

I rate and justify the value of this paper as:
Overall, this was a very interesting paper due to both its historical value and its basic postulation of cellular mobile networks as a whole.