

CHAPTER I
INTRODUCTION



The values of radio wave refractivity (N) and earth effective radius coefficient (K) are the basic values for radio system planning such as UHF, troposcatter (transhorizon radio) and microwave. These values are of prime importance in radio system design. The variation of the climate plays an important role that affects the values of N and K. It is known that the velocity of radio wave as well as the direction of propagation changes with the values of N. The changing values of N with height above the surface of the earth also affects the values of K. The discussion of the relation between N and K are given in the International Radio Consultative Committee (CCIR) recommendations (1) - (5) which produce the document every four years.

This thesis is concerned with

1. The evaluation of the radio wave refractivity at the surface of the earth (N_s) from the observed climatological data at the surface of the earth taken from 46 stations in Thailand during the period 1951 to 1970*.

These data are made available by the Meteorological Department, Ministry of Communication. They are composed of the mean values of the atmospheric pressure, temperature, and relative humidity. The instruments employed in measuring these values are barometer, thermometer, and wet and dry bulb thermometer respectively. The variation

* The climatological data at the surface of the earth are collected every day and published every twenty years by the Meteorological Department, Ministry of Communication.

of N_s from month to month and the contours showing iso-radio wave refractivity at the surface of the earth are plotted on the map of Thailand indicating the various values of N_s .

2. The values of K are evaluated from the data obtained during the period from 1966 to 1970*.

These data are temperature, atmospheric pressure, and dew-point temperature at different heights above the earth surface. They are normally observed every day by the Meteorological Department. The radiosonde equipment is carried up by a balloon with an ascending speed of 300 meters per second and records all required data at Bangkok, Chiang Mai, Songkhla, and Ubon Rathbathani weather stations. The data at different heights are transmitted back to the corresponding ground receiving station by radiosondes at frequency of 403 MHz.

Unfortunately there are only 4 such stations in Thailand where radiosonde measurements are performed. After obtaining the values of N and K the relation between them will be formulated.

3. Also the variations of radio wave refractivity at the surface of the earth (N_s) with K, and N_s with the effective earth radius (a_e) will be evaluated according to CCIR recommendation.

* The data obtained by radiosonde equipment are collected every day and printed every five years by the Meteorological Department.