

# **THE ANALYSIS OF SURFACE WAVEGUIDE FOR PROPAGATING RADIO WAVES IN UHF BAND**

**BY**

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# CERTIFICATE

We accept the work contained in this report as a confirmation to the required standard for the partial fulfilment of the degree of MS (EE).

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## **DEDICATION**

I dedicate this small piece of effort to my parents & supervisor as well as my colleague, who encourage and support me during whole tenure. Without their support and sincere advises, it could not possible to complete within given time period.

## **DECLARATION OF AUTHORSHIP**

I hereby declare that content of this thesis is my own work and that it is the result of work done during the period of registration. To the best of my knowledge, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

Parts of this thesis appeared in the following publications, to each of which I have made substantial contributions:

## **ACKNOWLEDGEMENTS**

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## ABSTRACT

In wireless communication, the next generation systems are focusing on supporting different applications, e.g. interactive media on interchanged packet systems. The factual investigations of these systems and the issues and challenges associated with them are of interest to the researchers all the time. Recently researchers are gathering data of radio waves signal in the regions of interest at the different points of the path to decide or construct a relationship between refractivity and the propagation of the signal. The aim of this work is to apply an accurate path loss prediction technique to demonstrate the need for a precise accounting of the refraction when planning future radio networks as sometimes it is expensive or not possible to use high power transmitters all the time.

The quantitative assessment of refractivity for different cities of Pakistan to improve forecasts in signal strength and to reduce propagation losses which lead to fading, inter-symbol interference for different frequencies of operation is the objective of this research. The investigation will help in minimization the forecast issues which is identified in signal strength by the communication designers. In general, the relationship between refractivity and propagation of signal is found to be inverse in nature most of the time. However, more precisely the results as shown in this work are providing a clearer picture of the relationship that exists between refractivity and propagation, depending on the behaviour of temperature, pressure and humidity.

The meteorological parameters are playing key role to tropospheric refractivity under standard atmospheric conditions during which radio waves propagates and degrade from transmitter to receiver. The meteorological information from the climate stations informs about radio refractivity of the selected zones which influences the quality of radio waveform transmitted as well as received with refractivity identified in its standard form. This research is attempting to identify the effects of radio refractivity on signal strength after regular intervals in a day, week and month by analysis of surface waveguide for propagating radio waves in UHF band. The main theory of signal propagation in different weather conditions and exact the meteorological information of a day, week and month which is used to identify the variation in refractivity. The analysis in this report provides information to explore and analyse the causes of the path losses,

the degradation of the signal quality and the reduction in coverage area in wireless communication system.

# TABLE OF CONTENTS

Certificate.....	ii
Dedication.....	iii
Declaration of Authorship.....	iv
Acknowledgements.....	v
Abstract.....	vi
Table of Contents.....	viii
List of Figures.....	xi
List of Tables.....	xiii
CHAPTER 1. Introduction and Background.....	2
1.1. Introduction.....	2
1.2. Background.....	4
1.2.1. Propagation Mechanisms.....	4
1.2.2. Propagation in the Troposphere.....	6
1.2.3. Different conditions of Refractivity.....	7
1.2.4. Effect of different refractive conditions on propagation.....	9
1.3. Atmosphere:.....	10
1.3.1. Troposphere.....	10
1.3.2. Stratosphere.....	10
1.3.3. Mesosphere.....	11



1.3.4. Thermosphere .....	11
1.3.5. Exosphere.....	11
1.3.6. Ionosphere.....	11
1.4. Average Weather Climate of Pakistan:.....	12
1.4.1. Temperature .....	13
1.4.2. Precipitation .....	14
1.4.3. Humidity .....	15
1.4.4. Dew Point.....	16
1.4.5. Wind.....	16
CHAPTER 2. Literature Review .....	20
2.1. Refraction in the Troposphere .....	20
2.2. Analysis of Troposphere Radio Refractive Conditions .....	22
2.3. Refractivity Gradient in Lowest Atmosphere Layer.....	23
2.4. Occurrence of Elevated Ducts .....	24
2.5. Calculation of k-Factor and Refractivity Gradient .....	25
2.6. Surface Refractivity gradient for radio system design.....	26
2.7. Modified Refractivity (M) .....	27
CHAPTER 3. Methodology and collection of Data .....	29
3.1. Methodology .....	29
3.1.1. Remote sensing .....	30

3.1.2. GPS Based Remote Sensing .....	32
3.1.3. Radiosonde.....	33
3.2. Data Collection .....	34
3.2.1. Weather Underground.....	35
CHAPTER 4. Analysis and Discussion .....	42
4.1. Measuring of Refractivity .....	42
4.2. Refractivity Analysis for Pakistan (Monthly Record) .....	45
4.3. Refractivity Analysis for Pakistan (Weekly Record).....	54
4.3.1. A Clear Day and Clear Night.....	55
4.3.2. A Cloudy day and Clear Night.....	56
4.3.3. Cloudy Day and Cloudy Night .....	58
4.3.4. Clear day and Cloudy night .....	60
CHAPTER 5. Conclusions and future work .....	64
5.1. Future Work.....	65
References.....	67

## LIST OF FIGURES

Figure 1.1: Different Refractive Conditions .....	10
Figure 1.2: Different layers of atmosphere .....	13
Figure 1.3: Islamabad daily low and high temperature.....	14
Figure 1.4: Probability of precipitation for Islamabad .....	15
Figure 1.5: Islamabad- Types of precipitations throughout the year .....	16
Figure 1.6: Islamabad- Relative Humidity with Daily Average Percentile Band.....	16
Figure 1.7: Islamabad-Dew Point with Daily Average Percentile Band .....	17
Figure 1.8: Islamabad- Wind directions over the entire year.....	18
Figure 1.9: Islamabad-Wind Speed's Daily Average Percentile Band .....	18
Figure 3.1: Remote Sensing.....	33
Figure 3.2: Atmospheric Sensing GPS based.....	34
Figure 3.3: Radiosonde with free balloon.....	36
Figure 3.4: Meteorological Stations around Islamabad, Pakistan.....	38
Figure 3.5: Meteorological Station of Karachi, Pakistan.....	39
Figure 3.6: Islamabad weekly weather Forecast .....	39
Figure 3.7: Karachi weekly weather Forecast.....	40
Figure 3.8: Islamabad weekly weather Graph.....	41

Figure 4.1a: Refractivity & signal strength of Islamabad for scenario 1.....	51
Figure 4.1b: Refractivity & signal strength of Islamabad for scenario 2.....	51
Figure 4.1c: Refractivity & signal strength of Karachi for scenario 1.....	52
Figure 4.1d: Refractivity & signal strength of Karachi for scenario 2.....	53
Figure 4.1e: Refractivity & signal strength of Multan for scenario 1.....	53
Figure 4.1a: Refractivity & signal strength of Multan for scenario 2.....	53
Figure 4.1f: Refractivity & signal strength of Gilgit for scenario 1.....	54
Figure 4.1g: Refractivity & signal strength of Gilgit for scenario 2.....	54
Figure 4.2a: Refractivity & Signal Strength for Cloudy Day & Clear Night.....	57
Figure 4.2b: Refractivity & Signal Strength for Cloudy Day & Clear Night.....	59
Figure 4.2c: Refractivity and Signal Strength for Cloudy day and Night.....	61
Figure4.2d: Refractivity and Signal Strength for Clear day and Cloudy Night.....	63

## LIST OF TABLES

Table 1.1: Different Refractive conditions.....	09
Table 4.1: Hourly Refractivity calculated for one day.....	48
Table 4.1a: Recorded Date of Refractivity and Signal Strength for Islamabad.....	49
Table 4.1b: Recorded Date of Refractivity and Signal Strength for Karachi.....	49
Table 4.1c: Recorded Date of Refractivity and Signal Strength for Multan.....	50
Table 4.1a: Refractivity Profile of Clear day and Cloudy night for Islamabad & Karachi..	57
Table 4.1b: Refractivity Profile of Clear day and night for Islamabad & Karachi.....	59
Table 4.1c: Refractivity Profile of Cloudy day & Clear night for Islamabad & Karachi....	60
Table 4.4d: Refractivity of Cloudy day and Cloudy night for Islamabad & Karachi.....	62