

# CHAPTER I INTRODUCTION

## I.1 Background

Wireless Local Area Network (WLAN) is a type of network that uses wireless technology to connect devices so they can connect to the internet. Wireless LAN network is already a standard facility in various public places, especially campuses. WLAN is used to connect to the internet because it has high bandwidth, low delays, and minimizes power consumption.

The WI-FI network protocol standard is regulated by the Institute of Electrical and Electronics (IEEE) with the 802.11 code. Based on the IEEE standard, a WLAN network with the 802.11ac code can work in two types of frequency bands, namely 2.4 GHz and 5 GHz. WI-FI with a frequency of 5 GHz has the advantage of data transfer speed and experiences little interference when compared to WI-FI with a frequency of 2.4 GHz. Even so, WI-FI with 2.4 GHz has the advantage of being a higher transmit power than 5 GHz.

Telkom University Landmark Tower (TULT) building is a building that was built at a height of 19 floors and is a smart building-based lecture building that supports the concept of *go green*. TULT building applies the 5GHz band frequency to provide internet access to people who use it. However, the performance of the WLAN is not satisfactory, with several problems such as capacity or workload for daily use of user access activity.

To overcome these problems, it is necessary to optimize the design and performance of WLANs operating in the TULT Building. The author focused on the research on the 1st to 3rd floors of the TULT Building. The method that can be done is to use the Plan, Prepare, Design, Implement, Operate, and Optimize (PPDIOO) method. By using the PPDIOO method in optimizing the 5GHz WLAN in the TULT Building, problems that impact network performance can be identified and resolved. With a focus on studying the capacity or workload to optimize 5GHz WLAN in the TULT Building floors 1 to 3.

This research was conducted by surveying and tracking WLAN networks using tools to check traffic and workload on the WLAN network, then analyzing the results of these measurements to determine the performance of the WLAN network

at the 5 GHz frequency band in the TULT Building. This research is important to ensure that the WLAN network can run perfectly under load by examining capacity and workload utilizing surveys and tracking on the 1st to 3rd floors of the TULT Building.

By knowing the existing condition of the WLAN network performance in the TULT Building floors 1 to 3, the authors can provide the necessary recommendations and solutions to prevent performance reduction of WLAN users utilizing the 5GHz frequency band. To overcome this problem the authors conducted research with the title " Wireless Design and /Optimization for Telkom University Landmark Tower (TULT) In 5Ghz Frequency Based on Capacity And Workload Using The PPDIIO Method.

## **I.2 Problem statement**

This research has the following problem statement formulation:

- What are the results of the identification and analysis of existing network performance based on workload and coverage of the current 5GHz WLAN in the TULT Building floors 1 to 3?
- What is the network performance on the 5GHz WLAN to handle the daily workload in the TULT Building floors 1 to 3?

## **I.3 Research objectives**

This research is conducted with the aim of:

- Examine and model the current network performance in the TULT Building on floors 1 to 3 based on Workload and Capacity 5 GHz WLAN.
- Record and examine the capacity and workload of the 5ghz WLAN with the latest user access activity.

#### **I.4 Research scopes**

This research was made based on the data obtained and the fields faced by the author are also quite broad, so to get the research results from the limitations of the problem in this research are:

- This research is not included in the implementation stage because the implementation is handed over to the network administrator of the TULT Building.
- The use of the *Prepare, Plan, Design, Implement, Operate, and Optimize* (PPDIOO) method only reached the Design stage.
- This research only examines 5ghz access points with SSID TelU-Connect

#### **I.5 Research benefits**

The benefits of this research are:

1. For Telkom University, this research is expected to provide an overview of existing conditions and provide solutions to prevent performance drop and have optimal coverage on 5GHz WLAN network performance in the TULT Building floors 1 to 3.
2. For other researchers, this research is expected to be useful in explaining the optimization of 5 GHz WLAN network performance in the TULT Building floors 1 to 3.

## **I.6 Report Systematic**

### **CHAPTER I INTRODUCTION**

This chapter contains a description of the research background, problem statement, research objectives, research scopes, research benefits, and report systematics.

### **CHAPTER II LITERATURE REVIEW**

This chapter contains literature relevant to the problems taken and discussed the results of previous studies related to ongoing research.

### **CHAPTER III RESEARCH METHODOLOGY**

This chapter discusses conceptual and systematic writing models to support the research process based on the selected object.

### **CHAPTER IV EXISTING ANALYSIS**

This chapter contains information about the current state of the network configuration at the Telkom University Landmark Tower building.

### **CHAPTER V TESTING RESULT**

This chapter contains the analysis that has been carried out and the result of the analysis based on the problems contained in the Telkom University Landmark Tower building.

### **CHAPTER VI CONCLUSIONS AND SUGGESTIONS**

This chapter contains conclusions from solving problems that have been carried out as well as suggestions for research that has been carried out