

## Research Articles

# EXPERIMENTAL STUDY ON NOISE MAPPING OF SPLIT UNIT AIR CONDITIONER SYSTEM

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### Abstract

This paper presents the procedures and the results of noise source at the split unit air conditioner system. Noise in split unit air conditioning system is a frequent problem for the air conditioner manufacturers. Split unit air conditioners have an indoor unit and an outdoor unit connected by communication pipes. Noise can reduce the efficiency and performance of the air conditioner. In order to identify and analysis of noise at air conditioner system, experiment has been conducted using sound intensity mapping method.

The investigation is carried out by varying the parameter which is the fan speed and temperature at air conditioner. In order to identify where the noise source comes from, a grid rig had been build to get the noise location and their rating by located the microphone at the rig point. The signal from the probe will be analyze by using Pulse LabShop software.

The results from the noise were showed in noise mapping with different color which indicates the different level of noises from different location. The highest noise sound levels occur at the front side of air conditioner which is at the fan that is about 74.784dB. The second highest noise sound level is occur at the right side which is at the compressor about 72.115dB. It can be concluded that sound power level will increase as higher as fan speed at the lowest temperature of the air conditioner.

**Keywords:** Sound Intensity Mapping, Noise Source, Fan Speed, Temperature, Pulse LabShop

### Introduction

Air conditioners are typically categorised into split-type and multi-type air conditioners. Split-type air conditioners have an indoor unit and an outdoor unit connected by communication pipes. Multi-type air conditioners have plural indoor units connected to an outdoor unit. Air conditioners may also be categorised into ones that air conditioners operate a refrigerant cycle in one direction to only supply a room with cool air, and ones that selectively operate a refrigerant cycle in two directions to supply a room with hot or cool air. Now days, mostly every home has their own air conditioner system is to provide comfort during hot days and nights.

A frequent problem for the air conditioner manufacturer is the noise comes from the air conditioner. The noise is considered undesirable and the cause of the noise may in some cases even limit the heating or cooling efficiency of the air conditioner.

*Noise in split unit air conditioning system is a frequent problem for the air conditioner manufacturers. Split unit air conditioners have an indoor unit and an outdoor unit connected by communication pipes. Noise can reduce the efficiency and performance of the air conditioner.*

The noise produced by air conditioning unit probably caused by several mechanical and aerodynamics sources such vibration of the compressor shell, electric motor vibration and fan noise [1]. Any mechanical coupling of such source as the fans, the compressor or the electric motor will cause the cabinet panel to

vibrate and radiate acoustics energy.

The most annoying source of noise at some air-conditioning units appears to be due to the vibration of the electric motors at 120 Hz and harmonics [1,2]. Actually this vibration is due to fluctuations in the magnetic forces [2]. There are some studies on the fan noise have found that it involved experiment with minor geometry changes of fan to reduce noise. Morinushi [3] have reported that minor changes in the location can have minimal effects on fan performance.