1. INTRODUCTION

Vibration in vehicles produces noise that affects the emotions and focus of the drivers. The exposure to the vibration will affect visual performance by producing blurred visual images, since the vibration can cause relative movement between the retina and the objects viewed. This scenario can affect driving comfort in that it can reduce the focus of a driver and it has the potential to cause road accidents. Based on previous research which examined the vehicle cabin acoustical environment, the main sources of noise that have been identified may be categorized into a few main sources, namely the transmission of the engine, the exhaust exit, and the noise from the tires that is produced by the tire-road contact. However, in this study, we focused on the main source of the vibration caused by tire interaction with the road surface. Based on previous studies concerning vehicles moving at a constant rate of speed, the dominant source of noise was found to be the vibration caused by tire-road contact.

In order to evaluate the noise level in the cabin, various standards and methodologies were considered and used, to predict the changes in sound quality while the vehicle was operated in both stationary and non-stationary conditions. The findings from the results can be used particularly by vehicle manufacturers to modify and improve the construction of vehicle to reduce the vibration exposure along with the reduction of noise in the cabin.

Various studies have been conducted by researchers to identify and estimate the generation of noise and vibration in the vehicle cabin in both stationary and non-stationary conditions. Generally, the transmission of noise into the vehicle is caused by two main sources: (1) airborne noise and (2) structure borne noise. One of the sources that contribute to the vehicle’s interior noise is the vibration caused by the tire-road contact. With regard to this, some studies have been carried out to investigate the effect of the tire tread rubber on the noise generated. As a result, various characteristics of the tread rubber will produce different levels of noise that are caused by different levels of vibration.

Following the research carried out previously, it has been...