UNIVERSITI TEKNOLOGI MARA

PERFORMANCE ENHANCEMENT OF INTEGRATED LIGHT EMITTING DIODE AND WI-FI ANTENNA USING STACKED MICROSTRIP

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Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

Faculty of Electrical Engineering

February 2018

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 21 December 2017 to conduct the final examination of Hamizan Bin Yon on his Master of Science thesis entitled " Performance Enhancement of Integrated Light Emitting Diode (LED) and Wi-Fi Antenna Using Stacked Microstrip" in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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AUTHOR'S DECLARATION

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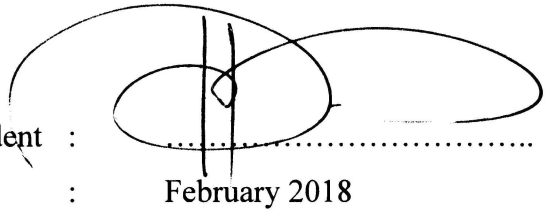
Signature of Student	:	
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ABSTRACT

Previous works on integrated antenna with LED have been developed by researcher to support a new concept of dual functionality in wireless communication and lighting systems. Somehow, the inconsistency in resonant frequency and antenna gain have driven this research to overcome previous limitations. Three antenna designs on stacked patch antenna were proposed. Antenna Design 1 to minimize frequency shifting, Design 2 with parallel LED circuit connection for power consumption concept and Design 3 to increase the gain. All antenna designs were simulated on FR-4 substrate to resonate at 2.45GHz. By using the stacked configuration on antenna Design 1, it was shown that frequency shifted was eliminated. Antenna Design 2 proposed a new LEDs circuit connections mainly designed to reduce power supply used to turn ON the LEDs. As a result, the voltage source for the LEDs circuit was reduced to 90% from previous works and the number of LEDs used also found to be increased, hence better parasitic and illumination effect. A air gap structure was introduced on antenna Design 3 which is located between substrate 1 and substrate 2 and optimization was done by using simulation software. Implementation of air gap structure has contributed to 54% improvement on gain at final anten na Design 3. All the three antenna designs have been fabricated and good agreement was achieved between the simulation and measurement result. A dual-functional prototype consists of Wi-Fi antenna and illumination device has been successfully developed. Adopted methods and techniques were able to significantly reduce the frequency shifting and increase the gain, as well as reducing the power consumption.

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