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COMPREHENSIVE ANALYSIS OF A BRIDGED-T PRE-EQUALIZER CIRCUIT FOR HIGH-SPEED VISIBLE LIGHT COMMUNICATIONS

[AZIZ, SITI HAJAR AB^{a, b,}](#); [NOR, NORHANIS AIDA MOHD^c](#) ; [ZABIDI, SURIZA AHMAD^b](#) [Save all to author list](#)^a Communication Technology Section, Universiti Kuala Lumpur – British Malaysian Institute, Selangor, Malaysia^b Department of Electrical and Computer Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia^c Department of Science in Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia[View PDF](#) [Full text options](#) [Export](#) **Abstract**[Author keywords](#)[SciVal Topics](#)[Metrics](#)**Abstract**

This paper presents a comprehensive analysis of a bridged-T equalizer circuit (BTEC) designed for a high-speed visible light communications (VLC) system. The circuit is proposed to overcome the bandwidth limitation of light-emitting diodes (LEDs) in the VLC system. The advanced design system (ADS) and MATLAB were integrated to analyze the behavior of the BTEC in terms of transfer functions and scattering parameters S_{11} , S_{12} , S_{21} , and S_{22} . The results indicate a good correlation between the two tools, with the center frequency being 786 MHz. The 3-dB lower and upper cut-off frequencies are 501 MHz and 1.23 GHz, respectively. The impedance point is at magnitude 1 and 0 phase degrees on the Smith chart. This precise point ensures optimal matching to 50Ω of source and load impedance. This simulation proves that the bridged-T pre-equalizer circuit is a symmetric and reciprocal network since $S_{11} = S_{22}$ and $S_{12} = S_{21}$. This work combines the computational capabilities of MATLAB with the circuit simulation capabilities of ADS, which satisfied the pre-equalizer circuit experimental stage. © (2025), (International Islamic University Malaysia). All rights reserved.

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