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UWB antenna based time-domain approach for through the walls gap estimation (Conference Paper)

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Abstract

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This paper has introduced a novel experimental system adopted a time domain approach for estimating through wall distance and recognizes buried objects behind the wall. The designed and fabricated balanced antipodal Vivaldi antenna (BAVA) has been used for the development of UWB system. The working mechanism of an intended detection system based on time domain reflectometry (TDR) and ground-penetrating radar (GPR). A miniature pulse in the UWB range is generated by the vector network analyzer (VNA) to irradiate a barrier made of two walls separated by airgap between them. The signal radiations reflect partially from the front wall while remaining goes through for getting reflected from the rear wall. The VNA is used for measuring the time interval passed between the instant when an incident signal irradiates the first wall and the instant when the incident signal gets reflected from the rear wall. The investigational process of a system is carried out by UWB antenna probe. The detected information is attained using the values of reflection coefficient (S_{11}) represented in time domain measurements. Experimental results have been proved the ability to detect wall gap as well as the width estimation between two walls with high accuracy. The maximum percentage error has been found to not exceeding 4.5% in the worst condition. © 2019 IEEE.

SciVal Topic Prominence

Topic: Slot antennas | Antennas | Vivaldi antenna
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Author keywords

BAVA GPR SLL CSTMWS TDR TWI UWB VNA

Indexed keywords

Engineering controlled terms: Electric network analyzers Geological surveys Geophysical prospecting Ground penetrating radar systems Radar antennas Reflection Retaining walls Ultra-wideband (UWB)

Engineering uncontrolled terms: Balanced antipodal vivaldi antennas (BAVA) BAVA Ground penetrating radar (GPR) SLL CSTMWS Time domain measurement Time domain reflectometry Time-domain approach Vector network analyzers

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