

A Planar Log-periodic Slot Antenna for UWB Applications

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A log-periodic slot antenna for ultra-wideband applications is proposed as shown in Fig. 1. The proposed antenna consists of a coplanar waveguide (CPW) line and log-periodic slots. The proposed antenna is to be fabricated on a cheap FR4 substrate with the height of 0.8 mm, permittivity of 4.4, and loss tangent of 0.02. The CPW line has four segments for wideband impedance match. The geometry of the slots is determined by exponential curves, which can be achieved by formulas of $X_{n+1} = \sigma X_n$, $x_{n+1} = \sigma x_n$, $Y_{n+1} = \sigma Y_n$, and $y_{n+1} = \sigma y_n$, where σ is set to 0.7 in this study. The length of $(X_1 + Y_1)$ is about half wavelength of the lowest frequency in the band of interest.

Fig. 2 shows the measured and simulated $|S_{11}|$ of the proposed slot UWB antenna. The two results agree well with each other. The measured $|S_{11}|$ shows that the frequency range ($|S_{11}|$ below -10 dB) is from 2.9 GHz up to 11 GHz, which covers the UWB spectrum (3.1 – 10.6 GHz). The simulated peak gain shows that the proposed antenna has stable gain about 4.5 dBi in the UWB band. Therefore, the proposed antenna is a good candidate for the UWB applications. Other results such as design procedure, parametric study, current distribution, and radiation pattern of the proposed log-periodic slot UWB antenna will be presented in the meeting.

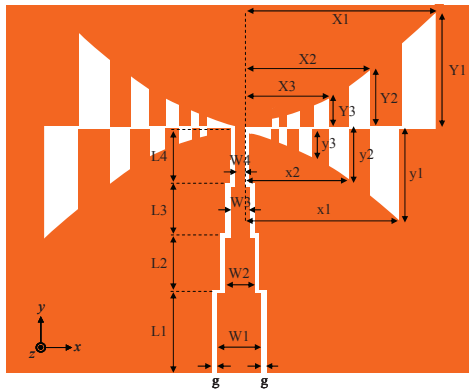


Fig. 1. The geometry of the proposed log-periodic slot UWB antenna.

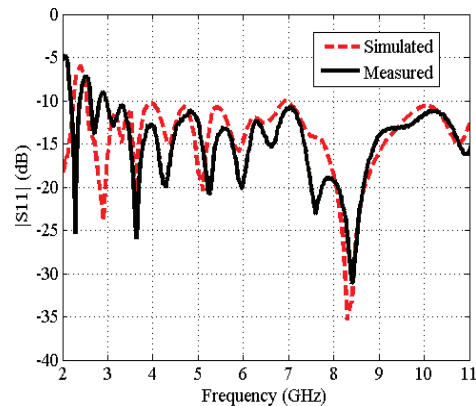


Fig. 2. The measured and simulated $|S_{11}|$ of the proposed antenna.