

ABSTRACT

Ground Penetrating Radar (GPR) is a system that use the radio wave to detect ground surface or burried object with a certain distance without ruin the soil. The signal transmitted by GPR is a pulse signal or continous wave signal. One of GPR applications uses the Step Frequency Continous Waves (SFCW) signal which has a wide bandwidth that is needed to detect a high-resolution object or subsoil structure. GPR has a characteristic of target detection is in the specific target and it can only work in one frequency range. However, this can be overcome by using work frequency that can be adjusted as needed by using a programmable signal generator.

In this research, a SFCW signal generator was designed and realized using the implementation of Phase Locked-loop (PLL) ADF4351 which is controlled by the Arduino UNO microcontroller so that it can generate SFCW signals at the required frequency. Firstly is designing a signal generator in one frequency variable. After that, design a signal generator to generate SFCW signal.

The signal generator in this research generates SFCW signals in the frequency range 500 MHz - 1500 MHz. Experiments were conducted with the number of steps frequency 8, 16 and 32 times. The measurement results for each step frequency show the power varies between -10.41 dBm up to -2.9 dBm. The design results and measurements show that the signal generator can be programmed to generate SFCW signals at frequencies as needed for the GPR system.

Keywords: Signal Generator, GPR, SFCW, PLL, ADF4351