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Author: Mr. Mohammad Fahim Sultan Anoy
BRAC University, Bangladesh

Mr. Md. Mahbub Ul Haque
BRAC University, Bangladesh
Mr. Abdulla Hil Kafi
BRAC University, Bangladesh
Ms. Raihana Shams Islam Antara
BRAC University, Bangladesh

DESIGN A SOFTWARE-DEFINED RADIO PLATFORM TO SUPPORT MULTI-FREQUENCY COMMUNICATIONS AND TUNING FOR SATELLITE SYSTEMS

Abstract

Software-Defined Radio (SDR) is becoming a trendy technology while working with space systems and communications, as they are adaptive, reconfigurable, and can be tailored according to the requirements of the mission. Here, a system is designed with an RTL-SDR and PC to automatically evaluate the spectrum and reconfigure itself to decrease the frequency tuning time. Moreover, the system would actively monitor the spectrum in which another PC is transmitting data and hop to the desired frequency to receive data, which can be implemented for reception from multi-satellite systems. Additionally, the SDR and the PC would operate in multiple bands simultaneously, hence the system is designed to provide an adaptable and modular platform that can be reconfigured and customized easily. Furthermore, the paper investigates the performance of the proposed system in terms of wireless communication by analyzing the frequency, bandwidth, bitrate, etc. The paper also provides a brief overview of SDR architecture design for operating it with embedded systems, for improved power consumption and performance efficiency.