Design and Analysis for DAB Gap-Filler Integrated System

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ABSTRACT

This thesis is aimed at designing a DAB signal repeater, which is also known as gap-filler, for solving the problem of the dead zone of electromagnetic wave caused by buildings structures. In addition to improving DAB signal coverage, this gap-filler also can relay and supply the signals which are shielded by the buildings structures. A gap-filler for digital radio (DAB) frequency range between 170MHz and 240MHz is being designed. The gap filler circuit is divided into three components, low noise amplifier (LNA), driver amplifier (DA) and power amplifier (PA). Finally, these three individual circuit components are integrated to form a gap-filler system with appropriate transmitting power. External receiving antenna and transmitting antenna are chosen to match with the amplifier system. The active device used in the low noise amplifier and driver amplifier are respectively BFG25W and BFG21W manufactured by Philips Company. For designing the amplifier, Microwave Office 2000 is being utilized to analyze and simulate the circuit and then make the impedance matching according to the theory of RF circuit. During this study, a large number of surface mounted devices of lump elements is being used for making the impedance matching for the frequency range. All circuit made in the printed circuit board and measured its S parameter by the network analyzer.

Keywords : Digital Audio Broadcasting (DAB) ; Gap-Filler ; Low Noise Amplifier (LNA) ; Driver Amplifier (DA) ; Power Amplifier (PA) ; Radio Frequency Circuit (RF Circuit) ; Surface Mounted Device (SMD)

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