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ANALYSIS AND DEVELOPMENT OF A LOW COST GSM TELEPHONE SYSTEM FOR A RURAL AREA

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Abstract : This work presents the analysis and development of a low cost GSM telephone system. A review of radio receiver and transmitter architectures showed the superheterodyne as having a better performance over the direct conversion radio in terms of selectivity and complexity. A low power bidirectional transceiver was developed based on the superheterodyne architecture. The specifications of the bidirectional transceiver were computed using specifications of the component modules in the spreadsheet approach. The resulting design was optimized using Matlab programs and simulated using the Genesys simulation software. The results show the front end of the transceiver as the most critical part of the transceiver. Both the generic and proposed transceivers had frequency response from 1700MHz to 1900MHz, the same dynamic range and noise figure but the proposed transceiver achieved these results with a 50% reduction in power amplifier and low noise amplifier chips and the 75% reduction in the number of voltage oscillator chips. This reduction in component count led to a 40.59% reduction in power requirement and a reduction in the overall cost of the proposed transceiver. The reduced power consumption of the architecture enables the use of solar energy as an alternative source of power supply for the transceivers.

1.0 Introduction