Reduced Power Consumption by Randomization for DSI3

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Abstract : The newly released Distributed System Interface 3 (DSI3) Bus Standard specification defines 3 modulation levels from which 16 valid symbols are coded. This structure creates power consumption variations depending on the transmitted data of a factor of more than 2 between minimum and maximum. The power generation unit has to consider therefore the worst case maximum consumption all the time and be built accordingly. This paper proposes a method to reduce both the average current consumption and worst case current consumption. The transmitter randomizes the data using several pseudo-random sequences. It then estimates the energy consumption of the generated frames and selects to transmit the one which consumes the least. The transmitter also prepends the index of the pseudo-random sequence, which is not randomized, to allow the receiver to recover the original data using the correct sequence. We show that in the case that the frame occupies most of the DSI3 synchronization period, we achieve average power consumption reduction by up to 13% and the worst case power consumption is reduced by 17.7%.

Keywords : DSI3, energy, power consumption, randomization

Conference Title : ICCSNDSP 2015 : International Conference on Communication Systems, Networks and Digital Signal Processing

Conference Location : Paris, France

Conference Dates : January 23-24, 2015