

# Energy Efficiency of Two-hop Transmission – Part I: A Novel Wireless Transceiver Power Consumption Model

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## **Abstract:**

Wireless communications afford mobility and flexible network topologies of computer networks. However, their energy efficiency must keep improving. Since the major power consumer in a wireless transmitter is the power amplifier, energy efficiency can be improved by reducing transmit power depending on the channel conditions and performance metrics. We propose a novel transceiver power consumption model for Class A, AB and B power amplifiers. It is a better fit than the existing affine model of the total transmitter power consumption, as a function of the transmit power. In the model, we explicitly upper- and lower-bound transmit power. We extend the model by using the link budget and a condition for successful reception to derive transmit power and total transmitter power consumption dependent on channel loss; and introduce power margin at the receiver for link adaptation.