

E157 Design Project 2: Receiver

Design a receiver using Mini Circuits (<https://www.minicircuits.com/>) connectorized modules that could decode a message from the secret transmitter in the RF lab. The transmitter has 17dBm of Output Power and modest (6dBi) directionality. The output is frequency shift keyed: 0 bits are transmitted at 2.256 GHz and 1 bits are transmitted at 2.296 GHz. The transmitter repeats a message continuously at a bit rate of 10kbps. Each message begins with a pilot frame that consists of the bits 010101. The remaining bits represent ASCII encoded characters. You must achieve a minimum receive range of 10ft.

Your receiver may use any architecture that you see fit, but your report should include a careful analysis of the receiver's expected performance. Include analytical predications of its system temperature, IIP2 and IIP3. You should supplement this with a spreadsheet showing the voltage noise power and power of distortion products at each stage.

Assume that you are using a standard analog lab oscilloscope (<https://www.keysight.com/en/pdx-x201837-pn-DSOX2024A?nid=-32542.1150190&cc=US&lc=eng>, 200MHz, 4 channel model) as your analog-to-digital converter.