

Test Report

Group 3

1 Test Procedure

The transmitter and receiver software was developed in conjunction. Initially, an AWGN channel model was used in order to test the receiver. Once the transmitter was ready it was included in the software model of the communication link. To simulate the effects of varying propagation delay, a random number of zero's were placed at the beginning of the Tx-data vector. Once we were able to detect the signal, find the correct sampling instant using a preamble, and demodulate the message with an SER and BER of zero, the design was deemed fit for HW testing. The HW testing was conducted primarily by running the system in diagnostics mode and observing the generated PSD, constellation plot and eye diagram. Some adjustments were made during this time in order to make design comply with the specified performance metrics.

2 Achieved performance

- Full duplex: No.
- Half duplex: Yes.
- Bandwidth: Signal lies within green spectrum mask.
- RTT: Tends to be high for first couple of transmissions, but then consistently below 4s.
- Packet loss: $\frac{1}{30} \approx 3.3\%$

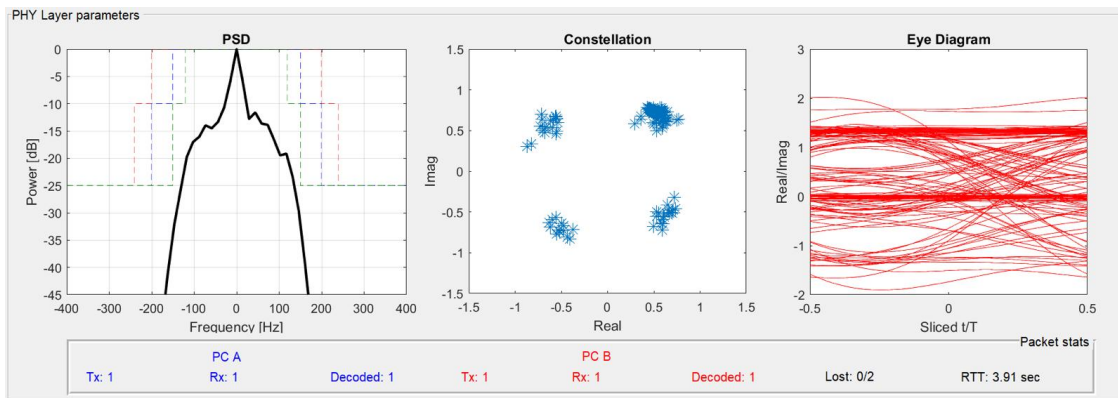


Figure 1: System performance.

3 Deviation

- The symbol rate R_s is reduced from 750 symbols/second to 150 symbols/second to fit within the desired spectrum mask.
- The Modulation is changed from 16-QAM to 4-QAM due to the noisy channel.
- Full duplex was not achieved.

4 Operation Manual

4.1 Chat Mode

4.1.1 Transmitters (Chat_PC_A_Tx and Chat_PC_B_Tx)

1. Run **Chat_PC_A_Tx.p** on PC A and **Chat_PC_B_Tx.p** on PC B
2. Enter the carrier frequency f_c and message X (max 50 ASCII characters)
3. Click the button **SEND** to encrypt the message and generate a 432-bit message
4. The message X and the carrier frequency are passed to the function **transmitter(X, f_c)**

4.1.2 Receivers (Chat_PC_A_Rx and Chat_PC_B_Rx)

1. Run **Chat_PC_A_Rx.p** on PC A and **Chat_PC_B_Rx.p** on PC B
2. Enter the carrier frequency and press **Activate receiver** to call the function **receiver(f_c)**
3. The interface displays the received message, power spectral density(PSD), constellation and eye diagram

4.2 Diagnostics Mode

1. Set the operation mode to **Diagnostics mode** on both **Chat_PC_A_Rx.p** and **Chat_PC_B_Rx.p**
2. Type a message in **Chat_PC_A_Rx.p** and transmit it to PC B
3. After the transmission, Rx_A waits for 6 seconds for an automatically generated acknowledgment from Rx_B
4. Packet loss rate and RTT are measured based on the acknowledgment received at Rx_A