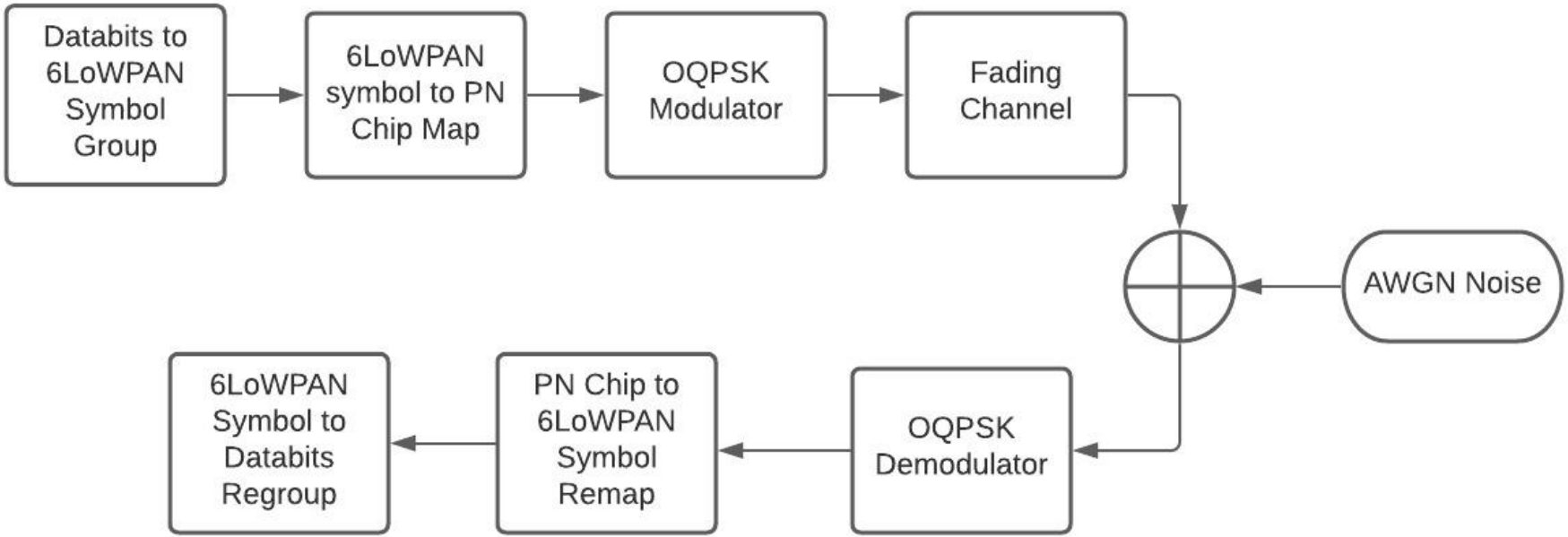
Parameter Specifications:

- Data Rate: 250kbps
- SNR = -2.7 dB
- Operating Bandwidth: 2.4 GHz
- Channel Bandwidth: 5MHz
- BER <= 1e-4
- Samples per frame: 4
- Pulse shaping using half sine
- OQPSK for modulation and demodulation

Block diagram



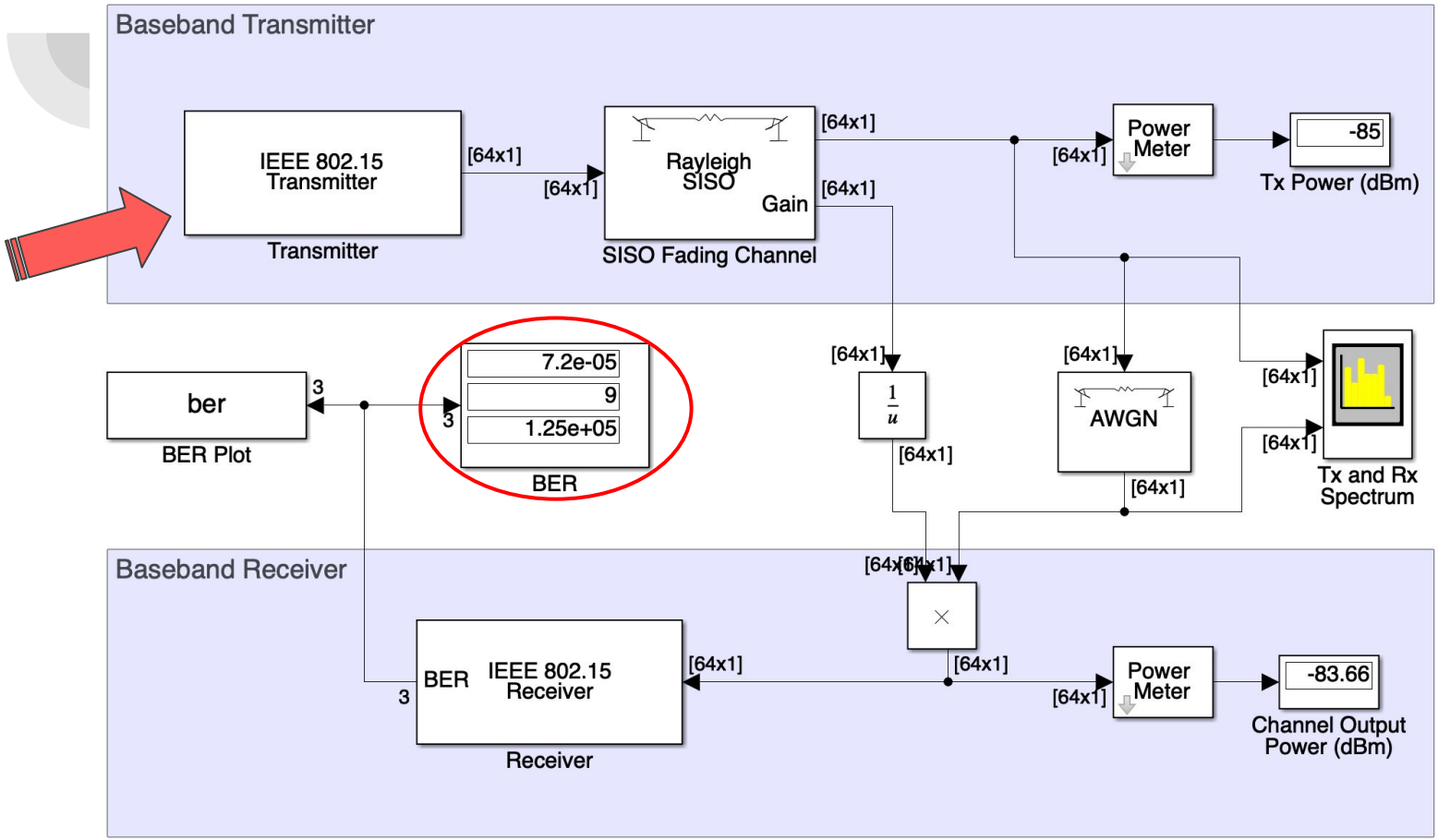
Symbol Chip Map

The mapping of symbols to chips is achieved through 32-chip PN sequences as shown in (Table 1)

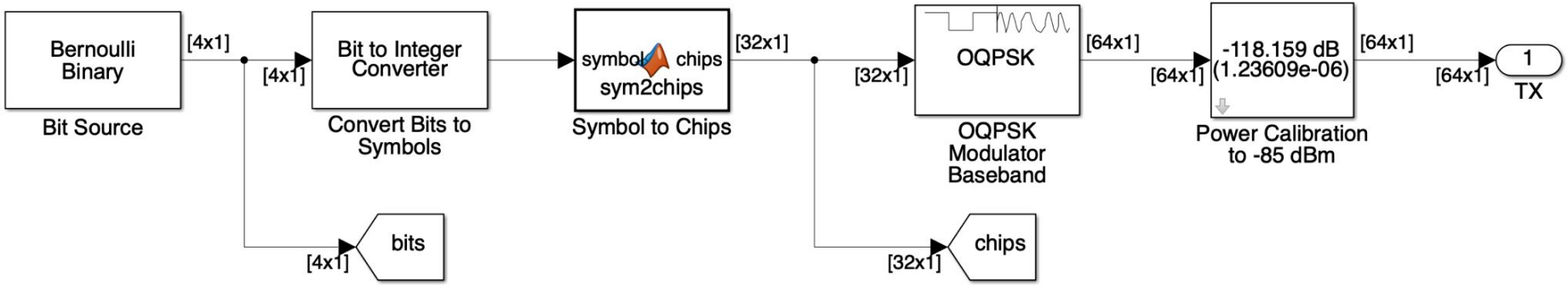
TABLE 1. SYMBOL TO CHIP MAPPING FOR THE 2.4 GHZ BAND

Data symbol (dec.)	Data symbol (bin.)	Chip values (c0 c1…c30 c31)
0	0000	11011001110000110101001000101110
1	1000	11101101100111000011010100100010
2	0100	00101110110110011100001101010010
3	1100	00100010111011011001110000110101
4	0010	01010010001011101101100111000011
5	1010	00110101001000101110110110011100
6	0110	11000011010100100010111011011001
7	1110	10011100001101010010001011101101
8	0001	10001100100101100000011101111011
9	1001	10111000110010010110000001110111
10	0101	01111011100011001001011000000111
11	1101	01110111011100011001001011000000
12	0011	00000111011110111000110010010110
13	1011	01100000011101111011100011001001
14	0111	10010110000001110111101110001100
15	1111	11001001011000000111011110111000

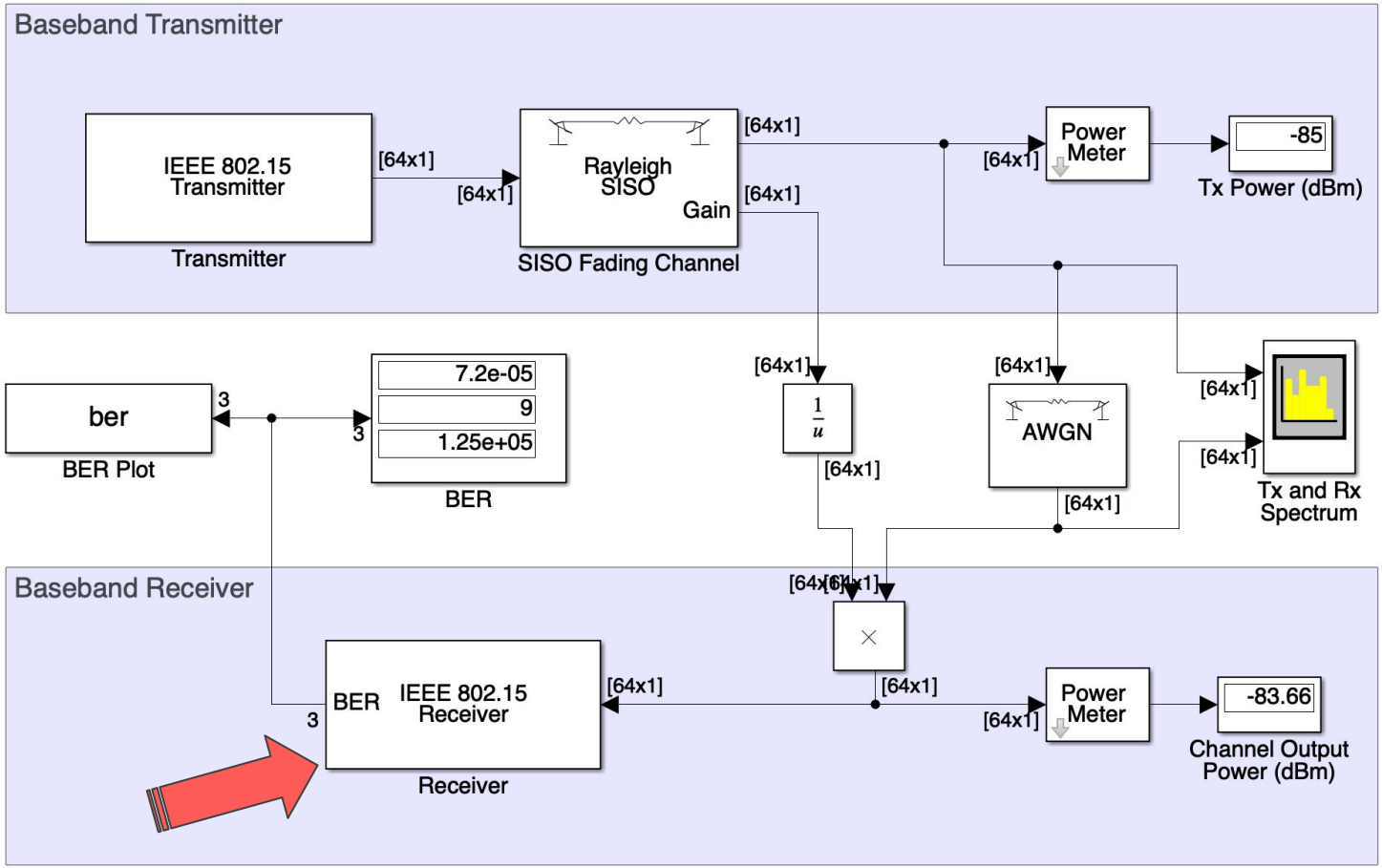
Modem Design 6LoWPAN



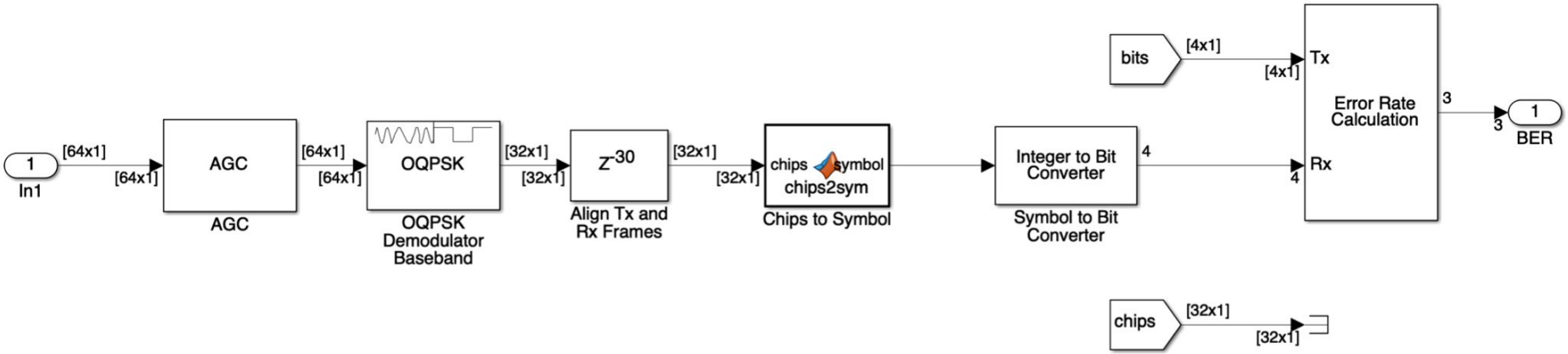
IEEE 802.15 Transmitter



Modem Design 6LoWPAN

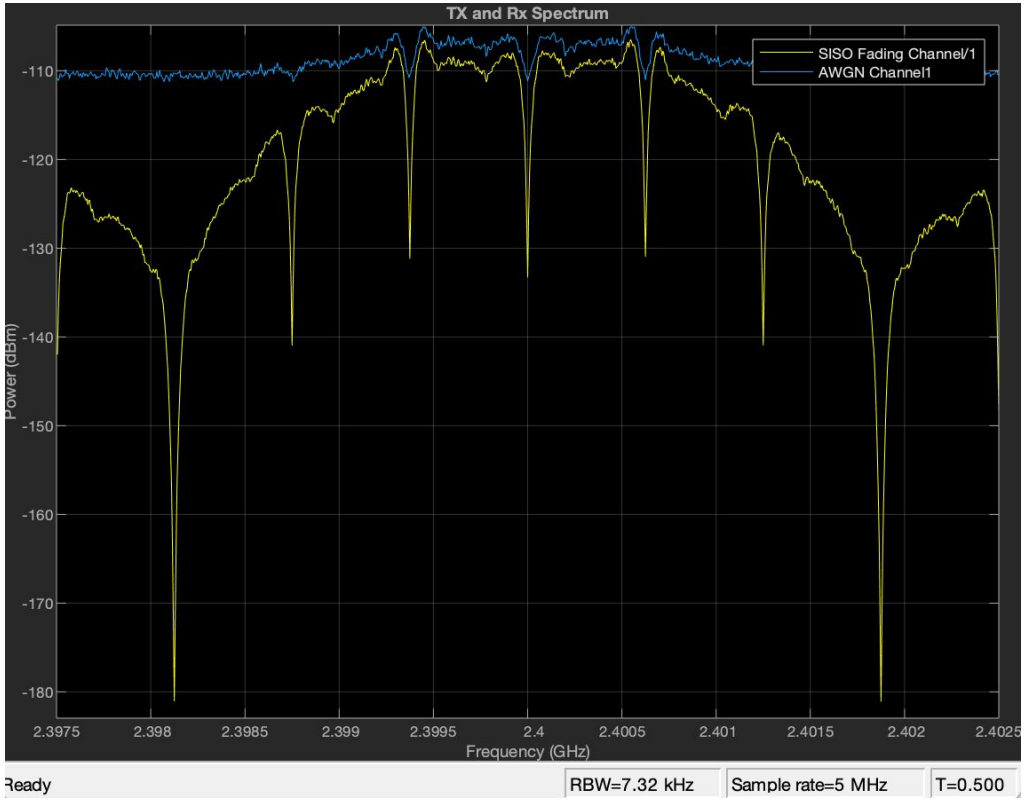


IEEE 802.15 Receiver



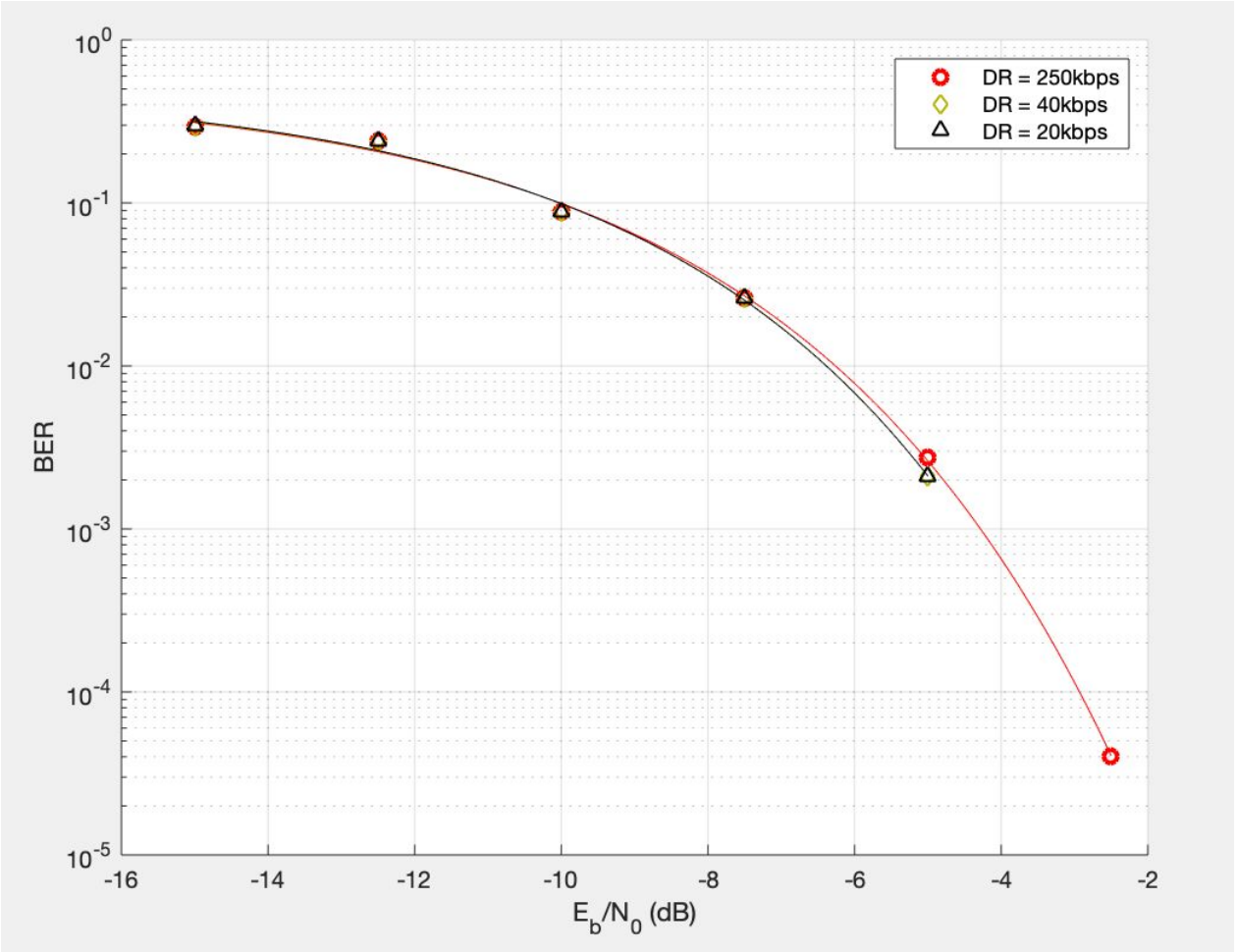
Simulation Results

The model achieves the specified BER less than 1e-4 at an SNR of -2.7 dB



BER Plot for Different data rates

This shows that the higher the data rate, the higher the probability of error for a desired SNR.



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