**Kocaeli University, Electronics and Telecommunications Engineering Department**

**Digital Communications Laboratory**

**Experiment 6: BPSK Modulation and Demodulation - Lab Report**

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| Name-Surname-Number: |
| Name-Surname-Number: |
| Name-Surname-Number: |

**SIMULINK PART - The table below is for verification only and filled by the lab instructor.**

|  |  |
| --- | --- |
| Understanding Carrier Phase in BPSK (15 pts) |  |
| Understanding bandwidth and power consumption of BPSK (10 pts) |  |
| Understanding the Synchronous Demodulation of BPSK (15 pts) |  |

**STM32 PART - Section 1: Transmitting a Data Byte Using BPSK Modulation**

**Step 1:** **Write a C code for BPSK Modulation (you can modify BASK or BFSK C code for this purpose)**. Set the carrier frequency and txData values as **it is given on the whiteboard**. Build STM32 code and flash the MCU then reset it, you don’t need to run MCU in debug mode.

**Step 2:** Connect NI Elvis II Scope CH0 to **Frame Sync Signal (D8 on Nucleo-64 or PA9 on Discovery)**.

**Step 3:** Connect NI Elvis II Scope CH1 to **BPSK Modulation output** **(A2 on Nucleo-64 or PA4 on Discovery).**

**Step 4:** Adjust the Scope divisions (1V/Div, 500µS/Div). Set Scope CH0 vertical position at -3V. Set your Scope “Trigger Type” to “Edge”, “Level” to “1V” and Trigger “Source” to “Scope CH0”.

**Step 5:** Plot your Scope screen on the graph. (30 pts)

A grid of black lines

Description automatically generated

**Section 2: Exploring Frequency Spectrum of BPSK Modulation**

**Step 6:** Stop the Scope then Open NI Elvis II DSA. Adjust the DSA parameters as listed in the left table then fill the right table. (10 pts)

|  |  |
| --- | --- |
| **Source Channel** | SCOPE CH1 |
| **Frequency Span** | 40000 |
| **Units** | dB |

|  |  |
| --- | --- |
| Frequency of the Carrier (kHz) |  |
| Data rate (kbit/s) |  |
| Bandwidth (kHz) |  |

**Section 3: Comments on BPSK**

**Step 7:** Answer the question written on the whiteboard. (20 pts)