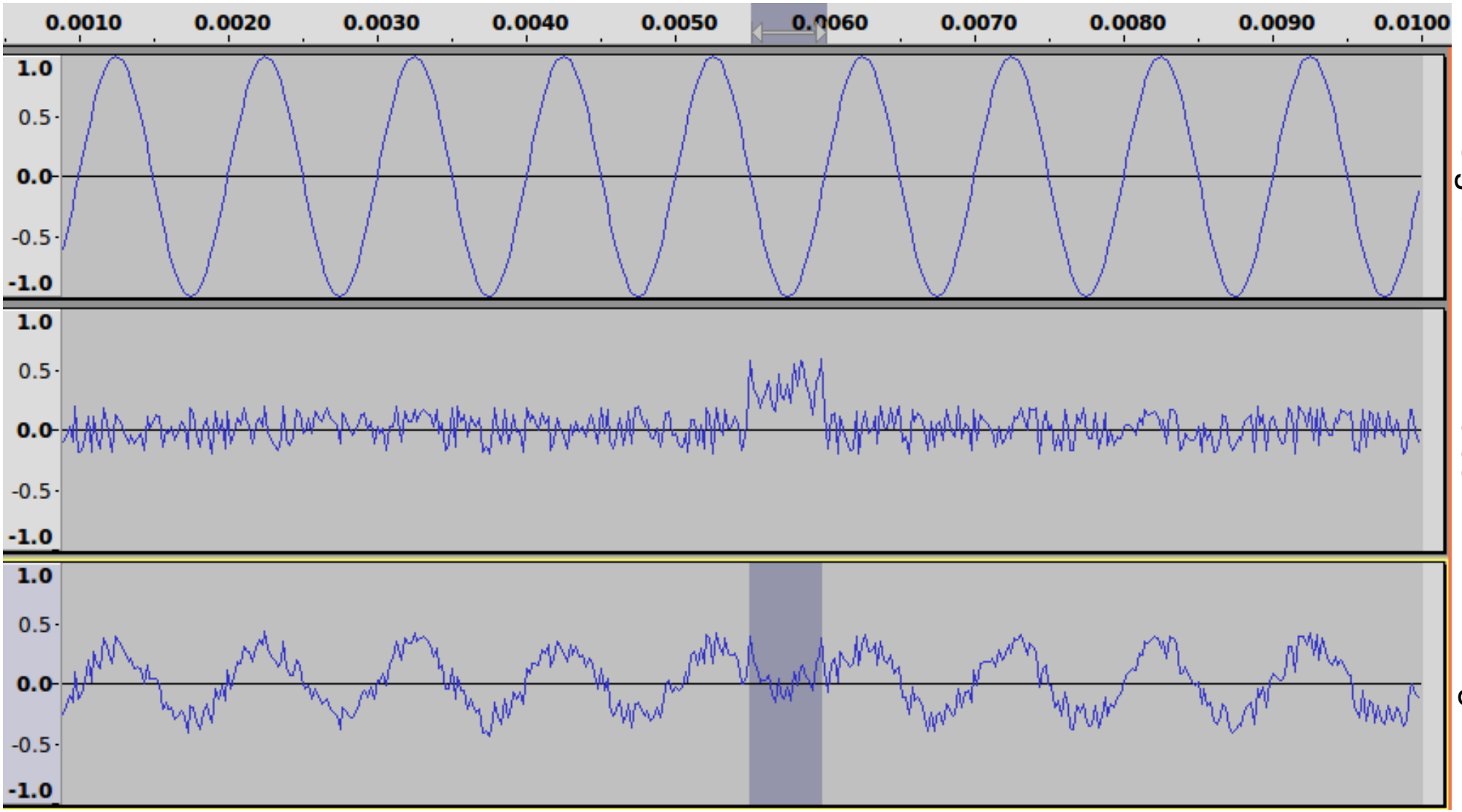
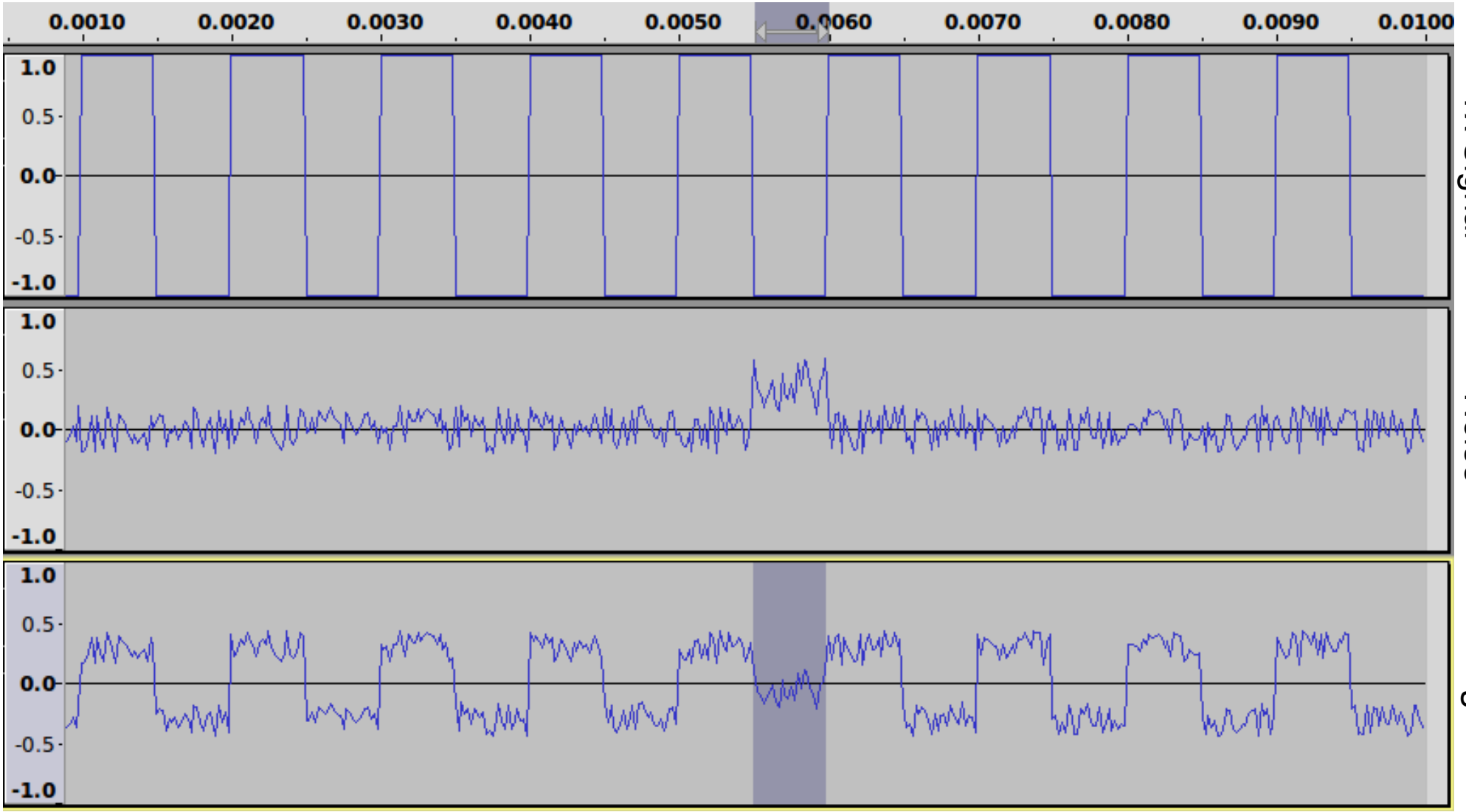
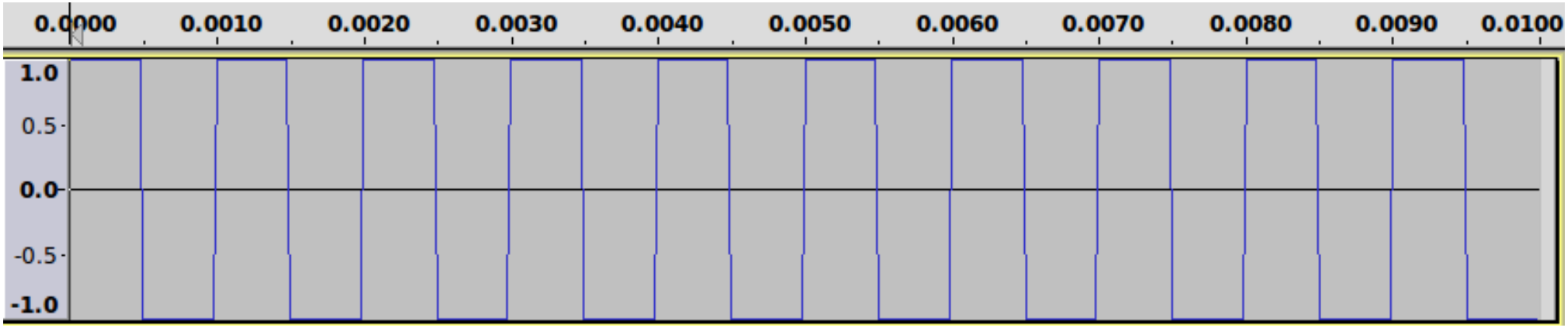
Tx Signal: 1000 Hz sine wave; Attenuation; Random noise with 0.5ms spike

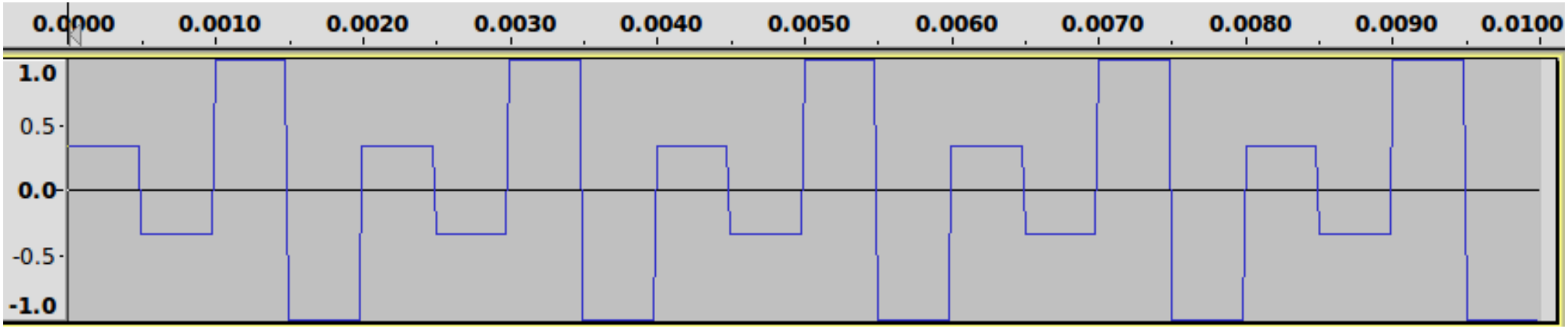


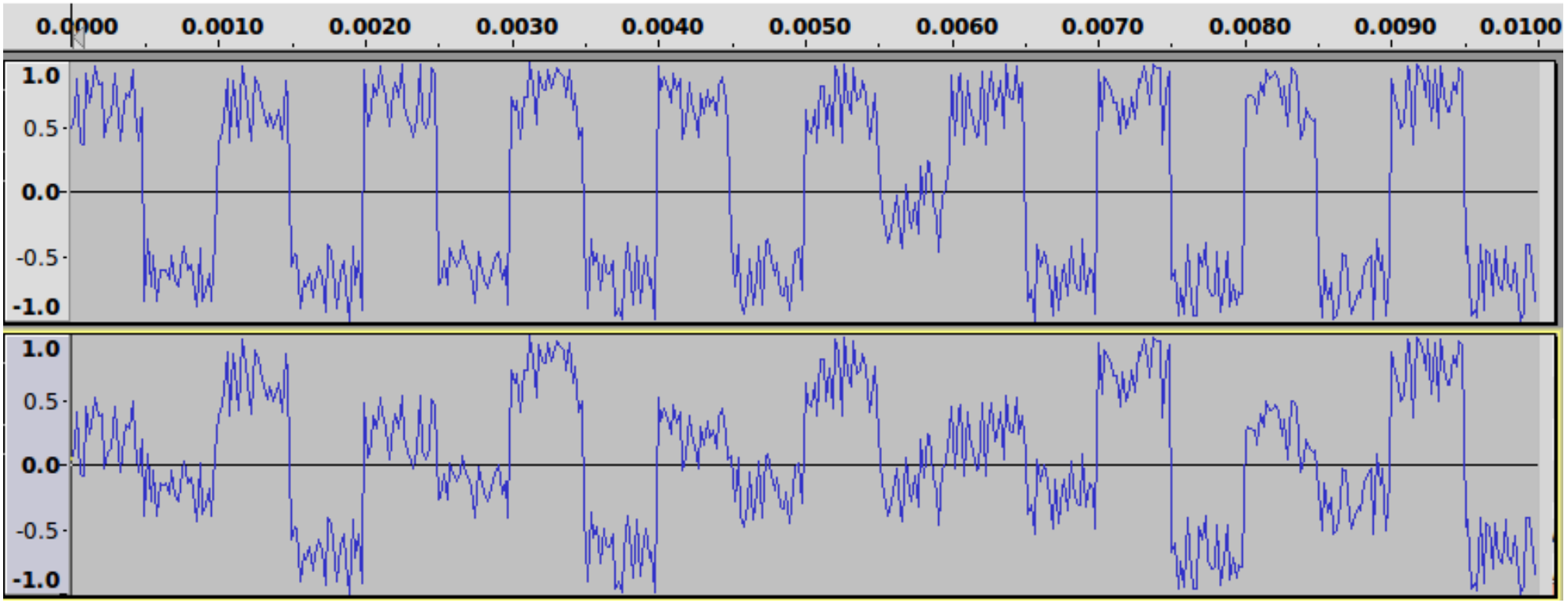
Tx Signal: 1000 Hz square wave; Attenuation; Random noise with 0.5ms spike



What about a signal with 2 levels vs a signal with 4 levels: which one will have more bit errors for some given noise?






0.0000
0.0010
0.0020
0.0030
0.0040
0.0050
0.0060
0.0070
0.0080
0.0090
0.0100
1.0
0.5
0.0
-0.5
-1.0
Rx (2 levels)
Rx (4 levels)

Signal with 4 levels has more chance of bit errors.
Smaller separation between levels; higher chance noise causes signal at one level to be received at one of the other 3 levels