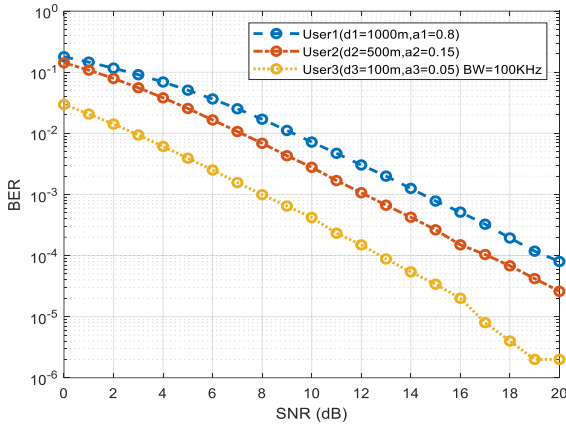


(b)



(c)

Figure 6. BER against SNR for different bandwidths, and distances for three users

Figure (6-a) shows the BER performance versus SNR at (100KHz) BW, the results show that the BER performance decrease as SNR increase and there is also a clear effect of distance and power coefficient. As the distance changed from (1 to 0.5) Km and the power coefficient changed from (0.8 to 0.15) the BER rate enhanced from user 2 to user 1 by (1.00E-04) and the distance changed from (500 to 100) m the and power coefficient changed from (0.15 to 0.05) the BER rate improved from user 3 to user 2 by (1.00E-03) for SNR of (18 dB). Hence the BER performance for user 3 is better than other users because user 3 is the nearest one. User 1 has the worst BER performance due to the interference from user 2 and user 3.

Based on increasing the bandwidth from 100 kHz to 1 MHz shown in Figure (6-b) for the same values of distance and power coefficient used in figure (6-a), find that the BER rate enhanced from user 2 to user1 by (12.00E-04) and the BER rate improved from user 3 to user 2 by (0.0007) for SNR of (18 dB). The results show that the performance of users 1 and 2 are close to each other until it reaches (4 dB) SNR and the BER performance has increased significantly.

Figure (6-c) shows the BER performance versus SNR at (10MHz) BW, the BER rate enhanced from user 2 to user1 by (1.00E-03) and the BER rate improved from user3 to user 2 by (6.00E-03) at SNR of (18 dB) with the same values of distance and power coefficient used in figure (6-a). The findings indicate BER performance for 1st user and 2nd user are closed to each other up to (8 dB) SNR, and there is a noticeable increase in the BER performance.

5.2 Second Scenario

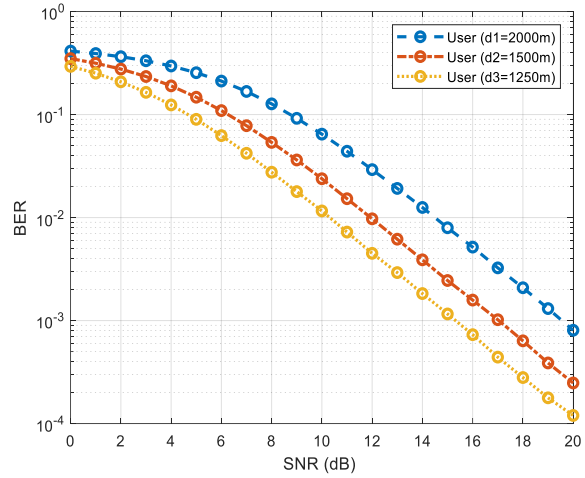


Figure 7. BER against SNR for one user with different distances

Figure.7 appears the BER performance for one user versus SNR at (100KHz) BW and (0.4) power coefficients for different distances. The effect of different distances appeared with increasing SNR. As the distance changed from (2 to 1.5) Km the BER rate improved by (6.00E-04) and the distance changed from (1.5 to 1.25) Km change the BER rate enhanced by (1.00E-04) at SNR of (20dB).

5.3 Third Scenario

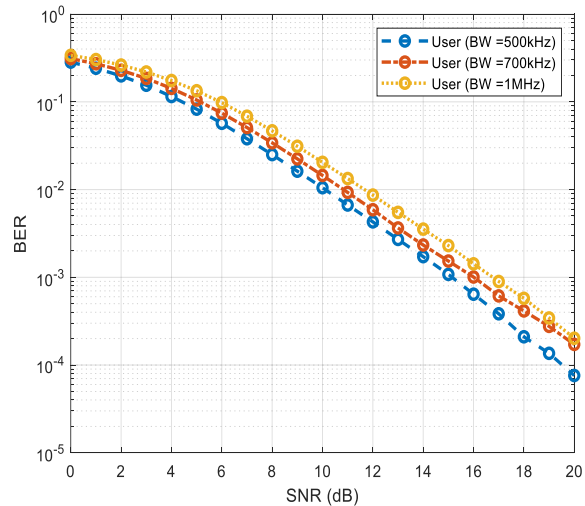


Figure 8. BER against SNR for one user with the different BW

This scenario studies the performance of a single user at the fixed distance of (950m), power coefficient of (0.75) and for different BW of (500, 700, 1000) KHz. As

BW changed from (700kHz to 500KHz) the BER rate improved by (1.00E-04) and BW changed from (1000 to 700) KHz the BER rate was enhanced by (3.00E-04) at SNR of 16dB. It becomes clear that as the BW increase the BER increase.

6. Conclusions

This paper has analyzed and explored the BER performance of DL NOMA PD against SNR for different scenarios with different BW, distances, and power location coefficients under AWGN and Rayleigh fading channels using QPSK with SIC. The findings indicate that the BER rate improved by (1.00E-04) at the BW of 100KHz, by (19.00E-04) at the BW of 1MHz, and by (16.00E-03) at the BW of 10 MHz and SNR of (18 dB) from user 3 to user1 for the first scenario. Hence the BER performance for user 3 is better than other users because user 3 is the nearest one. For the second scenario with one user and fixed BW and power coefficient with different distances. As distance changes from (2 to 1.25) Km, the BER rate is enhanced by (7.00E-04) at the SNR of (20 dB). For the third scenario with one user at the fixed distance and power coefficient with different BW. The BW Changed from (1000 to 500)KHz the BER rate improved by (4.00E-04) at the SNR of (16 dB). As the BW, distance, and power location coefficients rise, the BER increases. In comparison between BW, distance and power location coefficient factors, the BW parameter has the greatest influence on BER DL NOMA PD, according to the obtained results. Integration of NOMA with cognitive radio will be examined in future studies.

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