

CMPT-643: Wireless Communication

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Simulation Model of Multi-RAT in Wireless Network

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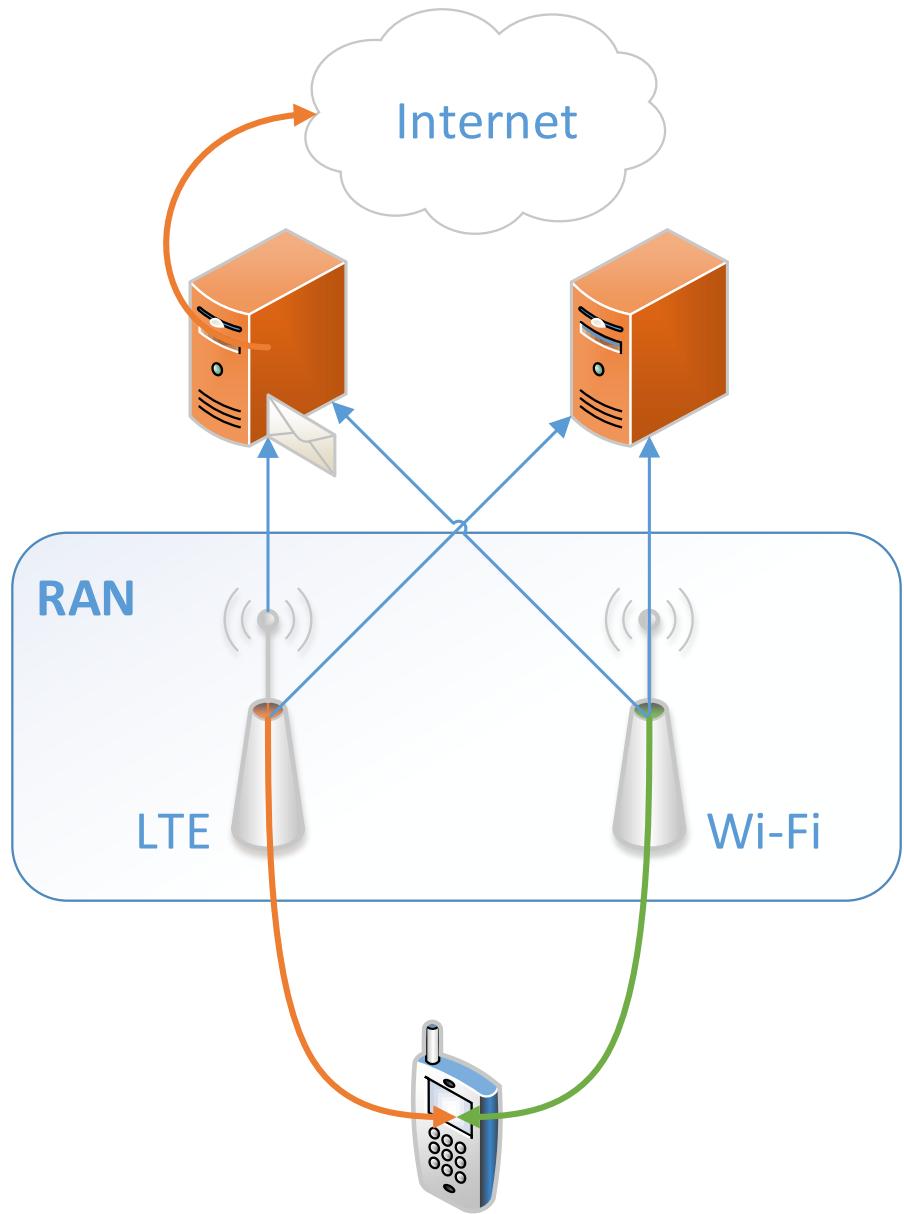
Content

Aim of This Project

Scenario Simulated

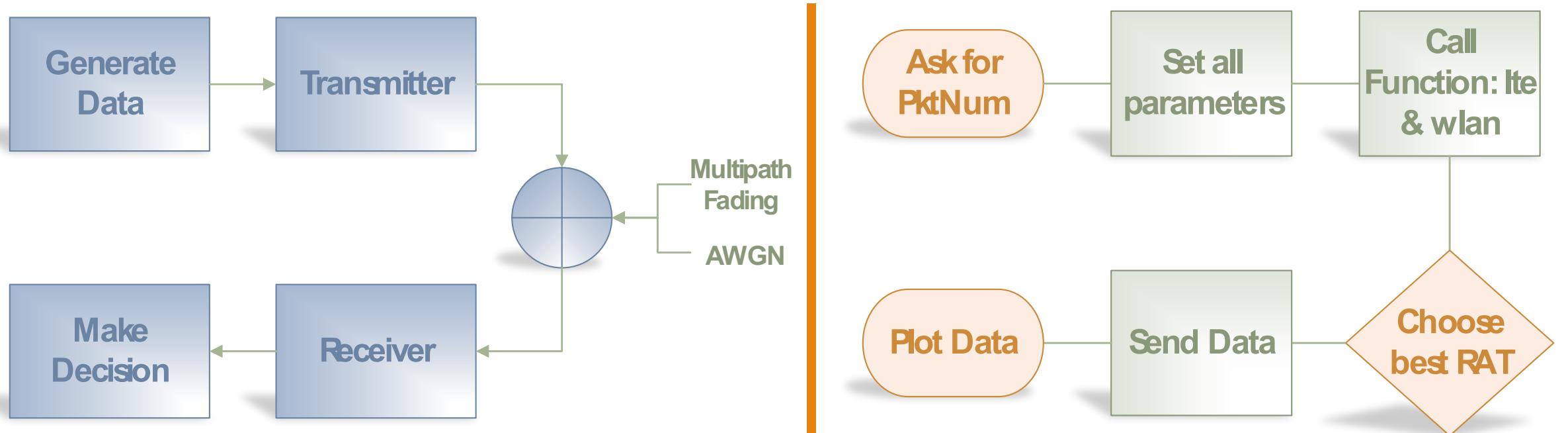
Simulation and Data analysis

Conclusion and Future

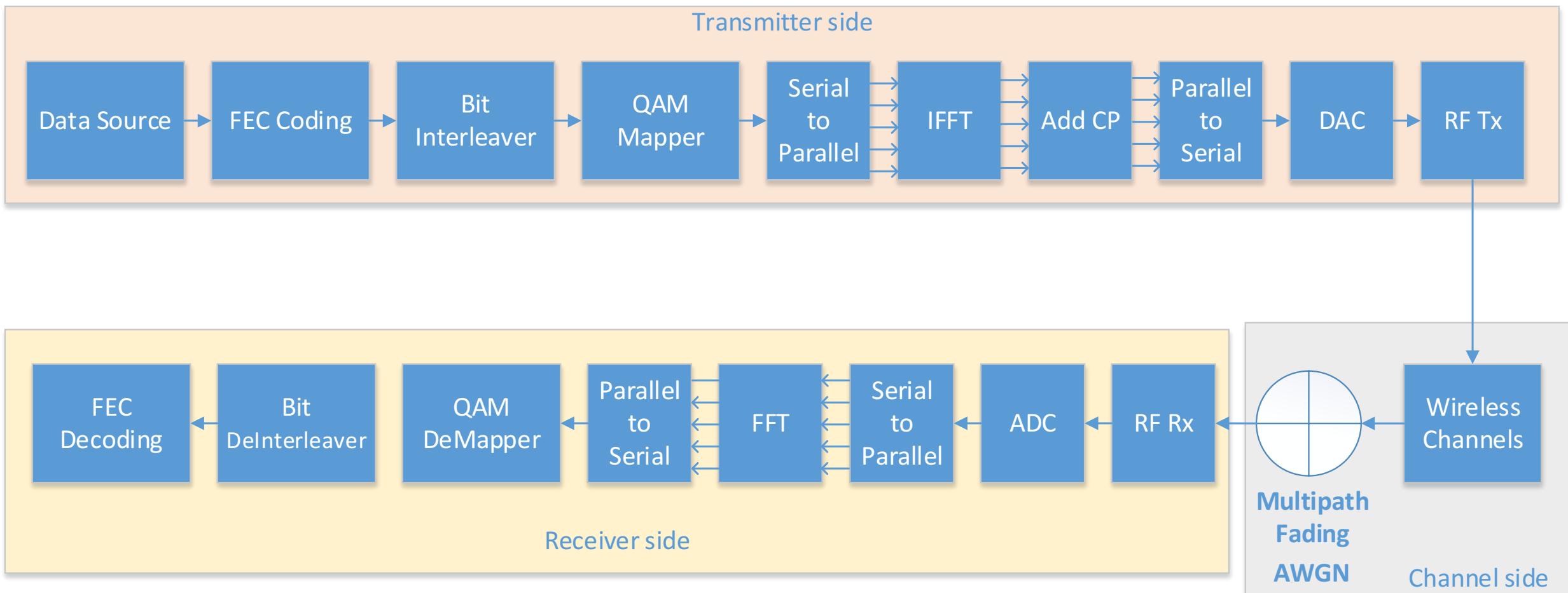


Aim of This Project

SELECT THE BEST RAT BASED ON BER BY VARYING SNR



Scenario Simulated



Scenario Simulated

	LTE	IEEE 802.11ac
Scenario	Single Cell	Single Cell
Carrier frequency (GHz)	2.6	2.4
Tx Power (dBm)	23	24
NodeB/AP Type	TD-LTE eNodeB, based on LTE Rel-8	AP: TP-Link router (TL-WR1041N), based on 802.11ac
Bandwidth (MHz)	20	20
Antenna configuration	DL: 2x2 UL: 1x2	DL: 2x2 UL: 2x2

Simulation and Data Analysis

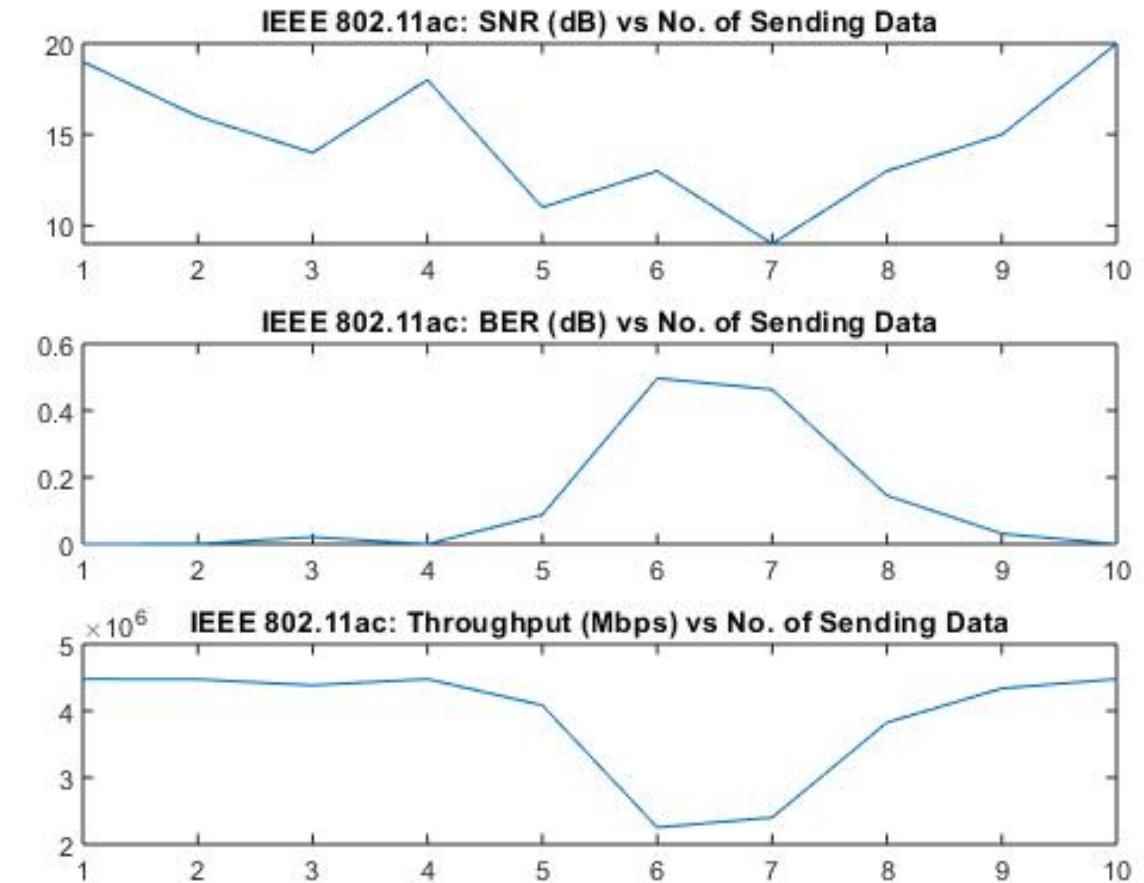
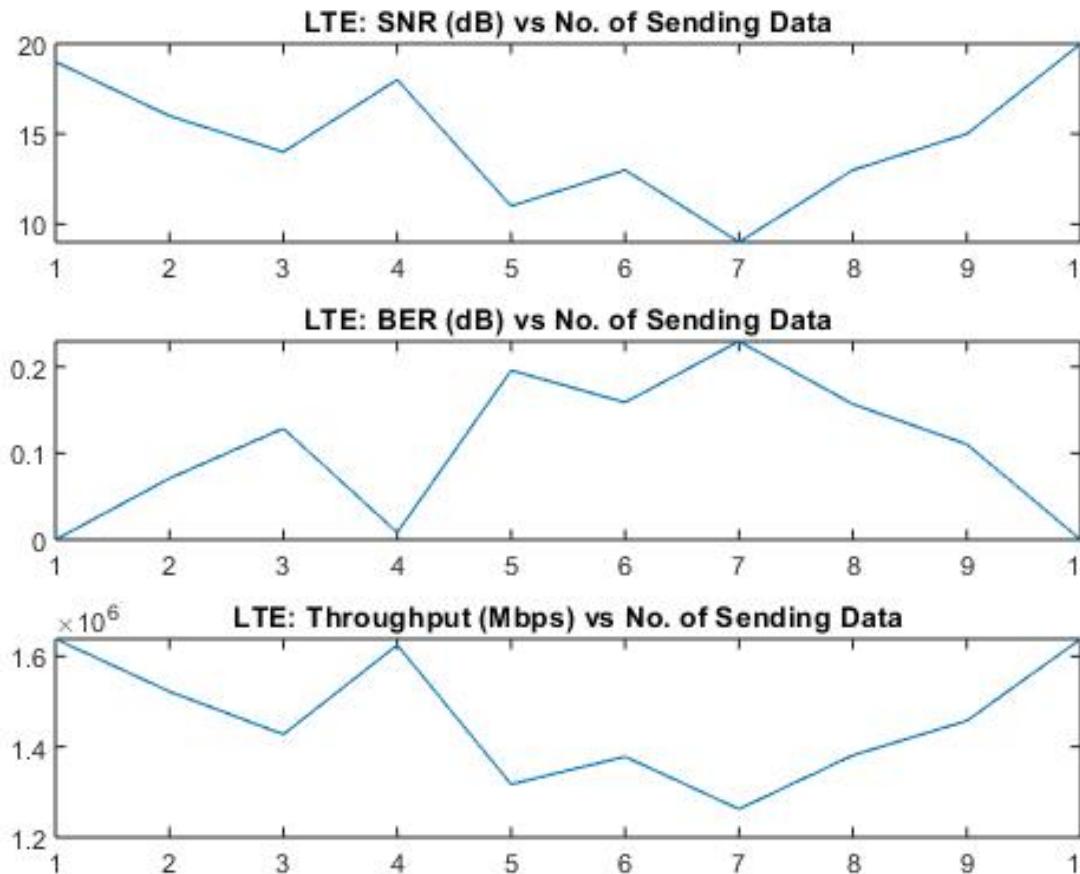
The experiment was done using MATLAB.

Practical SNR ranges:

- 8 to 20 dB

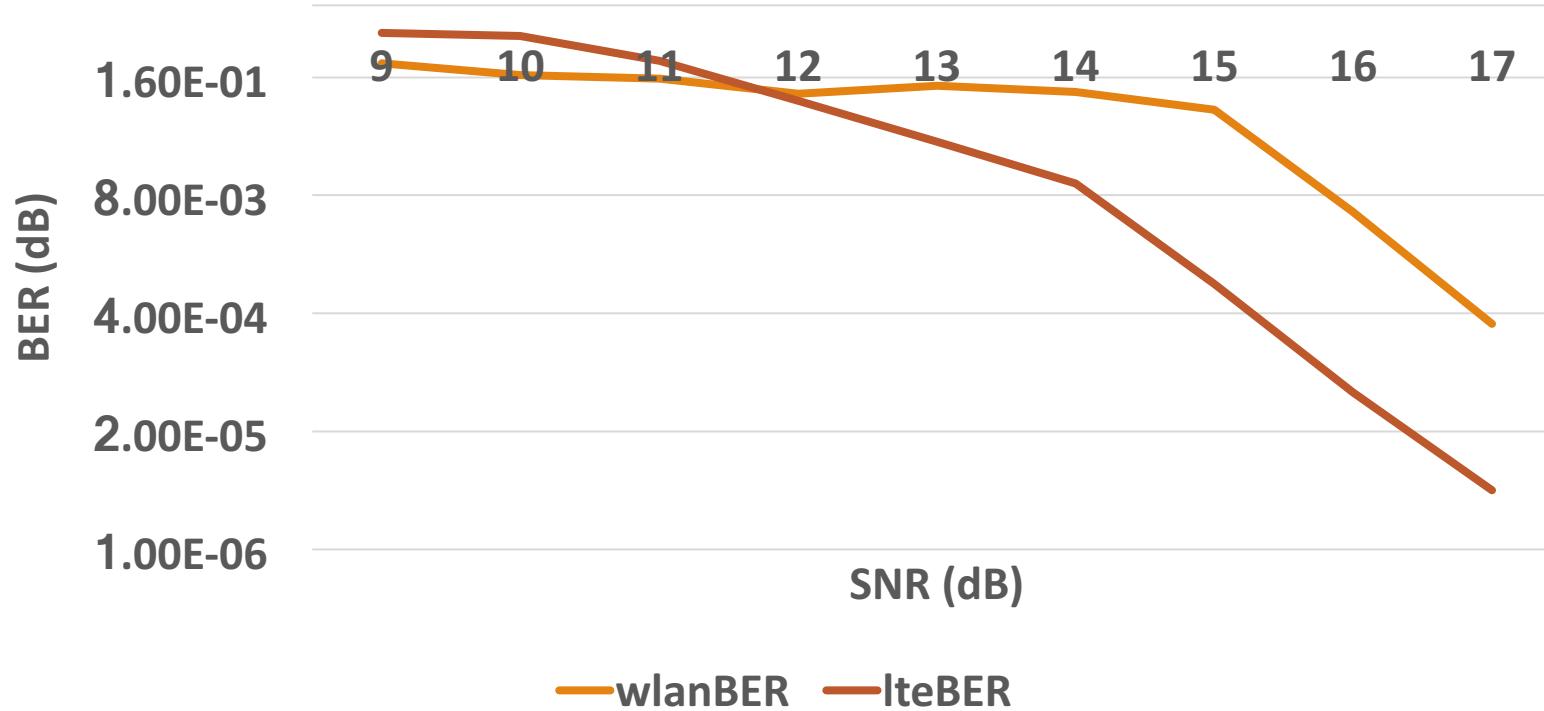
Performance Measurements:

- BER
- Throughput



Simulation and Data Analysis (cont'd)

BER vs SNR



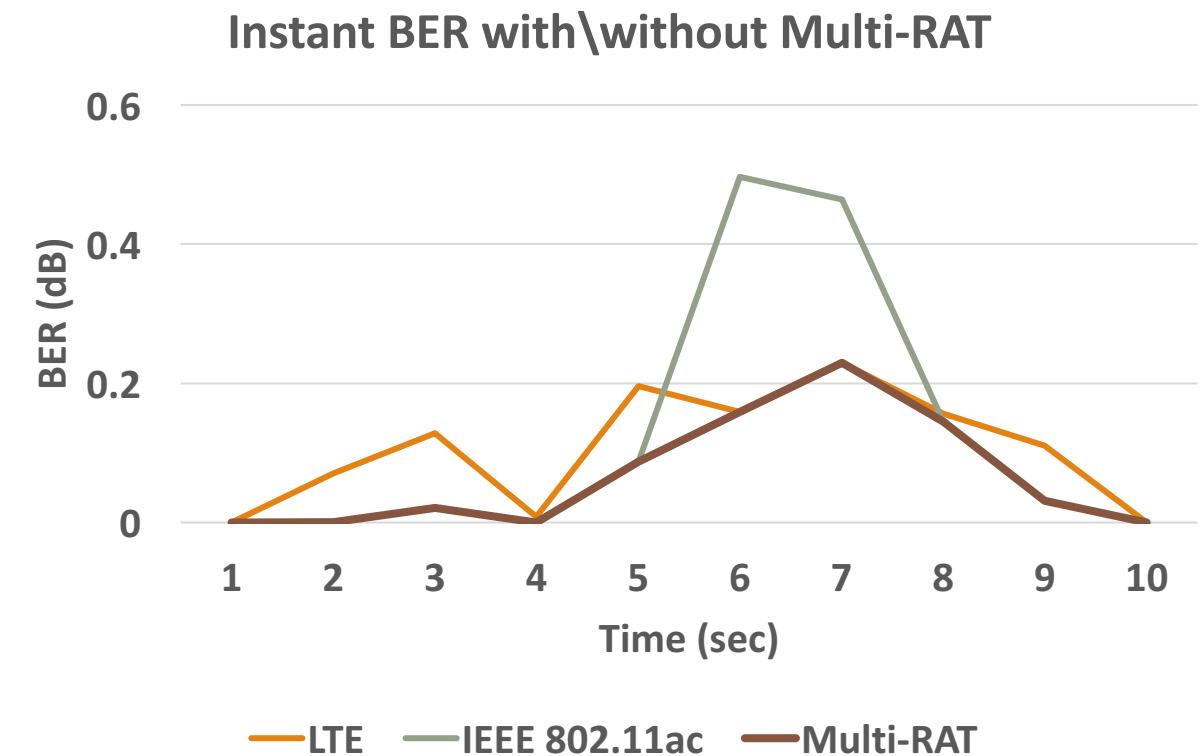
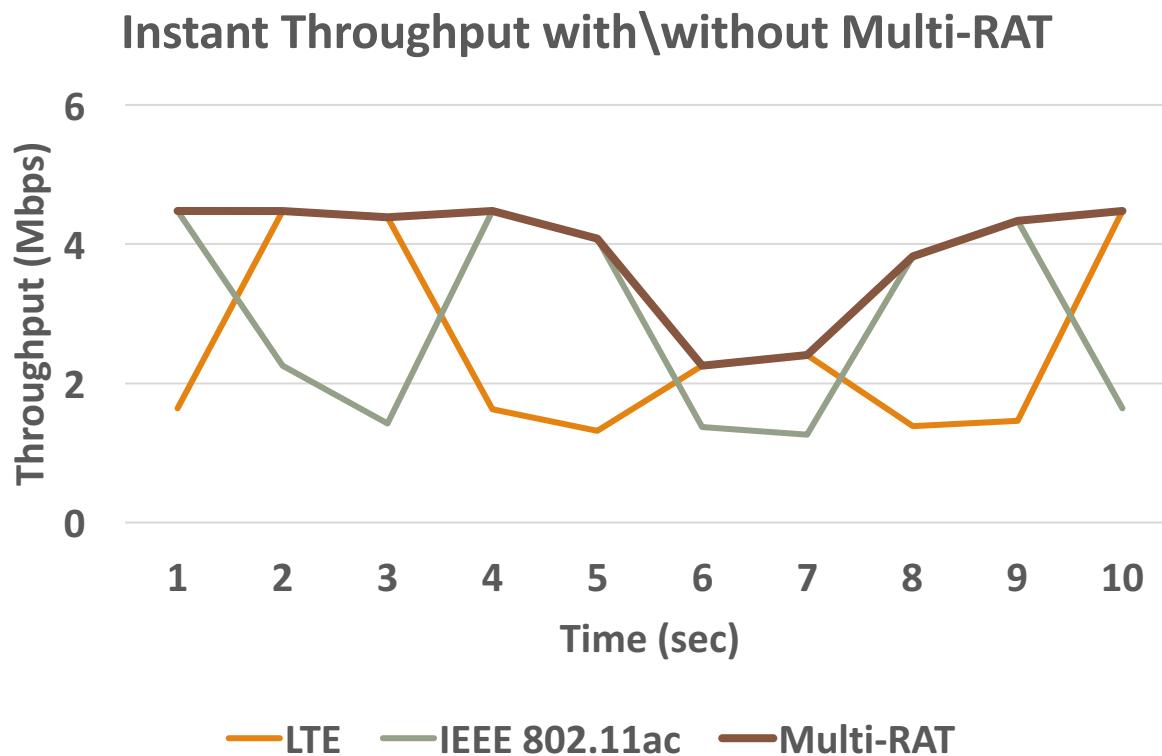
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How many times you want send:5  
LTE is select, SNR=10  
LTE is select, SNR=10  
IEEE 802.11ac is select, SNR=15  
LTE is select, SNR=13
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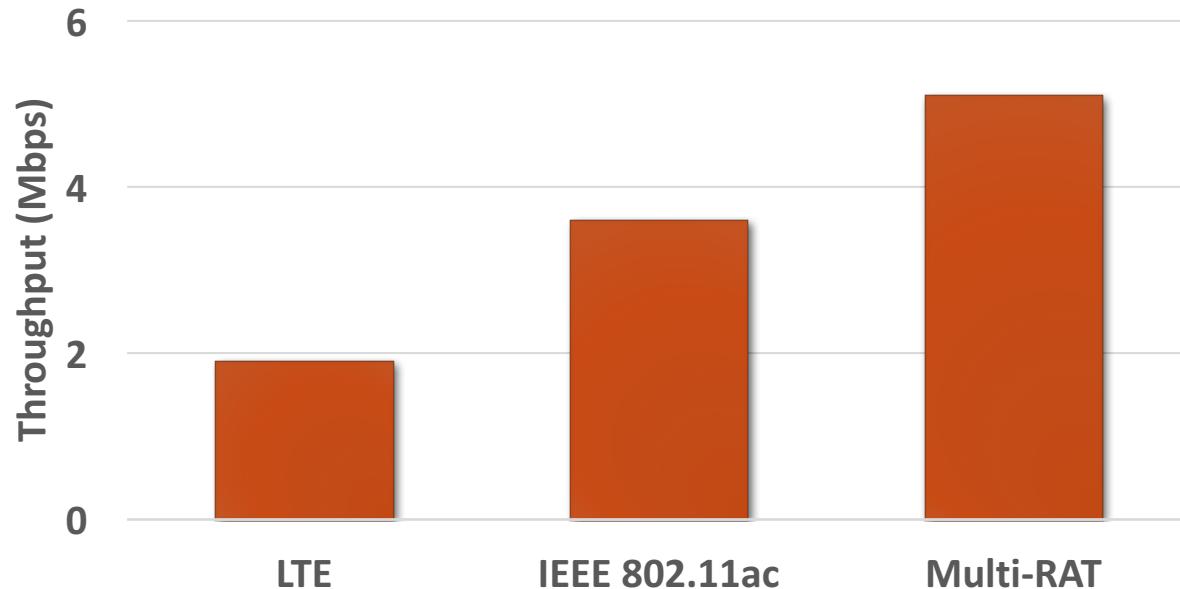
Simulation and Data Analysis (cont'd)

Selection Depend on SNR Value

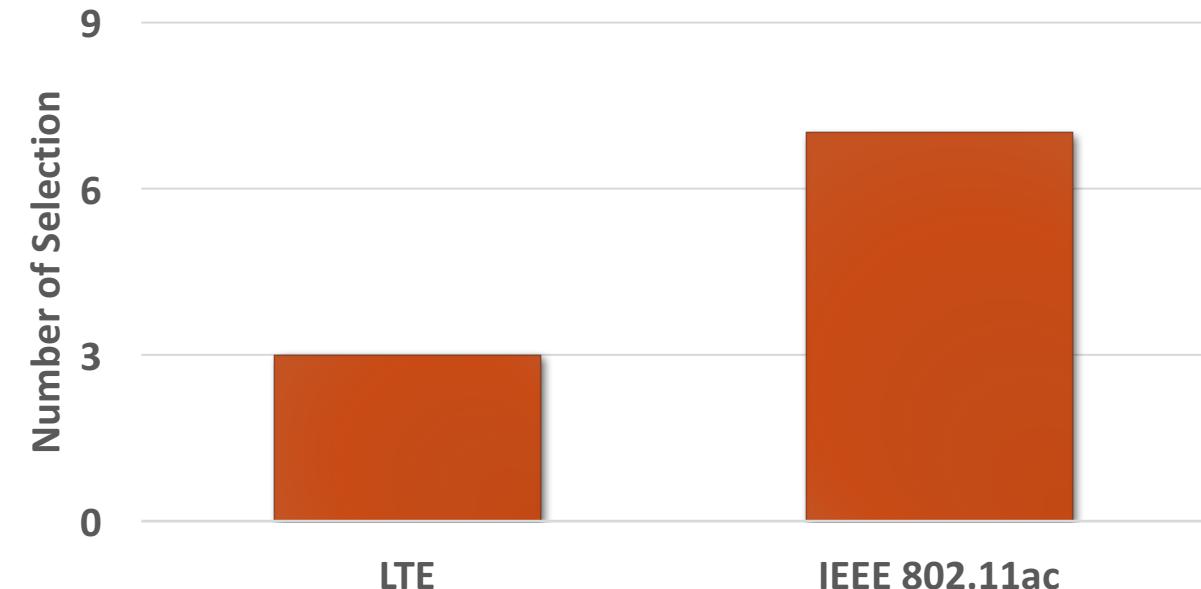
Simulation and Data Analysis (cont'd)



Average Throughput with\without Multi-RAT



Number of Selection for Each Technology



Simulation and Data Analysis (cont'd)

Conclusion and Future Work

What have been achieved?

Future Work:

- Build 5G network and SDN.
- Proposed algorithm for selection.

References

- [1] A. Nanjundappa, S. Singh and G. Jain, "Enhanced multi-RAT support for 5G," *2018 15th IEEE Annual Consumer Communications & Networking Conference (CCNC)*, Las Vegas, NV, 2018, pp. 1-2.
- [2] S. Borst, A. Ö. Kaya, D. Calin and H. Viswanathan, "Dynamic path selection in 5G multi-RAT wireless networks," *IEEE INFOCOM 2017 - IEEE Conference on Computer Communications*, Atlanta, GA, 2017, pp. 1-9.
- [3] S. Chandrashekhar, A. Maeder, C. Sartori, T. Höhne, B. Vejlgaard and D. Chandramouli, "5G multi-RAT multi-connectivity architecture," *2016 IEEE International Conference on Communications Workshops (ICC)*, Kuala Lumpur, 2016, pp. 180-186.
- [4] U. Doetsch, H. Droste, A. Roos, T. Rosowski, G. Zimmermann, P. Agyapong, N. Fonseca, I. D. S. Lindqvist, H. Eriksson, H. Tullberg et al., "Deliverable d6. 4 final report on architecture."
- [5] A. Nanjundappa, S. Singh, and G. Jain, "Enhanced multi-rat support for 5g," in *Consumer Communications & Networking Conference (CCNC), 2018 15th IEEE Annual*. IEEE, 2018, pp. 1–2.
- [6] S. Borst, A. O" . Kaya, D. Calin, and H. Viswanathan, "Dynamic path selection in 5g multi-rat wireless networks," in *INFOCOM 2017-IEEE Conference on Computer Communications*, IEEE. IEEE, 2017, pp. 1–9.

Thank you
Any Questions?