DTDMA Data Rate Analysis

Applicable Release: NetSim v13.3.17 or higher

Applicable Version(s): Pro

Project download link: See Appssendix-1. The URL has the configuration files (scenario, settings, and other related files) of the examples discussed in this analysis for users to import and run in NetSim.

Effect of Modulation and Coding Rate

NetSim Scenario:

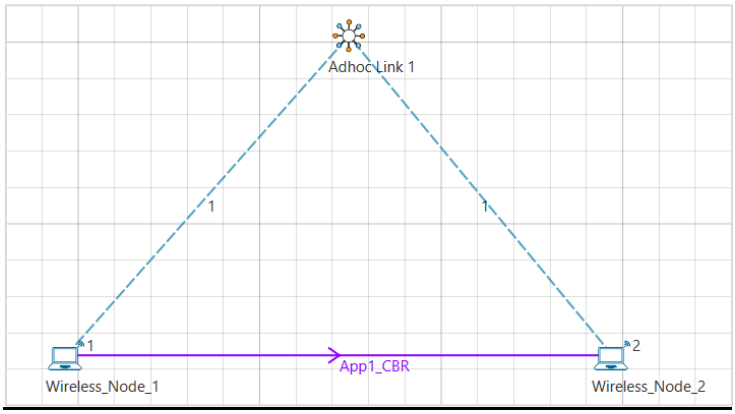


Fig 1: NetSim Scenario with 2 Wireless Nodes and Application Traffic is from N1 to N2

PHY Rate Calculation

Calculation for PHY Rate in the wireless links used for all 6 cases.

$$SymbolsPerSlot = SlotDuration(ms) \times DataSymbolRate(kBd)$$

$$BitsPerSlot = SymbolsPerSlot \times ModulationOrder \times CodingRate$$

$$Phy\ Rate(kbps) = \frac{BitsPerSlot}{SlotDuration(ms)} = 1.024\ kbps$$

The Slot Duration, Data Symbol rate, Modulation Technique, Bandwidth and Coding rate can be configured in the Wireless Nodes.

Network Settings to be done:

Physical Layer DTDMA	
Bandwidth (KHz)	10000
Data symbol rate(kBd)	10000
Modulation Technique	BPSK, QPSK, GMSK, 16QAM,64QAM
Coding Rate	1/2, 2/3,3/4,5/6
MAC Layer	
Slot Duration(ms)	2
Application properties	
Packet Size	1460
IAT (micro sec)	116
Simulation Parameters	
Simulation Time (s)	100

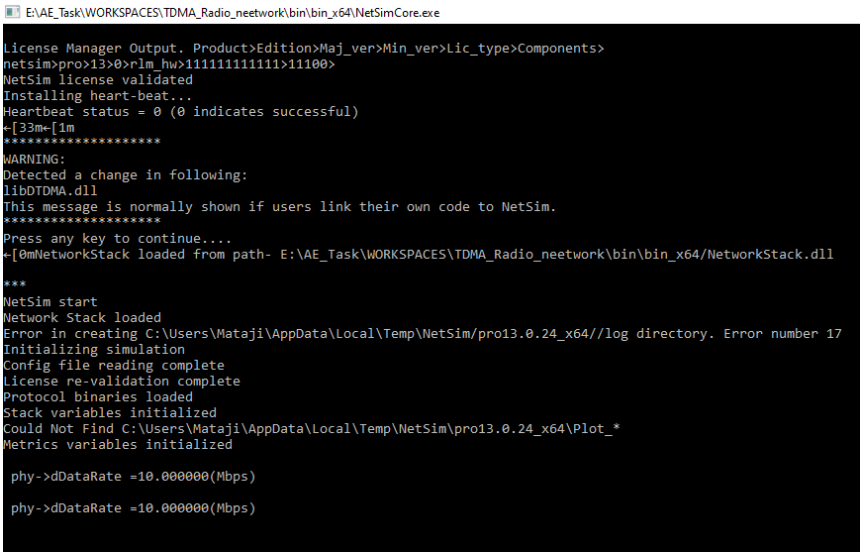
Phy Rate Calculation for various Modulation and Coding rates

Modulation Technique	Modulation Bits	Coding rate	Phy Rate (Mbps)	Application Throughput (Mbps)
BPSK	1	1/2	5	3.89
		2/3	6.67	5.19
		3/4	7.50	5.84
		5/6	8.33	6.49
GMSK	1	1/2	5	3.89
		2/3	6.67	5.19
		3/4	7.50	5.84
		5/6	8.33	6.49
QPSK	2	1/2	10	7.78
		2/3	13.33	10.38
		3/4	15	11.68
		5/6	16.67	12.97
16QAM	4	1/2	20	15.56
		2/3	26.67	20.75
		3/4	30	23.34
		5/6	33.33	25.93
64QAM	6	1/2	30	23.34
		2/3	40	31.12
		3/4	45	34.99
		5/6	50	38.87

Printing Phy rate values to console:

Modify the source code of DTDMA.c and use the following command to print Data rate value on to the console.

```
fprintf (stderr, "\n phy->dDataRate =%lf(Mbps) \n", phy->dDataRate);
```



Appendix 1: Download Link

The configuration files (scenario, settings, and other related files) of the examples discussed in this analysis are available for users to import and run in NetSim.

Users can download the files from NetSim's git-repository.
Link: https://github.com/NetSim-TETCOS/DTDMA-Datarate-Anlaysis_v13.3/archive/refs/heads/main.zip

1. Click on the link given and download the folder.
2. Extract the zip folder. The extracted project folder consists of one NetSim Experiments file, namely *DTDMA-Datarate-Analysis_v13.3.17.netsimexp*
3. Import per steps given in section 4.9.2 in NetSim User Manual

All the experiments can now be seen folder wise within NetSim > Your Work.