

Faculty of Engineering & Technology Electrical & Computer Engineering Department

WIRELESS AND MOBILE NETWORKS: ENCS5323

Project: Online Calculator

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Section: 1

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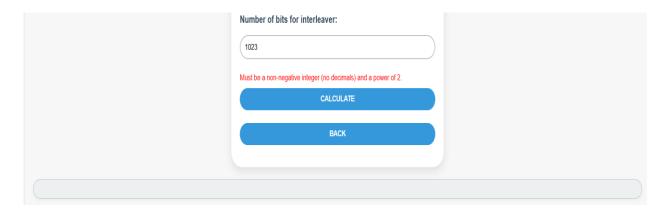
Main Page



Application1

Validation

andwidth:	
_9	
Must be a non-negative number.	
Number of bits for quantizer:	
7.6	
Must be a non-negative integer (no decimals).	
Source encoder rate:	
6	
Must be between 0 and 1.	
Channel encoder rate:	
5	
Must be between 0 and 1.	
Number of bits for interleaver:	
1023	
Must be a non-negative integer (no decimals) and a power of 2.	
CALCULATE	



There is no output.

Scenario1 (midterm)

Bandwidth: 4000 Number of bits for quantizer: 8 Source encoder rate: 0.25 Channel encoder rate: 0.5 Number of bits for interleaver: 1024 CALCULATE BACK

The Sampling Frequency = 8000 Samples/s

The Number of Quantization Levels = 256 Levels

The Bit Rate at the Output of the Source Encoder = 16000 bits/s

The Bit Rate at the Output of the Channel Encoder = 32000 bits/s

The Bit Rate at the Output of the Interleaver = 32000 bits/s

Bandwidth: 1200 Number of bits for quantizer: 7 Source encoder rate: 0.4 Channel encoder rate: 0.3 Number of bits for interleaver: 512 CALCULATE BACK

The Sampling Frequency = 2400 Samples/s
The Number of Quantization Levels = 128 Levels
The Bit Rate at the Output of the Source Encoder = 6720 bits/s
The Bit Rate at the Output of the Channel Encoder = 22400 bits/s
The Bit Rate at the Output of the Interleaver =22400 bits/s

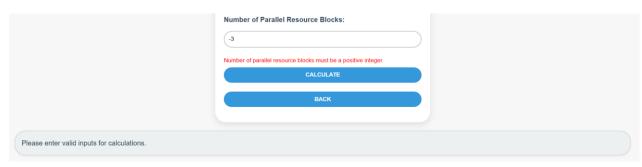
Bandwidth:		
3000		
Number of bits fo	or quantizer:	
6		
Source encoder	rate:	
0.8		
Channel encoder	r rate:	
0.6		
Number of bits fo	or interleaver:	
256		
	CALCULATE	

The Sampling Frequency = 6000 Samples/s	
The Number of Quantization Levels = 64 Levels	
The Bit Rate at the Output of the Source Encoder = 28800 bits/s	
The Bit Rate at the Output of the Channel Encoder = 48000 bits/s	
The Bit Rate at the Output of the Interleaver =48000 bits/s	

Application2

Validation

andwidth (kHz):		
220		
Bandwidth and subcarrier spacing	-	bandwidth
should be divisible by subcarrier s Subcarrier Spacing (kHz):	spacing.	
18		
Number of OFDM Symbols	3:	
-5		
Number of OFDM symbols must be	be a positive integer.	
Duration of the Resource B	Block (ms):	
-6		
Duration of the resource block mu Number of QAM Bits:	ust be a non-negative number.	
213		



There is no output.

Scenario1 (midterm)

ndwidth (kHz):		
180		
Subcarrier Spacing	(kHz):	
15		
Number of OFDM S	ymbols:	
7		
Duration of the Res	ource Block (ms):	
0.5		
Number of QAM Bit	s:	
1024		
Number of Parallel	Resource Blocks:	
4		
	CALCULATE	
	BACK	

Bits per Resource Element: 10

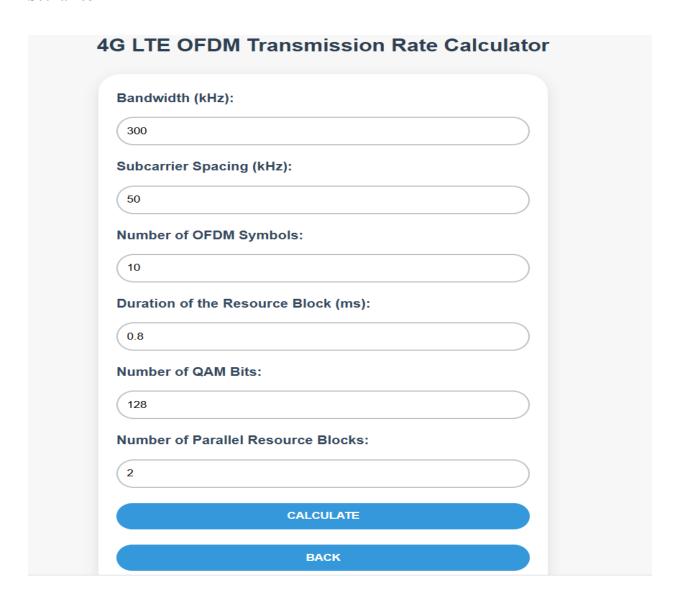
Bits per OFDM Symbol: 120

Bits per OFDM Resource Block: 840

Maximum Transmission Rate: 6720000 bits/s

4G LTE OFDM Transmission Rate Calculator Bandwidth (kHz): 200 Subcarrier Spacing (kHz): 10 Number of OFDM Symbols: 8 **Duration of the Resource Block (ms):** 1 Number of QAM Bits: 64 **Number of Parallel Resource Blocks:** 3 CALCULATE **BACK**

Bits per Resource Element: 6
Bits per OFDM Symbol: 120
Bits per OFDM Resource Block: 960
Maximum Transmission Rate: 2880000 bits/s



Bits per Resource Element: 7

Bits per OFDM Symbol: 42

Bits per OFDM Resource Block: 420

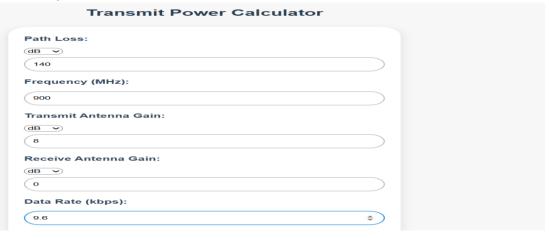
Maximum Transmission Rate: 1050000 bits/s

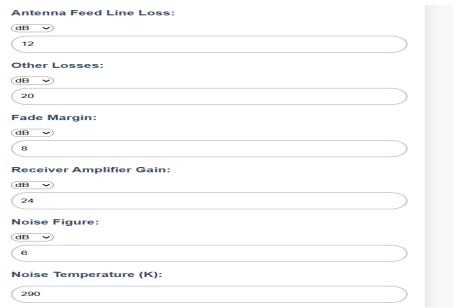
Application3

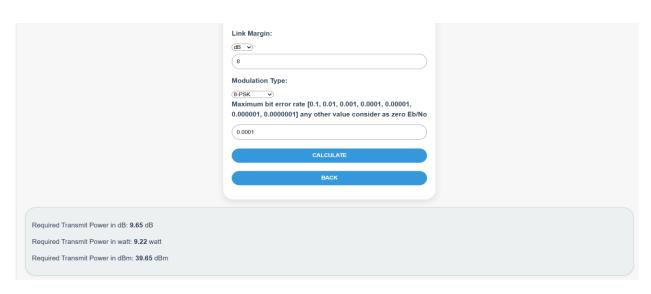
Validation

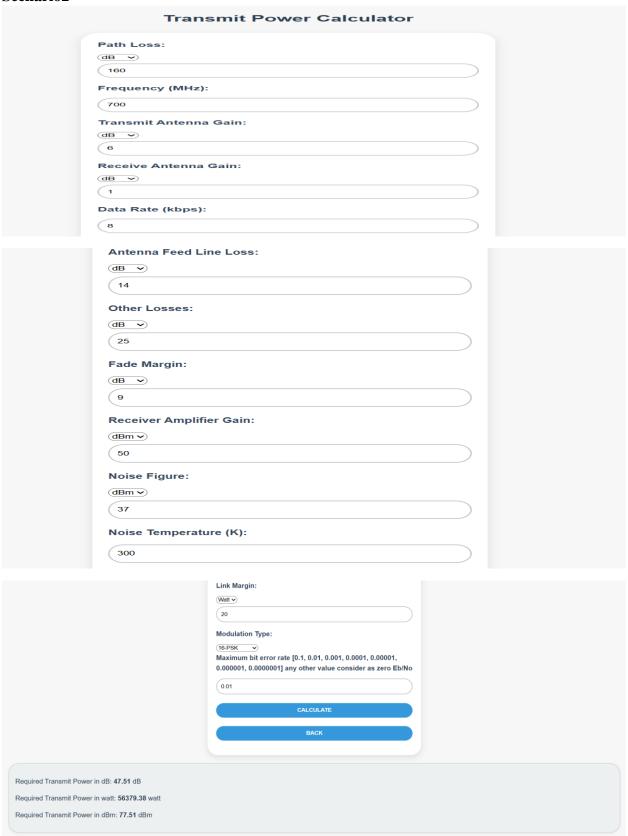
-9	
Frequency must be a non-negative number.	
Transmit Antenna Gain:	
dB ♥	
Receive Antenna Gain:	
dB v	
Data Rate (kbps):	
-8	

Scenario1 (midterm)





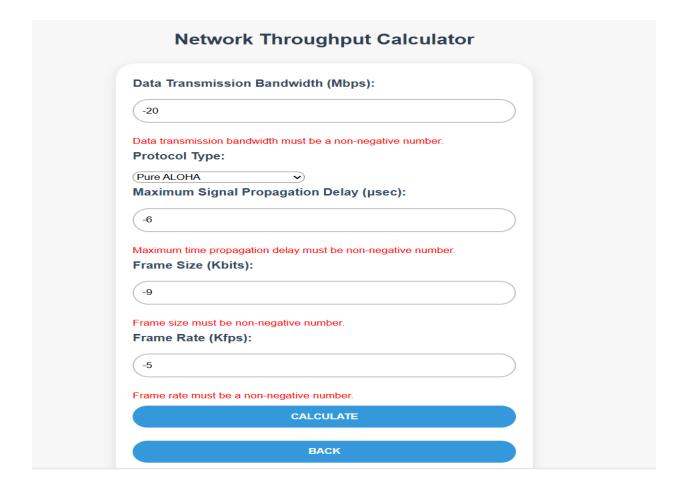




	Trans	mit Power Calculator
	Path Loss:	
	(dBm ❤)	
	200	
	Frequency (MHz):	
	5000	
	Transmit Antenna C	eain:
	200	
	Receive Antenna G	ain:
	(Watt ~)	
	100	
	Data Rate (kbps):	
	11	
	Antenna Feed Line	Loss
	dBm >	
	40	
	Other Losses:	
	dBm ❤	
	35	
	Fade Margin:	
	12	
	Receiver Amplifier	Gain:
	dB ✓	
	12	
	Noise Figure:	
	dB 🗸	
	24	
	Noise Temperature	(K):
	300	
		ink Margin:
		dB v
		23
		Adulation Tunos
		Modulation Type:
		BPSK/QPSK v
		Maximum bit error rate [0.1, 0.01, 0.001, 0.0001, 0.00001,
		.000001, 0.000001] any other value consider as zero Eb/No
		0.001
		CALCULATE
		BACK
		B.O.
D 1 17 115	: ID 00 57 ID	
Required Transmit Power	r in dB: 32.57 dB	
Required Transmit Power	r in watt: 1808.69 watt	
Required Transmit Power	r in dBm: 62.57 dBm	

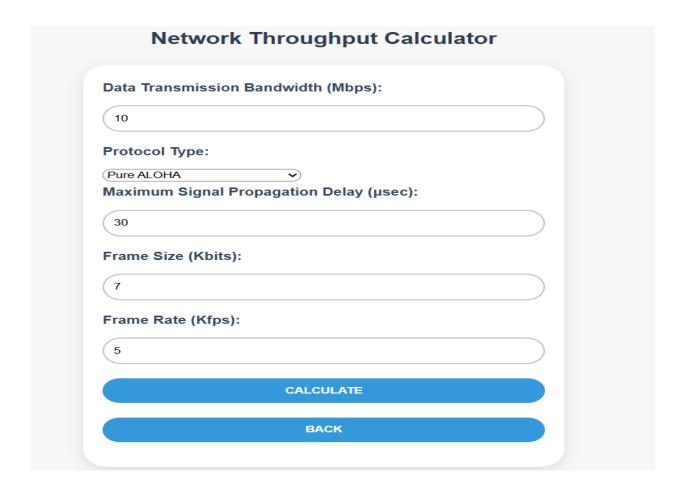
Appliation4

Validation



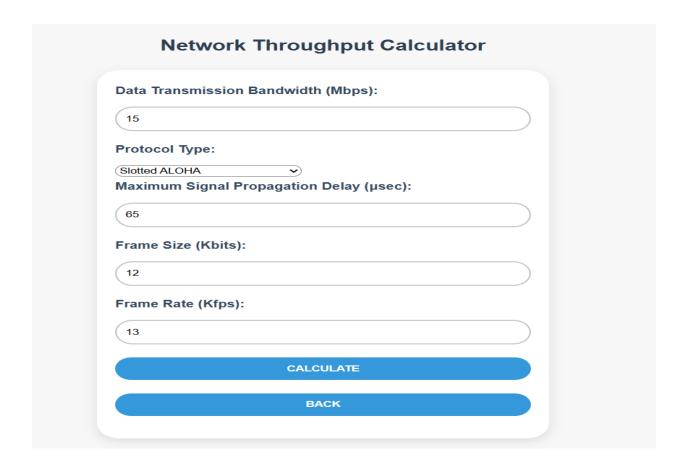
Invalid inputs. Please check the errors above and correct them.

Scenario1: Pure ALOHA



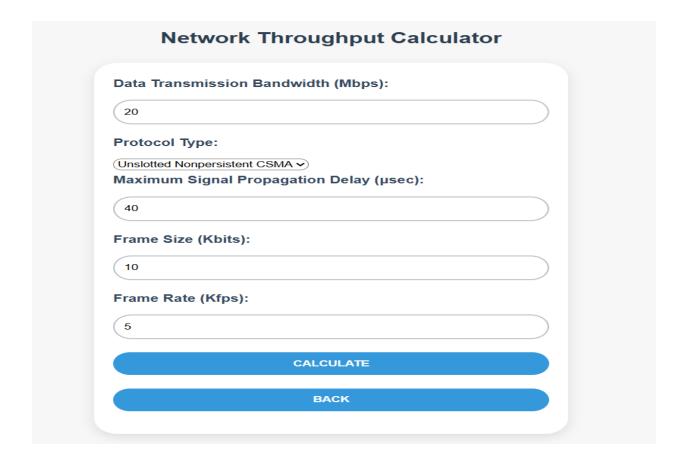
T: 0.0007 second	
G: 3.5000	
alpha: 0.0429 second	
Throughput (S): 0.002438024364268783	
Throughput (S): 0.24%	

Scenario2: Slotted ALOHA



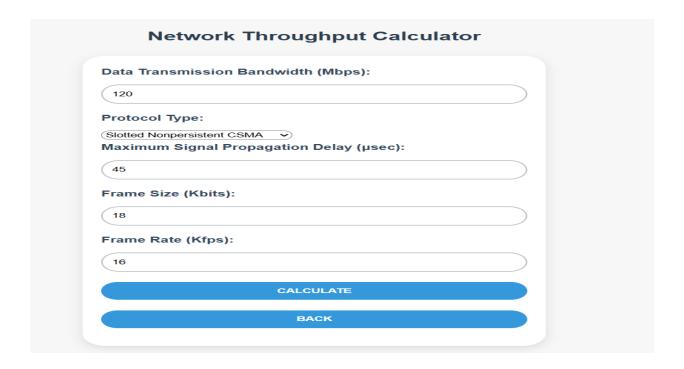
T: 0.0008 second		
G: 10.4000		
alpha: 0.0812 second		
Throughput (S): 0.008251064768218934		
Throughput (S): 0.83%		

Scenario3: Unslotted Nonpersistent CSMA (midterm)



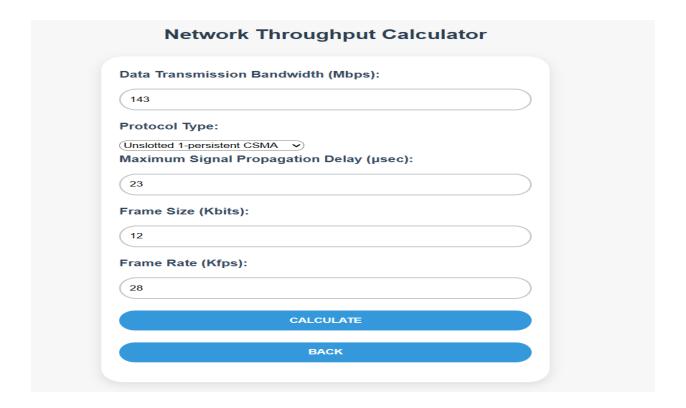
T: 0.0005 second	
G: 2.5000	
alpha: 0.0800 second	
Throughput (S): 0.6722186073650828	
Throughput (S): 67.22%	

Scenario4: Slotted Nonpersistent CSMA



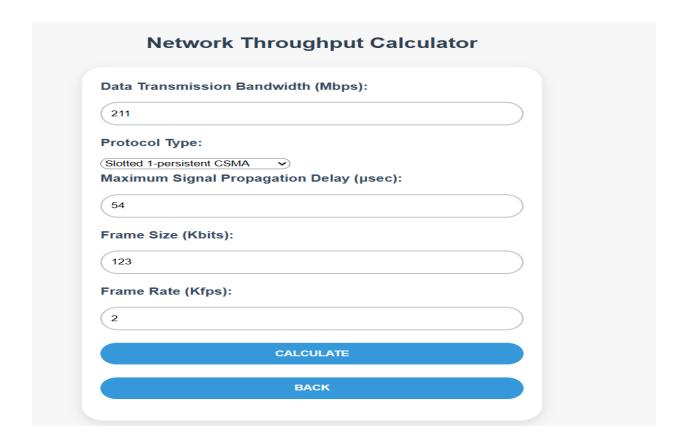
T: 0.0001 second
G: 2.4000
alpha: 0.3000 second
Throughput (S): 0.8852593913626363
Throughput (S): 88.53%

Scenario5: Unslotted 1-persistent CSMA



T: 0.0001 second	
G: 2.3497	
alpha: 0.2741 second	
Throughput (S): 0.10886894015691631	
Throughput (S): 10.89%	

Scenario6: Slotted 1-persistent CSMA



T: 0.0006 second	
G: 1.1659	
alpha: 0.0926 second	
Throughput (S): 0.4616480850312269	
Throughput (S): 46.160000000000004%	

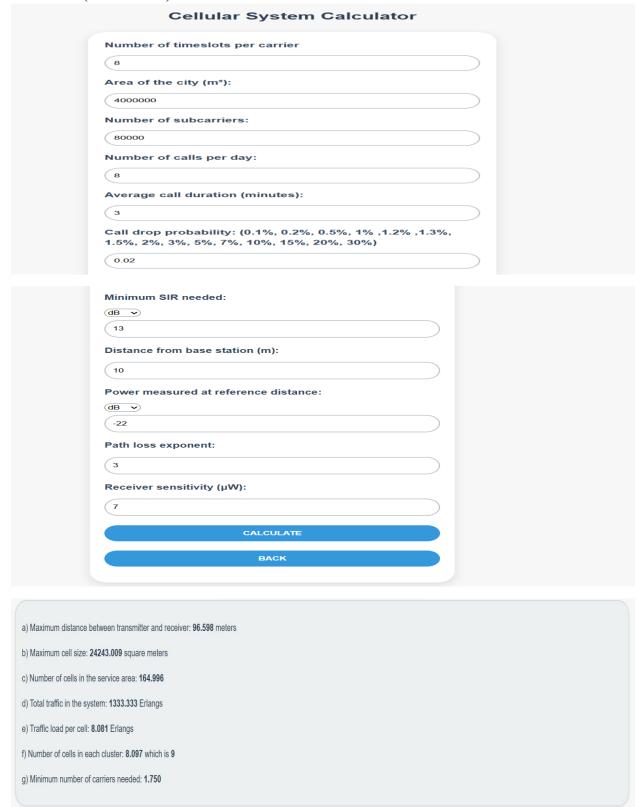
Application5

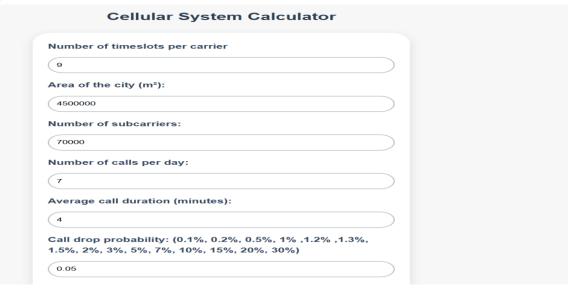
Validation

	neslots per carrier
8.5	
Area of the cit	ty (m²):
-4000000	
Number of su	bcarriers:
70000.8	
Number of ca	lls per day:
-9	
Average call o	duration (minutes):
3	
	oability: (0.1%, 0.2%, 0.5%, 1% ,1.2% ,1.3%, 5%, 7%, 10%, 15%, 20%, 30%)
-8	
	Minimum SIR needed:
	Distance from base station (m):
	(-10
	Power measured at reference distance:
	Path loss exponent:
	Province and the text of the
	Receiver sensitivity (µW):
	CALCULATE
	BACK

Subcarriers must be a non-negative integer and not a decimal number.

Scenario1 (worksheet2)







a) Maximum distance between transmitter and receiver: 64.943 meters
b) Maximum cell size: 10957.542 square meters
c) Number of cells in the service area: 410.676
d) Total traffic in the system: 1361.111 Erlangs
e) Traffic load per cell: 3.314 Erlangs
f) Number of cells in each cluster: 2.582 which is 3
g) Minimum number of carriers needed: 0.778

Cellular System Calculator Number of timeslots per carrier 7 Area of the city (m²): 40000000 Number of subcarriers: 75000 Number of calls per day: Average call duration (minutes): Call drop probability: (0.1%, 0.2%, 0.5%, 1% ,1.2% ,1.3%, 1.5%, 2%, 3%, 5%, 7%, 10%, 15%, 20%, 30%) Minimum SIR needed: (dBm 🗸 50 Distance from base station (m): Power measured at reference distance: (-20 Path loss exponent: Receiver sensitivity (µW):



GitHub Link					
Main Page (mohammadabusham	s02.github.io)				