

CARLETON UNIVERSITY
Department of Systems and Computer Engineering
SYSC 4700: Telecommunications Engineering Winter 2018
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A Solution for Assignment 2

Q1)

A) Calculate R using the above values.

$$R_{max} = 100 * 300 * 10^6 * 30 = 900 \text{ Gbps}$$

B) Discuss how realistic the given n, B, and SE values are.

n is too high since it needs very large antenna array which is difficult to implement, B should be typically less than 10% of the central frequency. Thus, B should be less than 100 MHz. Thus, n and B are not realistic. SE is also not realistic since archiving 30 bits/Sec/Hz is very difficult but a number less than 10, e.g., 4 or 5 is acceptable.

Q2)

A) 20 Gbps

<https://arstechnica.com/information-technology/2017/02/5g-imt-2020-specs/>

B) As an example, assume n=8 and B=250 MHz, we can write

$20 * 10^9 = 8 * 250 * 10^6 * SE$. Thus, SE=10. For B= 250 MHz, f should be at least 2.5 GHz. This is one of the reasons for increasing the carrier frequency in 5G.