

Reseaux Mobiles Introduction: Quick Quiz 1

- How many mobile phones are there in the world in 2012?
 - Around 70 million
 - Around 700 million
 - Around 7 billion
- If you wanted to escape GSM coverage, where would you go? (tick all correct)
 - 10 miles out to sea
 - On the Hong Kong Metro
 - Dome of Brunelleschi's cathedral in Florence
 - On the RER-C North of the Eiffel tower
 - Top of Mt Everest
 - Timbuktu
- If one signal is received at 8W, and the other at 100mW, what is the difference in levels in dB? 19dB
- If two signals have a difference in level of n (dB), what is the difference in power, where n=:
 - 20 100
 - 30 1000
 - 3 2
- If one signal is sent at 29dBm, what is the transmit power in Watts? 0.79W
- The Shannon-Hartley Theorem states:

$$C = B \log_2 (1 + S/N)$$

S/N: Signal-to-noise ratio

B: Bandwidth (Hz)

What is C?:

- Average Channel throughput (bit/s)
 - Maximum Channel throughput (bit/s) ✓
 - Minimum Channel throughput (bit/s)
- A radio channel has a bandwidth of 10MHz. The noise level is 20dBm. What is the channel capacity if the signal level is:
 - 20dBm? 10Mbps
 - 23dBm? 16Mbps
 - 10dBm? 14.5kbps
 - The Friis Transmission equation for received power (W) at distance r (m) is:
$$p_R = p_T G_T G_R \lambda^2 / (4 \pi r)^2$$
What is:
 - p_T ? Transmit Power
 - G_R ? Receiver antenna gain
 - λ ? Radio carrier wavelength

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9. What are the principle atmospheric propagation obstacles to radio waves between 10GHz and 100GHz? Water, and oxygen at 60GHz
10. Name 3 other uses of the UHF band, besides public mobile communications. TV, aircraft, fixed transmission, radar, satellite
11. Which organization co-ordinates spectrum worldwide?:
- a. FCC
 - b. 3GPP
 - c. ITU-R/WRC✓
 - d. WHO
 - e. ARCEP
12. What does TDMA stand for?
Time Division Multiple Access
13. What are the causes of Rayleigh fading? (>1 response possible)
- a. Absorption by rain
 - b. Interference from multiple reflections
 - c. Blocked direct path
 - d. Moving mobile antennas
14. Name two ways for a mobile receiver to mitigate Rayleigh fading
- a. Move (in space)
 - b. Frequency hop (move in frequency)
15. Which organization is mainly responsible for developing GSM standards?
- a. 3GPP