Mobile Communication networks

Exercices 1

1. Which wireless communication technologies are supported by the following mobile phone models?

(You may consult this information in the site [http://www.gsmarena.com](http://www.gsmarena.com/) ).

* 1. Nokia 5110 https://[www.gsmarena.com/nokia\_5110-7.php](http://www.gsmarena.com/nokia_5110-7.php)

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| --- | --- | --- | --- | --- | --- | --- |
| **Technology** | GSM |  |  |  |  |  |
| Type of technology | Cellular |  |  |  |  |  |
| Typical use | SMS/ Voice Calls |  |  |  |  |  |
| Typical radio range | Varies |  |  |  |  |  |
| Data rate | 9.6 kbps |  |  |  |  |  |
| Frequencies | 900 MHz |  |  |  |  |  |
| Radio technology  (physical layer) | TDMA |  |  |  |  |  |
| MAC | FDMA/ TDMA |  |  |  |  |  |

* 1. Samsung Galaxy S22 Ultra 5G

[https://w](http://www.gsmarena.com/samsung_galaxy_s22_ultra_5g-11251.php)ww.gsm[arena.com/samsung](http://www.gsmarena.com/samsung_galaxy_s22_ultra_5g-11251.php)\_g[alaxy\_s22\_ultra\_5g-11251.php](http://www.gsmarena.com/samsung_galaxy_s22_ultra_5g-11251.php)

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| --- | --- | --- | --- | --- | --- | --- |
| **Technology** | GSM | CDMA | HSPA | EVDO | LTE | 5G |
| Type of technology | 2G Cellular | 2G Cellular | 3G Cellular | 3G Cellular | 4G Cellular | 5G Cellular |
| Typical use | SMS/ Voice Calls | Like GSM | Internet browsing/ Improved multimedia capabilities/ Online gaming… | Like HSPA | High-speed internet access/ HD video streaming… | Extremely high-speed internet access/ Ultra-low latency / AR/ VR/ IoT… |
| Typical radio range | Varies |  |  |  |  |  |
| Data rate | HSPA 42.2/5.76 Mbps, LTE-A (7CA) Cat20 2000/200 Mbps, 5G (5+ Gbps DL) |  |  |  |  |  |
| Frequencies | 850 /900/ 1800/ 1900 MHz | 800/ 1900 MHz | 850/ 900/ 1700/ 1900/ 2100 MHz |  | 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, 32, 38, 39, 40, 41, 66  (International)  1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 18, 19, 20, 25, 26, 28, 29, 30, 38, 39, 40, 41, 46, 48, 66, 71 (USA) | 1, 2, 3, 5, 7, 8, 12, 20, 25, 28, 38, 40, 41, 66, 75, 77, 78 SA/NSA/Sub6 (International)  1, 3, 5, 7, 8, 20, 28, 38, 41, 66, 71, 260, 261 SA/NSA/Sub6/mmWave (USA) |
| Radio technology (physical layer) | TDMA | CDMA | WCDMA | CDMA2000 | OFDMA/ SC-FDMA | OFDMA/ SC-FDMA |
| MAC |  |  |  |  |  |  |

* 1. Your Cellular Phone

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| --- | --- | --- | --- | --- | --- | --- |
| **Technology** | GSM | CDMA | HSPA | EVDO | LTE | 5G |
| Type of technology | 2G Cellular | 2G Cellular | 3G Cellular | 3G Cellular | 4G Cellular | 5G Cellular |
| Typical use | SMS/ Voice Calls | Like GSM | Internet browsing/ Improved multimedia capabilities/ Online gaming… | Like HSPA | High-speed internet access/ HD video streaming… | Extremely high-speed internet access/ Ultra-low latency / AR/ VR/ IoT… |
| Typical radio range | Varies |  |  |  |  |  |
| Data rate | HSPA, LTE-A, 5G, EV-DO Rev.A 3.1 Mbps |  |  |  |  |  |
| Frequencies | 850 /900/ 1800/ 1900 MHz | 800/ 1900 MHz | 850/ 900/ 1700/ 1900/ 2100 MHz |  | 1, 2, 3, 4, 5, 7, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28, 30, 32, 34, 38, 39, 40, 41, 42, 46, 48, 66 - A2633 | 1, 2, 3, 5, 7, 8, 12, 20, 25, 28, 29, 30, 38, 40, 41, 48, 66, 71, 77, 78, 79 Sub6/mmWave - A2633 |
| Radio technology  (physical layer) |  |  |  |  |  |  |
| MAC |  |  |  |  |  |  |

1. Draw a graph depicting the radio spectrum used by the above wireless technologies.