

Marwadi University

Department of Information and Communication Technology, Faculty of Engineering and Technology

Subject: Mobile and Pervasive Computing (01CT0716)

Task 3: Cellular network

Deadline: 17/9/2023

Q. 1 What is small scale fading? Explain with an example.

Q. 2 Define Large scale path loss.

Q. 3 Sketch the graph that represents small scale fading and large scale pathloss.

Q. 4 In a cellular network one Base Transceiver Station (BTS) transmits the signal with 10W and BTS antenna gain is 15. Mobile station connected with this BTS receives 2×10^{-7} W power. Calculate the distance between BTS and Mobile station. Kindly find the mobile station specifications below.

NETWORK	<u>Technology</u> <u>Frequency</u>	GSM/5G 2.4 GHz
BODY	<u>Dimensions</u>	165.9 x 76.2 x 8 mm (6.53 x 3.00 x 0.31 in)
	<u>Weight</u>	188 g (6.63 oz)
	<u>SIM</u>	Hybrid Dual SIM (Nano-SIM, dual stand-by)
DISPLAY		IP53, dust and splash resistant
	<u>Type</u>	AMOLED, 120Hz, 1200 nits (peak)
	<u>Size</u>	6.67 inches, 107.4 cm ² (~85.0% screen-to-body ratio)
	<u>Resolution</u>	1080 x 2400 pixels, 20:9 ratio (~395 ppi density)
PLATFORM	<u>Protection</u>	Corning Gorilla Glass 3
	<u>OS</u>	Android 12, MIUI 14 (International), MIUI 13 (India)
	<u>Chipset</u>	Qualcomm SM4375 Snapdragon 4 Gen 1 (6 nm)
	<u>CPU</u>	Octa-core (2x2.0 GHz Cortex-A78 & 6x1.8 GHz Cortex-A55)
MEMORY	<u>GPU</u>	Adreno 619
	<u>Card slot</u>	microSDXC (uses shared SIM slot)
	<u>Internal</u>	128GB 4GB RAM, 128GB 6GB RAM, 256GB 8GB RAM
MAIN CAMERA		UFS 2.2
	<u>Triple</u>	48 MP, f/1.8, (wide), PDAF 8 MP, f/2.2, 120° (ultrawide), 1/4", 1.12µm 2 MP, f/2.4, (macro)
	<u>Features</u>	Dual-LED dual-tone flash, HDR, panorama
	<u>Video</u>	1080p@30fps
SELFIE CAMERA	<u>Single</u>	13 MP, f/2.5, (wide), 1/3.0"
	<u>Features</u>	HDR
	<u>Video</u>	1080p@30fps

SOUND	<u>Loudspeaker</u>	Yes
	<u>3.5mm jack</u>	Yes
COMMS		24-bit/192kHz audio
	<u>WLAN</u>	Wi-Fi 802.11 a/b/g/n/ac, dual-band
	<u>Bluetooth</u>	5.1, A2DP, LE
	<u>Positioning</u>	GPS, GLONASS
	<u>NFC</u>	Yes (market/region dependent)
	<u>Infrared port</u>	Yes
	<u>Radio</u>	Unspecified
FEATURES	<u>USB</u>	USB Type-C 2.0, OTG
	<u>Sensors</u>	Fingerprint (side-mounted), accelerometer, gyro, proximity, compass
BATTERY	<u>Type</u>	Li-Po 5000 mAh, non-removable
	<u>Charging</u>	33W wired, 50% in 22 min (advertised)
TESTS	<u>Performance</u>	AnTuTu: 360745 (v9) GeekBench: 1998 (v5.1), 2017 (v6)
	<u>Display</u>	<u>Contrast ratio: Infinite (nominal)</u>
	<u>Camera</u>	<u>Photo / Video</u>
	<u>Loudspeaker</u>	<u>-28.0 LUFS (Good)</u>
	<u>Battery life</u>	<u>Endurance rating 101h</u>
	<u>Antenna</u>	10
	<u>Gain</u>	
	<u>System loss factor</u>	1.5