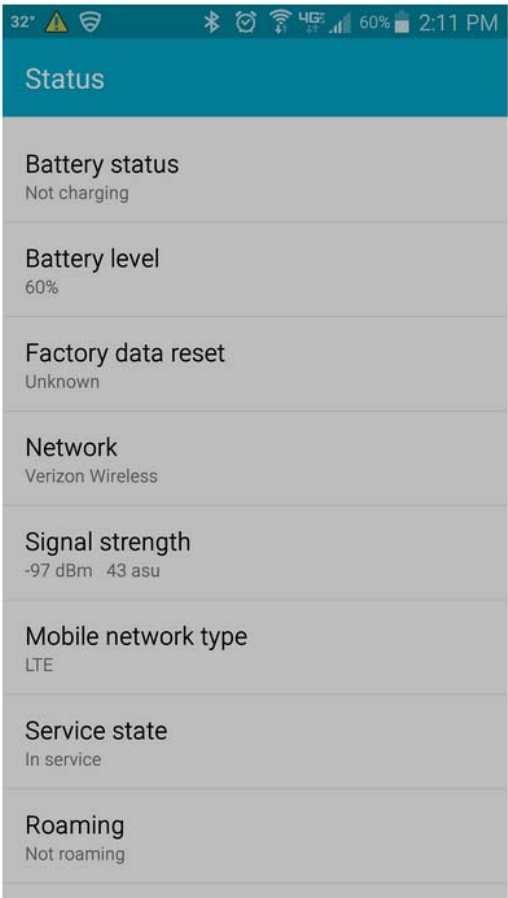


dB – In Class Problem (Power)

- 1) Assuming a cellular phone base station transmits at 10W and a smartphone transmits at 100mW, what's the difference in these two power levels in dB?
- 2) If the received signal is -97dBm (a realistic number), how many watts is this?
- 3) How many volts is this in a 50 Ohm system?



The image shows a screenshot of an Android phone's status bar at the top, displaying 32°F, a warning icon, Wi-Fi, Bluetooth, LTE, and 60% battery at 2:11 PM. Below the status bar is a 'Status' settings menu with the following items:

Battery status	Not charging
Battery level	60%
Factory data reset	Unknown
Network	Verizon Wireless
Signal strength	-97 dBm 43 asu
Mobile network type	LTE
Service state	In service
Roaming	Not roaming

$$dB_m = 10 \log_{10} \frac{P}{1 \text{ mW}}$$

dB – In Class Problem (Power)

1) Assuming a cellular phone base station transmits at 10W and a smartphone transmits at 100mW, what's the difference in these two power levels in dB?

$$dB_m = 10 \log_{10} \frac{P}{1 \text{ mW}}$$

10W => 40dBm

100mW => 20dBm

Therefore, there is a difference of 40dBm – 20dBm = **20dB**

2) If the received signal is -97dBm (a realistic number), how many watts is this?

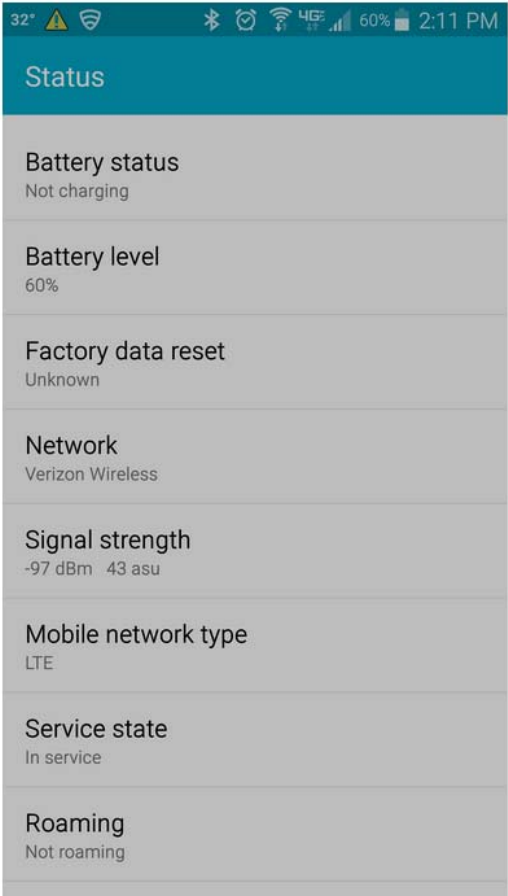
$$dB_m = 10 \log_{10} \frac{P}{1 \text{ mW}}$$

-97dBm => **199.5fW**

3) How many volts is this in a 50 Ohm system?

$$P = V^2/R$$

V = **3.16uVRMS**



Status	
Battery status	Not charging
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