



THE HERALD TIMES

## Technology &amp; Lifestyle

## Dear Tech Editor:

We all use cell phones every day. But no one can tell me how these networks actually function. Can you?

—Sam Thompson

## Dear Sam:

Great question. Allow me to explain.

Cell phones use **radio** waves to transmit sound. When someone makes a call, a phone uses a pair of frequencies called a **channel**. This is called **full-duplex**, and it allows both parties to speak and listen simultaneously. Each area has a limited number of channels available at a time. For example, the **bandwidth** of a cell tower might be between 800-1200 **MHz**.

To allow multiple connections at once, a city or region is divided into a **hexagonal grid**. Each **cell** has a **cell site** with an **antenna**. And these antennas each have a limited **range**. Cells can share **frequencies** as long as they are not **adjacent**. That system is called **frequency reuse**. And even when a phone leaves its coverage area, it can still connect to a **roaming partner's** cells.

Hope that helps! —Tech Ed.

## Get ready!

1 Before you read the passage, talk about these questions.

- 1 How do cell phones use radio frequencies?
- 2 How does society benefit from radio frequency technology?

## Reading

2 Read the column. Then, mark the following statements as true (T) or false (F).

- 1 ☐ Each base station covers a particular cell.
- 2 ☐ A roaming partner is a device indicating that a phone is outside its coverage area.
- 3 ☐ A full-duplex system uses two separate frequencies at the same time.

## Vocabulary

3 Match the words or phrases (1-8) with the definitions (A-H).

- 1 ☐ bandwidth
- 2 ☐ MHz
- 3 ☐ adjacent
- 4 ☐ full-duplex
- 5 ☐ cell
- 6 ☐ antenna
- 7 ☐ radio
- 8 ☐ frequency reuse

- A beside something
- B the transmission of electromagnetic waves
- C a division within a city or region
- D the range of frequencies that a tower can transmit
- E a physical device used to transmit or receive signals
- F a system by which different cells can share the same frequencies
- G the unit of measurement for frequencies
- H a system that uses two frequencies for call transmission



**4 Read the sentence pairs. Choose which word or phrase best fits each blank.**

**1 cell site / range**

- A At the \_\_\_\_\_, there is a large antenna on top of the building.  
B The caller was outside the \_\_\_\_\_ of the antenna, so his call would not connect.

**2 roaming partner / channel**

- A The students learned that a \_\_\_\_\_ is made up of two frequencies.  
B Connecting to a \_\_\_\_\_ usually costs extra money.

**3 frequency / antenna**

- A A(n) \_\_\_\_\_ can be measured using megahertz.  
B When the \_\_\_\_\_ broke, the man went to the cell site to fix it.

**5 Listen and read the column again. Why are radio frequencies important in telephone communication?**

## Listening

**6 Listen to a conversation between a reporter and an electrical engineer. Choose the correct answers.**

- 1 What is true about cells?  
A They each contain a single channel.  
B They are capable of containing unlimited bandwidth.  
C They consist of two frequencies.  
D They are arranged in a hexagonal grid.
- 2 Which concept does the woman identify incorrectly?  
A channels                      C antennas  
B base stations              D bandwidth

**7 Listen again and complete the conversation.**

**Engineer:** Well, wireless networks use **1** \_\_\_\_\_ to transmit and receive audio.

**Reporter:** I see. And the **2** \_\_\_\_\_ transmit that audio?

**Engineer:** Yes. Every city is made up of cells. They're arranged in a **3** \_\_\_\_\_.

**Reporter:** In other words, they're all **4** \_\_\_\_\_ to one another.

**Engineer:** That's correct. Now, cell phones are a **5** \_\_\_\_\_ system.

**Reporter:** What **6** \_\_\_\_\_?

## Speaking

**8 With a partner, act out the roles below based on Task 7. Then, switch roles.**

**USE LANGUAGE SUCH AS:**

*Can you tell me ...?*  
*In other words ...*  
*So, you are saying ...*

**Student A:** You are a reporter. Talk to Student B about:

- wireless networks
- the purpose of different components
- the relationships between components

**Student B:** You are an electrical engineer. Talk to Student A about wireless networks.

## Writing

**9 Use the conversation from Task 8 to fill out the interview report.**

Date: \_\_\_\_\_  
Reporter: \_\_\_\_\_  
Interviewee: \_\_\_\_\_  
Occupation: \_\_\_\_\_

Wireless Networks use \_\_\_\_\_.

Cells are \_\_\_\_\_.

Cell phones are on a full-duplex system, which means \_\_\_\_\_.

There are a limited number of \_\_\_\_\_.