

## WORKSHOP: Hunt the Transmitter

### Scenario

You are members of the Radiocommunications Planning Department for the famous mobile phone company, Banana. Your company has just paid £5 billion to run one of the five new operating licenses for the next generation, Internet-access mobile phones. This licence is essentially a plot of virtual real estate on the increasingly congested radio spectrum and Banana had to fight hard to get it.

The company directors want your department to work out where to put Banana's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Banana's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

### The Task

- Identify which areas on the land use map have potentially the most customers for your company and make sure that you target these areas with your transmitters.
- Choose how many transmitters you think you want to use, bearing in mind your budget of £250,000.
- Decide what range each transmitter should cover. Each transmitter has a range of either 5km, 2km or 1km. Longer range transmitters are more expensive (See Table One for costs).
- Look out for major obstacles in the way of your transmitter. Tall buildings will block your signals, although you could choose to place your transmitter on the top of a tall building instead of on a mast. Trees make signals very weak so try to avoid sending signals through heavily wooded areas.
- Take notice of the relief contours lines on the map - are there hills that you can place your transmitters on so that they are above obstacles such as trees and tall buildings? The land profiles may help you to check whether your chosen spot is on a hill or in a valley.
- Once you've decided roughly where you'd like to place your transmitters, check whether different target areas can receive the signal. There should be a 'line of sight' between the transmitter and the target area. This means there should be a clear line between the transmitter and the target area without obstructions. Check whether you've got any regions of overlap where areas receive a signal from more than one transmitter - this could cause interference problems.
- If you're happy with your choices, mark up your planning map with the locations and heights of each transmitter. Don't forget to work out how much your scheme costs. You may decide to have a plan A and a plan B to submit to the company directors, perhaps one that's more expensive but provides the best coverage and one that's more economical but doesn't provide such a good service.

## ANTENNA SPECIFICATIONS

Antenna type	Height	Range	Cost
Long Range	20m	4 km	£90,000
Mid Range	15m	2 km	£70,000
Short Range	10m	1 km	£50,000

## EQUIPMENT LIST

Each planning team has:

- Map of Phoneville, with relief contours marked in brown.
- Transmitter ranges (three different-sized red circles representing the long, mid and short range transmitters).
- Scissors to cut out the transmitter ranges.
- Blue Tack to stick the transmitter ranges to the map.
- Land profiles 1-6, showing cross sections through the terrain at key points on the map (see the labelled map for the locations of each cross-section).
- Ruler to measure ranges.

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You are members of the Radiocommunications Planning Department for the famous mobile phone company, Two One Two. Your company has just paid £5 billion to run one of the five new operating licenses for the next generation, Internet-access mobile phones. This licence is essentially a plot of virtual real estate on the increasingly congested radio spectrum and Two One Two had to fight hard to get it.

The company directors want your department to work out where to put Two One Two's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Two One Two's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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You are members of the Radiocommunications Planning Department for the famous mobile phone company, Vodkaphone. Your company has just paid £5 billion to run one of the five new operating licenses for the next generation, Internet-access mobile phones. This licence is essentially a plot of virtual real estate on the increasingly congested radio spectrum and Vodkaphone had to fight hard to get it.

The company directors want your department to work out where to put Vodkaphone's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Vodkaphone's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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You are members of the Radiocommunications Planning Department for the famous mobile phone company, TB Sellnet. Your company has just paid £5 billion to run one of the five new operating licenses for the next generation, Internet-access mobile phones. This licence is essentially a plot of virtual real estate on the increasingly congested radio spectrum and TB Sellnet had to fight hard to get it.

The company directors want your department to work out where to put TB Sellnet's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of TB Sellnet's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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The company directors want your department to work out where to put Shokia's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Shokia's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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The company directors want your department to work out where to put Rollermotor's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Rollermotor's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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The company directors want your department to work out where to put Eric'sdaughter's new transmitters in the Phoneville area. Every household should be able to receive a signal, but your budget is limited - most of Eric'sdaughter's cash went on paying for the spectrum so you don't have much left for hardware. Your department's job is to provide the best coverage at the minimum cost.

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