C6

2.4GHz Radio Communication

CHAPTER ASSIGNMENT

Name _____ Class _____ No. _____ Date _____

Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from the Guru Jazzy micro:bit chapter page.

Activity · Signal strength

1. With a partner, put this program on both boards and run it.

```
on start:
    radio set group 1
forever:
    radio send number 0
    pause (ms) 500
on radio received (receivedNumber):
    show number (received packet signal strength)
```

Record the reading at each distance.

Where the other board is	Reading in dBm
Touching yours	
Across the desk	
Across the room	
Outside the door	

2. Which reading is the strongest signal: -42 or -95? Explain how you can tell.

3. Change one board to group 2 and run both again. What happens, and why?

Activity · Sending messages

4. Build the two-way pager: A sends "Hello", B sends "Goodbye", and `on radio received` shows what arrives. Write what each board shows when your partner presses A.

5. Both boards run exactly the same program. Explain how each one knows to show the message rather than send it.

6. Send a message with three or four other pairs in the room, all in group 1. What goes wrong, and how would you fix it?

Activity · Finding and scoring

7. Build the treasure finder: the hidden board sends `"x" = 5` every 100 ms, and the finder turns the signal into beeps. What happens to the beeps as you walk closer?

8. In the finder, `item` is worked out as `round(map(signal, -100, -40, 15, 1))`. Work out `item` for a signal of -100 and for -40, and say what each one does to the beeping.

9. Build the four-judge voting system with your group: four clickers sending `"A"`, `"B"`, `"C"` and `"D"`, and one scoreboard. Which LED lights for judge C?

Check yourself

1. What does a radio group do, and what range of numbers can it take?

2. Give one thing the micro:bit radio can do that needs no internet, and one thing it cannot do at all.

3. `radio send value "A" = 1` sends two things. Say what each one is for.

4. Transmit power runs from 0 to 7. What would you set it to for a game across a field, and what for two boards on one desk? Explain both.

5. Design a two-board game of your own that only uses `radio send string`. Describe how a round is played.

Chapter quiz

1. What is required for two micro:bit boards to communicate with each other over the radio?

A	B	C	D
They must connect to the same Wi-Fi router with a password	Both boards must set the same Radio Group number (between 0 and 255)	They must be plugged into the same computer with USB cables	They require an external Bluetooth dongle

2. What are the minimum and maximum power levels for `radio set transmit power`?

A	B	C	D
0 (lowest) to 7 (highest, ~70m)	1 to 10	0 to 100%	-10 to +10 dB

3. What does RSSI measure, and what does a reading of -42 dBm signify compared to -100 dBm?

A	B	C	D
Battery level; -42 dBm means empty	Signal strength: -42 dBm means very close, -100 dBm means far apart	Microphone frequency	Processor temperature

4. In the Proximity Treasure Finder project (Section 6.3), how is distance conveyed to the user?

A	B	C	D
By speaking English words	The beeps speed up as the signal gets stronger and slow down as it weakens	By vibrating a phone	By flashing colors on a laser

5. In the Classroom Voting System (Section 6.4), how do 4 student clickers send their choices to the teacher's receiver?

A	B	C	D
With `radio send value "A" = 1` for yes and `= 0` for no	Via email	Through QR codes	Using Google Forms

6. Two boards must share which setting before they can hear each other?

A) The same radio group B) The same battery C) The same USB cable

D) The same program name

7 What does `radio send value "A" = 1` send out?

A	B	C	D
A name and a number together	Only a number	Only text	The whole program

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8 Which group numbers can `radio set group` use?

A) 0 to 255 B) 0 to 7 C) 1 to 10 D) 0 to 1023

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/microbit/chapter-6-radio/