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Mega_Link 2

AN047 Guide for Alignment of 4G Directional Aerials

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Directional 4G Aerial

4G 5G High Gain Directional LPDA Yagi Antenna 11dBi 10 Meter LMR195 Cable 50 Ohm 600MHz-6GHz IP67 Indoor/Outdoor Waterproof LTE Aerial Three 02 Vodafone EE (Single Antenna - 10M Cable)

Note: There is a right way up (so that drain holes are on lower edge)

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Mobile Tower Locations

https://www.myamplifiers.com/mobile-network-coverage-map-cell-tower-locations/

https://www.youtube.com/watch?v=Nso87UaSETQ

Map Cell Towers

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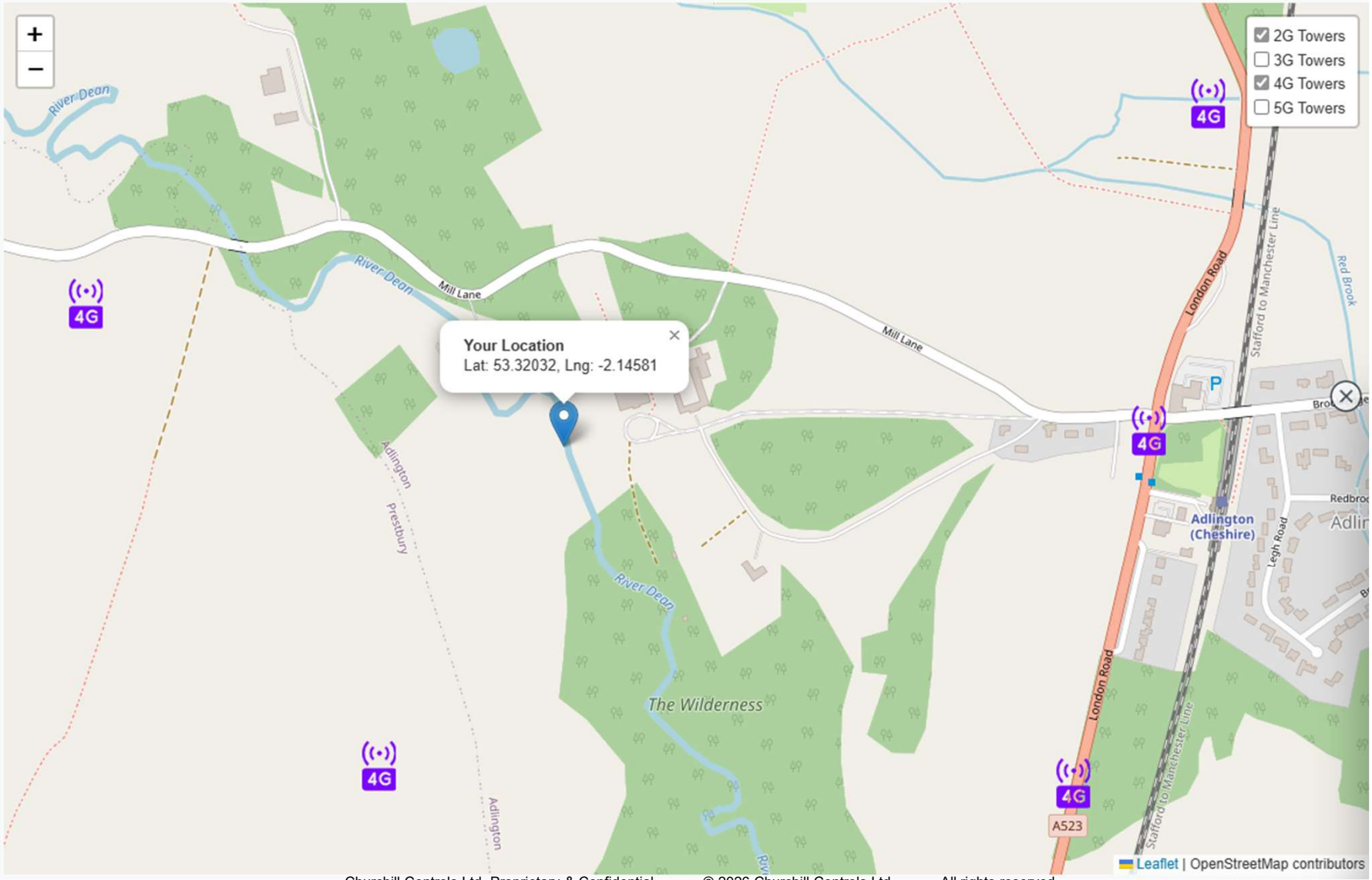
SK10 4LF



Using CS2389 to align aerial

- Survey Locations:
  - Switch on the CS2389 and run a "Survey" in different locations around the site to identify where the best signal is received (e.g., front vs. back of building)
- Mount Aerial:
  - High as possible, use compass to set bearing pointing to likely “best line of sight” cell tower location from map as a starting point
- Connect Aerial:
  - Connect aerial cable to the CS2389
- Use Live Monitor Mode:
  - Access the live monitor function to see “real-time” data
- Align Antenna:
  - Slowly rotate 4G aerial, pausing for a few seconds to let the CS2389 display new readings, searching for the highest signal strength (RSRP)
- Fix Position:
  - Lock the aerial in the position that yields the best results
- Save/Download Reports:
  - Run a survey and download results to save for future reference

Live Monitor Mode

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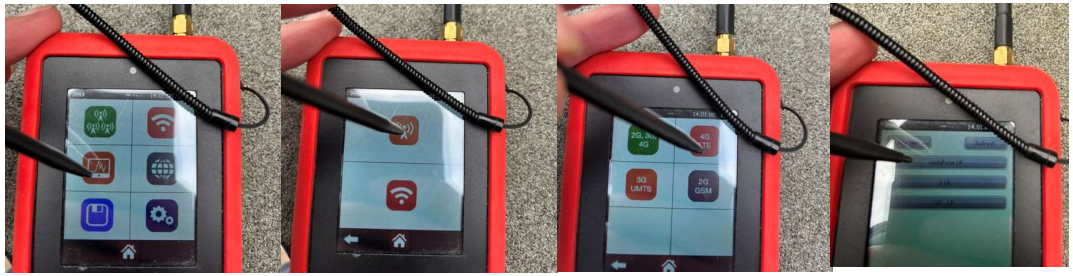
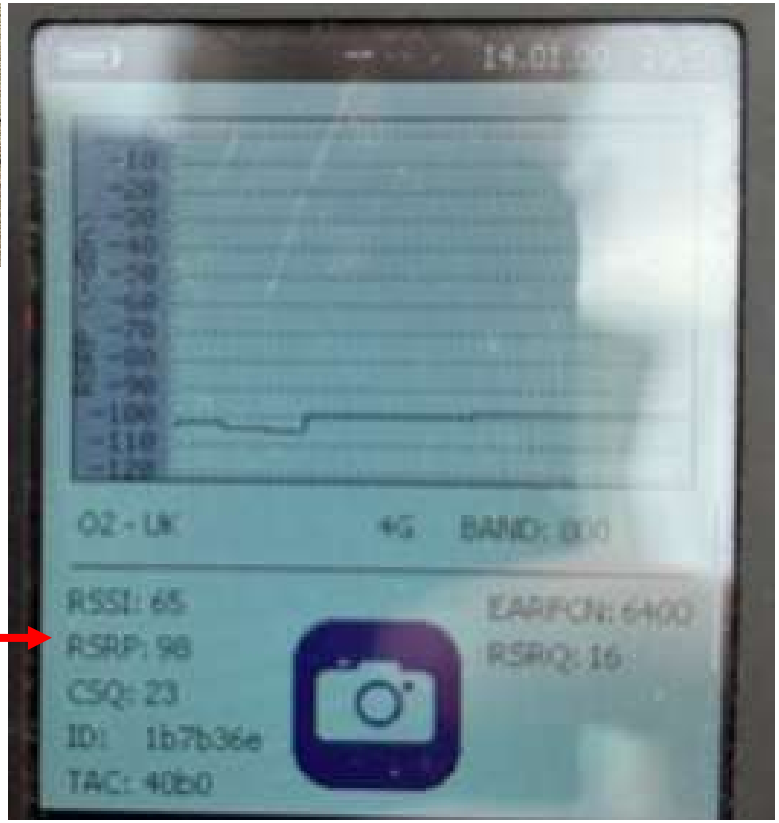
- CS2389
  - Website says a SIM card is needed for 4G but I found it works without
  - Sometimes I had to use return arrow and try again for numbers to work after graph gets to end of run



RSRP



Understanding RSRP

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- 4G RSRP (Reference Signal Received Power) is a key LTE metric measuring the average power of received pilot signals from a cell tower, indicating signal strength in dBm
- It helps determine coverage, and optimal antenna placement
- Values range from -44 dBm (excellent) to -140 dBm (no signal):
  - with -80 dBm to -90 dBm being good.

RSRP

RSRP	Signal strength	Description
>= -80 dBm	Excellent	Strong signal with maximum data speeds
-80 dBm to -90 dBm	Good	Strong signal with good data speeds
-90 dBm to -100 dBm	Fair to poor	Reliable data speeds may be attained, but marginal data with drop-outs is possible. When this value gets close to -100, performance will drop drastically
< -100 dBm	Poor	Marginal data with drop-outs is possible, performance will drop drastically

Source:
https://wiki.teltonika-networks.com/view/Mobile_Signal_Strength_Recommendations

2G Operation

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- For 2G (GSM) networks, aerial alignment aims to maximize the Received Signal Strength Indicator (RSSI), measured in dBm.

2G (GSM)

2G (GSM) Signal strength is defined by only one value: **RSSI** – Received Signal Strength Indicator; RSSI is a negative value, and the closer to 0, the stronger the signal.

RSSI

RSSI	Signal strength	Description
>= -70 dBm	Excellent	Strong signal for best achievable speeds
-70 dBm to -85 dBm	Good	Strong signal with good data speeds
-85 dBm to -100 dBm	Fair	Fair but useful, fast and reliable data speeds may be attained, but marginal data with drop-outs is possible
-100 dBm to -110 dBm	Poor	Performance will drop drastically
<= -110 dBm	Very poor	Connection may be lost

Source:
https://wiki.teltonika-networks.com/view/Mobile_Signal_Strength_Recommendations