REMOTE AREA CONNECTIVITY PROBLEMS

Weak signal problems

This works only if I am out.

Were was the spot with connectivity?

Capacity problems

Good quality

Connect to a fibre

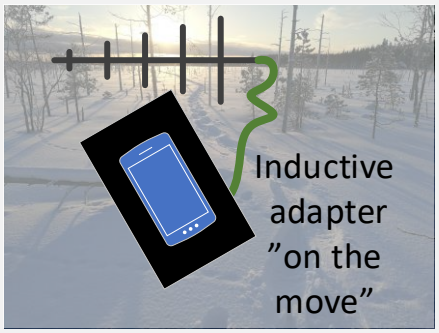
Contact your operator

Poor quality

Solving weak signal problems

Wireless solutions shown here
-no miracles but improvements possible

Connect to a fibre



It is much better signal up here

Directional antenna, high gain

Short, high quality cable

Long, low quality cable eats all signal strength and antenna gain benefits

Modem (4G, 5G)
-external antenna capacity

WiFi system
Indoors and outdoors

Pros: cable could be short

Outdoor modem (4G, 5G)
-as such or with a directional antenna

WiFi system
Indoors and outdoors

Example shops for stuff/system providers: satshop.fi, hajakaista.fi, ...

Help FI: https://www.traficom.fi/fi/viestinta/laajakaista-ja-puhelin/ohjeita-matkaviestinverkon-kuuluvuuden-parantamiseksi

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IMPORTANT FACTORS

Antenna: often a high gain antenna (> 10 dBi) is required.

Antenna placement: usually the higher its place is, the better is the signal level since visibility to the base station is the best. **Point antenna** towards the base station. The location of base stations can be defined visually, from information on a web page of operator, or experimentally by rotating antenna and checking the signal level.

Cable: connects the antenna to the modem. Causes losses. Short is better as well as a low loss cable.

Modem: makes the connection. Some have integrated WiFi. Indoor and outdoor models.

WiFi: used for local wireless access. Use WiFi repeaters to improve signal quality in other floors and more distant rooms. There are both indoor and outdoor WiFi devices available.

ANTENNA

Check the carrier frequency of your operator, the antenna should match with it. There are multiband antennas as well that provide flexibility.
In FI, 4G uses 800 MHz outside cities but 1.8 GHz and 2.6 GHz may also be used.

The antenna must be directed to the base station of your operator.

As a help, the web site https://www.cellmapper.net/map keeps a list of locations, frequencies, antenna beam directions and operators.

There are several types of antennas. Yagi or log-periodic antenna is the common used in terrestrial TV. Then there are planar antennas inside a radom.

MIMO antennas have more than one antenna elements and they offer better signal quality. Make sure that your modem supports MIMO antenna before buying it.

CABLE

The cable causes losses, measured as dB/m; the lower this value is – the better. Remember that you target ”antenna gain – cable losess > 0 dB”, i.e., the cable should not eat all antenna benefits, though there are some gains also from antenna placement.

Cable lossess vary from 1 dB/m down to 0.2 dB/m. Don’t buy too long cable.

Check that the cable connectors match with the antenna and modem connectors (there are female and male SMA, N, RP-SMA connectors).

MODEM

The outdoor modem could be close to the antenna, i.e, a short cable could be used. A USB cable from the modem to inside.

Sometimes an outdoor modem (with its own antenna) may be suffcient.

ADAPTER

The (inductive) adapter is a platform into which you place your smart phone, modem or tabled (separate models). There is induction loss (about 6 dB) that has to be compensated by the antenna. This could be used ”on the move” if you carry a light antenna, a mast and this adapter with you in your snowmobile or all-terrain vehicle.

Contact professionals for help. Check which operator has the best signal at your place. Use online tools like cellmapper.net