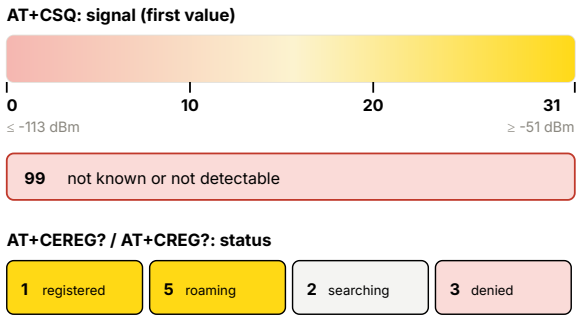
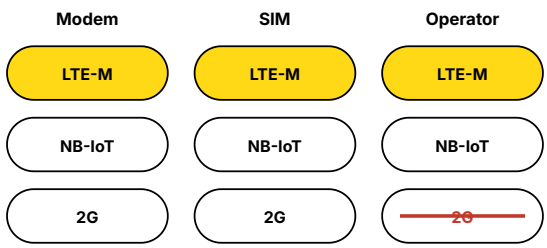
4G PLC not connecting? 6 checks before blaming the code

When a PLC with a mobile modem does not connect, the code may be fine. Check the SIM, the technology, the antenna, the signal, the network registration and the APN, in this order. Valid for any PLC or gateway with an LTE-M, NB-IoT or 2G/GPRS modem.

Read what the modem says



Two AT commands tell you where it stops: the signal with AT+CSQ and the registration with AT+CEREG? (LTE-M, NB-IoT) or AT+CREG? (2G).



Example: the three share LTE-M; this operator has switched 2G off

One shared technology: the modem, the SIM plan and the operator in your area must support the same one.

Work from the bottom up

A modem that does not see the SIM, has no signal or is not registered will never open a data connection, whatever the code does. Check in this order.

Coverage changes

A mobile link can drop. Keep the data on the PLC while the link is down and send it when it comes back.

Six checks, in this order

Check	What to do	Good result
1. SIM	Active SIM with a data plan. Disable the PIN, or set it in the code or the setup.	The modem reads the SIM without asking for a PIN.
2. Technology	Ask your operator which of LTE-M, NB-IoT or 2G it offers in your area, and set the modem to it.	Modem, SIM and operator share one technology.
3. Antenna	Antenna for the bands your operator uses, connected and outside the metal cabinet.	Antenna connected and outside the cabinet.
4. Signal	Send AT+CSQ and read the first value.	Between 0 and 31, as high as you can get; not 99.
5. Registration	Send AT+CEREG? (LTE-M, NB-IoT) or AT+CREG? (2G).	Status 1 or 5. With 3, ask your operator.
6. APN	Set the APN, user and password your operator gives you.	The PLC gets an IP address and reaches the server.

What the symptoms tell you

Symptom	Possible causes	Next step
The modem does not answer AT commands	Wrong port or baud rate, modem not powered, a setup step missing for your PLC range.	Follow the guide of your PLC range.
SIM error or PIN required	SIM not inserted correctly, PIN enabled, SIM not activated.	Check 1.
Signal 99	No antenna, antenna inside the cabinet, wrong bands, no coverage for that technology.	Checks 2 and 3.
Status 2 for a long time	The modem is searching: technology, bands or coverage.	Checks 2 and 3.
Status 3	Network rejects the SIM: not activated, no plan for that technology, roaming not allowed.	Call the operator.
Registered but no data	Wrong APN, user or password; data plan without credit.	Check 6.
Connects and drops	Weak signal, unstable supply.	Check 3; keep the data on the PLC.

From the standard

- AT+CSQ: 0 is -113 dBm or less, 31 is -51 dBm or more, 99 is not known or not detectable.
- AT+CEREG and AT+CREG status: 1 home, 5 roaming, 2 searching, 3 denied.
- Values from 3GPP TS 27.007.

Before you buy the SIM

Ask the operator which technologies it offers in the place of installation, not where you test.

Many IoT SIMs include LTE-M and NB-IoT. A 2G-only SIM does not help with an LTE-M or NB-IoT modem.

If it has never worked

- Test the SIM in a phone or a USB modem at the same place.
- Move the antenna outside, or test the PLC outside the cabinet.
- Check the setup steps of your PLC range: modem selection, slot and library.

Security

A mobile connection puts the PLC on a public network.

Prefer a private APN or a VPN, do not expose services to the Internet and use authentication on every service.

References: 3GPP TS 27.007 (AT command set); GSMA, Legacy mobile network rationalisation (2G and 3G switch-off). Device manuals take precedence over this general guide.