Quick-Start Guide:
- Installation and maintenance visits of HWM loggers.

Checks to be made DURING A DEPLOYMENT:

Connectors *– Cleanliness & Protection against water:*

Logger and antenna may have a plastic connector.

(No grease is required)

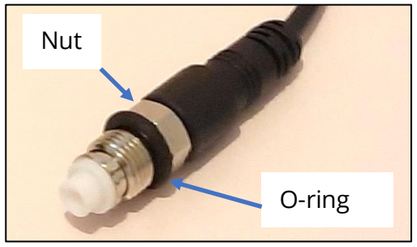
Ensure both halves of the connection are free of water, dirt, and debris before connecting. Tighten to finger-tight to ensure a water-tight connection.

Logger and antenna may have a metal connector.

Apply a small quantity of WRAS approved silicon grease (type **SG M494**) to the **inside** of the logger connector during installation.

(1) Prior to connecting the antenna, ensure that the connector is dry and clear of dirt and debris; trapped moisture or contaminants can impair the antenna performance. Clean if necessary.

The antenna connector has an O-ring included for protection against water and moisture ingress; it acts as a seal.



(1) Check that the O-ring is present and undamaged.
(2) Before connection, ensure that the connector and O-ring are dry and clear of dirt and debris. Clean carefully if necessary.
(3) Insert the antenna connector into the logger connection and ensure it is fully home.
(4) Tighten the connector correctly; the nut on the antenna should be finger tight, plus 1/4 turn.

---

(1) Ensure the antenna cable has no sharp bends, cuts, or other damage as it joins the antenna or the connector of the antenna.

(2) Check for any damage to the antenna cable; it must be free from cuts, crush damage or sharp bends.
(3) When installing the logger, or other equipment, check the equipment does not cause any crush damage to the antenna cable. Cable ties fixing the cable in place should not be too tight.

Antenna correctly positioned and signal checks:

(1) The antenna should not be bent to fit the installation; if it is too big for the chamber, use a smaller type of HWM approved antenna.
(2) Ensure that the radiating end of the antenna does not touch or go close to a metal surface.

(OK near metal)

(3) The radiating element of the antenna should ideally be positioned in free air (free from obstructions).
(See picture below for a good example).

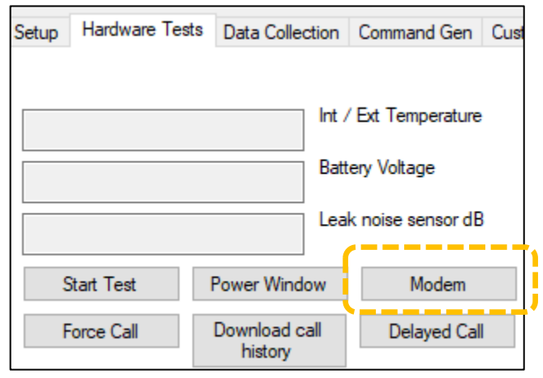
(4) Try to avoid placing the antenna in a location where it can be flooded. If this is unavoidable, then place it where the risk is at its minimum.
(5) For equipment that is installed in a chamber below ground level, the antenna should be placed above ground level if possible.
Where this is not possible, the antenna should be positioned near to the top of the chamber.

Testing has to be done with the chamber lid in a closed position; where the programming cable needs to be used, try to close the chamber lid as best as possible without causing damage to the cable.

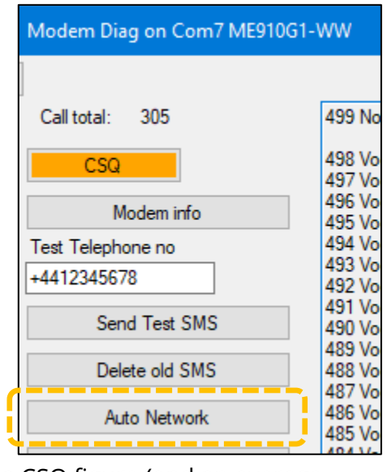
(Instructions below are given for the IDT - PC version. If your logger uses the IDT - mobile version, refer to the MAN-2000-0001 user-guide for equivalent tests).

The results are obtained by making tests using the IDT tool.

(1) Within the Hardware Tests tab, locate and then click on the Modem button.



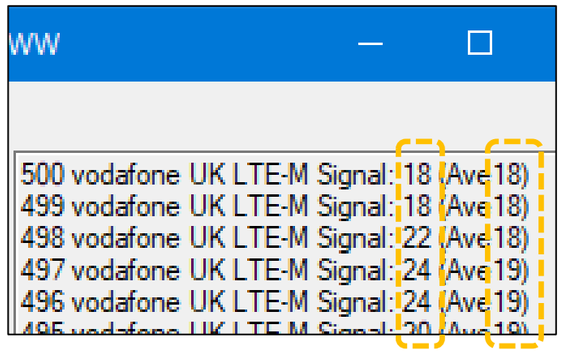
Then click the Auto Network button.



The logger first selects the most usable network from those that are available.
Then the logger tests the radio signal up to 500 times and reports a CSQ figure (and an average CSQ figure).

(2) Allow the test to run for at least 10 results, or until the result stabilises. Then click the CSQ button to cancel testing.

(3) Make a note of each antenna position and result. Try alternative locations for the antenna to find the best location (highest CSQ number).



(The result line may vary depending on modem fitted, and whether 2G, 3G, or 4G signal is in use).

It is important to select the most suitable antenna and install it in the most suitable location for the site. HWM offers a selection of alternative antennas; refer to the HWM Antenna Installation Guide (MAN-072-0001) for examples. HWM also offers a selection of brackets and hangers for antenna.

The following guidelines are provided for CSQ result vs antenna suitability:

15+ Good. (Data transmission should be reliable).

8-14 Acceptable. (Depending upon the ambient conditions data transmission may be possible).

Acceptable results may be improved by selecting the right antenna and the position / rotation which gives the best result.

0-7 Poor. (The logger may be able to register with the network but will not be able to send or receive data reliably).

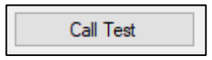
To improve a poor (or only just acceptable) CSQ result, consider the possibility that there may be some equipment fault. Check for this by temporarily swapping with a known good reference unit. First swap the antenna and if no improvement then also swap the logger. Check at each stage to see if the CSQ has improved.

** For metal antenna connectors: **
** . . . Top-up the silicon grease at the end. **

Call tests

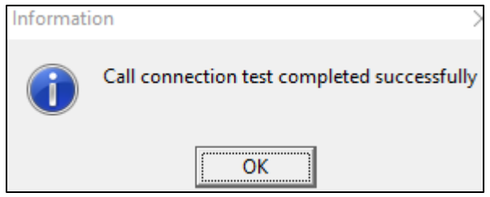
A call test must be made for each installation.

(1) Make a call test.



A Call Test is done with IDT cable still attached. Therefore, a small gap may still exist in the chamber covering.
IDT takes control of the modem, using the logger settings and indicates if the call was successful.

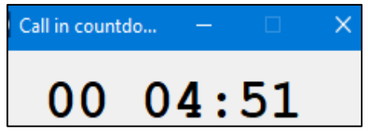
Check:



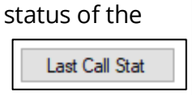
(2) Make a delayed call test.

To test with the chamber lid completely closed, click on the Delayed Call button. remove the programming cable, and close the chamber lid. The test takes place after 5 minutes.

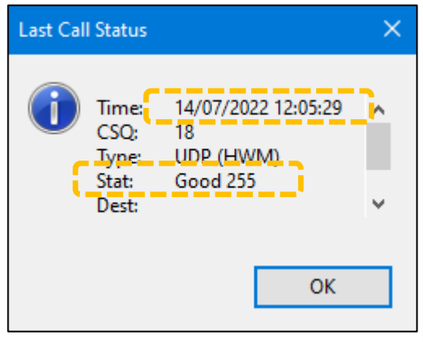
IDT provides a countdown before a call will start. Give a few additional minutes for the call to take place.



Replace the IDT cable and check the status of the last call-in attempt by clicking the 'Last Call Stat' button.

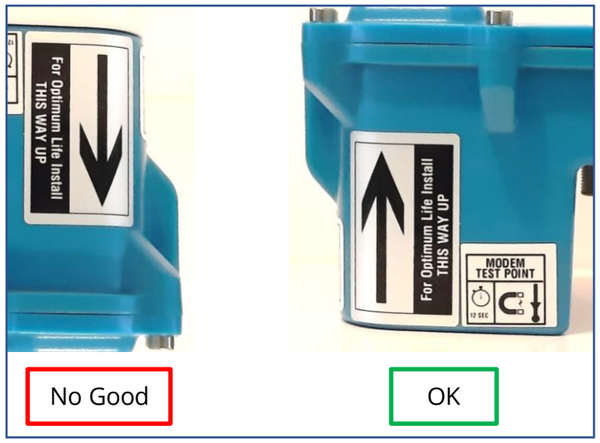


Check the time of the call to confirm it matches the one made a few minutes ago. Check the status is also 'Good'.



! Always check logger-orientation is correct to get the best battery life from the unit before leaving.

Check for a "This way up" direction indication on the logger label. Also check user-guide.



Checks DURING A MAINTENANCE VISIT:

(Refer also to the checks and tests listed previously for a new deployment).

Equipment can fail to call in for many reasons:

- Environmental issues (e.g., flooding)
- The site structure (e.g., lid of chamber attenuates radio signal too severely)
- The site location (e.g., cellular network radio coverage is poor).
- Equipment failure

Prior to travelling to site, it is beneficial to prepare for the visit. Ensure you have:

- Replacement equipment (in case it is needed)
- Information about the history of the logger's ability to call-in from its current site and also any other diagnostic indicators; use sources such as DataGate.

Did the logger call-in for only a short time after it was installed?

(This may indicate the antenna is not optimised or that there is some problem with the cellular radio signal in the area).

Check the message history:

(1) If the logger has been successfully calling in for some time, but is now becoming less reliable, pay attention to the **CSQ indication** within the recent messages.
(A logger that shows a sudden drop in the CSQ level may simply indicate that the site has been disturbed and that the antenna has fallen into the bottom of the chamber, and it needs to be returned to the optimum position).
(Alternatively, it could indicate an antenna failure. In such circumstances, the antenna should be swapped out for a new replacement).
If antenna replacement or re-positioning does not cure the problem, another possibility is a logger fault.
It is useful to first **make a comparative test** at the installation site using a known good logger of the same type; if the reference logger has a good CSQ level and calls in successfully, then it is likely the original logger is at fault; replace it with a new unit.

Note: Always remember to record the logger swap on DataGate so that the data produced by the new logger is linked to the correct site.

(2) If the logger has been successfully calling in for some time, but is now becoming less reliable, pay attention to the **battery voltage indication** within the recent messages.
(A logger that shows significant dips in the measured voltage is an indicator that the battery is reaching the end of its useful life.
In such circumstances, the logger should be swapped out for a new replacement. If the logger also has an external battery, this should also be replaced at the same time).

(3) The CSQ indicator in the logger message history may alternatively indicate that the **CSQ level is usually low**, and that the logger has always struggled to call into the server.

In this scenario, comparative tests are required. First measure the CSQ on site with the original logger. Then swap the logger and antenna with known good units and repeat the test.

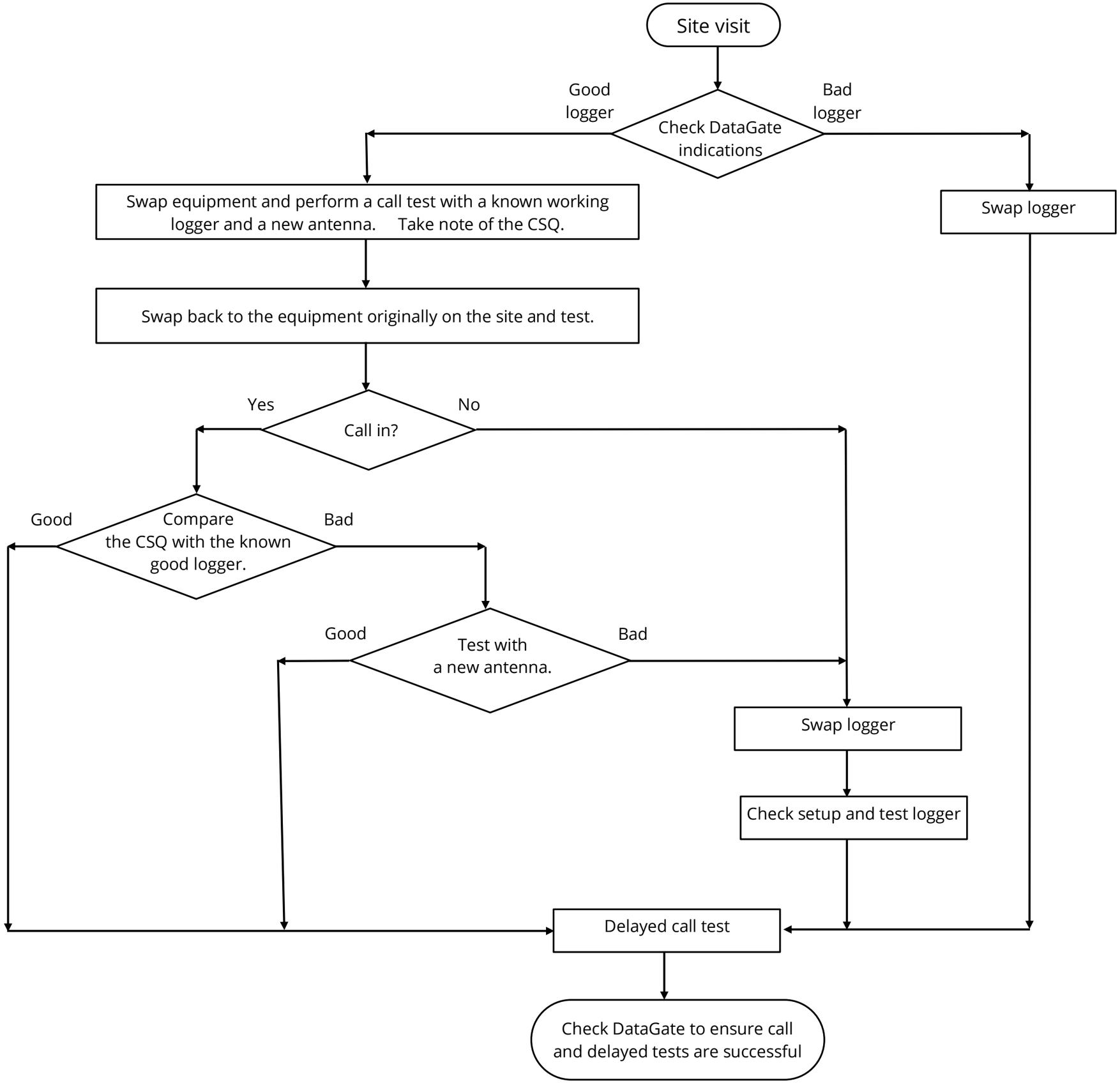
. . . If the CSQ level improves, a new antenna and possibly a new logger are required.

. . . If there is no CSQ level improvement, initially try to re-position the antenna. If this also fails, re-try the tests with a different type of antenna.

If an improved result is obtained, install the best equipment and antenna type / location.

If there is no improved result with the antenna inside the chamber, consider if it is possible to install the antenna outside of the chamber at a location where the cellular radio signal is OK.

** For metal antenna connectors: **
** . . . Top-up the silicon grease at the end. **



HWM-Water Ltd
Ty Coch House
Llantarnam Park Way
Cwmbran
NP44 3AW
United Kingdom
+44 (0)1633 489479
www.hwmglobal.com