Morse Micro



HaLowLink 2 Software Release Notes

OpenWrt Software Package

Copyright © Morse Micro

Refer to the online version for up-to-date content

Table of Contents

Table of Contents 2
1 Overview 3
2 Software Change Summary 4
2.1 Release 3.2.3 4
2.1.1 New Features 4
2.1.2 Feature Improvements 4
2.1.3 Known Issues 4
2.2 Release 2.11.13 5
2.2.1 New Features 5
2.2.2 Resolved Issues and Improvements 5
2.2.2.1 Security compliance improvements 5
2.2.3 Known Issues 5
2.2.3.1 Unbalanced downlink distribution in multi-STA scenarios 5
2.2.3.2 Receive degradation at 2 MHz near -73 dBm RSSI 5
2.2.3.3 Receive degradation at 1 MHz at strong signals 6
2.2.3.4 Intermittent STA association failure at very close range 6
2.3 Release 2.11.12 6
2.3.1 New Features 6
2.3.2 Resolved Issues and Improvements 6
2.3.2.1 Security compliance improvements 6
2.3.2.2 Multi-STA performance 6
2.3.2.3 Documentation 7
2.3.3 Known Issues 7
2.3.3.1 Unbalanced downlink distribution in multi-STA scenarios 7
2.3.3.2 Receive degradation at 2 MHz near -73 dBm RSSI 7
2.3.3.3 Receive degradation at 1 MHz at strong signals 7
2.3.3.4 Intermittent STA association failure at very close range 7
3 Revision History 8

1 Overview

This document provides an overview of changes and improvements for the latest OpenWrt software release for the HaLowLink 2.

HaLowLink 2 is Morse Micro's Wi-Fi HaLow (802.11ah) access point and extender platform, designed for long-range, low-power IoT connectivity. The software runs on OpenWrt and is managed through the device's web-based user interface.

To upgrade your device, navigate to the **Upgrade** page in the web UI. An active internet connection is required.

None

Support for the 2 MHz channel option and the restriction enforcing 'Auto' mode in the EU regulatory domain have been discontinued effective from Release 3.2.3. The 2 MHz configuration was certified under the polite spectrum access route of EN 300 220-2 V3.1.1, which does not test or validate any duty cycle, so there is no measured basis for the 10% duty cycle it was run at. Because 2 MHz exceeds the 1 MHz occupied bandwidth cap for band 84, it falls instead under the non-specific SRD entries, which permit only a 0.1–1% duty cycle, which is far below 10%, and no EU provision anywhere allows 2 MHz at 10%. With V3.1.1 also being withdrawn on 11 June 2027, full regulatory compliance required aligning with EN 304 220 at 1 MHz, resulting in the removal of 2 MHz channel support in the EU region.

2 Software Change Summary

2.1 Release 3.2.3

Release 3.2.3 is the next maintenance release for HaLowLink 2 after release 2.11.13. It updates the MM8108 driver and firmware package to version 2.1.0, as well as the underlying OpenWrt version from 23.05.6 to 24.10.5.

2.1.1 New Features

- Upgraded MM8108 driver and firmware from 1.17.9 to 2.1.0
- Added a new Link Metrics diagnostic tool within the Web GUI
- Updated OpenWrt version from 23.05.6 to 24.10.5
    - Updated the Linux kernel from v5.15.167 (with v6.1.110-1 mac80211 backport) to v6.6.119 (with v6.12.61 mac80221 backport).

2.1.2 Feature Improvements

- Removed the 2MHz channel & the 'Auto' only restriction in EU
- Enabled airtime fairness to improve downlink balance in multi-station setups and resolve medium monopolization.
- Upgraded the dnsmasq package to resolve multiple security vulnerabilities (CVEs)
- GUI stability and usability enhancements:
    - Resolved frequency list inaccuracies in iwinfo for EU and AU2024 regulatory domains
    - Fixed a uhttpd crash causing intermittent web interface loading failures

2.1.3 Known Issues

- Transient throughput drops detected in multi-hop 802.11s Mesh networks
    - The wireless link self-heals within approximately 2 seconds without requiring manual intervention

Please refer to the Linux Software Release Notes for comprehensive details regarding the new features and known issues introduced in the 2.1.0 (MM8108) driver/firmware update.

2.2 Release 2.11.13

Release 2.11.13 is a maintenance release for HaLowLink 2 following release v2.11.12. It updates the MM8108 driver and firmware package to version 1.17.9, which fixes the reported security vulnerabilities. There are no new end-user features in this release.

2.2.1 New Features

- There are no new features in this release. The MM8108 driver and firmware have been updated to version 1.17.9; this update delivers the security improvements described below and introduces no new end-user functionality.
    - For a full list of MM8108 driver features, refer to the MM8108 Linux Software Release Notes (1.17.9).

2.2.2 Resolved Issues and Improvements

2.2.2.1 Security compliance improvements

- Hardened parsing of 802.11 management-frame information elements (IEs) against malformed input:
- Added bounds validation for vendor-specific IE lengths, preventing out-of-bounds reads.
- Protected against a buffer overflow when parsing the Traffic Indication Map (TIM) information element.
- Protected against a buffer overflow when parsing the S1G Capabilities information element.

2.2.3 Known Issues

All known issues reported in release 2.11.12 are carried forward unchanged into 2.11.13; this release does not resolve any of them. They are listed again below for completeness.

2.2.3.1 Unbalanced downlink distribution in multi-STA scenarios

- In multi-STA setups, an unbalanced downlink distribution may be observed when traffic is sent simultaneously to more than four stations, with the first two associated stations potentially monopolizing the medium.
    - Workaround: Enable airtime fairness on the HaLowLink 2 (enable_airtime_fairness=1).

2.2.3.2 Receive degradation at 2 MHz near -73 dBm RSSI

- Some degradation is observed at 2 MHz, with an RSSI of approximately -73 dBm.
    - Workaround: Increase or decrease the RSSI by 2 dB to resolve this issue.

2.2.3.3 Receive degradation at 1 MHz at strong signals

- Some degradation is seen at 1 MHz at strong signal levels.
    - Workaround: Move the devices farther apart to lower the signal strength.

2.2.3.4 Intermittent STA association failure at very close range

- When pairing two devices at very close range, the STA may intermittently fail to join the HaLowLink 2 due to excessively strong received signal levels (greater than -10 dBm).
    - Workaround: Ensure a minimum separation of 2 meters between the HaLowLink 2 and STA before initiating the pairing sequence to maintain reliable association. An improvement is planned for a future firmware release.

2.3 Release 2.11.12

Release 2.11.12 is the first maintenance release for HaLowLink 2 following the production release v2.11.8. It includes security compliance improvements, stability fixes for high-density deployments, and an updated MM8108 driver and firmware package. There are no new end-user features in this release.

2.3.1 New Features

- There are no new features in this release. The MM8108 driver and firmware have been updated to version 1.17.8; however, all features introduced in that driver version were already available in the HaLowLink 2 production release v2.11.8.
    - For a full list of MM8108 driver features, refer to the MM8108 Linux Software Release Notes v2 (1.17.8).

2.3.2 Resolved Issues and Improvements

2.3.2.1 Security compliance improvements

- Updated OpenSSL configuration to meet current security standards, ensuring compatibility with stricter TLS requirements and audit criteria.
- Addressed a CWE-125 security weakness.

2.3.2.2 Multi-STA performance

- Multi-STA performance has been improved for up to 8 stations.
- Improved interference performance in AP mode: beacon transmission is now maintained under high levels of adjacent-channel interference.
- Enhanced stability in high-density deployments: resolved a firmware crash that could occur when operating with 32 or more connected STAs.

2.3.2.3 Documentation

- The user guide now lists all open network ports, with justification and usage context for each.

2.3.3 Known Issues

2.3.3.1 Unbalanced downlink distribution in multi-STA scenarios

- In multi-STA setups, an unbalanced downlink distribution may be observed when traffic is sent simultaneously to more than four stations, with the first two associated stations potentially monopolizing the medium.
    - Workaround: Enable airtime fairness on the HaLowLink 2 (enable_airtime_fairness=1).

2.3.3.2 Receive degradation at 2 MHz near -73 dBm RSSI

- Some degradation is observed at 2 MHz, with an RSSI of approximately -73 dBm.
    - Workaround: Increase or decrease the RSSI by 2 dB to resolve this issue.

2.3.3.3 Receive degradation at 1 MHz at strong signals

- Some degradation is seen at 1 MHz at strong signal levels.
    - Workaround: Move the devices farther apart to lower the signal strength.

2.3.3.4 Intermittent STA association failure at very close range

- When pairing two devices at very close range, the STA may intermittently fail to join the HaLowLink 2 due to excessively strong received signal levels (greater than -10 dBm).
    - Workaround: Ensure a minimum separation of 2 meters between the HaLowLink 2 and STA before initiating the pairing sequence to maintain reliable association. An improvement is planned for the next firmware release.

3 Revision History

Version Number	Release Date	Release Notes
1	24 Apr 2026	Release OpenWrt 2.11.12
2	04 Jun 2026	Release OpenWrt 2.11.13
3	18 Oct 2026	Release OpenWrt 3.2.3

Morse Micro provides this information "as is" without warranties of any kind, express or implied. No guarantee is made as to the accuracy, completeness, or suitability of this information or Morse Micro's products for any specific purpose. Use of this information and products is at the user's sole risk. Morse Micro products are not designed or tested for use in mission-critical systems, and should not be used in such applications. Performance specifications are based on internal testing and are believed to be reliable; however, they are not guaranteed. It is the Buyer's responsibility to test and validate all product performance, compatibility, and compliance, both in isolation and within end applications. Morse Micro assumes no liability for the use or application of any product, circuit, or information described herein. No license or other rights—express or implied—are granted under Morse Micro's intellectual property. This document contains proprietary information of Morse Micro and is subject to change without notice. Wi-Fi®, Wi-Fi HaLow™, and the Wi-Fi logo are trademarks of Wi-Fi Alliance. ZigBee™ and Z-Wave™ are trademarks of their respective owners. All other trademarks are the property of their respective owners.



Morse Micro

Morse Micro Pty. Ltd. Corporate Headquarters

Level 8, 10-14 Waterloo Street, Surry Hills, NSW 2010, AUSTRALIA

Email: sales@morsemicro.com

Copyright © Morse Micro Pty. Ltd.