



## Customer Release Notes

HL7900

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## Sierra Wireless

Semtech Corporation acquired Sierra Wireless in January 2023. The Sierra Wireless brand is gradually being phased out. During the phase-out period, references to both “Semtech” and “Sierra Wireless” may appear in product documentation.

## Contact Information

Sales information and technical support, including warranty and returns	Web: <a href="http://sierrawireless.com/company/contact-us/">sierrawireless.com/company/contact-us/</a> Global toll-free number: 1-877-687-7795 6:00 am to 5:00 pm PST
Corporate and product information	Web: <a href="http://sierrawireless.com">sierrawireless.com</a>

## Revision History

Revision number	Release date	Changes
1	August 2024	Document creation, Release 1.0
2	March 2025	Added Release 2.0 and Release 2.1
3	October 2025	Added Release 3
4	April 2026	Added Release 4

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# 1: Introduction

## 1.1 Document Scope

This document describes the firmware releases for the HL7900.

Semtech highly recommends migrating to new releases when available to take advantage of any security and stability improvements.

## 1.2 Firmware Packages and Tools

Module resources, including firmware packages, release notes, tools and other product documentation are published on the [Source](#) and can be accessed via the device-specific page.

## 1.3 Document Audience

This release note may be distributed to all HL7900 customers.

## 2: Compatibility

### 2.1 Hardware Compatibility

The latest firmware release is compatible with commercial HL7900 hardware. There are no major known issues with pre-commercial hardware, but it is no longer actively tested or supported. Pre-commercial units can be identified by the marking of "Sample" on the module shield.

### 2.2 Software Feature Compatibility

The HL7900 software is not compatible with other hardware.

## 3: Firmware Release 4

Release with DOCOMO approval completed.

### 3.1 Firmware Release Description

#### 3.1.1 Firmware Release Identification

**Table 3-1: Firmware Release Identification—Release 4**

Component	Details
Firmware Version	SWI1350L.4.5.22060521.202602100800.01
Date of generation (UTC)	2026/02/10 08:00
IMEI SV	05
GSMA TS.25	1-Oct-2025
Chipset Vendor Stack Version	BF_CORE_02_02_00_00_60521
Supported HW	HL7900

#### 3.1.2 Host Software Versions

The following tools were validated against this release.

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*Note: Semtech recommends upgrading to newer Host Software releases when available. Refer to applicable software release notes for any compatibility restrictions.*

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**Table 3-2: Validated Host Software Tools—Release 4**

SW Tools Name	Version
Image Burning Tool	4.0.25

## 3.2 Software Changes

**Table 3-3: Software Changes - Release 4 New Features**

ID	Title	Description	Impacted Domains
KAVALAN-171	Hot swap support for external SIM interface	Supports KSIMDET to detect insertion and removal events of the external SIM (SIM1) for applications requiring SIM detection (PRI).	System
KAVALAN-16	3rd Party FOTA	Enables delta firmware updates using images hosted on a customer-managed server.	FOTA
KAVALAN-1174	LPM Logging	AT command +KFPLOG is added to allow writing <reason> and <note> to a footprint log file. It does not automatically record.	AT
KAVALAN-765	Secure JTAG	The JTAG interface should be disabled by default. Contact SMTC to enable. Once a module has had JTAG enabled it shall be considered decommissioned for commercial use.	System
KAVALAN-306	JTAG for customer application development	OpenMCU customers can have MCU JTAG enabled by default for application development.	System

**Table 3-4: Software Changes - Release 4 Bug Fixes**

ID	Title	Description	Impacted Domains
Core			
KAVALAN-1202	Module is getting stuck during LETP run of SQA tests	Fixes an issue where configuration files were not correctly backed up using the +KCFGBU command.	System
KAVALAN-1192	UART3 not working if wake pin is floating	Fixes an issue where UART3 did not function correctly when the wake pin was left floating.	System
KAVALAN-1210	[HL79E][TPF]: AT%FOTAHTTP command not working	Fixes an issue where the AT%FOTAHTTP command failed to execute or return a response as expected.	FOTA
KAVALAN-1187	[HL7900][ATIP] Only two sessions are created instead of the expected six sessions	Fixes an issue where the number of supported ATIP sessions was limited to two instead of the expected maximum.	Network
KAVALAN-1039	AVFOTA fails to progress when incorrect clock is corrected after initial failure	Fixes an issue where AVFOTA failed to resume after correcting an incorrect device clock, causing the update process to remain stuck.	FOTA

Table 3-4: Software Changes - Release 4 Bug Fixes (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-1213	HL7900 does not sent proprietary events with Semtech SIM v6.0	Fixes an issue where proprietary SIM-related events were not reported when using Semtech SIM v6.0.	Network
KAVALAN-1043	Encountering an issue while attempting to download the CEP file using the AT%IGNSSCEP command	Fixes an issue where downloading the CEP file using the AT%IGNSSCEP command failed with an error.	iGNSS
AT / QMI Commands			
KAVALAN-692	[HL7900][CCLK, CTZU] Time Clock is not automatically updated after re-attaching network even when AT+CTZU is enabled	How customer will validate effect of AT+CTZU if enabled the same and does not have any impact on CCLK Fixes an issue where the device time was not automatically updated after network re-attachment when AT+CTZU was enabled.	Network
KAVALAN-1032	AT%LWM2MCMD2="GET_FOTA_STATE" returns incorrect value (7) and does not reset to 0 after FOTA upgrade attempt. Firmware upgrade fails	Fixes an issue where the FOTA state remained at an incorrect value due to invalid LwM2M configuration, preventing firmware upgrade completion.	FOTA
KAVALAN-1207	SHUB UART2 not enabling AT service	Fixes an issue where SHUB UART2 failed to enable AT command service after execution of AT+KMFC.	System
KAVALAN-284	Module is rebooting continuously when invalid inputs are given in AT%SETACFG	Fixes an issue where providing invalid parameters to AT%SETACFG caused continuous module reboots instead of returning an error.	Syntax

### 3.3 Security Corrections/Improvements

No changes made.

## 3.4 Known Issues

*Note: This section reflects known issues in Release 4*

**Table 3-5: Known Issues—Release 4**

ID	Title	Description	Impacted Domains
AT/QMI Commands			
KAVALAN-1334	ATV* ("ATV="; "ATV=?"; "ATV?"; "ATV;" "ATVa) returns ERROR (numeric code 4 for ERROR) but still made TA response format Change to Numeric code	ATE* returns ERROR but still made TA response format Change to Numeric code.	AT
KAVALAN-1331	ATE= returns ERROR but still made echo OFF	ATE= returns ERROR but still modifies the echo state to OFF	AT
KAVALAN-1328	Inconsistent behavior is observed during network registration	Even after successful registration, the module continues to send UICC REFRESH and SCAN START events. After this, the module fails to remain registered to the network and is still not registered even after 30 minutes.	AT
KAVALAN-1315	FW upgrade/downgrade fails when performed back-to-back; module reboot required before next FW operation	After upgrade or downgrade, reset is needed to continue 2nd upgrade or downgrade.	FOTA

## 4: Firmware Release 3

Release 3 with GCF approval completed.

### 4.1 Firmware Release Description

#### 4.1.1 Firmware Release Identification

**Table 4-1: Firmware Release Identification—Release 3**

Component	Details
Firmware Version	SWI1350L.3.4.22052661.202507210755.01
Date of generation (UTC)	2025/07/21 07:55
IMEI SV	04
GSMA TS.25	14-May-2025
Chipset Vendor Stack Version	BF_CORE_02_02_00_00_52661
Supported HW	HL7900

#### 4.1.2 Host Software Versions

The following tools were validated against this release.

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*Note: Semtech recommends upgrading to newer Host Software releases when available. Refer to applicable software release notes for any compatibility restrictions.*

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**Table 4-2: Validated Host Software Tools—Release 3**

SW Tools Name	Version
Image Burning Tool	3.0.25

## 4.2 Software Changes

Table 4-3: Software Changes - Release 3 New Features

ID	Title	Description	Impacted Domains
KAVALAN-1	External PSRAM	Added support for external PSRAM for customers using OpenMCU applications.	System
KAVALAN-31	AT Command Access Control	Added three levels of AT Command protection. L1: unprotected, L2: customer password, L3: Sierra internal. Modules ship with no L2 password.	System
KAVALAN-36	SNTP Client	New AT+KNTTP command for SNTP time synchronization. Parameters: timezone offset (-48 to +56 quarter-hours), update mode, NTP server address, custom port	System
KAVALAN-83	External "GNSS LNA Enable Signal" External LNA Control	GPIO_44 automatically controls external GNSS LNA power. Supports passive (0dB, LOW) and active antennas: 15dB, 18dB, 21dB gain (HIGH) Controlled by new AT command AT+KGNSSACTANT	GNSS
KAVALAN-82	Tx On Pin	Added support for Tx On output pin that is high during Tx activity. Supports Cat-M and Cat-NB.	System
KAVALAN-92	Semtech R2C Connectivity	Completed Semtech R2C SIM qualification.	R2C
KAVALAN-387	TLS 1.3 Cipher Suites	AT+KSSLCRYPTO enhanced with TLS 1.3 support: AES_128_GCM_SHA256, AES_256_GCM_SHA384, CHACHA20_POLY1305_SHA256, AES_128_CCM_SHA256, AES_128_CCM_8_SHA256. Multiple cipher suite priority ordering added.	Network
KAVALAN-690	iGNSS AT Commands	New AT%iGNSSINFO (position query), AT%iGNSSSEV (events), AT%iGNSSCFG (configuration), AT%iGNSSCEP (ephemeris), AT%iGNSSACT (start/stop). Completed interface for integrated GNSS.	iGNSS
KAVALAN-840	MIPI Antenna Tuning	Added support for external MIPI controlled antenna tuner. See HL7900 Product Technical Specification for more details.	System
KAVALAN-301	Piecewise Firmware Download	New AT+WSD command enables firmware download in 1KB segments via AT interface. Segments transferred using XMODEM protocol and assembled in module flash. Eliminates the need to hold complete firmware in host memory during update.	FW Download

Table 4-3: Software Changes - Release 3 New Features (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-536	Modified IP AT Commands for EOF Pattern Support	AT+KUDPSND and AT+KTCPSPND enhanced to support byte-count termination instead of EOF pattern. Module returns to command mode after exact byte count transferred, preventing failures when payload contains a pattern.	AT
KAVALAN-540	URC Data Format Configuration	Enhanced AT+KURCCFG for 3 output formats: mode 0 (raw binary), mode 1 (text), mode 2 (2-byte ASCII HEX). Applied to +KUDP_DATA and +KTCP_DATA URCS. Simplified parsing for CR/LF based systems.	AT
KAVALAN-769	Fast Transition to Power Saving Mode from RRC Idle State	Added support for faster entry into Power Saving Mode (PSM) when the device transitions to RRC Idle state. Previously, the device would wait for the network-configured T3324 activity timer to expire (often 20-50 seconds) before entering PSM, which increased power consumption in applications with intermittent data patterns. This feature introduces the AT%TRSHCMD="PSM";T3324" command, allowing developers to configure or bypass the T3324 timer and enter PSM immediately upon RRC idle transition. This results in significantly reduced power consumption for IoT applications with burst traffic patterns. Note that this is a runtime command that must be re-entered after each device reboot to take effect.	Power
KAVALAN-770	T3396 Timer Support	New AT%LTEINFO command detects T3396 timer when network denies with an EMM DENIED state. It shows how long module cannot attach to the network.	Power
KAVALAN-771	T3346 Timer Detection	New AT%TIMEREV command reads T3346 back-off timer when network rejects RRC connection. Host can avoid reconnect attempts during back-off period to save battery.	AT
KAVALAN-778	Extended Wait Timer URC	New AT%KCSCON URC format: %KCSCON: rrc_state, reject_type, timer_seconds. This distinguishes network capacity (temporary) from registration rejection (permanent). Critical for battery optimization.	AT
KAVALAN-887	URC Payload Limit Increase	Increased +KUDP_DATA / +KTCP_DATA maximum payload from 511 bytes to 1500 bytes in hex format.	AT

Table 4-4: Software Changes - Release 3 Bug Fixes

ID	Title	Description	Impacted Domains
Core			
ALT1350-637	The module crashes when downloading AV packages through FOTA with poor network or disconnect condition	Module with FW Release 2 occasionally performs a reset when downloading AV packages via FOTA. This occurs due to watchdog time out.	FOTA
AT / QMI Commands			
KAVALAN-742	+KSUP URC happens a very long time after reset	Customers tend to send +KCNXCFG immediately on boot (e.g. when AT is ready after receiving +KSUP), but this results in an error because +KCNXCFG has not been registered yet.	Network
KAVALAN-877	Packet lost in UDP NB-IOT	Data lost in customer's stress test.	Network
ALT1350-741	+KTCP_NOTIF notification not received after TCP disconnection by the remote server	1. +KTCP_NOTIF notification not received after TCP disconnection by the remote server. 2. When the remote server TCP is disconnected, the module will continuously receive +KTCP_DATA notifications.	Network
KAVALAN-843	FW update from R2BP3 to R3BP1 using AT port is failing	Firmware update to R3BP1 is failing on AT port from R2BP3.	System
KAVALAN-847	Secured MQTT connection fails to activate, returning "+CME ERROR: 907" when executing "AT+KMQTTCNX=1"	While doing a secured MQTT connection, the session is unable to start after doing AT+KMQTTCNX=1. +CME ERROR: 907 is returned.	System
KAVALAN-853	The TCP_DATA URC should return after executing AT+KTCPSEND=1,<data_size>, but it is returned after executing AT+CFUN=4 or AT+CFUN=1,1	URC is not being returned as expected. Instead, it is returned after executing AT+CFUN=4 or AT+CFUN=1,1, which disables or re-enables the radio functionality of the device.	System
KAVALAN-854	Module reboots after executing AT&F0 Restore Factory Settings	Module reboots when we execute at&f0.	System
KAVALAN-855	Module is getting rebooted continuously after reset when the DTLS client is configured with <restore_on_boot>=1	To test the feature of UDP secure client (DTLS) using AT+KUDPCFG with parameter <restore_on_boot>=1, session should be restored on boot. But after the reset, module is getting rebooted continuously.	System

Table 4-4: Software Changes - Release 3 Bug Fixes (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-860	URC dropped on incremental FW download	From KAVALAN-301, when URCs are dropped during the 1k XMODEM transfer, the host may get out of sync. Hence, customer requested for the URCs to be buffered during the XMODEM session. Customer prefer to use Data Mode rather than XMODEM to send the 1k fragment (KAVALAN-859). If Data Mode already buffers URCs, then that would also solve this issue.	System
KAVALAN-861	KCARRIERCFG command returns ERROR for valid input 0	Changing the use of network scan commands affects the +KCARRIERCFG configuration setting.	System
ALT1350-768	Setting +KSLEEP command will return ERROR	Entering the AT command: AT+KSLEEP=2 or AT+KSLEEP=1,2 returns ERROR.	System
KAVALAN-875	Module is rebooting or getting in hang state for few seconds, when the temperature reaches to -20, 55, and 85 degrees Celsius, even though KTEMPMON is not configured for automatic shutdown	When AT+KTEMPMON=1,85,1,2,10,7 is configured, which says URC enabled and sets GPIO7 as temperature warning indicator at 85 degrees Celsius, module still gets rebooted or hangs when temperature reaches -20, 55, and 85 degrees Celsius.	System
KAVALAN-878	Performing a reset on the AT port using "at+cfun=1,1" and pressing any key on the AT port during reset causes the CLI port to enter uboot mode	When AT+CFUN=1,1 is performed on an AT port and any key is hit on the AT port, the CLI port enters uboot mode.	System
KAVALAN-879	Extra space and CR LF to be removed in hex mode with +KUDP_DATA	There are two <CR><LF> between the comma and the hex data. It would be better if the <CR><LF> could be discarded to have the URC on one line and make parsing simpler.	System
KAVALAN-915	AT%SCANCFG command giving ERROR	Replace %SCANCFG with %SCANRTCFG.	System
KAVALAN-937	The complete message payload is not being published while using MQTTPUB	When using the AT+KMQTTPUB command to publish a message after configuring the MQTT session, the message payload is not being published completely. This is a Regression issue. This issue was not observed in R3BP1.	System
KAVALAN-901	AVready test: Failed to retrieve data for "Read Object Wireless Identifiers" and "Read Data – Object Extended Connectivity Statistics" on AVMS.	AVready test failed on AVMS with an Error "Resource does not exist"	AVMS

Table 4-4: Software Changes - Release 3 Bug Fixes (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-905	HL7900 AVready TC052 and TC053 fail to resume firmware download/installation after power cycle during FW download/Installed process	HL7900 AVready TC052 and TC053 failed to resume firmware download/installation after a power cycle during the process.	AVMS
ALT1350-887	FOTA package download failed	Supplier webbug server issue cause ise2 download first, which lead to DOTA package download failure.	FOTA
ALT1350-721	Delta FOTA failed due to incorrect FOTA version	There are two commands to read the FOA version: Command1: at%GETACFG="LWM2M2.Device.FirmwareVersion" Command2: at%lwm2mcmd2="GET_RESOURCE";3 The FOTA versions read by the HL7900.3.0.T1 firmware through these two commands are different, which causes Delta FOTA to fail.	FOTA
ALT1350-758	CMUX function cannot work	No response when entering AT commands via CMUX DLC port.	System
ALT1350-772	The module crashed after changing the network carrier	Changing the network carrier via AT command: AT%NWOPER="VZW" or AT+KCARRIERCFG=1 crashes the module.	System
ALT1350-899	Unexpected TEST command response of GMI, GMM, GMR	SSI bug of BF_PACK_02_02_00_00_51351	System
ALT1350-839	Setting the Level 2 password will cause the module to reboot	Setting level 2 password via AT command: at!setcnd causes the module to reset.	System
ALT1350-936	Crash on Executing CLI FTP Command	After version ALT1350_02_02_00_00_51351_MCU, SSI modified one of the assert statements. Our previous implementation now triggers this assert and should be updated to align with the modification.	System
ALT1350-1027	puk.sfp.bin in Semtech signed HL7900_IPUK_INT.exe is incorrect	puk.sfp.bin in Semtech signed HL7900_IPUK_INT.exe is incorrect.	AVMS

## 4.3 Security Corrections/Improvements

No changes made.

## 4.4 Known Issues

*Note: This section reflects known issues in Release 3*

**Table 4-5: Known Issues—Release 3**

ID	Title	Description	Impacted Domains
Core			
KAVALAN-284	Module is rebooting continuously when invalid inputs are given in AT%SETACFG	The alternate SSI command for AT+KSELACQ, i.e., AT%SETACFG=radom.config.auto_preference_mode,"CAT;NBIOT", is accepting invalid inputs, causing the module to reboot continuously. Attached are the logs captured over the weekend, which show that the module rebooted approximately every 3–4 minutes.	Syntax
KAVALAN-1043	Encountering an issue while attempting to download the CEP file using the AT%IGNSSCEP command	An error occurs when attempting to download the CEP file for AGNSS using the AT%IGNSSCEP command. The issue persists across multiple setups tested on both live and Amarisoft networks. However, the CEP file can be successfully downloaded on a laptop using the provided URL, username, and password.	iGNSS

Table 4-5: Known Issues—Release 3 (Continued)

ID	Title	Description	Impacted Domains
AT/QMI Commands			
KAVALAN-998	AT+CLAC command does not include many AT commands in its list	<p>Many AT commands are missing/removed from the list of AT+CLAC. The list includes:</p> <ul style="list-style-type: none"> <li>▪ AT&amp;K</li> <li>▪ AT%LWM2MCMD2</li> <li>▪ AT%LWM2MEV2</li> <li>▪ AT%LWM2MOPEV2</li> <li>▪ AT+IFC</li> <li>▪ AT+IPR</li> <li>▪ AT+ODIS</li> </ul>	AT
KAVALAN-1039	AVFOTA fails to progress when incorrect clock is corrected after initial failure	<p>When the device clock is set to an incorrect time and a FOTA operation is triggered, the update fails as expected and the state is reported as:</p> <pre>AT%LWM2MCMD2="GET_FOTA_STATE" %LWM2MCMD2: 5</pre> <p>However, after resetting the device clock to the correct time and retrying the FOTA process, the update does not resume or complete. The module remains stuck in the same state:</p> <pre>%LWM2MCMD2: 5.</pre>	FOTA

# 5: Firmware Release 2.1

Release 2.1 with Verizon approval completed.

## 5.1 Firmware Release Description

### 5.1.1 Firmware Release Identification

**Table 5-1: Firmware Release Identification—Release 2.1**

Component	Details
Firmware Version	SWI1350L.2.5.21244021.202411120303.01
Date of generation (UTC)	2024/11/12 03:03
IMEI SV	02
GSMA TS.25	14-Mar-2023
Chipset Vendor Stack Version	BF_CORE_02_01_01_02_44021
Supported HW	HL7900

### 5.1.2 Host Software Versions

The following tools were validated against this release.

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*Note: Semtech recommends upgrading to newer Host Software releases when available. Refer to applicable software release notes for any compatibility restrictions.*

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**Table 5-2: Validated Host Software Tools—Release 2.1**

SW Tools Name	Version
Image Burning Tool	2.0.24

## 5.2 Bug Fixes

Table 5-3: Software Changes—Release 2.1 Bug Fixes

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVALAN-354	Failed to connect to an AUX module via IPV6	Add IPv6 support in HL79xx platform.	IPV6
KAVALAN-629	[VzW] CATm1 TC 2.18 failed on LTE Originations by -4%	Fix protocol stack to meet Verizon DFIT TC 2.18 .	Core
KAVALAN-614	[VzW] CATM1 FIT TC5.3 failed on TAU reject after exiting PSM	Fix protocol stack to meet Verizon CATM1 FIT TC5.3.	Core
KAVALAN-597	[VzW] Test Case 5.6 failed to send TAU	Fix protocol stack to meet Verizon DR_IMLess TC5.6.	Core
KAVALAN-624	[VzW] TC6.7.x failed to send attach request	Fix protocol stack to meet Verizon DR_IMLess TC6.7.x.	Core
KAVALAN-707	[VzW] TC2.18 CATM1 LTE Originations fail in origination attempts	Fix protocol stack to meet Verizon TC2.18 CATM1 LTE Originations.	System
Core			
KAVALAN-332	Temperature Protection is not working	Module would not go into shutdown mode when temperature reaches the threshold.	Core
ALT1350-642	LWM2M Firmware version does not match in AVFOTA	Fix the version's format as it cannot be recognized by the AVMS server.	FOTA
KAVALAN-545	Suppress bootloader info on UART1 during power up	Remove bootloader output on UART1, which is for debugging purposes.	System
AT / QMI Commands			
KAVALAN-709	Configured GPIO does not work properly	Failed to setup GPIO input direction.	System

## 5.3 Security Corrections/Improvements

No changes made.

## 5.4 Known Issues

*Note: This section reflects known issues in Release 2.1*

**Table 5-4: Known Issues—Release 2.1**

ID	Title	Description	Impacted Domains
Protocol Certification			
ALT1350-637	Module crashes in poor network	The module crashes when downloading AV packages through FOTA while reconnecting via a poor network connection.	FOTA
ALT1350-429	In the host Linux interface, PPPD cannot dial successfully	There is a high probability that dialing will fail if PPDD is executed on Linux host.	System
Core			
KAVALAN-284	Module reboots continuously	Invalid inputs of AT%SETACFG cause module to reboot continuously.	Core

## 6: Firmware Release 2

Release 2 with updated GCF.

AVMS FOTA is not working on this version. Instead of this, FW upgrade over UART is needed on this release. The fix will be included in next release.

### 6.1 Firmware Release Description

#### 6.1.1 Firmware Release Identification

**Table 6-1: Firmware Release Identification—Release 2**

Component	Details
Firmware Version	SWI1350L.2.3.21244021.202410110425.01
Date of generation (UTC)	2024/10/11 04:25
IMEI SV	02
GSMA TS.25	14-Mar-2023
Chipset Vendor Stack Version	BF_CORE_02_01_00_02_44021
Supported HW	HL7900

#### 6.1.2 Host Software Versions

The following tools were validated against this release.

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*Note: Semtech recommends upgrading to newer Host Software releases when available. Refer to applicable software release notes for any compatibility restrictions.*

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**Table 6-2: Validated Host Software Tools—Release 2**

SW Tools Name	Version
Image Burning Tool	2.0.24

## 6.2 Software Changes

Table 6-3: Software Changes—Release 2 New Feature

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVALAN-569	Resolving RRC Mis-match (TS36.331)	Added capability to handle corner-case scenario where the RRC states get out of sync between network and module. See INACTTMR parameter of AT%LTECMD in the HL7900 AT Command Reference Guide for details.	3GPP
Core			
KAVALAN-175	Ping (ICMP)	Added support for a ping command via AT command. See AT%PINGCMD in the HL7900 AT Command Reference Guide for details.	Core
KAVALAN-27	PPP Interface	Added support for a PPP connection over the UART interface.	Core
KAVALAN-673	SRD Japan Regulatory	Complete Japan regulatory for the unlicensed Radio in sub-GHz bands: <ul style="list-style-type: none"> <li>▪ For n=1, 920.6 to 928.0MHz, BW 200KHz 38ch</li> <li>▪ For n=2, 920.7 to 927.9MHz BW 200KHz 37ch</li> <li>▪ For n+3, 920.8 to 927.8MHz BW 200KHz 36ch</li> </ul>	Core
KAVALAN-562	KRIC - LWM2M Enhancement	Enhancement of AT+KRIC, refer to the HL7900 AT Command Reference Guide for details.	LwM2M
KAVALAN-587	MNO Configuration Selection - Enhanced	Added capability to turn on automatic switching based on the SIM for MNO network.	Network
KAVALAN-17	CMUX	Added support virtual interfaces for AT commands, PPP data, and NMEA.	Core
KAVALAN-169	DNS Resolve command	Added +KDNSRSLV command, refer to the HL7900 AT Command Reference Guide for details.	Core
KAVALAN-28	Secure Boot	Support secure boot per Semtech standards and processes.	Core
AT / QMI Commands			
ALT1350-548	Implement +CCID	Added AT+CCID to display ICCID and EID information, refer to the HL7900 AT Command Reference Guide for details.	AT

**Table 6-3: Software Changes—Release 2 New Feature (Continued)**

ID	Title	Description	Impacted Domains
ALT1350-421	Optimized +KGPIO and +KRIC implementations	Convert +KGPIO, +KGPIOCFG and +KRIC as thin Semtech applications with less memory consumption.	AT
KAVALAN-390	Secondary UART host interface - Phase 2	Added support for PPP data on UART2 (SHUB\_UART).	UART
KAVALAN-561	AT command switch fixed/mobile mode	Added support for AT+KALTCFG, refer to the HL7900 AT Command Reference Guide for details.	AT
KAVALAN-565	Ability to configure Paging Time Windows	Added support for AT+KEDRXCFG, refer to the HL7900 AT Command Reference Guide for details.	AT
ALT1350-503	Add LWM2M events support in KRIC	Added support for AT+KRIC for LwM2M, refer to the HL7900 AT Command Reference Guide for details.	LwM2M

## 6.3 Bug Fixes

**Table 6-4: Software Changes—Release 2 Bug Fixes**

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVALAN-615	Incorrect response on at%ccid	Added AT+CCID with EID support to AT IFS, refer to the HL7900 AT Command Reference Guide for details.	Cert
KAVALAN-649	Missing G5 root cert	Added G5 root certificate file for VzW LwM2M.	LwM2M
Core			
KAVALAN-656	AT COM intermittently hangs or module reboots after AT+COPN command	Wrap a handler in the MCU to parse the PLMN table content and generate the +COPN response	Core
KAVALAN-382	ATO is failing to return NO CARRIER value and ATO=? is returning OK	Fixed response of ATO to meet 3GPP SPEC.	Core
KAVALAN-577	[MQTTS] Crash occurs when receiving a message from the server with secured connection	Resolved NULL semaphore issue when receiving a message from the server with secured connection.	Core
KAVALAN-650	[MQTTS] Unable to re-publish message to an existing topic with QoS=1	Resolved NULL semaphore issue when changing QoS to 1.	Core
KAVALAN-647	DLCs are not accessible, causing error "Level 2 halted"	Configured Max DLC to 2 from 4.	Core
KAVALAN-670	hexa 0x00 not handled as DATA with KUDP_DATA and +KUDPRCV	Improved +KUDP_DATA URC to output NULL character.	Core
KAVALAN-496	AT port sometimes hangs after subscribing a topic on secure MQTT broker	Resolved NULL semaphore issue when subscribing a topic via secure MQTT connection.	Core
KAVALAN-578	The module gets stuck during the transmitting of large data (30MB)	Added a timer to leave data mode when there is no read/write action.	Core
KAVALAN-521	Reboot when DTLS client configured for secure UDP connection	Resolved NULL semaphore issue by configuring UDP with secure client.	Core

Table 6-4: Software Changes—Release 2 Bug Fixes (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-609	Failure to receive HTTP disconnect indication, module reboot observed while creating HTTP session	Fixed memory leak that was leading to scenarios where HTTP disconnect indications were not sent by module and in some cases module rebooted while opening new sessions.	Network
KAVALAN-579	Module reboots while establishing PPP connection after network recovery	Fix modem assertion when disconnecting the first PPP connection and establishing the second.	Core
KAVALAN-525	[UDP]Module cannot receive 0 byte data	Assert check on 0 length data when receiving a 0 byte data message from the server.	Network
AT / QMI Commands			
KAVALAN-375	AT+IFC? values do not restore to defaults after reset.	AT+IFC? do not restore to defaults after module reset and persists with last values set.	Core
KAVALAN-513	Module reboots instead of returning ERROR, executing AT%H again after terminating call	Module reboots instead of returning ERROR. It executes AT%H again after terminating call.	Core
KAVALAN-340	Module reboots when executing AT+CNMI with invalid values for <ds> and <bfr>	Module is getting rebooted after executing AT+CNMI with incorrect parameters. This issue is making module inaccessible for ~10 to 12 sec as module gets rebooted.	
KAVALAN-206 KAVALAN-216	The +CGCMOD command does not work as expected in 3GPP Document	The +CGCMOD command does not work as expected in the 3GPP Document.	3GPP
KAVALAN-680	AT+CEREG persistence incorrect	During an HL7900 test, AT+CEREG unsolicited message is ALWAYS enabled after a reboot even after disabling the message.	Core
KAVALAN-195	The CLAC command does not work as expected in the 3GPP Document	The CLAC command does not work as expected in the 3GPP Document.	3GPP

## 6.4 Security Corrections/Improvements

No changes made.

## 6.5 Known Issues

Note: This section reflects known issues in Release 2.

Table 6-5: Known Issues—Release 2

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVLAN-354	[IPV6][UDP] Failed to connect to an AUX module via IPV6 under Amarisoft network	Set up HL78 as an aux module and then used DUT to connect to with UDP+IPV6 under Amari, but failed.	IPV6
Core			
KAVLAN-332	Module is not getting shut down when KTEMPMON configured in mode=1, URMode=1 and action 1	Module is configured with AT+KTEMPMON=1,30,1,1,10 (mode=1, URMode=1 and Action 1 i.e. automatic shutdown). Automatic shutdown does not occur even if temperature reaches past the configured value (30+).	Core
KAVLAN-657	Unable to download 30KB file through all 6 connections under NBloT	This issue does not happen on LTE-M.	Network
ALT1350-642	LWM2M Firmware version not match in AVFOTA	FW version format is incorrect, making AVFOTA unavailable.	FOTA
AT / QMI Commands			
KAVLAN-709	When GPIO is configured to input and pull up (AT+KGPIOCFG=1,1,1) LED should be ON for GPIO1, but the LED is OFF, which is not expected	When GPIO is configured to input and pull up (AT+KGPIOCFG=1,1,1) then LED should be ON for GPIO1, but instead the LED is OFF. Also AT+KGPIO=1,2 displays the output as +KGPIO: 1,0 which is incorrect. The displayed should be +KGPIO: 1,1.	System
KAVLAN-545	Need to suppress bootloader info on UART1 during power up	Boot loader output must be removed during power on.	System

# 7: Firmware Release 1

Release 1 with AT&T TA and updates Generic and PTCRB.

## 7.1 Firmware Release Description

### 7.1.1 Firmware Release Identification

**Table 7-1: Firmware Release Identification—Release 1**

Component	Details
Firmware Version	SWI1350L.1.8.21142521.202407090612.01
Date of generation (UTC)	2024/07/09 06:12
IMEI SV	01
GSMA TS.25	14-Mar-2023
Chipset Vendor Stack Version	BF_PACK_02_01_00_01_42521
Supported HW	HL7900

### 7.1.2 Host Software Versions

The following tools were validated against this release.

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*Note: Semtech recommends upgrading to newer Host Software releases when available. Refer to applicable software release notes for any compatibility restrictions.*

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**Table 7-2: Validated Host Software Tools—Release 2**

SW Tools Name	Version
Image Burning Tool	510.11.3

## 7.2 Software Changes

Table 7-3: Software Changes—Release 2 New Feature

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVALAN-51	Cat-M1 Release 14 Data rates	Support data rates of (590/1100 kbps) DL/UL. The following features should be supported to achieve this.	3GPP
KAVALAN-160	3GPP AT Command	Must support standard 3GPP Commands	3GPP
KAVALAN-97	LWM2M Client	OEM customers need the ability to configure a LWM2M connection from the module to their backend systems. Customers use a variety of LWM2M servers so the client needs to be generic and configurable.	LwM2M
KAVALAN-116	TCP Client	TCP Client using internal IP stack for customer use through AT commands and data mode.	Network
KAVALAN-117	UDP Client	UDP Client using internal IP stack for customer use through AT commands and data mode.	Network
KAVALAN-118	HTTP	HTTP (non secure) AT Commands for customer use with the internal IP stack. Similar functions to HL7800.	Network
KAVALAN-18	MQTT	As an embedded developer my end application needs to communicate with a MQTT broker in the cloud using the MQTT protocol.	Network
KAVALAN-162	Cypher suites	The embedded security stack must support customer runtime selection of multiple cipher suites supported for D/TLS client session.	Core
Core			
KAVALAN-72	LTE bands	LTE-M: 1, 2, 3, 4, 5, 8,12,13,18, 19, 20, 25, 26, 28, 66, NB-IOT: 1, 2, 3, 4, 5, 8,12,13,18, 19, 20, 25, 26, 28, 65, 66, 70, 85	Network

Table 7-3: Software Changes—Release 2 New Feature (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-39	NAD	Some customers want to offer a private LTE solution for their customers. One example is using 900 MHz licensed spectrum currently owned by the company Anterix. The Anterix Spectrum is a 3x3 which falls into 3GPP Band 8, but rather than using the 3GPP standard 45 MHz duplexing scheme for Band 8, these networks will need to use a 39 MHz duplexing scheme. NAD relies on the network sends UL channel frequency to the UE in SIB2, to indicate the duplex spacing.	Network
KAVALAN-49	NIDD	As an OEM integrator I want to use NIDD to send data over a MNO network using NB-IoT. I need AT commands to setup the connection, send data, and notifications for received data.	Network
KAVALAN-54	RAI	As an OEM developer of a product that is very power conscious I want to minimize the time my device is active on the network and get to a hibernate state faster. I need an AT command to activate the 3GPP RAI feature from my host MCU when it determines that the data session is complete.	Network
KAVALAN-60	Unsolicited notification of RAT scan finish	When using the HL79 module customer need to be able to understand when it has started/stopped performing a scan of a given technology for the selected band mask as they may well not be able to keep the unit on indefinitely due to a restricted power supply i.e. a battery.	Network
KAVALAN-21	MNO Configuration Selection	As an OEM integrator my product may be used on multiple MNO networks. I need to have an AT command to set the active MNO and have the required configuration settings applied. The FW version is not expected to change. I also want the ability to turn on automatic switching based on the SIM in use.	Network
KAVALAN-27	PPP Interface	As an OEM integrator I have an MCU running my application connected to the HL7900 module. My MCU runs an IP stack and data will be sent to the module using a PPP connection. The PPP connection should be available on the primary UART using CMUX, or dedicated on the secondary UART.	Network

Table 7-3: Software Changes—Release 2 New Feature (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-35	Host wake/Ring indicator	As an OEM integrator I want to put my host MCU and the HL7900 module to sleep when not in use. I need a HW signal (RI) to assert when there is an incoming event such as SMS, network state change, TCP connection request, TCP data reception, UDP DATA reception or PPP data. There should be AT commands to configure this and set the HW pin to the primary UART RI or alternate GPIO.	Network
KAVALAN-10	Primary Host UART interface	As an OEM integrator I need to connect the HL7900 to my host MCU that runs my application. I want to use a 8-wire UART as the primary communications interface. There must be AT commands available to set/change the baud rate. The UART must be able to support AT commands, PPP data and NMEA output. I must also be able to perform a FW update (Both Full image and Delta) locally using the UART.	Core
KAVALAN-64	Secondary Host UART interface	Module must provide a secondary 4-wire UART interface. This interface should be capable of supporting AT commands, PPP data, NEMA, or routed to the internal MCU for customer use.	Core
KAVALAN-62	SWD Customer Debug Interface	SWD interface for internal development but also customers who develop on the MCU. There must be a way for customers to disable SWD in production to secure the modem.	Core
KAVALAN-90	Debug UART	3rd UART interface used primarily to get debug logs and/or access CLI. May be a 4-wire UART only.	Core
KAVALAN-17	CMUX	As an OEM developer I only have 1 UART interface available to my host MCU. I want to use CMUX to have separate virtual interfaces for AT commands, PPP data, NMEA and debug. I need sample code to implement this on my host MCU running an RTOS.	Core
KAVALAN-30	Temperature Protection	The module should automatically shutdown if it detects the temperature outside of acceptable limits.	Core
KAVALAN-105	GPIOs	Include 11 GPIOs for use by AT commands or customer MCU/Sensor Hub application	Core
KAVALAN-93	Power Modes	The module should support user configurable power modes. These should map closely to what is available from the chipset. This should be an area to review what was done on HL78 and make improvements.	Core

Table 7-3: Software Changes—Release 2 New Feature (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-104	ADCs	Minimum of 2 ADC input pins for customer to use through AT commands or MCU hosted application, or with Sensor hub	Power
KAVALAN-33	Wake PIN	As an OEM integrator my MCU needs the ability to wake the module from a deep sleep state via a GPIO.	Power
KAVALAN-20	Wake up time	Fast boot time from PSM or eDRX sleep modes. Must be 10 ms or less from WAKE pin assert to AT Ready	eDRX
KAVALAN-46	Concurrent PSM and eDRX	The ability to use eDRX during the active window of the PSM.	eDRX
KAVALAN-53	NV Backup and Restore	AT commands to backup the NV application settings and restore from the backup.	Core
KAVALAN-165	Enable/Disable HW IO Feature	As an OEM integrator I need the ability the enable/disable the various HW features of the module. See AT+KHWIOCFG	Core
AT / QMI Commands			
KAVALAN-161	Network Status Command	Add AT commands +CREG, +CEREG, +CEINFO. Add AT commands %SCANCMD, %MEAS, %MEASCMD.	AT
KAVALAN-26	Key storage and management for secure connections'	Manage certificates and PSK to support DTLS, TLS with cipher suites (auth and MAC algorithms) (e.g. SHAW, AES, CCM, RSA)	Core
KAVALAN-100	RTC accuracy	Get accurate RTC time from the module to sync their system. Customers require less than 2min/month drift, ideally less than 30s/month.	Core
KAVALAN-15	Delta Image local FW download	Update the FW image of the module using a DELTA image locally through the UART interface.	Core
KAVALAN-8	AVFOTA	Using the Air Vantage platform to perform and manage these updates	FOTA
KAVALAN-61	AT Command to indicate if C-DRX is supported on the current connection	Knowing if a current connection support CDRX or not will allow the customer to change their connection profile and save more battery.	Power
KAVALAN-166	RF Test Commands	Test the RF performance either for evaluation purposes, or for manufacturing at factory.	RF

## 7.3 Security Corrections/Improvements

No changes made.

## 7.4 Known Issues

Note: This section reflects known issues in Release 1.

Table 7-4: Known Issues—Release 1

ID	Title	Description	Impacted Domains
Protocol Certification			
KAVALAN-195	The CLAC command does not work as expected in 3GPP Document	The CLAC command does not work as expected in 3GPP Document.	3GPP
KAVALAN-216	The CGDSCONT command does not work as expected in 3GPP Document	The CGDSCONT command does not work as expected in 3GPP Document.	3GPP
KAVALAN-206	The +CGCMOD command does not work as expected in 3GPP Document	The +CGCMOD command does not work as expected in 3GPP Document.	3GPP
KAVALAN-525	[UDP]Module can not receive 0 byte data	Sending 0 byte data from server to module, KUDP_DATA is not returned.	UDP
KAVALAN-578	[HTTP] The module gets stuck during the transmitting of large data (30MB)	DUT gets stuck while downloading large data (30MB).	HTTP
KAVLAN-354	[IPV6][UDP] Failed to connect to an AUX module via IPV6 under Amarisoft network	Set up a HL78 as an aux module and then use DUT to connect to it with UDP+IPV6 under Amari, but failed.	IPV6
KAVLAN-496	[MQTT] AT port sometimes hangs after subscribing a topic on secure MQTT broker	After subscribing a topic via secure MQTT connection, the AT port of HL79 MQTT client sometimes will hang for around 3 minutes.	TLS
KAVLAN-577	[MQTTS] The module is crashed when receiving a message from the server with secured connection	The module crashes when receiving a message from the server with secured connection.	TLS
KAVLAN-609	[HTTPS] HTTPS session timeout URC +KHTTP_IND: 1,0, is not getting observed and module reboot is happening when trying to open session	When 2 HTTPS sessions were created and after completing KHTTPGET on both, KHTTP_IND: 1,0 or KHTTP_IND: 2,0, are not getting observed even after waiting for more than 5 minutes. So after closing both sessions manually, while trying to start session 3 or 4, module reboot happens instead of session start. This only happens with AmariSoft, not with a live network.	TLS

Table 7-4: Known Issues—Release 1 (Continued)

ID	Title	Description	Impacted Domains
KAVALAN-521	Module gets rebooted when DTLS client configured for secure UDP connection	At the time of configuration of UDP for secure client (DTLS) using AT+KUDPCFG, it first gives an OK and connected notification but then module gets rebooted. <ul style="list-style-type: none"> <li>Case #1: when &lt;restore_on_boot&gt;=0, module gets rebooted once and there is no UDP configuration under AT+KUDPCFG?</li> <li>Case #2: when &lt;restore_on_boot&gt;=1, module reboots continuously</li> </ul>	DTLS
KAVALAN-579	[HL79][PPP-ATD]Module reboots while establishing PPP connection after network recovery	First create a PPP connection, wait for 10 sec enter in command mode using +++. Disconnect the module from the network and reconnect to the network. Again try to establish PPP connection, then the module reboots.	PPP
Core			
KAVALAN-332	Module is not getting shutdown when KTEMPMON configured in mode=1, URMode=1 and action 1	Module is configured with AT+KTEMPMON=1,30,1,1,10 (mode=1, URMode=1 and Action 1 i.e. automatic shutdown). Even after temperature reaches the configured value 30+, automatic shutdown still does not happen.	Core
KAVALAN-284	Module is rebooting continuously when Invalid inputs are given in AT%SETACFG	Alternate SSI command for AT+KSELACQ i.e. AT%SETACFG=radom.config.auto_preference_mode,"CAT;NBIOT" is accepting invalid inputs due to which the module is rebooting continuously. Based from the logs captured, it was observed that the module rebooted almost every 3-4 minutes.	Core
KAVALAN-340	Module reboots when we execute AT+CNMI with invalid values for <ds> and <bfr>	Module is getting rebooted after executing AT+CNMI with incorrect parameters. This issue makes module inaccessible for 10 to 12 seconds as module gets rebooted.	Core

Table 7-4: Known Issues—Release 1 (Continued)

ID	Title	Description	Impacted Domains
AT / QMI Commands			
KAVALAN-375	[V25TER] AT+IFC? values do not restore to defaults after reset.	AT+IFC? do not restore to defaults after module reset and persist with last values set.	AT
KAVALAN-382	[V25TER] ATO is failing to return NO CARRIER value and ATO=? is returning OK	ATO is failing to return NO CARRIER value, ATO=? should return ERROR but returning OK.	AT
KAVLAN-513	[V25TER] Module getting rebooted instead of returning ERROR when we execute AT%H again after terminating call	Module getting rebooted instead of returning ERROR when AT%H is executed again after terminating the call.	System

# 8: Firmware Package Download Process

## 8.1 Windows Host via USB/UART

To download a new firmware package on a Windows host:

1. Power on the HL7900 module.
2. Make sure the latest driver is installed, and AT / COM ports over USB / UART are working from the host side.
3. Enter the following command to make sure active\_uart=1  
AT+KBOOTCFG?  
If active\_uart=0, set it to active\_uart=1 via AT+KBOOTCFG=0,1,1 and reboot to take effect.
4. Executing the EXE file to start FW download.

# A: Appendix

Module resources, including product documentation, firmware packages and tools are published on the [Source](#).

## A.1 Reference Documents

- HL7900 Migration Guide  
Reference: 41114810
- HL7900 Product Technical Specification  
Reference: 41114801