

GainSpan Corporation - Confidential

Title: Release Notes
Product: GS2011M/GS2100M Firmware
Version: 5.1.5 GA Release
Date: 2015 Apr 17

RELEASE NOTE HISTORY

These notes cover the changes since 5.1.4 GA. Changes since 5.1.5 Beta are updated as "(Since 5.1.5 Beta)".

The GS2011M/GS2100M Firmware includes the following versions of GainSpan Software products

Code	Version #	Product Description
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WFW	5.1.5.15	802.11 MAC/PHY (WLAN) Firmware
GEPS	5.1.5.10	GainSpan Embedded Platform software
S2W	5.1.5.10	Serial to Wi-Fi

Note:

1. GS flash programming tool and Super Block that comes with the package from SDK builder must be used to program the modules.

Supported features

Network Interfaces

* WiFi Station

- 802.11b/g/n with 802.11n 1x1 HT20 in 2.4GHz
- WEP-64 Open/Shared, WPA(TKIP), WPA2(AES), WPA2(AES+TKIP) personal security, WPA-Enterprise, WPA2-Enterprise.
- EAP Type(s)
 - * EAP-TLS
 - * EAP-TTLS/MSCHAPv2
 - * PEAPv0/EAP-MSCHAPv2
 - * PEAPv1/EAP-GTC
 - * EAP-FAST
 - * EAP-TTLS/PAP (Beta) (Since 5.1.2 Beta)
- Standard Legacy and WMM Power save protocols
- Advanced Switch-To-Active Power Save protocol
- DTIM and Custom wakeup Intervals for Power Save protocol
- AMPDU/AMSDU Rx
- WMM based QoS
- Association Keepalive with keepalive period configuration
- Beacon Miss detection with configurable duration
- Transmit failure indication with configurable fail count
- Rate Adaptation
- Tx/Rx Statistics

* WiFi Limited AP

- 802.11b/g/n with 802.11n 1x1 HT20 in 2.4GHz
- Supports WEP-64 Open, WPA-Personal(TKIP), WPA2-Personal(AES)
- Support for 64 STAs in Open security and 16 STAs in WPA2-Personal security.
- AMPDU Rx for multiple STAs (up to 16 simultaneous sessions)
- AMSDU Rx
- Legacy and WMM Power save protocols with power save buffering for up to 64 STAs
- AP mode power save (sleep between beacons)
- WMM based QoS
- L2 forwarding between STAs
- STA inactivity tracking and disassociation
- Rate Adaptation
- Vendor Specific IE support for management frames
- Tx/Rx Statistics

* Supports following protocols

- IPv4
- ARP
- ICMP
- UDP
- TCP
- DHCP Client
- DNS Client
- DHCP Server
- DNS Server
- HTTP(S) Client
- HTTP(S) Server
- TLS 1.0/1.2 client
- TLS 1.0 Server
- mDNS/DNS-SD
- SNMP Client
- CoAP Client
- IGMP (Multicast)

* Supports SSL APIs (TLS v1.0/1.2). The following cipher supported

- TLS_RSA_WITH_AES_128_CBC_SHA
- TLS_RSA_WITH_3DES_EDE_CBC_SHA
- TLS_RSA_WITH_RC4_128_SHA
- TLS_RSA_WITH_RC4_128_MD5

* Support for Certificate Signed using SHA256 with AES Encryption.

I/O Drivers

* Supports the drivers for the following I/Os

- SPI
 - + Slave (Max clock speed supported 10Mhz)
 - + Master (Max clock speed supported 30Mhz)
- UART (Max baud rate supported 921.6K)
- SDIO (Max clock rate 33Mhz)

- PWM
- ADC (Sigma delta and SAR)
- I2C

Power Management

- * Supports Standby in Station Mode
- * Supports DeepSleep in Station Mode
- * Supports DeepSleep in AP Mode

Device Management

- * Over the Air FW Update with Digital Signature Verification
- * Provisioning
 - Web based Provisioning
 - WPS 2.0
 - Group provisioning (For Android Devices)

Unassociated Mode (Beacon Mode)

- * Transmit frames without association
 - Transmit Data, Management and RTS/CTS control frames
 - Transmit timestamp based on 40MHz clock
 - CCA enable/disable, rate, power, channel, etc
- * Receive frames without association
 - Receive Frame filter
 - IE based filter for beacon, probe request and response frames

WLAN RF Tests

- * Transmit
 - Frame transmit with various controls like power, rate, etc
 - TX99, TX100 transmissions
- * Receive
 - Frame receive with channel and MAC address controls
 - Statistics display after receive complete/stop

Misc

- * Energy Measurement Unit
- * ISO TX Support

Reference Applications

- * Serial to WiFi
- * TLS - Always on sensor application
- * TLS Low Power - Low power sensor application

Dependency table

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- a. SoC: GS2000 D1
 - b. Modules: GS2011MxxRev 3.3 or later, GS2100MxxRev 3.2 or later, GS2011MxxS 4.1 or later
 - c. GS2K_Flashprogram_Plusversion 1.2 or later
 - d. SDK IDE - IAR version 6.5.50
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RELEASE NOTES

Release Notes for each product include sections for version, enhancements, modifications and bug fixes:

+-----+
+ WFW +
+-----+

Release

5.1.5.15 - 15 Apr 2015

New Features (Since 5.1.4 GA)

* None

Modifications (Since 5.1.4 GA)

- * CTS-to-self used for ERP protection instead of RTS/CTS (Since 5.1.5 Beta)
* TransmitGain improvement for 11b and 11gn

Limitations

- * In Station Mode/Limited AP, WEP 128 Open/Shared does not work
* AMPDU Tx(optional in Wi-Fi Alliance Certification) Not supported
* Receive sensitivity is not fully optimized; Further optimization planned in next release.

Known Issues

- * 5130: During large HTTP data transfer after standby, sometimes WLAN reset is seen.
* 4884: WPS2.0 association is failing with Linksys AP's
* 5568: Sometimes DUT sends the trigger frame after about 10 seconds once the TIM bit is set by the AP
* 5753: DHCP Process takes 2 to 10 seconds to complete with Ciscot600
* 5152: Client compatibility: L3 connection is not happening with SAMSUNG GALAXY TAB GT-P1010 in channel 14
* 5683: Streaming TCP data(music file)stops since ipod's TCP window in custom application is getting full stopping the data streaming
* 5570: Device sometimes does not associate with Netgear AP
WGR614 v7

Bug Fixes

- * 5678: Unsolicited Tx power doesn't vary when we change the parameter
- * 5855: Switch to Active PS:DUT is not switching its radio state when scan and data transfer is done simultaneously with iOS hotspot
- * 5562: Sometimes beacons are missed as observed on some EVBs.
- * 5404: HTTP GET fails through provisioning while scanning in switch-to-Active PS method with iOS hotspot
- * 5670: Re enable Rx MCS7 which was disabled in 5.1.4 release
- * 5717: The power out reduces by 2 dBm over a period of time
- * 5846: AT+WRXPS=1 will not take immediate effect when applied with at+wiieeeppoll
- * 5538: Limited AP is not removing the client from its table when only disassociation packet is sent
- * 4821: WPS2.0 association is failing at 'N' rates with some APs
- * 5663: WLAN Exception when associating with DLINK 601 after a reset
- * 5594: AT+WRATE=? always output 221 irrespective of auto rate or fixed rate
- * 5578: Gaps where radio does not ACK or transmits
- * 5211: Limited AP sends data packets to client even though client goes to power save (Since 5.1.5 Beta)
- * 5148: During TCP data transmission DUT sends ACK packets with Zero MAC Address resulting in dissociation only with Cisco Aironet 1600 AP. (Since 5.1.5 Beta)
- * 5596: Device sometimes sends zero-addressed ACK frames. (Since 5.1.5 Beta)

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+-----+
+  GEPS                               +
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Release

5.1.5.10 - 31 Mar 15

New Features (Since 5.1.4 GA)

- * Domain Name Verification for SSL including HTTPS
- * Ability to configure the Retry Interval for DHCP Client
- * Ability to configure the Lease Time Requested by DHCP Client
- * Ability to configure erase time and verify erase for External Flash FWUP.
- * Socket Option to set Max TCP TX Queue depth
- * Socket Option to set the TCP Retry Period to less than 1s.

Modifications (Since 5.1.4 GA)

- * Improved EMU power factor accuracy
- * Improved SNTP accuracy by considering the round trip delay
- * Optimization on the SSL Open (Removing the 1s delay)
- * DNS Retry period is now linear

Limitations

- * None

Known Issues

- * ID 5041: Sometimes L3 fails with Trendnet TEW-652BRP AP
- * ID 5069: Group key renewal is not happening with limited AP.
- * ID 4984: Limited AP doesn't give IP address to clients when client count exceeds 50. This issue is seen in a test setup which has a complex mix of client devices being connected (iPads, iPods, smartphones, laptops, GS1011/2011 clients). The issue is not seen when using only GS1011/2011 clients.
- * ID 5081: In Long Run, OTA-FWU Push Method Upgrade Procedure is not successful some times. The system continues to work properly after failure of the procedure.
- * ID 5089: DHCP Decline is not sent when Duplicate IP address detected

Bug Fixes: (Since 5.1.4 GA)

- * ID 5806: ThreadX Message Queue size need to 2^N Words. The API that returns the Queue Size in Words based on the message size in bytes corrected.

- * Fixed the issue of Random Number Generator across standby when the oscillator to the TRNG block was turned off.
- * ID 5601: SDIO medium busy with High throughput data transfer
- * ID 5482: In HTTPD if the socket send failed then the error code is not set properly in certain cases leading to Application Reset.
- * ID 5858: In the Network Interface Open after standby, if the lease time has expired then the interface open returns failure.
- * ID 5163: Malformed SSL Close Alert Packet.
- * ID 5465: Incorrect Check in the XML String Encoder incase of failure causing application reset.
- * ID 5464: DNS Lookup returns ERROR when DNS RESPONSE includes TTL=0
- * ID 5605: DNS lookup with exception in DNS responses (corrupted response) results in System Reset
- * ID 5764: If remaining window size is less than the Packet Size to be sent, TCP is unable to recover
- * ID 5817: Spurious DHCP packets on the DHCP Client Socket not freed
- * ID 5505: Switching between AP mode and Client Mode does not cleanly close the supplicant interface causing system reset
- * ID 5666: When WPS registrar offers more than one credentials, the WPS Enrollee code fails to pick the right one.
- * ID 5743: Sometimes NCM STOP command does not cleanly stops the NCM.
- * ID 5602: Application Reset occurs in SSL server when it receives the data(1kb) from SSL client in a long run
- * ID 5549: TCP Echo failure when GSNode is acting as a TCP client and sending 1280 bytes (Since 5.1.5 Beta)

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+-----+
+ Serial to Wi-Fi Application +
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Release

5.1.5.10 - 31 Mar 15

New Features (Since 5.1.4 GA)

- * Domain Name Verification for SSL.
This is enabled using the command AT+SSLCONF=<Domain name check>,<Buffer size>. For Details refer to Section 3.13.13 S2W Adapter Guide.

- * Ability to configure the Retry Interval for DHCP Client. In manual mode, use the command AT+NDHCP=n[,<hostname>,<radio mode>,<lease period>,<retryinterval>]. For details refer to section 3.12.1 S2W Adapter Guide. In NCM auto mode, use AT+NCMAUTOCONF=<Conf Id>,<Value> command with Conf ID 27. Refer to Section 3.22.2 in the S2W Adapter Guide.

- * Ability to configure the Lease Time Requested by DHCP Client. In manual mode, use the command AT+NDHCP=n[,<hostname>,<radio mode>,<lease

period>,<retryinterval>]. For details refer to section 3.12.1 S2W Adapter Guide. In NCM auto mode, use AT+NCMAUTOCONF=<Conf Id>,<Value> command with Conf ID 26. Refer to Section 3.22.2 in the S2W Adapter Guide.

- * Updated the AT+WEBPROV command with an optional parameter for the format of the output. If this is set to 1, additional information about the WEP Auth Type is also passed to the host.

- * Support for initiating OTAFU using Domain Name

- * Support for Domain Name Checking in Incoming Certificate. Mismatch reported to the host when the loglvl set to 1 in case of SSL/HTTPS Open on command prompt. Mismatch based action (action specified in the enhanced at command) is taken in case of OTA-FU using HTTPS.

- * New command AT+GRATARP to send the grat ARP.

Modifications (Since 5.1.4 GA)

- * Increase the Timeout of the SysQual for Network Task from 30s to 180s

- * Default TCP Retry Period changed to 1s (earlier 2s) and number of retries changed to 75 (earlier 12).

- * TimeSync first invocation is when the command is issued and then periodically after the time period configured. Earlier, the first invocation was after the first time period expiry.

Limitation

- * Loading of Provisioning and OTAFU Web Pages with HTTPS multiple times is not consistent on Chrome, Firefox.

- * Number of TCP server sockets to be created is limited to 10.

- * ID 5382: SPI byte-stuffing is not supported in current release.

- * ID 5492: OTAFU with SSL enabled need sufficient memory to work.

Known Issues

- * ID 5086: Unable to Configure Static ARP entry when DUT is not in associated state

- * ID 5097/5142: Sending more than 1KB data using SSL over TCP may stop sending data after several iterations, only headers would be received. Workaround is to send 1KB or less than 1kb chunks of data.

- * ID 5165: With 16 clients connected to Limited AP in WPA-PSK security, during data transfer, observed ARP resolution stops in between data transfer on certain clients even though Limited AP forwards the ARP request packet to the client.

Bug Fixes (Since 5.1.4 GA)

- * ID 5496: With SPI DMA host interface, issue with GPIO37 not being pulled low during Write Operation when the ping interrupt is missed.
- * ID 5540: Loss of data on the UART interface when using HW Flow Control
- * ID 5601: SDIO lines get busy during high throughput data transfer.
- * ID 5233: The Host is not informed about the WEP Auth Mode (Open/Shared) as part of the provisioning information sent to the Host.
- * ID 5396: ATB command behavior is not compatible with GS1011/GS1500 behavior
- * ID 5507: Removed spurious send failed message
- * ID 5819: RTC TIme not retained in GS2011 across Reset
- * ID 5812: Data not forwarded to Host when TCP FIN comes in the last data packet
- * ID 5574: I2C commands are not working
- * ID 5676: LimitedAP is offering Default gateway even when it is configured to different gateway with NCM
- * ID 5511: Enhanced Auto connection: L4 timeout gives ERROR message to the Host. Now auto connection L4 retry count is set to infinite
- * ID 5823: Setting Keep Alive Value as 0 does not stop the Keep Alive
- * ID 4988: STA MAC address doesn't get reverted after issuing 'at+f' (only AP MAC address properly) gets updated
- * ID 5489: Command response of OTAFU not backwards compatible with GS1XXX
- * ID 5537: Data sent to Host even after nclose is given
- * ID 5544: Subtype field doesn't have proper format length.
- * ID 5623: After WR_REQ, GPIO37 goes high due to network data
- * ID 5479: Data transmission from DUT to network machine is stopped when we get DISCONNECT message from another client on DUT
- * ID 5590: In LongRun, Unable to send responses after few iterations from GSLinkserver(with SSL enabled) to the client.
- * ID 5471: PMK cache not retained in the association after DUT comes out of standby
- * ID 5134: WPS Credentials are sent to the host if the connection fails even before the EAP Message exchange
- * ID 5484: CONNECT message is observed twice when IP config NEW IP async message occurs with NCM enabled
- * ID 5851: When issuing commands with ECHO enabled, S2W processes the command even if HOST doesn't issue
- * ID 5573: The SPI response is coming in two chunks if data is received using TCP server. (Since 5.1.5 Beta)
- * ID 5884: CID's above '9' is printed as decimal in the at+cid command (Since 5.1.5 Beta)
- * ID 5508: The AT command responses are coming in chunked. (Since 5.1.5 Beta)
- * ID 5600: NCM Auto Conf ID 26 does not work (Since 5.1.5 Beta)
- * ID 5917: GS2000 hangs when it is configured as slave using at+i2ccnf=1,0 (Since 5.1.5 Beta)
- * ID 5919: The length of the asyncmsg for DISCONNECT does not include \r\n (Since 5.1.5 Beta)
- * ID 5924: DNS Verification for OTAFU with IP Address is not working (Since 5.1.5 Beta)
- * ID 5925: The max timeout for auto connection is limited to 2.5s. (Since 5.1.5 Beta)

* ID 5926: The External Reset Boot does not clear the RTC SRAM area
(Since 5.1.5 Beta)

* ID 5951: APP SW Reset is seen when at cmds are issued after the
DUT comes out of deep sleep. (Since 5.1.5 Beta)

* ID 5990: DUT hangs for at+wa command after OTAFU PULL(HTTP/HTTPS)
upgrade is done with code restore from 5.1.4 to 5.1.5. (Since 5.1.5
Beta)

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