DIGI INTERNATIONAL
9350 Excelsior Blvd, Suite 700
Hopkins, MN 55343, USA
+1 (952) 912-3444 | +1 (877) 912-3444
www.digi.com

Digi XBee Cellular LTE Cat 1 Verizon Release Notes

Digi XBee Cellular LTE Cat 1 Verizon

Version 101A (September, 2022)

INTRODUCTION

These are the release notes for Digi XBee Cellular LTE Cat 1 Verizon.

SUPPORTED PRODUCTS

- Digi XBee Cellular LTE Cat 1 Verizon

KNOWN ISSUES

1. By-pass mode is now deprecated and is not recommended for new designs. XBee3 Cellular products support direct USB. Direct access to the cellular module is not recommended or supported on the XBee Cellular Cat 1 Verizon.
2. CRITICAL!!: If you are upgrading to 100A or later an update is required to the underlying cellular module. The latest version (6.3.11 or later) of XCTU will detect and update the module. Do not unplug or otherwise interrupt the update once it has begun or the cellular module may become permanently unrecoverable and corrupted. The same applies for downgrading.
3. Module with SPI mode enabled and pending Status frames to send to the SPI Master will not go to sleep.
4. 3732 Closing a TLS session and then immediately opening a new one may result in failure. To workaround, insert a small delay (~5s)
5. 3100 Intermittent failure to go to sleep or wake up when using pin sleep with the SPI_nSSEL line while in SPI mode.
6. If upgrading to version 1010 or later from a firmware prior to the 1010 release, you will need to reformat the file system using the ‘ATFS FORMAT CONFIRM’ command or by calling ‘os.format()’ from the MicroPython REPL.
7. It may not be possible to interrupt MicroPython autostart if the application performs a soft reset very quickly. Workaround: delay the soft reset by a second using time.sleep(1). [XBPY-796]
8. For UDP sockets, it is required to either connect or bind the socket before being able to use send or sendto.

UPDATE CONSIDERATIONS

The 1012 release requires an update to the underlying cellular module. The latest version of XCTU will detect and update the module.

UPDATE BEST PRACTICES

Digi recommends the following best practices:

1. Test the new release in a controlled environment with your application before you update production devices.
2. Unless otherwise noted, apply updates in the following order:
    1. Device firmware
    2. Modem/Module firmware
    3. Configuration
    4. Application

Digi recommends Digi Remote Manager for automated device updates. For more information, go to https://www.digi.com/products/iot-platform/digi-remote-manager.

If you prefer manually updating one device at a time, follow these steps: 1. Update to latest firmware from XCTU

TECHNICAL SUPPORT

Get the help you need via our Technical Support team and online resources. Digi offers multiple support levels and professional services to meet your needs. All Digi customers have access to product documentation, firmware, drivers, knowledge base and peer-to-peer support forums.

Visit us at https://www.digi.com/support to find out more.

CHANGE LOG

101A (September, 2022)

This is a recommended release.

NEW FEATURES

1. ATRJ added to report the network reject code if supplied.
2. The **ATFC** command has been added to read the EARFCN of the current cellular connection.
3. **D0** can now be set to 6, which enables mirroring of the cellular component power status. When **D0** is 6, DIO0 will read high (3.3V) when the cellular component is powered and active, and will read low (0V) when the cellular component is inactive. See the documentation for additional details.
4. When entering command mode from the MicroPython REPL (ATAP=4), MicroPython will hold output until leaving command mode.
5. A new Remote Manager data services device request with the target of 'format' has been added. Upon receipt of this request the XBee will format its filesystem. [XBCELL-6141]
6. The built-in function `enumerate` is now available in MicroPython. [XBPY-77]
7. **ATOT** command has been added to read the active technology for the current network connection.
8. Added support for reporting more detailed socket close reasons.
9. For performance reasons, filesystem writes are no longer synced to the device on each write operation. To avoid data loss when writing files, be sure to close the file before shutting down or resetting the XBee. If writing to a file using MicroPython, you may also call the `flush()` method of the file object, or use `os.sync()`, without closing the file. This change does not impact applications which

are not writing data to the XBee's filesystem.
10. The Digi Remote Manager default keepalive intervals have been increased to reduce data usage and align with network provider guidance.
11. Added support for Active Scan in MicroPython. [XBCELL-6307]
12. Added support for reporting Timezone when using ATDT1. [XBCELL-7785]
13. Updated MicroPython to version 1.18.
14. The AI value 0x30 (update in progress) is now applied for the XBee firmware as well. [XBCELL-5629]
15. Added support for reporting Timezone offset using time.tz_offset() as seconds west from UTC. [XBCELL-7784]
16. Added AT command for performing a MicroPython Soft Reset: ATPYR [XBPY-431]
17. Added support for MicroPython boot.py, for consistency with other MicroPython platforms. [XBPY-167]
18. Added support for sending Python control commands through Remote Manager. [XBCELL-6885]
19. Additional fields added to ATAS cell scan results. Exact fields vary based on variant and cell technology but include ARFCN, PCID, RSRQ, and Timing Advance.
20. Added option for reporting serving cell info to Digi Remote Manager as a health metric. [XBCELL-8977]

BUG FIXES

1. DNS results are now cached for up to 24 hours, and cached results are now retained when the XBee goes to sleep (pin sleep, cyclic sleep, or xbee.sleep_now(...) in MicroPython). Note that this refers to the XBee's DNS cache for the ATLA command, socket.getaddrinfo(...) in MicroPython, configured hostnames such as the ATDL and ATEQ commands, and other connections or transmissions to hostnames. Previously, DNS results would be cached for less than an hour and would be lost during sleep, causing extra DNS lookup activity and some additional data usage. (DNS results are cached for one day or the TTL value specified by the nameserver, whichever is shorter.) [XBCELL-6545]

2. A Filesystem Request API frame with Get Path ID command and a pathname which resolves to the root directory (/) now correctly releases the Path ID. Updating a path ID with an absolute pathname now functions properly. [XBHAWK-578, XBPY-905]

3. Fixed an issue with API mode and ATIP 0 (UDP) where a TX IPv4 UDP frame with source port matching ATC0 would generate a TX status 0x81 ("Connection lost") after disassociating from the network and reassociating. [XBCELL-6852]

4. Fixed an issue where certain AT commands would fail to generate a response in command mode. [XBCELL-6884]

5. Fixed an issue where using ATPG with a nonexistent hostname would delay or cause temporary errors in subsequent activities.

6. Fixed an issue with the filesystem giving "ENODEV hardware failure" errors if the XBee was reset while asleep. [XBCELL-4378]

7. Attempting to rename a secure file now errors out with EPERM. [XBCELL-7071]

8. Fixed an issue where select.select() on a UDP socket could indicate readable without any received data available. [XBCELL-7295]

9. Fixed an issue where the AI command could return 0x2D (shutdown) before or after XBee sleep when no modem shutdown has taken place. [XBCELL-7361]

10. Return an error on UDP sockets if send/sendto is called before connect/bind. Previously, send/sendto would fail to actually send the message. [XBCELL-7177]

11. The network.Cellular() object in MicroPython will now block and attempt to perform the shutdown()

operation while an update of the cellular component or XBee itself is in progress. The operation will fail by raising an OSError with value EAGAIN. [XBCELL-7122]

12. Fixed an issue where a 0x2B Cellular Component Firmware Update frame marked as the final request and containing a non-empty payload could cause the update to fail. [XBCELL-5197]
13. In MicroPython, maximum UDP TX datagram sizes are now enforced. OSError EMSGSIZE will be returned if a datagram is too large to send. [XBCELL-7783]
14. Improve reliability of receiving SMS messages. [XBCELL-8356]
15. When creating a TLS socket in Micropython, the minimum TLS version that should be allowed is now pulled from the ATTL value. [XBCELL-8444]
16. Improve retrieving the IMSI value from the SIM on certain providers that can change the IMSI while running. [XBCELL-6463]
17. Fixed an issue where under some circumstances, FTP_OTA device requests sent through Digi Remote Manager could result in attempting to download an incorrect filename. [XBCELL-8835]
18. Fixed an issue where a modem status would be sent prematurely when a FOTA, initiated through DRM, is successful. [XBCELL-8836]

1016 (September 18, 2020)

This is a recommended release.

NEW FEATURES

1. Added support in MicroPython for doing nonblocking socket connect() calls.
2. Added support for 4 digit short code SMS targets (P#, 0x1F frames and sms_send() in MicroPython)
3. Updated MicroPython to version 1.12. This does change the bytecode format requiring recomplication of program code.
4. The ER (for TCP) and ES (for UDP) AT commands have been added to allow override of the IP ports used for Remote Manager.
5. A command to specify Remote Manager idle timeout (ATMT) has been added. Remote Manager connections will be closed when there is no activity for this time. MT does not apply when persistent connections have been configured (ATMO bit zero is set).
6. The ATPG (Ping) command has been added to assist in network diagnostics.
7. Digi's version of MicroPython now allows for step sizes other than one in slicing bytes and string objects.
8. TLS connections now use SNI (Server Name Indication).
9. API frames have been added to provide filesystem access. See the documentation for further details.

BUG FIXES

1. Fixed an issue in MicroPython where a select() call against a listen socket would always return return as 'writable'. Listen sockets are never writable. [XBCELL-5793, XBCELL-5796]
2. Socket Status 0xCF API frames are now correctly generated if SPI mode was forced by holding DOUT low during boot. [XBCELL-6084]
3. PWM output will now properly resume after coming out of sleep. [XBCELL-6140]
4. Improved reliability of shutdown command and airplane mode. [XBCELL-5648, XBCELL-5676]
5. SMS send in MicroPython properly returns an error if an update is in progress. [XBPY-542]
6. ATAS response frames in API mode did not always contain the user-specified Frame ID. [XBCELL-

6549]

1015 (February 19, 2020)

This is a recommended release.

NEW FEATURES

1. Added support for closing all open sockets when using the API Close Socket frame.
2. Add support for various line ending conventions in TLS/SSL certificates and keys.
3. Retrieving the RSRP and RSRQ LTE signal quality indicators is now possible in MicroPython and with the SQ and SW AT commands.
4. The Reboot command in Digi Remote Manager will now cleanly shut down the cellular radio before rebooting device.
5. Added Cellular.shutdown command in MicroPython.
6. To improve the over the air update experience:
    - The FI AT command has been added which will report the status of the last update attempt.
    - The AI command will now report the value 0x30 when an update is in progress.
    - During an update, socket or SMS creation/transmits will return an error indicating an update is in progress.
7. Added Clean Shutdown button (ATSD command) to XCTU firmware definition file.
8. Added username (ATCU) and password (ATCW) settings that are needed by some cellular carriers to authenticate and connect to the network.
9. Added PIN (ATPN) and PUK (ATPK) settings that are needed when using a locked SIM.
10. The ATSD (Shutdown) command now takes an optional parameter to reboot the XBee after shutting down.
11. The ATDB command now can take an optional parameter to get an uncached RSSI signal value.
12. In MicroPython, slice-assignment to arrays and bytearrays is now supported.
13. MicroPython has had the 'uselect' module added. This will allow cleaner asynchronous socket operations.
14. The **FO** command has been added, which is used to initiate a cellular component FTP OTA. See the documentation for usage details.

BUG FIXES

1. Fixed issue with ATDT reporting a time value that was far into the future/incorrect.
2. ATPY^ now correctly interrupts a MicroPython script which has disabled keyboard interrupts using `micropython.kbd_intr(-1)`. [XBPY-446]
3. The MicroPython REPL no longer continuously prints "soft reboot" if autostart is disabled after the script starts and the script performs a soft reset. [XBPY-795]

1013 (August 7, 2019)

This is a recommended release.

NEW FEATURES

1. A new family of socket operation API frames (Create, Connect, Close, Socket Status) have been added to increase the level of control and visibility into network connection creation and management.
2. The ATSD (Shutdown) command was added. You should use the ATSD command to safely shut down a device before removing power.

3. Over-The-Air (OTA) update notifications will be sent out as modem statuses. This applies to both OTA XBee firmware and OTA cellular component updates.
4. The ATII command was added, which reads the IMSI (International Mobile Subscriber Identity) from the SIM.
5. Added support for closing all open sockets when using API Close Socket frame.
6. Add support for various line ending conventions in TLS/SSL certificates and keys.

BUG FIXES

1. Increase space available for phone numbers to accomodate full length international numbers including country code. [XBCELL-5110]
2. Improved the cellular component update process.

- Allow firmware multiple revisions back to load. [XBCELL-5344]
- Complete the update process without resetting entire module. [XBCELL-5331]
- Improve timing of update. [XBCELL-3756]

4. Fix issue where Connected Sleep was not properly entering the expected low power state. [XBCELL-1217, XBCELL-4929]
5. Fixed issue with ATDT reporting a time value that was far into the future/incorrect.

1012 (June 11, 2019)

This is a recommended release.

ENHANCEMENTS

1. Support new cellular module revision. Note that the latest revision hardware should not downgraded to versions earlier than 1012. You can tell by checking ATHI value (2 is latest revision, 3 is previous). All XBees with the change ship with version 1012 or later.

BUG FIXES

1. TCP download speed improved as it was slower in 1011 than in previous versions. [XBCELL-5123]
2. File extensions that are too long in the filesystem caused a watchdog reset with file operations. [XBCELL-5195]
3. Filenames with leading dots could not be created. [XBCELL-5202]

1011 (April 12, 2019)

This is a recommended release.

NEW FEATURES

1. Cellular Network Time command (ATDT)

- Reports the local time of the XBee device, if time has been synchronized with the network.
- Read the number of seconds since Jan 1 2000 00:00:00 UTC, or an ISO 8601-formatted timestamp.

2. Enhanced support for Digi Remote Manager

- Filesystem support
    - Upload, download, list and delete files remotely using the SCI File System service or File

Management UI in Digi Remote Manager.
- SM/UDP connection management
    - In order to minimize data charges for an inactive connection, the XBee will no longer maintain an active TCP connection to DRM. DRM will periodically be polled through Digi's SM/UDP protocol on an interval determined by the DF AT value (default of once per day). Requests to bring up and terminate a full-featured TCP connection can be made from DRM over SM/UDP.
- The previous constantly connected behavior may be regained by setting bit-0 of the MO AT command. * See the documentation for additional details.
- Configuration and status reporting
    - Read current settings, configure the XBee device, and read the XBee device's current status remotely.

3. Active Scan command (ATAS)

- Scans for mobile cells in the vicinity and returns information about the cells in the service area of the XBee.

BUG FIXES

1. When SPI operation has been forced by holding DOUT/DIO13 pin 2 low while resetting the XBee, data arriving at the configured listening socket would be dropped. [XBCELL-4691]

2. Keyboard interrupt at the MicroPython REPL only works when the interrupt byte appears first in a block of input. [XBCELL-4853]

3. The RO parameter (packetization timeout) no longer applies when at the MicroPython REPL (AP = 4). [XBCELL-4853]

1010 (November 1, 2018)

This is a recommended release.

NEW FEATURES

1. User Data Relay Frame

- Relay custom user data to and from MicroPython and the local interface.

2. MicroPython Features:

- Flash upload mode now compiles and stores the code in the file system at /flash/lib/main.mpy.
- Cross compilation support using mpy-cross on a PC and uploading them to the file system.
- The XBee adds an os.compile() method to compile .py files into .mpy files on the device itself.
- The XBee adds an os.bundle() method to freeze multiple .mpy files into the device flash for execution in place to reduce heap usage.

BUG FIXES

1. Unable to delete mpy files from the file system after failing to import them. [XBPY-219]

100C (September 7, 2018)

This is a recommended release.

BUG FIXES

1. Fixed issues with a memory leak when using TLS mutual authentication and additional sockets cannot be opened. [XBCELL-3861]
2. Sequence to initially connect to cellular network improved. [XBCELL-4091]

100B (June 14, 2018)

This is a recommended release.

NEW FEATURES

1. File system support

- ATFS command to access through Command Mode
- MicroPython file interfaces for programmatic access
- Provides MicroPython module import support
- Allows storage of TLS certificates for authentication
- Secure encrypted file storage to protect MicroPython code and TLS private keys

2. TLS Authentication

- Accessed in MicroPython with the ussl.wrap_socket method
- Configurable with the $0/$1/$2 commands
- Uses certificates stored on the filesystem
- New API frame 0x23 to access multiple authentication profiles

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100A (December 8, 2017)

This is a recommended release.

NEW FEATURES

1. IMPORTANT: This new version requires an update to the underlying cellular module. The latest version (6.3.11 or later) of XCTU will detect and update the module.
2. Upgrading the underlying module is now supported (required by 100A).

- Downgrade is also supported.

3. Multiple TLS/SSL sockets are now supported.
4. New MicroPython Features

- MicroPython XBee Sleep Control.
    - Better integration between MicroPython and XBee Sleep modes.
    - API for entering low power modes.
    - MicroPython Secondary UART.
- Configure DIO Lines to use as a second UART usable by MicroPython.
- I2C Master Support.
    - Pin 7 and 19 on the XBee can be used as an I2C Master bus by MicroPython.

5. Incoming TCP/UDP connections.

- Incoming connections can be used with API, Transparent and MicroPython.

6. PWM0/RSSI support.
7. SPI.

- The XBee can be configured as an SPI Slave device.

BUG FIXES

1. ATVL format changed to be consistent with other XBees. [XBCELL-496]
2. Fixed buffering issue where data from the cellular modules would show up in command mode when in bypass mode (AP5). [XBCELL-854]
3. Three failed socket attempts will no longer cause the modem to leave then rejoin the network. [XBCELL-924]
4. Issue where UDP datagram was not truncated when the number of requested bytes is less than the actual datagram. [XBCELL-1838]
5. Some commands were subject to buffer overflow in command mode. [XBCELL-2579]
6. Issue where multiple sockets in MicroPython could cause a watchdog reset. [XBCELL-2851]

1008 (June 8, 2017)

This is a recommended release.

NEW FEATURES

1. Significant UART performance improvements for data transfer rates.
2. Incoming connections now are supported in API mode.
3. Close flag is now supported for UDP API mode sockets making API mode sockets easier to manage and more available.
4. MicroPython ifconfig() interface has changed and programs should now use add the config() method for getting and setting network parameters.
5. The AN command to set the APN was changed to take affect after AC or CN is executed; a new command OA was added to return the actual value of the APN in the modem.

BUG FIXES

1. Fixed issue where sending a TCP/UDP frame in API mode over 1500 bytes did not generate a status frame. [XBCELL-742]
2. ATLA command now returns immediately if the XBee is not on the network. [XBCELL-1306]
3. Fixed issue where CI did not correctly report 0x24 when a server did not exist. [XBCELL-1844]
4. Fixed issue where the TD parameter did not completely ignore RO in transparent mode. [XBCELL-1908]
5. Fixed issue where MicroPython was fixed to SSLv3. [XBCELL-2015]

1007 (May 15, 2017)

This is a recommended release.

NEW FEATURES

1. MicroPython!

- On-device programmability to add local intelligence.
- Many examples in the Digi MicroPython Programmer Guide.
- AT commands for managing run-time behavior.

2. Digital I/O support.
3. Analog Input support.
4. Incoming connections in transparent mode.

BUG FIXES

1. Fixed issue where DNS lookup command for very long domain names was not returning results. [XBCELL-1278]
2. Fixed issue where IPv4 transmit options were not handled correctly between frames. [XBCELL-1544]
3. Fixed issue where large data transmissions lose data in transparent mode when operating at 115200 or higher. [XBCELL-1842]

1006 (February 3, 2017)

This is a recommended release.

NEW FEATURES

1. Deep sleep mode.
2. Pin sleep support.
3. Cyclic sleep support.
4. Airplane mode sleep support.
5. DNS lookup command (ATLA).
6. Domain names now supported in DL command.
7. Destination phone number moved to P# command.
8. Operating Destination Address (ATOD) support.
9. SMS UTF-16/UCS-2 encoding support.
10. Association blink pattern now matches XBee Wi-Fi.
11. Antenna diversity setting.

BUG FIXES

1. ATCI behavior made consistent when invalid parameters are set. [XBCELL-498]
2. Tower connection reliability improved. [XBCELL-699]
3. ATAN blocked when second power supply not connected. [XBCELL-770]
4. Fixed issue where reboot during OTA update locks modem. [XBCELL-860]
5. Fixed issue where firmware locks up on restart when switching into bypass mode. [XBCELL-861]
6. Fixed issue where Device Cloud socket locks up on disconnect. [XBCELL-868]
7. Improved reliability of boot time. [XBCELL-910]
8. SSL 3.0 and TLS 1.2 now work. [XBCELL-923]
9. ATCI now returns 0x27 after socket timeout. [XBCELL-1002]
10. Fixed issue where cellular component can get stuck when connecting to network. [XBCELL-1048]
11. Fixed issue where SMS messages between network providers are lost (related UCS-2 enhancements). [XBCELL-1105]
12. SMS failed for phone numbers starting with “+”. [XBCELL-1268,XBCELL-1348]
13. Added options for hardware flow control (D6 and D7) to X-CTU configuration file.[XBCELL-1308]

1005 (November 28, 2016)

Initial release.

NEW FEATURES

1. API & Transparent mode
2. AT command mode
3. By-pass to raw cellular modem
4. SMS
5. TCP/UDP (up to six sockets)
6. TLS/TCP (up to 1 socket)

*Release Notes Part Number: 93000808