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Digi XBee 3 Cellular LTE-M/NB-IoT Global Release Notes

Digi XBee 3 Cellular LTE-M/NB-IoT Global

Version 1141E (February, 2024)

INTRODUCTION

These are the release notes for Digi XBee 3 Cellular LTE-M/NB-IoT Global.

SUPPORTED PRODUCTS

- [Digi XBee 3 Cellular LTE-M/NB-IoT Global](#)

KNOWN ISSUES

1. **CRITICAL!!:** For complete support for new features added in the 11410 firmware such as Bluetooth Low Energy and the Gecko Bootloader, you must update to the latest version of XCTU (6.4.2 or later). If you are upgrading from a version prior to 11410, you must use the 1140F firmware. It will not be possible to downgrade to a version prior to 11410 after upgrading.
2. By-pass mode is now deprecated and is not recommended for new designs. XBee 3 Cellular products support direct USB to access the cellular modem directly. See the user manual for details on how to configure your XBee to use direct USB.
3. Intermittent failure to go to sleep or wake up when using pin sleep with the SPI_nSSEL line while in SPI mode. [XBCELL-3100]
4. u-blox cellular modem firmware versions before L0.0.00.00.05.08,A.02.04 do not support hardware flow control; as a result, RTS (DIO6) and CTS (DIO7) cannot be relied upon for flow control in bypass operating mode. Flow control in bypass operating mode is only reliable when using XBee firmware version 11414 or later and u-blox cellular modem firmware version L0.0.00.00.05.08,A.02.04 or newer. [XBCELL-3359, XBCELL-4946]
5. Loss of signal after multiple attempts to rejoin the network will result in entering an Out-of-Service mode where no network registration or data transfer will be attempted for four minutes. [XBCELL-3494]
6. A race condition exists that will reduce the number of available sockets when a socket is closed while data is in flight. The workaround is to reboot the XBee if a persistent error is received on attempts to open new sockets. [XBCELL-3499]
7. When in API mode, multiple incoming connections to a listening socket over the maximum allowed

will result in attempts to connect being rejected. Incoming connections made once established connections are closed will not be properly reported through API frames. Avoid making multiple simultaneous incoming connections to the XBee. [XBCELL-3500]

8. Internal logic can interfere both with USB operation and network connectivity in direct USB mode when configured for anything other than bypass (AP=5). Workaround: Enabling bypass mode can eliminate some edge case conflicts that can cause USB direct network connection issues and USB interface operation conflicts. Note that this is not enabling bypass mode but is ensuring better control of network functionality in USB direct mode. [XBCELL-3753]
9. Modules registering to the AT&T network have been observed infrequently to get stuck in the PSM dormant state (AI=0x2c). This state persists until the XBee is reset. [XBCELL-4812]
10. Versions of XCTU earlier than 6.4.2 will error out at the end of a firmware update, due to the 35 second delay on first boot. Fix: Update to the latest version of XCTU.
11. u-blox cellular modem firmware versions L0.0.00.00.05.06,A.02.00 and L0.0.00.00.05.06,A.02.01 have a maximum baud rate of 115,200 baud. If using bypass operating mode with XBee firmware version 11414 or newer AND one of these u-blox cellular modem firmware versions, ensure ATIB is set to 7 (115,200 baud). If using u-blox firmware version L0.0.00.05.08,A.02.04 with XBee firmware 11414 or later (recommended), ATIB should be left at its default value of 0xA (921,600 baud). [XBCELL-4946]
12. 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]
13. Connections to the BLE API Service within five seconds of waking from sleep can sometimes fail to perform the unlock sequence.
14. Instances where the desired BLE connection type is “Display YesNo” with legacy pairing being used the XBee will request LE Secure Connections instead of using “Just Works”. This will cause the XBee to fail to pair as LESC will be disabled on the other device. [XBPY-862]
15. As a workaround for a TLS receive issue specific to u-blox cellular modem firmware version L0.0.00.00.05.12,A.02.19, any open TLS connection will prevent the modem from entering the PSM “dormant” state. This includes any connection to Digi Remote Manager (if MO bit 0 is set). Workaround: close any TLS connections when PSM dormant state is desired. This behavior does not impact configurations which do not make use of LTE PSM. [XBCELL-7666]
16. SMS messages received during a period of activity, such as transmitting an SMS message, creating a TCP connection, or any another blocking operation, may be silently discarded by the underlying cellular component. Applications cannot rely on simultaneously sending and receiving SMS messages. Applications may require app-level acknowledgements and retries if SMS receive reliability is imperative. [XBCELL-8614]
17. u-blox cellular modem firmware version L0.0.00.00.05.12,A.02.21 has a known issue relating to leaving the PSM dormant state. The modem will sometimes not leave the dormant state even when local activity requires it. [XBCELL-9702]
18. Secure files created using firmware 1141B or 1141C can only be decrypted properly using those firmware versions. Secure files created using other firmware versions cannot be decrypted properly using 1141B or 1141C. [XBCELL-9983]
19. If bootloader version 2.3.2 is installed, and the XBee is forced into command mode via serial-break reset, and ATAC is executed within 500 milliseconds of boot, command-mode input preceding ATAC may be executed twice. [XBCELL-10059]

UPDATE CONSIDERATIONS

The 11412 release or later is required to perform over the air or over the wire (UART) updates to the underlying cellular module. There are scripts available on our support site to update over the wire or over the air. See the LTE-M/NB-IoT User Guide for complete prerequisites and instructions.

The 11417 release changed and improved upon the functionality of LTE Power Saving Mode (PSM). Applications which rely upon certain old behaviors may need to be updated. See the 11417 release notes below and the XBee 3 Cellular LTE-M/NB-IoT User Guide for more information.

The 11418 release added support for multiple u-blox modem firmware versions: L0.0.00.00.05.11,A.02.16

(SARA-R410M-02B-02) and L0.0.00.00.05.12,A.02.19 (SARA-R410M-02B-03).

Customers should upgrade to the newest u-blox modem firmware, or plan to do so during a future XBee firmware update, because compatibility with older u-blox modem firmware will be removed in the future.

Digi XCTU version 6.5.6 or newer must be used when installing XBee firmware 11418 or newer.

CELLULAR MODEM HARDWARE COMPATIBILITY

u-blox SARA-R410M-02B cellular module hardware versions after 02B-03 are compatible only with modem firmware version L0.0.00.00.05.12,A.02.19 and later. As a result, XBee devices with this modem hardware version are compatible only with XBee firmware release 11418 or newer.

XBee devices with modem hardware version 02B-03 are manufactured with **AT%C** set to 4, which prohibits the installation of firmware 11417 and older. Existing XBee devices have **AT%C** of either 2 or 3, and remain compatible with both existing and newer XBee firmwares.

The hardware version of the u-blox SARA-R410M-02B cellular module is printed on the label of the u-blox module, on the bottom side of the XBee device.

SECURE FILE COMPATIBILITY

Secure files created using firmware 1141B or 1141C can only be decrypted and used by 1141B or 1141C. Firmware versions 1141B and 1141C are unable to decrypt secure files created using other firmware versions. Any secure files created using these versions must be deleted and created again after updating. [XBCELL-9983]

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

1141E (February, 2024)

This is a recommended release.

BUG FIXES

1. Fixed an issue with BLE bonding. Bonding information was not stored correctly. [XBCELL-9971]
2. Fixed a critical issue found with some of our customer devices where the firmware cannot be updated and files on the file system cannot be created or modified. This issue can only happen to devices that have flash ID beginning with 0xEF40. The flash ID can be determined with the AT!F command.

The same fix has been applied to the XBee 3 Bootloader, which is included with the XBee firmware .gbl file. Customers are strongly encouraged to install 1141E or newer so that the new bootloader version 2.3.2 (ATVH = 232) is installed. Bootloader version 2.3.2 is backward-compatible with older XBee firmware versions. [XBCELL-10001]

KNOWN ISSUES

1. Bluetooth bonding using LE Secure Connections is unreliable if neither the XBee nor the target device expose I/O capabilities. [XBCELL-10053]
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1141D (January, 2024)

This is a recommended release.

BUG FIXES

1. Fixed an issue where secure files created using firmware 1141A or older could not be decrypted, and secure files created using 1141D could not be decrypted using 1141A or older.

NOTE: Secure files created using firmware 1141B or 1141C can only be decrypted and used by 1141B or 1141C. Any secure files created using these versions must be deleted and created again after updating. [XBCELL-9983]

1141C (December, 2023)

This is a recommended release.

NEW FEATURES

1. Updated MicroPython to version 1.20.0. This does change the bytecode format requiring recompilation of program code.
2. In MicroPython, `os.bundle()` now reserves 64 KiB of the XBee's internal flash. This is increased from 32 KiB on previous firmwares. [XBCELL-5885]
3. In MicroPython, the `phyconfig` method was added to GAP connection objects, allowing configuration of the Bluetooth PHY selection – the default 1M PHY, or 2M PHY (higher data rate but reduced

range). [XBCELL-9793]

4. In MicroPython, the `digi.ble.format_address` and `digi.ble.parse_address` functions have been added, to aid in converting BLE MAC addresses between a human-readable format (e.g. "00:12:34:56:78:9A") and the 48-bit format presented by `gap_scan` and used in `gap_connect` (e.g. `b"\x00\x12\x34\x56\x78\x9A"`). [XBPY-1044, XBPY-1045]
5. To improve the reliability of the Digi Remote Manager SM/UDP Request Connect feature, the XBee no longer performs a UDP check-in with Digi Remote Manager if a TCP connection is already open, or if a datapoint/health metric upload will soon cause a TCP connection to be created. [XBCELL-9785]
6. The `math` module was added to MicroPython. [XBPY-1058]
 - Functions: `acos`, `asin`, `atan`, `atan2`, `ceil`, `copysign`, `cos`, `degrees`, `exp`, `fabs`, `floor`, `fmod`, `frexp`, `isfinite`, `isinf`, `isnan`, `ldexp`, `log`, `log10`, `modf`, `pow`, `radians`, `sin`, `sqrt`, `tan`, `trunc`
 - Constants: `e`, `pi`

BUG FIXES

1. In MicroPython, `os.bundle(None)` now performs a soft reboot of the REPL, to clear out stale data. [XBPY-1021]
2. Fixed an issue where the TCP connection to Remote Manager for publishing data points or health metrics could be delayed by several minutes unexpectedly. [XBCELL-9670]
3. Fixed an issue where the XBee would be unresponsive on boot if a non-default value is saved for `AT$0`, `AT$1` or `AT$2`. [XBCELL-9788]
4. Repeated BLE connect and disconnect cycles no longer stop the device from advertising. [XBCELL-9844]
5. Fixed an issue where interacting with the XBee BLE API service would disrupt the output of data received in transparent mode. [XBCELL-9913]
6. Fixed an issue where MicroPython would cause the XBee to crash when using callbacks or certain other features. [XBCELL-9916]

KNOWN ISSUES

1. Secure files created using firmware 1141B or 1141C are not readable (decrypt incorrectly) on other firmware releases, and vice versa. [XBCELL-9983]

1141B (June, 2023)

This is a recommended release.

NEW FEATURES

1. Include the cellular network type (4g) in the health metrics reported to Digi Remote Manager when HM bit 7 (Serving Cell Data) is set. [XBCELL-9069]
2. The `modem_status.receive()` and `modem_status.callback()` functions have been added to the `xbee` module in MicroPython, allowing MicroPython applications to respond to modem status messages generated by the module. [XBCELL-7803]

3. Optimize TCP receive data buffering for MicroPython sockets, by allowing more data to be collected between `.recv()` calls. [XBCELL-9278]
4. Added the modem event log that can be viewed with the `ATM#` command. This log provides power and connection status of the cellular modem component and can be used to help understand cellular connection issues. [XBCELL-8741]

BUG FIXES

1. Fixed an intermittent issue where deep sleep or shutdown was held off for up to 30 seconds after the cellular component was turned off. [XBCELL-9142]
2. Fixed a critical issue found with some of our customer devices where the devices got into a state where the firmware can not be updated and files on the file system can not be created or modified. This issue can only happen to devices that have the flash id 0xC22314. The flash id can be determined with the `AT!F` command. [XBCELL-9031]
3. In MicroPython, callbacks are now allowed to be any callable object. Previously they were required to be either literal functions or lambdas. [XBPY-958]
4. Fixed an issue where the XBee would stop seeing received SMS messages after approximately 75 messages. [XBCELL-9348]
5. For the SMS messaging with Remote Manager feature, the default value for `ATDP` (Remote Manager phone number) was changed to 12029823370 and the default value for `ATRI` (Remote Manager service ID) was changed to the empty value (single space, ASCII 0x20) meaning no service ID. This change was made because the previous default phone number 32075 was discontinued by Digi's Remote Manager SMS service provider and will no longer function. To ensure the Remote Manager SMS message feature continues to work properly with this change in defaults, it is highly recommended the settings on both the device side and the Remote Manager side be checked and this functionality be tested by sending an SMS ping from Remote Manager.
6. Fixed an issue in the MicroPython `digi.ble` module where a gap scan iterator would block indefinitely after the module enters sleep. [XBCELL-9577]
7. Fixed an issue in MicroPython where bundled code could not be imported if the bundled filename contains a directory separator. [XBPY-1022]

KNOWN ISSUES

1. The XBee will be unresponsive on boot-up if a non-default value for `AT$0`, `AT$1` or `AT$2` is saved to flash (`ATWR`). Workarounds: update to newer XBee firmware, downgrade to the previous firmware, or apply `AT$0/$1/$2` at runtime without performing `ATWR`. [XBCELL-9788]
2. Secure files created using firmware 1141B or 1141C are not readable (decrypt incorrectly) on other firmware releases, and vice versa. [XBCELL-9983]

1141A (September, 2022)

This is a recommended release.

NEW FEATURES

1. Added support for Active Scan in MicroPython. [XBCELL-6307]
2. Updated MicroPython to version 1.18.

3. The AI value 0x30 (update in progress) is now applied for the XBee firmware as well. [XBCELL-5629]
4. Added support for reporting Timezone offset using `time.tz_offset()` as seconds west from UTC. [XBCELL-7784]
5. Allow MicroPython floats as values in Remote Manager data points.
6. Added AT command for performing a MicroPython Soft Reset: `ATPYR` [XBPY-431]
7. Added support for sending Python control commands through Remote Manager. [XBCELL-6885]
8. 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.
9. Added option for reporting serving cell info to Digi Remote Manager as a health metric. [XBCELL-8977]

BUG FIXES

1. 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]
2. 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]
3. Improve reliability of receiving SMS messages. [XBCELL-8356]
4. Added support for reporting Timezone when using `ATDT1`. [XBCELL-7785]
5. Enabled PS/CS combined operation when `CP=1` [XBCELL-8315]
6. When creating a TLS socket in MicroPython, the minimum TLS version that should be allowed is now pulled from the `ATTL` value. [XBCELL-8444]
7. Improve retrieving the IMSI value from the SIM on certain providers that can change the IMSI while running. [XBCELL-6463]
8. 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]
9. Fixed an issue where a modem status would be sent prematurely when a FOTA, initiated through DRM, is successful. [XBCELL-8836]

KNOWN ISSUES

1. MicroPython code which has been “bundled” can not be imported if the bundled filename contains a directory separator. Workaround: Restructure the code into a single directory before bundling. [XBPY-1022]

11418 (August, 2021)

This is a recommended release.

IMPORTANT NOTES

XBee devices with u-blox cellular module hardware version 02B-03 are only compatible with u-blox firmware L0.0.00.00.05.12,A.02.19 and newer, and may only be used with XBee firmware 11418 or newer.

The hardware version of the u-blox SARA-R410M-02B cellular module is printed on the label of the u-blox module, on the bottom side of the XBee device. You can also check the **AT%C** value; XBee modules with u-blox hardware 02B-03 report a value of 4, while older hardware will report 2 or 3.

NEW FEATURES

1. When entering command mode from the MicroPython REPL (ATAP=4), MicroPython will hold output until leaving command mode.
2. MicroPython adds `digi.cloud.Console()` class to communicate with the Digi Remote Manager's Console tab. [XBCELL-4486]
3. MicroPython adds `uos.dupterm()` method to redirect MicroPython terminal to another stream-like interface (e.g., `machine.UART(1)`, `digi.cloud.Console()`). [XBPY-909]
4. 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]
5. The built-in function `enumerate` is now available in MicroPython. [XBPY-77]
6. **ATOT** command has been added to read the active technology for the current network connection.
7. This release includes support for a new maintenance release for the cellular module (u-blox SARA-R410M-02B-03 version L0.0.00.00.05.12) which contains a number of fixes listed in this [PCN](#) from u-blox. See the Digi Product Support page for XBee 3 for directions on how to obtain this update and apply it using Digi XCTU or EasyFlash. Note that the L0.0.00.00.05.12 firmware can only be installed using XCTU or the u-blox EasyFlash tool, and requires USB Direct access to install.

Digi XCTU version 6.5.6 or newer must be used when installing XBee firmware 11418.

The 11418 release was tested with the following u-blox versions:

- L0.0.00.00.05.11,A.02.16 (SARA-R410M-02B-02)
- L0.0.00.00.05.12,A.02.19 (SARA-R410M-02B-03)

Customers should upgrade to the newest u-blox modem firmware, or plan to do so during a future XBee firmware update, because compatibility with older u-blox modem firmware will be removed in the future.

8. The firmware's compatibility number (**AT%C**) has been incremented to 4 for compatibility with new u-blox 02B-03 hardware. See the UPDATE CONSIDERATIONS section above and the product documentation for more details. Existing hardware (02B-02 and earlier) is not impacted by this change. [XBCELL-7598, XCTUNG-2099]
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 MicroPython `boot.py`, for consistency with other MicroPython platforms. [XBPY-167]

BUG FIXES

1. Fixed an issue where certain AT commands would fail to generate a response in command mode. [XBCELL-6884]
2. Fixed an issue with the filesystem giving "ENODEV hardware failure" errors if the XBee was reset

while asleep. [XBCELL-4378]

3. Attempting to rename a secure file now errors out with EPERM. [XBCELL-7071]
4. 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]
5. Fixed an issue where closing a TLS socket could cause the loss of queued TX data. [XBCELL-3400, XBCELL-7614]
6. Fixed an issue where received UDP datagrams with payload size over 512 bytes would be treated as one 512-byte datagram followed by another datagram with the rest of the payload. Received UDP datagrams of up to 1024 bytes are now supported. [XBCELL-3257]
7. Fixed an issue in MicroPython where Cellular.signal() would block and timeout when in PSM dormant. Instead, an ENOTCONN error will be raised right away. [XBCELL-7315]
8. 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]

KNOWN ISSUES

1. As a workaround for a TLS receive issue specific to u-blox cellular modem firmware version L0.0.00.00.05.12,A.02.19, any open TLS connection will prevent the modem from entering the PSM “dormant” state. This includes any connection to Digi Remote Manager (if MO bit 0 is set).
Workaround: close any TLS connections when PSM dormant state is desired. This behavior does not impact configurations which do not make use of LTE PSM. [XBCELL-7666]
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11417 (November, 2020)

This is a recommended release.

NEW FEATURES

1. The **ATFC** command has been added to read the EARFCN of the current cellular connection.
2. **DO** can now be set to 6, which enables mirroring of the cellular component power status. When **DO** 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 (powered off, or in the PSM state). See the documentation for additional details.
3. This release includes support for a new maintenance release for the cellular module (u-blox SARA-R410M-02B-02 version L0.0.00.00.05.11). See the Digi Product Support page for XBee 3 for directions on how to obtain this update and apply it using EasyFlash, over-the-air update, or API mode. The 11417 release was tested with this u-blox firmware and it is recommended that you upgrade for best results.

When upgrading with direct USB using XCTU you must use at least XCTU 6.5.4 or above. There is a compatibility issue with Windows 7 that may prevent synchronization in the update process, so if encountered use Windows 10 or script based update.

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. LTE Power Saving Mode (PSM), which is enabled by setting bit 3 of ATDO, now has improved functionality in combination with XBee sleep features. Specific behaviors which have been changed or improved include:
 - The cellular component remains in the PSM “dormant” state (ATAI reporting 0x2C) more reliably during normal operation.
 - The cellular component remains in the PSM “dormant” state when waking the XBee from sleep (i.e. pin sleep, cyclic sleep, or `xbee.sleep_now(...)` in MicroPython). In previous releases, the cellular component would be woken up at the same time. The cellular component is intended to be left “dormant” until woken to perform user activity.
 - Waking the cellular component from PSM “dormant” state after waking the XBee from sleep no longer forces a re-registration.

Note that an application is not typically required to monitor **ATAI** and be aware of PSM state transitions, except as a means to determine the reason why socket connections were closed, etc. The XBee will wake the cellular component automatically upon initiation of IP traffic such as a TCP/TLS connection, sending a UDP packet, creating a “listening” TCP or UDP socket, or performing a DNS lookup.

See documentation for more details. [XBCELL-6545]

3. Sending an SMS will now wake the cellular component from the PSM dormant state. [XBCELL-3750]
4. Fixed an issue where the cellular component would be reset excessively when **CP** (Carrier Profile) is set to 1. [XBCELL-6682]
5. Fixed an issue where **AI** could be 0 (Internet connected) but **MY** would not report a valid IP address. [XBCELL-6773]
6. A Filesystem Request API Get Path ID command with a pathname resolving to the root directory (/) now correctly releases the Path ID. Updating a path ID with an absolute pathname also now functions properly. [XBHAWK-578, XBPY-905]
7. Improved the reliability of reading the network-provided eDRX cycle length with the **D?** command. [XBCELL-6808]
8. Fixed an issue with API mode and **ATIP 0** (UDP) where a TX IPv4 UDP frame with source port matching **ATCO** would generate a TX status 0x81 (“Connection lost”) after disassociating from the network and reassociating. [XBCELL-6852]
9. Fixed a 5 microampere regression in deep sleep current consumption introduced in the x16 release. [XBCELL-6851]

11416 (September 18, 2020)

This is a recommended release.

NEW FEATURES

1. Added support in MicroPython for doing nonblocking socket connect() calls.
2. The **BP** command has been added to allow adjustment of the BLE advertisement power level.
3. Added xbee_connect method to the digi.ble module. This method wraps a gap_connection object and will authenticate and allow API frame access to another XBee3 over BLE.
4. Added support for 4 digit short code SMS targets (P#, 0x1F frames and sms_send() in MicroPython)
5. Added BLE pairing and bonding support for MicroPython GATT client connections. See the MicroPython Programmers Guide for API documentation and the xbee-micropython repository for samples.
6. Updated MicroPython to version 1.12. This does change the bytecode format requiring recompilation of program code.
7. The ER (for TCP) and ES (for UDP) AT commands have been added to allow override of the IP ports used for Remote Manager.
8. 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).
9. Added new Digi Remote Manager health metrics, which can be enabled with the ATHM command, see documentation for details:
 - Cellular Reference Signal Received Power (RSRP)
 - Cellular Reference Signal Received Quality (RSRQ)
 - Module temperature
 - TCP and UDP application data counters
 - Internet link deactivations
 - Sleep count
10. Digi's version of MicroPython now allows for step sizes other than one in slicing bytes and string objects.
11. 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. Fixed an issue where AI would be stuck at 0x23 on certain networks. [XBCELL-6532]
7. ATAS response frames in API mode did not always contain the user-specified Frame ID. [XBCELL-6549]

11415 (February 19, 2020)

This is a recommended release.

NEW FEATURES

1. The ATIB command was added, which controls the baud rate used by the XBee CPU to communicate with the u-blox cellular chipset when using bypass mode (ATAP = 5). This command has no effect on other operating modes.
 - Note that this XBee AT command only changes the physical speed of the "host side" of this UART link; before changing a working ATIB value you must use the AT+IPR command in bypass mode to set the baud rate of the cellular chipset.

- Depending on NVM profile configuration, use of firmware update, etc., the ATIB value may not match the actual configuration of the cellular chipset, in which case you will need to try different ATIB values until communication is restored.
- 2. The Low Power Shutdown Feature was added, which allows specifying voltages where the XBee will shutdown the modem and file system to prevent memory corruption. This is useful for XBees running off of a battery.
- 3. Added support for closing all open sockets when using the API Close Socket frame.
- 4. Add support for various line ending conventions in TLS/SSL certificates and keys.
- 5. The ability to enable and configure eDRX for additional power saving options has been added. A new enable flag has been added to DO (bit 5) and the DX and D? commands allow configuration and query respectively.
- 6. Retrieving the RSRP and RSRQ LTE signal quality indicators is now possible in MicroPython and with the SQ and SW AT commands.
- 7. The Reboot command in Digi Remote Manager will now cleanly shut down the cellular radio before rebooting device.
- 8. Added Cellular.shutdown command in MicroPython.
- 9. 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.
- 10. Bluetooth Low Energy (BLE) MicroPython APIs:
 - The `digi.ble` module is now available in MicroPython.
 - GAP scan (advertisement discovery).
 - GAP advertise (custom advertisements including beaconing).
 - GAP connect.
 - GATT client operations.
 - See the documentation for additional details.
- 11. Added Clean Shutdown button (ATSD command) to XCTU firmware definition file.
- 12. Added username (ATCU) and password (ATCW) settings that are needed by some cellular carriers to authenticate and connect to the network.
- 13. Added PIN (ATPN) and PUK (ATPK) settings that are needed when using a locked SIM.
- 14. The ATSD (Shutdown) command now takes an optional parameter to reboot the XBee after shutting down.
- 15. The ATP1 command has now added PWM functionality.
- 16. The ATDB command now can take an optional parameter to get an uncached RSSI signal value.
- 17. In MicroPython, slice-assignment to arrays and bytearray is now supported.
- 18. The **BI** command has been added, which determines the name that appears in the XBee device's BLE advertisement data. If **BI** is set to the default value (0x20; ASCII space character), the default name of "XBee3 Cellular LTE-M/NB1" will be used.

19. MicroPython has had the 'uselect' module added. This will allow cleaner asynchronous socket operations.
20. The **FO** command has been added, which is used to initiate a cellular component FTP OTA. See the documentation for usage details.
21. Increased RAM available to the MicroPython interpreter to allow for more complex applications.
22. The `ucryptolib` MicroPython module has been added allowing for hardware accelerated AES encryption/decryption in user applications.
23. Updated the XCTU firmware definition file to support cellular component firmware update over USB Direct using XCTU 6.5.0+ on Windows.
24. MicroPython now supports registering callbacks for various functions, including the following:
 - Cellular SMS
 - User Data Relay Frames
 - `micropython.schedule()`
25. The `WDT` class has been added to the `machine` MicroPython module. This allows for the system to detect a hung or poorly behaved application in certain scenarios and recover. The Digi implementation differs from upstream in that it has modified defaults and allows a selection of recovery strategies.

BUG FIXES

1. Enable RTS/CTS flow control on the UART link between the XBee CPU and the u-blox cellular modem. If the u-blox cellular modem is not updated to firmware version L0.0.00.00.05.08,A.02.04, this has no effect, because older u-blox firmware does not support RTS/CTS flow control. See KNOWN ISSUES above and the "Hardware flow control in bypass mode" troubleshooting topic in the user guide. [XBCELL-3359, XBCELL-4946]
2. Fixed issue with ATDT reporting a time value that was far into the future/incorrect.
3. `ATPY^` now correctly interrupts a MicroPython script which has disabled keyboard interrupts using `micropython.kbd_intr(-1)`. [XBPY-446]
4. 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]

11413 (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. 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.
3. The ATII command was added, which reads the IMSI (International Mobile Subscriber Identity) from the SIM.
4. This release includes support for a new maintenance release for the cellular module (u-blox SARA-R410M-02B-01 version L0.0.00.00.05.08) and includes a number of fixes listed in this [PCN](#) from u-blox. See the Digi Product Support page for XBee 3 directions on how to obtain this update and apply it using EasyFlash, over-the-air update, or API mode. XBee firmware 11413 supports both the

current u-blox firmware and the new maintenance release.

BUG FIXES

1. Reduce the time it takes to reach AI = 0x00 on NB-IoT networks. [XBCELL-5191]
 2. Increase space available for phone numbers to accommodate full length international numbers including country code. [XBCELL-5110]
 3. Extended blocking module entering sleep when performing Over-the-Air update to include the image download phase. [XBCELL-5322]
 4. Shutdown command (ATSD) now errors out if an over-the-air update is in progress. Over-the-air updates are now rejected if a shutdown is in progress. [XBCELL-5351]
 5. Sending an SMS on a network that doesn't support SMS will no longer cause a modem reset. Check with your carrier for network capabilities. [XBCELL-5345]
 6. Sending a TX Request API frame for the TLS protocol with the close flag and with a payload containing one or more bytes will no longer result in data loss. The workaround is dependent upon updating the u-blox cellular modem to firmware version L0.0.00.00.05.08,A.02.04. [XBCELL-3400]
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11412 (June 28, 2019)

This is a recommended release.

NEW FEATURES

1. The firmware now supports updating the firmware on the cellular component. Two methods are available:
 - Packaged Firmware Update: Update performed through the serial interface
 - Firmware Update Over the Air: Update performed through Digi Remote Manager
2. The ATMV command, which reports the cellular component firmware version, now includes the revision and patch level. For instance prior to 11412 the ATMV was displayed like "L0.0.00.00.05.06 [Feb 03 2018 13:00:41]" and now it is displayed like "L0.0.00.00.05.06,A.02.00".
3. The ATSD (Shutdown) command was added. You should use the ATSD command to safely shut down a device before removing power.

BUG FIXES

1. Reduced the chance of encountering a critical bug that causes the cellular component to stop working. This bug only happens with a specific cellular component firmware version which can be determined by the output of the ATMV command. On firmware versions prior to 11412 the problematic cellular component firmware version will be displayed as "L0.0.00.00.05.06 [Feb 03 2018 13:00:41]" and on version 11412 it will be displayed as "L0.0.00.00.05.06,A.02.00".

To reduce the chance of encountering this critical bug it was necessary to add additional delay in situations where the cellular component is being powered down. These delays are only done when running with the problematic cellular component firmware. It is highly recommended that you update the cellular component firmware to avoid this bug and the added delays. [XBCELL-4934]

11411 (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.
 - SMS-based connection management
 - SMS messaging from Digi Remote Manager is now supported. Requests to bring up and terminate a full-featured TCP connection can be made from DRM over SMS.
 - 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.
 - Data point creation and upload using MicroPython
 - Create data points with integer or string values and upload them to Digi Remote Manager using MicroPython code.
 - See the documentation for additional details.
 - Device health metrics reporting
 - Configure the XBee to upload device health metrics to DRM, including cellular signal strength.
 - See the documentation for additional details.
 - Data service device request handling with MicroPython
 - Receive Data Service Device Requests from DRM using MicroPython, allowing data to be passed to and from the XBee.
 - See the documentation for additional details.
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. Fixed security issue to make it more difficult to create a phony firmware update image. [XBCELL-4609]
 2. ATAI stuck at 0x22 after fixing an incorrect ATAN value. [XBCELL-4508]
 3. 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]
 4. Keyboard interrupt at the MicroPython REPL only works when the interrupt byte appears first in a block of input. [XBCELL-4853]
 5. The RO parameter (packetization timeout) no longer applies when at the MicroPython REPL (AP = 4). [XBCELL-4853]
 6. Changed the device type string reported to Digi Remote Manager from XBee Cellular LTE-M/NB-IoT Global to XBee3 Cellular LTE-M/NB-IoT Global.
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11410 (November 13, 2018)

This is a recommended release.

NEW FEATURES

1. Gecko Bootloader
 - Upgrade images are now .gbl files instead of .ebin files, they are compressed to reduce OTA update data usage.
 - The first boot cycle when applying an upgrade to firmware version 11410 or later will exhibit a delay of approximately 35 seconds before the XBee modem becomes responsive.
2. User Data Relay Frame
 - Relay custom user data to and from MicroPython, BLE, and the local interface.
3. MicroPython Features:
 - Flash upload mode now compiles and stores the code in the file system at /flash/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.
4. Bluetooth Low Energy (BLE)
 - Send a subset of API frames to the XBee through the encrypted BLE API Service
 - Configure the XBee 3 Cellular using the Digi XBee Mobile app for Android and iOS.

BUG FIXES

1. Unable to delete mpy files from the file system after failing to import them. [XBCELL-219]
 2. Server certificates programmed previously on the system may still be used to authenticate servers despite configuration change or being removed from the file system. [XBCELL-3736]
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1140F (November 13, 2018)

This is a recommended release.

IMPORTANT NOTES

1. This is a gating firmware and is required to update devices on versions earlier than 11410. This gating firmware will automatically update the device to 11410 after about a minute of operation. Versions of XCTU earlier than 6.4.2 will error out at the end of the firmware update, due to the time it takes for the update to apply. Update to the latest version of XCTU to avoid this error.
 2. This firmware will reduce the size of the file system to 420KB after formatting. The upgrade will maintain as much of the file system as possible, prioritizing files in the /flash/cert directory before files in other directories.
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1140C (September 25, 2018)

This is a recommended release.

NEW FEATURES

1. NB-IoT Support
 - Support for European and U.S. Carriers.
 - Important: Conditionally approved for use on T-Mobile NB-IoT network for evaluation and

development purposes. Full certification will be completed with an upcoming cellular component firmware update (SARA-R410M-03B). Contact Digi sales for more information.

2. Added new option 1 to CP command for network configuration.
3. Added new commands BM, BN to select band mask.
4. Added new command N# to select network preference.

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]
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1140B (June 14, 2018)

This is a recommended release.

NEW FEATURES

1. File system support
 - o ATFS command to access through Command Mode
 - o MicroPython file interfaces for programmatic access
 - o Provides MicroPython module import support
 - o Allows storage of TLS certificates for authentication
 - o Secure encrypted file storage to protect MicroPython code and TLS private keys
 2. TLS Authentication
 - o Accessed in MicroPython with the `ussl.wrap_socket` method
 - o Configurable with the `$0/$1/$2` commands
 - o Uses certificates stored on the file system
 - o New API frame 0x23 to access multiple authentication profiles
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1140A (May 4, 2019)

This is a recommended release.

NEW FEATURES

1. Initial release
2. Digital I/O support
3. Analog Input support
4. API & Transparent mode
5. AT command mode
6. By-pass to raw cellular module
7. SMS
8. TCP/UDP (up to six sockets)
9. TLS (up to six sockets)
10. Incoming connections
11. MicroPython!
 - o On-device programmability to add local intelligence
 - o Many examples in the Digi MicroPython Programmer Guide
 - o AT commands for managing run-time behavior
12. Low power modes
 - o LTE power save mode (PSM)

- Deep sleep mode
 - Pin sleep support
 - Cyclic sleep support
 - Airplane mode support
13. Digi TrustFence secure boot
 14. SMS UTF-16/UCS-2 encoding support
 15. Multi-network capability (Verizon, AT&T, ...)

BUG FIXES

1. When a transmission wakes the cellular component from the PSM sleep state, it is possible for the transmission to fail while network registration is being confirmed and retry may be necessary.
[XBCELL-3506]

*Release Notes Part Number: 93001302