Release Notes

Octane 6.0.3

ABOUT THIS RELEASE

This Octane firmware release is compatible with Impinj Speedway® Fixed Readers (models R120, R220 and R420) and Impinj Gateways (models xPortal R640, xSpan R660 and xArray R680). This release is not compatible with legacy Speedway IPJ-R1000 readers.

SUPPORTED REGIONS OF OPERATION

Impinj readers and gateways have been certified for use in multiple regions and geographies. A list of supported regions and geographies is available online at www.impinj.com/supported_regions

APPLICATION COMPATIBILITY

Application	Version
Octane Software Development Kit (SDK) libraries (.NET, Java)	3.0.0
Octane LLRP Tool Kit (LTK) libraries (.NET, Java, C for Linux, C++ for Linux)	10.34.0
LLRP Vendor Extension Definitions for LLRP Toolkit	1.30.0
Octane Embedded Tool Kit (ETK)	6.0
ItemTest software	1.14.0
Speedway Connect software	2.8.0

DOCUMENT COMPATIBILITY

Document	Version
Impinj Speedway Installation and Operations Manual	6.0
Impinj xArray Installation and Operations Manual	6.0
Impinj Firmware Upgrade Reference Manual	6.0
Impinj RShell Reference Manual	6.0
Impinj Octane SNMP	6.0
Impinj Octane LLRP	6.0
Impinj LLRP Tool Kit (LTK) Programmers Guide	6.0
Impinj Embedded Developers Guide	6.0

NEW FEATURES AND CHANGES

Octane 6.0.3

- Added support for three new products operating in the EU 915 – 921 MHz upper frequency band. Upper band operation is defined in harmonized European standard ETSI EN 302 208 and is characterized by up to 4 W e.r.p and three 400 kHz channels with center frequencies of 916.3, 917.7 and 918.7 MHz. The new products are:
    - Speedway 4-port reader part number IPJ-REV-R420-EU2
    - xSpan gateway part number IPJ-REV-R660-EU2
    - xArray gateway part number IPJ-REV-R680-EU2
- Added new regulatory region 29, “ETSI_915 – 921 MHz band,” to the LLRP definitions
- Added link layer discovery protocol (LLDP) and Cisco discovery protocol (CDP) support for PoE+ power negotiation.
- Changed default RF reader mode to 1002 for all readers and gateways. While this change benefits all products, the Speedway R420 implementation of mode 1002 yields a faster read rate than the R220/R120 readers.
- The ImpinjIntelligentAntennaManagement parameter default changed from ON to OFF for Speedway readers and the xPortal gateway. Generally it should be re-enabled only in multi-readzone use cases where antennas are covering different zones with dynamic tag populations. It is also re-enabled automatically if Low Duty Cycle is enabled.
- Added Ubuntu 18 support to the Octane Embedded Tool Kit (ETK)

Octane 5.14.0

- South Africa added as Speedway R120 GX2 reader selectable region (reader model IPJ-REV-R120-GX22M1)
- Number of SNMP trap sinks supported increased from 1 to 4 for enhanced SNMP-based reader monitoring and management
- Default value for ImpinjIntelligentAntennaManagement parameter changed from ON to OFF for xSpan and xArray gateways. Default remains ON for Speedway readers and the xPortal gateway.
- The IntelligentAntennaManagement feature will be automatically enabled if Low Duty Cycle is enabled. Low Duty Cycle is not recommended for use with xArray or xSpan Gateways.
- RF reader mode 1005 “AutosetCustom” added. This mode is reserved by Impinj for future use.

Octane 5.12.3

- Added Thailand as an available region for the xSpan GX1 gateway (model IPJ-REV-R660-GX11M1)

Octane 5.12.2

- Addresses NTP and DHCP issues
- Addresses IPv4 and IPv6 static IP address issues

Octane 5.12.1

- Improves the default xArray location algorithm resulting in faster and more accurate tag location reports

Octane 5.12.0

- Support Speedway R120 reader operation
    - Octane 5.12.0 or later is required for fixed reader model IPJ-REV-R120-xxxxxx
- Added enabling or disabling mDNS via RShell
- Enhanced security
    - Updated openssh to 7.4p1
    - Updated openssl to 1.0.1u
    - Updated thttpd to 2.27

Octane 5.10.1

- Added Philippines as an available region for Speedway R420 GX1 readers (model IPJ-REV-R420-GX12M1)
- Added Brazil, Hong Kong, Malaysia, Singapore and Taiwan as available regions for xSpan GX1 gateways (model IPJ-REV-R660-GX11M1)
- Added China as an available region for xSpan GX2 gateways (model IPJ-REV-R660-GX21M1)

Octane 5.10.0

- Enabled IPv6 network operation
  - Support includes DHCP, static addressing, DNS, HTTP, NTP, FTP, Telnet, SSH, cURL, zeroconf, SNMP, SNMP traps, and LLRP
  - Libraries updated
- Improved xSpan R660 and xArray R680 direction mode accuracy
  - Changed the direction algorithm to allow an age interval of 0.5 seconds
  - Changed the direction algorithm such that the “most seen” sector is reported in the “last seen” fieldname in the Update Report
- Added Singapore as an available region for Speedway R220 GX1 readers
- Added Korea as an available region for Speedway R420 GX2 readers, xPortal R640 GX2 gateways and xArray R680 gateways

Octane 5.8.1

- SNMP trap management data is sent to *localhost* when SNMP and SNMP traps are enabled

Octane 5.8.0

- Enable xSpan Gateway operation
  - Provides control of 13 beams organized into 3 linear sectors (a center sector [1] and two outer sectors [2, 3])
  - Enables Inventory operations
  - Enables single axis Direction Role (tag direction is reported when tagged items in the field of view transition between sectors in the direction aligned along the major axis of the enclosure)
- Supports the MarginRead command
  - Feature available in the Impinj Monza R6 family of tag chips
  - Used to validate that non-volatile memory (NVM) bits (e.g. EPC) were strongly written during tag access operations
- Allows each antenna enabled in the Antenna Inventory Specification (AISpec) to have different inventory search modes
  - Enables fine control of search modes to optimize reading tags in inventory role
- Enables repeated antenna IDs in a sequence specified in the Antenna Inventory Specification (AISpec)
  - Enables changing the configuration of an antenna multiple times within the same AISpec to improve inventory efficiency
  - The length of the sequence is constrained by number of antennas connected to the reader
- Enhances Network Time Protocol (NTP) functionality
  - Option to enable or disable NTP
  - Option to enable or disable dynamic servers
  - Faster synchronization at startup
  - Added reliable NTP status indicators
- Increases the EPCglobal Gen2 Read command WordCount to 60 words maximum
  - Prior limit was 32 words
  - Facilitates reading more tag memory in a single read operation
- Adds SingleTargetReset enumerator to Octane SDK SearchMode
  - Reader inventories tags that are in inventory state B and resets the inventory flag to state A so that they will respond to reader queries
  - Useful for high-throughput applications to avoid the long decay times of SingleTarget search mode with session 2 or 3
- Provides a LLRP event notification before a reader uses an antenna
  - Enables close monitoring of antenna usage as opposed to inferring usage from tag reports
  - Has the potential of generating substantial LLRP traffic so should be used only when required
- Removed upper channels from Australia and New Zealand regions
  - Reduces potential interference and improves performance
- Removes India as a selectable region for EU model readers and gateways
  - India compliant model available from certified partner in India
- Adds Hong Kong as a selectable region for GX1 model readers and gateways

Octane 5.6.0

- Encrypt LLRP communications using transport layer security (TLS) protocol version 1.2
  - Self-signed certificate (no client validation)
  - Inbound connections only
  - Cipher suites
    - TLS_RSA_WITH_3DES_EDE_CBC-SHA
    - TLS_RSA_WITH_AES_128_CBC-SHA
    - TLS-RSA_WITH_AES_128_GCM-SHA256
- Protect reader and gateway infrastructure from unauthorized access
  - Reader authentication using simple network management protocol (SNMP) version 3
    - MD5 authentication protocol
  - Reader authentication using IEEE 802.1X with EAP MS-CHAPv2
    - Windows 2012 server
    - In addition to existing EAP MDF and PEAP authentications
- Monitor reader and gateway infrastructure using a network management system (NMS) and SNMP v2c traps
  - Supported traps

Network linkup	nsNotifyShutdown	nsNotifyRestart
authenticationFailure	impUnexpectedRestart	coldStart

- Improve xArray location accuracy by optimizing RF transmission characteristics to fit the local environment
  - Disable beams to minimize reflections from nearby metal surfaces
  - Reduce transmit power to minimize reflections
- Integrate data from USB human interface devices
  - USB drivers for HID such as keyboards and barcode scanners
- Utilize custom Impinj reader modes
  - Use mode 1003 (Autopilot Static Fast) for fast capture of xArray location data
  - Use mode 1004 (Autopilot Static Dense Reader) to maximize tag reads in multi-reader environments with high RF interference
- Develop xArray tag direction applications
  - LLRP Tool Kit
  - .Net SDK library
- Updated operating system
  - Debian version 8 “Jessie”

Octane 5.4.0

- Added tag direction mode for xArray when used with Octane Java SDK 1.20
- Added security features
  - Wired 802.1x
    - WPA supplicant implementation on reader
    - Extensible Authentication Protocol (EAP) methods supported
    - MD5 - provides authentication of EAP peer to the EAP server
    - PEAP – Protected Extensible Authentication Protocol
  - SFTP upgrades
    - Secure download of metafile and .upg files
    - Server access credentials provisioned via RShell
  - Customer Application Partition (CAP) file security for embedded applications
- Added mode AutoPilot Static (1002) to read static tags
- Deprecated Mode 1001. Note: starting with Octane 4.8, mode 1001 was mapped to mode 1000
- Added xArray beam polarization control
- Setting update interval to 0 results in tag reports being sent every 0.5 seconds (tag limit for this setting is 512 tags)

- Updates to tag limits for WAM and location modes are as follows:

Mode	Tag Limit	Min Update Interval
0 – MaxThroughput	1024	1
1 – Hybrid	1024	1
2 - DenseReaderM4	4096	3
3 - DenseReaderM8	4096	3
4 - MaxMiller (FCC)	1024	1
5 - DenseReaderM4Two (ETSI)	4096	3
1000 – AutoSetDenseReader “AutoPilot”	4096	3
1002 – AutoSetDenseReaderDeepScan “AutoPilot Static”	4096	3

Octane 5.2.2

- Added support for GX3 readers for Australia;
- GX1 readers can no longer be configured for Australia; it has been removed from the drop-down list in “Available Regions” on the reader’s web UI.
- Upgrading a GX1 reader that is currently configured for Australia will lock the reader in Australia region
- Improvements made to enhance reader stability

Octane 5.2.1

- Addresses Shell Shock vulnerability
- Support for wide area monitoring (WAM) and locationing roles on xArray (R680)
- xArray tilt sensor updates are disabled while a location spec is running
- xArray LED updates are disabled while a location spec is running; if application makes an LLRP connection and immediately starts a ROSpec, the LED may become disabled before changing the LLRP connection LED to solid. Under normal circumstances when an application establishes an LLRP connection, the Octane firmware will set the LLRP connection status LED to solid and then when a ROSpec is started, it disables control of the LEDs before starting the ROSpec. If the connection and ROSpec happen quickly one after the other, the LLRP connection status may remain in a blinking state.
- ReportIntervalSeconds moved from ImpinjLocationReporting to ImpinjLocationConfig and renamed to UpdateIntervalSeconds.
- MotionWindowSeconds renamed to ComputeWindowSeconds
- If GET_REPORT command is issued when location role is active, we do not recompute the location estimates (xArray returns last computed location for all tags).
- ComputeWindowSeconds and TagAgeIntervalSeconds parameters are 16-bit values now
- xArray maximum tag counts are now dependent on mode:

Mode 0: 128 tags	Mode 2: 1024 tags	Mode 1000: 256 tags
Mode 1: 256 tags	Mode 3: 2048 tags	Mode 1002: 2048 tags
	Mode 4: 512 tags	

- The host name for xArray (R680) is now xarray-xx-xx-xx
- TimeStampUTC in location reports has been renamed to LastSeenTimestampUTC.
- xArray location role returns empty report when GET_REPORT issued with no tags; this used to do nothing in prior firmware versions
- xArray location role forces Tx power to max value in all cases, even if set to lower power in SET_READER_CONFIG

RESOLVED ISSUES

Octane 6.0.3

- Fixed an NTP issue where enabling and disabling NTP rapidly could result in inaccurate NTP status.
- Fixed an intermittent xArray issue where the status LED of a LLRP connected gateway would blink green. The correct state for the LED is solid green when a LLRP host is connected.

Octane 5.14.0

- Fixed reporting issue where the xArray gateway PCBA serial number was incorrectly reported using LLRP capabilities command

Octane 5.12.3

- Fixed LLRP port (5083) access issue when the reader is not connected to a network.
- Fixed Speedway R220 2-Port EU reader crash caused by sending a fast sequence of “GET_READER_CONFIG LLRP” requests
- Fixed an issue introduced in Octane 5.12.2 where RShell and WebUI were not displaying subnet mask, default gateway and broadcast address when reader is assigned a static IP address.
- Resolved an issue where readers configured with DHCP would occasionally drop off the network.
- Resolved an issue where watchdogs would infrequently cause reader reboots.
- Improved single target, single antenna inventory behavior.

Octane 5.12.2

- Fixed NTP issue when NTP was not starting when in static IP address mode.
- Fixed auto-calculation issue when static IPv4 address is used without a broadcast address.
- Fixed handling of IPv6 static masks display issue in shell and webUI.
- Fixed issue to always choose static IP address when its specified

Octane 5.12.1

- Fixed an NTP issue where the error message “Status=6’System-Resource-Limited" was mistakenly reported when both the reader and NTP server are assigned static IP addresses
- Fixed crash when AccessSpec specifies multiple C1G2BlockWrites with total WriteCount > 32

Octane 5.12.0

- Fixed issue where web UI and RShell command would return different IP addresses
- Fixed issue where RShell command would return incorrect IP address when using a static address
- Fixed issue where DHCP failed when the Ethernet cable was connected to the reader after power up
- Added nsswitch.conf and resolv.conf files which were inadvertently removed in previous release

Octane 5.10.1

- Fixed an NTP ntp.conf restriction issue associated with IPv6 addresses
- Fixed several issues with configuring ntp via rshell and ntp time synchronization

Octane 5.10.0

- Fixed reader connection using the mDNS local hostname resolution feature (e.g. speedway-xx-xx.local) when reader is directly connected to a computer via Ethernet cable.
- Fixed issue with installation of encrypted CAP files
- Fixed xArray location algorithm METRIC_ACTUAL_NUMBER_CYCLES metric
- Fixed WebUI issue where the reader reboot button could be clicked while a reader firmware upgrade was in-progress

Octane 5.8.0

- Fixed an issue where the PC word was not reported when using the Monza R6 FastID feature
- Improved the reliability of the FastID feature in Reader mode 2 with Monza R4 and R5 tag chips
- Fixed issue where antenna hub ID number was incorrectly reported in ETSI readers
- Addressed glibc vulnerability CVE-2016-3075
- Fixed how the web UI displayed the xPortal gateway when the product was in idle state
- Improved the stability of USB hubs

Octane 5.6.4

- Fixed a syslog issue that caused the watchdog daemon to reboot the reader

Octane 5.6.2

- Added auto-adjustment of xPortal transmit power
    - Transmit (TX) power set via LLRP is automatically adjusted to ensure that radiated RF power limits are correct for the xPortal (R640) gateway. The maximum TX power setting allowed by LLRP remains unchanged from table 9.1, *Regional Transmit Power Capabilities*, in the Octane LLRP manual.
    - For example with region 0: FCC part 15.247, if the LLRP TX power is set to 28.5dBm the Octane 5.6.2 firmware will automatically adjust the xPortal radiated TX power to 4W EIRP, the allowed maximum power.
    - xPortal gateways running earlier versions of firmware (< 5.6.2) must have the maximum LLRP TX power setting manually decreased to maintain regulatory compliance.
    - The TX adjustment may result in read range degradation.

Region	TX Adjustment
FCC, Australia, Bangladesh, Brazil, Canada, China, Hong Kong, Indonesia, Korea, Latin America, Malaysia, New Zealand, Peru, Philippines, Singapore, South Africa, Taiwan, Thailand, Uruguay, Vietnam	-1.50 dBm
ETSI, India	-0.25 dBm

- Fixed an Octane 5.6.0 FTP issue which prevented the FTP server from starting
- Fixed an intermittent reader reboot issue during the firmware upgrade process
- Added China to the list of xArray gateway supported countries
- Fixed the user documentation quick link on the reader web UI

Octane 5.6.0

- Fixed issue that caused reader to fail during user data writing

Octane 5.4.0

- Fixed memory leak in reader caused by sending a GET_READER_CONFIG LLRP message.
- Fixed Single Target with Suppression / Tag Focus
- FastID now reports TID for any tag with TID memory equal to 96 bits; if TID is less than 96 bits, no TID is reported

Octane 5.2.2

- Updated ETSI support to version 1.4.1
- Removed STP status from reader's web UI
- Updated copyright on reader's web UI

Octane 5.2.0

- Fixed issue where Java LTK AntennaEvent.getAntennaID() reports an incorrect Antenna ID
- Fixed condition where Peru region was rejected by SET_READER_CONFIG
- Fixed issue causing NTP data for static servers being deleted in RShell
- Reader web UI updated with correct ETSI standard 302 208 v1.4.1 NOT 302 208 v1.2.1

DEPRECATED FUNCTIONALITY

Octane 5.12.0

- Removed Telnet support to address a security vulnerability
    - Use SSH as an alternative for remote management
- Removed TFTP upgrades to address a security vulnerability

Octane 5.10.0

- Removed from WebUI the option to select Singapore as an available region for xPortal R640 GX1 gateways
- Removed capability to configure GPS and cellular via RShell
- Removed capability to set userclass in DHCP
- Removed capability to disable the sending of hostname in DHCP
- Removed capability to disable LLRP service broadcast in zero-configuration networking (zeroconf) discovery

Octane 5.6.0

- USB Wi-Fi adapters supported in versions 5.2 and 5.4 are not supported in versions 5.6 or later

KNOWN ISSUES

- Reader and gateways with PCBA revision 6.0 or higher require Octane 6.0 firmware or higher. Earlier versions of Octane firmware will not install on PCBA revision 6.0 or higher. Octane 6.0 firmware will install on PCBA revisions 4 and 5.
- An EU upper band reader or gateway (IPJ-REV-Rxxx-EU2yyy) must be powered by either an Impinj AC/DC adapter or an IEEE 802.3at PoE+ supply. Use of an IEEE 802.3af PoE PSE will result in unreliable, difficult to identify, and potentially degraded reader operations.
- Rshell “show system platform” will return active power source = “jack” if an AC/DC adapter is connected to an EU upper band product (IPJ-REV-Rxxx-EU2yyy) even if the adapter is not connected to AC power.
- When an antenna hub is used with a Speedway EU reader in fixed frequency mode the antenna port is always declared 'unusable' and 'FAULT' and 'ANT_NOT_READY' errors are reported. Best practice is to avoid use of fixed frequency operation when deploying antenna hubs.
- A LAN with a high volume (rate approaching 80 KB/s) of multicast DNS (mDNS) traffic may cause unplanned, intermittent reader reboots. The mDNS protocol is primarily implemented by Apple Bonjour and open source Avahi software packages. Segregating the reader by assigning it to its own VLAN resolves the issue.
- It may take up to 3 minutes to re-establish full network connectivity following a reader reboot
- The ImpinjReader.applySettings method sends an incompatible reader configuration to the reader causing an exception
- Displaying dynamic NTP servers is not supported
- WPA over Ethernet on IPv6 networks is not tested
- When changing to/from a static IP address from/to dynamic addressing the reader must be rebooted
- Using the reader as a HID device connected to a USB 3.0 port on the host computer is not supported
- RShell does not report WLAN status correctly
- C1G2 read with length=0 is not supported
- When firmware upgrades are performed using a metafile, if retrieve-period is set to less than 5 minutes, firmware upgrade may fail
- NTP data for static servers may return only alias; for NTP servers like time.nist.gov, getHostByName is only returning one address, and which one it returns seems to be non-deterministic.
- Reader may stop working when attempting blockWrite of 32 words and 8 OpSpecs without specifying ImpinjBlockWriteWordCount.
- Reader may stop working when executing a ROSpec with one AccessSpec and 16 OpSpecs in 1 AccessCommand.
- Broadcast UDP snmp messages are not being sent from the reader.
- Antenna Hub WebUI misaligned port numbers rendered in the image when using Chrome.
- GPS coordinates reported in Rshell from cellular modem is incorrect, and do not match the correct coordinates reported via LLRP.
- The show image summary command in LastOperationStatus field returns with a typo, “LastOperationStatus=’couldn”””t connect to host”.
- Applying a ROSpec with multiple AISpecs may cause reader to reboot.
- Manually applying a VAR region upgrade (.upg) using the WebUI causes the browser to lose HTTP connectivity. Workaround – use region dropdowns in WebUI or Rshell for region upgrades with .upg file.
- Firmware downgrades to a version earlier than region is supported will cause the reader to revert to a state with no region assigned and the reader does not operate.

- If a reader is assigned a hostname from DHCP and then not assigned a host name when the DHCP lease is renewed, the assigned hostname will be used until the reader is rebooted and the original default hostname (e.g. speedwayr-xx-xx-xx) is use
- When running Low Duty Cycle, the reader will not go into low power mode as expected from the empty field timeout setting. This is especially noticeable in AutoSet Dense Reader and Max Throughput reader modes. Instead use Max Miller, or Dense Reader (M=4) or (M = 8).
- The response from the RShell command “show rfid llrp rospec 0” does not show the RO Spec parameters on xArray and xSpan.

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