Intel® RSP SW Toolkit - Gateway

Application Interface (API)

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# Introduction

This document defines the Application Interfaces (API) formats used by the Intel® RSP SW Toolkit – Gateway. The features and functionality included are intended to showcase the capabilities of the Intel® RFID Sensor Platform (Intel® RSP) by demonstrating the use of the API to collect and process RFID tag data. THE SOFTWARE IS NOT INTENDED TO BE A COMPLETE END-TO-END INVENTORY MANAGEMENT SOLUTION.

## Terminology

|  |  |
| --- | --- |
| **Term** | **Description** |
| RSP | RFID Sensor Platform |
| NFC | Near Field Communications |
| GPIO | General Purpose Input / Output |

## Reference Documents

|  |  |
| --- | --- |
| **Document** | **Document Number** |
| RFID Sensor Platform – Hx000  Installation & User Guide | 338088 |
| RRS-Hx000\_Message\_API | 338178 |
| Intel® RSP SW Toolkit – Gateway, Installation & User Guide | 338443 |
| Intel® RSP SW Toolkit – Sensor NFC App, Installation & User Guide | 338454 |
| Intel® RSP SW Toolkit – Gateway, Application Interface | 338971 |

# System Description

The Intel® RSP SW Toolkit – Gateway is a Reference Design intended to showcase the capabilities of the Intel® RFID Sensor Platform (Intel® RSP) by demonstrating the use of the API to collect and process RFID tag data as well as highlighting various features and functionality commonly used by inventory management systems. THIS SOFTWARE IS NOT INTENDED TO BE A COMPLETE END-TO-END INVENTORY MANAGEMENT SOLUTION.

A goal of the Intel® RSP is to be as “zero-config" as possible. To achieve this, the system architecture makes use of existing technologies such as DHCP, mDNS Service Discovery and MQTT. Also, each Intel® RSP can be optionally provisioned via NFC to support mutual authentication and identification to the Gateway. The figure below illustrates this messaging.

Figure 1: Zero-Config Data Flow

The Intel® RSP SW Toolkit – Gateway utilizes three types of data interfaces…

1. mDNS Service Discovery announcements
2. REST interfaces
3. JSON RPC over MQTT

The figure below illustrates the type of data exchanged across these interfaces.

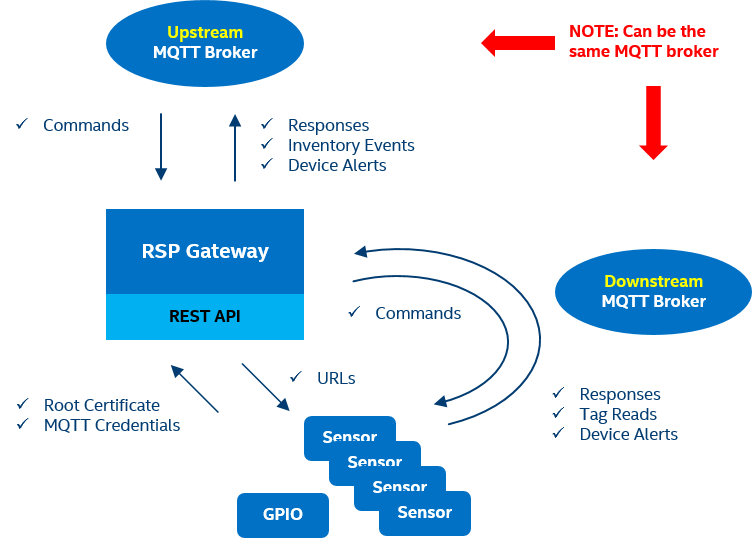


Figure 2: Data Interfaces

## mDNS Service Discovery

The Gateway announces basic Gateway Services (Root Certificate, MQTT Credential and NTP Time Server URL using a DNS service announcement.

## REST Endpoints

* + 1. Root Cert Endpoint

The Root Certificate Endpoint returns the CA Root certificate (in one-line PEM format) used for this installation of the Intel® RSP.

* + 1. MQTT Credentials Endpoint

The MQTT Credentials Endpoint returns a JSON object containing broker URL, topic and password information needed to connect to the MQTT broker.

## JSON RPC

JSON RPC over MQTT is used to command and control the RFID and GPIO devices on the “downstream” channels. It is also used to command and control the Gateway itself on the “upstream” channels. This exchange of information follows the JSON RPC 2.0 specification. JSON-RPC is a stateless, lightweight protocol that is transport agnostic.

### Request Object

The Request object has the following members:

* **jsonrpc**
  + A String specifying the version of the JSON-RPC protocol.
* **method**
  + A String containing the name of the method to be invoked.
* **params**
  + A Structured value that holds the parameter values to be used during the invocation of the method.
  + This member may be omitted.
* **id**
  + An identifier containing a String or Number value (if included).
  + This member is used to correlate the context between requests and responses.

### Response Object

The Response is expressed as a single JSON Object, with the following members:

* **jsonrpc**
  + A String specifying the version of the JSON-RPC protocol.
* **result**
  + The presence of this member indicates successful execution of the corresponding method.
  + This member is not present when the execution of the method resulted in an error.
* **error**
  + The presence of this member indicates unsuccessful execution of the corresponding method.
  + This member is not present when the execution of the method was successful.
  + When present, the error Object contains the following members:
    - **code**
      * An integer that indicates the error type that occurred.
    - **message**
      * A String providing a short description of the error.
    - **data**
      * A Primitive or Structured value that contains additional information about the error (optional).
  + See table below for supported error codes.
* **id**
  + This member is always present on a response and contains the same value as the id member in the corresponding Request Object.
  + This member is not present on indications.

### Error Codes

The RSP provides one of the following error codes when an error occurs.

Table 1 JSON RPC Error Code Fields

|  |  |  |
| --- | --- | --- |
| **Code** | **Message** | **Meaning** |
| -32001 | Wrong State | Cannot be executed in the current state |
| -32002 | Function not supported | The requested functionality is not supported |
| -32100 | No facility assigned | The RSP has no Facility ID assigned yet |
| -32601 | Method not found | The method does not exist |
| -32602 | Invalid Parameter | Out of range or invalid format |
| -32603 | Internal Error | RSP application error |
| -32700 | Parse error | Invalid JSON Object |

### Notification Object

A Notification is a Request object without an "id" member. A Request object that is a Notification signifies that a corresponding Response object is not expected.

### MQTT Topics

#### Upstream

The following MQTT Topics are used to communicate with the Gateway.

rfid/gw/alerts

rfid/gw/events

rfid/gw/command

rfid/gw/response

rfid/gw/notification

#### Downstream (Sensor)

The following MQTT Topics are used to communicate with RFID Sensor Platforms.

rfid/rsp/connect

rfid/rsp/command

rfid/rsp/response

rfid/rsp/data

rfid/rsp/rsp\_status

#### Downstream (GPIO Device)

The following MQTT Topics are used to communicate with GPIO Devices.

rfid/gpio/connect

rfid/gpio/command

rfid/gpio/response

rfid/gpio/status

# Data Definitions

This section defines the messages associated with each of the Gateway interfaces.

## mDNS Service Announcement

The Gateway (or its proxy) announces basic Gateway Services using the JmDNS service announcement.

* + - 1. JmDNS ServiceInfo Parameters

Table 2 JmDNS ServiceInfo Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| type | A string value defined as "\_rfid.\_tcp.local." |
| name | A string value defined as "RFID-Gateway" |
| port | An integer value defined as 0. |
| text | A string value defined as a JSON Object (see below) |

* + - 1. JmDNS Text Field

The following JSON Object is an example "text" string.

{

"sensor\_token\_required":true,

"root\_cert\_url":"http://some-server.com/endpoint",

"mqtt\_credentials\_url":"https://some-server.com/endpoint",

"ntp\_host":"RFID-Gateway-01.local"

}

Table 3 JSON Text Field Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sensor\_token\_required | Boolean to indicate the use of a provisioning tag |
| root\_cert\_url | The URL for accessing the cloud CA root certificate |
| mqtt\_credentials\_url | The URL for accessing the mqtt credentials |
| ntp\_host | The address or hostname of the local NTP server. |

## REST Endpoints

* + 1. Root Certificate Endpoint
       1. GET

N/A

* + - 1. Response

The Root Certificate Endpoint returns the CA Root certificate (in one-line PEM format)

{

"one\_line\_pem":"-----BEGIN CERTIFICATE-----\nMIIEKzCCAxOgAwIBAgIJAOCJFM85pZzDMA0GCSqGSIb3DQEBCwUAMIGrMQswCQYD\nVQQGEwJVUzETMBEGA1UECAwKQ2FsaWZvcm5pYTERMA8GA1UEBwwIQ2FybHNiYWQx\nHzAdBgNVBAoMFkVuY2luaXRhcyBMYWJvcmF0b3JpZXMxDTALBgNVBAsMBFJGSUQx\nGjAYBgNVBAMMEWVuY2luaXRhc2xhYnMuY29tMSgwJgYJKoZIhvcNAQkBFhljb250\nYWN0QGVuY2luaXRhc2xhYnMuY29tMB4XDTE2MTAzMDIyNDY0NVoXDTE3MTAzMDIy\nNDY0NVowgasxCzAJBgNVBAYTAlVTMRMwEQYDVQQIDApDYWxpZm9ybmlhMREwDwYD\nVQQHDAhDYXJsc2JhZDEfMB0GA1UECgwWRW5jaW5pdGFzIExhYm9yYXRvcmllczEN\nMAsGA1UECwwEUkZJRDEaMBgGA1UEAwwRZW5jaW5pdGFzbGFicy5jb20xKDAmBgkq\nhkiG9w0BCQEWGWNvbnRhY3RAZW5jaW5pdGFzbGFicy5jb20wggEiMA0GCSqGSIb3\nDQEBAQUAA4IBDwAwggEKAoIBAQDgB+m9NQyd4pcqfYSi++DmO2aCmXoNPmfJzAFZ\nxsgjIIlKweDujpt3At3Zk3ogZNPQTkaYCVdwnABs3tMmjiGOhqgHEmXXsDUUtFiR\nkObtehBc6khqIrE/eRR94P0B/NXHvuKrgeQxIO2nv9Q6E16H/mlV1udTtPHQrQ4w\n91gkShWjmXe7LfBh/mdEPM9F1TbG9CgV46QBN2Fl0ouFvC89t88IqcKlBVNr3xvx\niCwaWQs0wWcHinF+rDtX2mjRYLV4ItfLd5AYiuVk1id24KowMgVDofgLLtBU7NJK\nq9ojUBIcaSgPfUATKrqegyVUImUSlS6M9R9oIYFujxPcJyW/AgMBAAGjUDBOMB0G\nA1UdDgQWBBRdbPlmWZ8X9ofsz5kWXHAgqtVnizAfBgNVHSMEGDAWgBRdbPlmWZ8X\n9ofsz5kWXHAgqtVnizAMBgNVHRMEBTADAQH/MA0GCSqGSIb3DQEBCwUAA4IBAQAk\n8o41WUQjleryN/aGStX8zj8cF6XA9Hnb4+HAPUAry4Q2cfdGu9uLHVBy2DQ46m3D\nUomVMXd+Q8EG09Iq6PHMlWVbYnkh2+fTiQkZaRM5BBC7lpQZcVi/ka7giklEv78y\nYGx9RoRgWVFWUhANdpRByWIVBuVxLiStrjOzqIF1X/uCXw8XHb48Ip6tDlfOa+rs\noTlw32CgDQBI5iM397zPoPcB71xXwBC4JaQr0Uk4nePGRarZKqY8/CYcBYlQEkbJ\nT/1NbXO2T4ixVjjvysw8blFedx1QqZ2ijAVXYBnLDqFoOF6uuaSmazuJ/gSQc9cv\nle28t5HuKhIAq4CR9c/k\n-----END CERTIFICATE-----\n"

}

Table 4 Root Certificate Endpoint Response

|  |  |
| --- | --- |
| Parameter | Definition |
| one\_line\_pem | The Root CA Certificate in one-line PEM format. |

* + 1. MQTT Credentials Endpoint
       1. POST

{

"username": "RSP-958a7b",

"sensor\_token":"123456789ABCDEF0123456789ABCDEF0"

}

Table 5 MQTT Credentials Endpoint POST

|  |  |
| --- | --- |
| Parameter | Definition |
| username | A username string (typically the hostname of the device) |
| sensor\_token | A hexadecimal string representation of a 256-bit token |

* + - 1. Response

{

"mqtt\_uri":"ssl://RFID-Gateway-01.local:8883",

"mqtt\_topic\_prefix":"rfid/rsp",

"mqtt\_password":"lu1qamFVhBdlVIbKfzdGuOCulPuS1bcY"

}

Table 6 MQTT Credentials Endpoint Response

|  |  |
| --- | --- |
| Parameter | Definition |
| mqtt\_uri | The URI containing the protocol, address or hostname and port of the MQTT broker |
| mqtt\_topic\_prefix | The MQTT topic prefix is prepended to the sub-topics used between the GW and Intel® RSP. The valid topics are…  < mqtt\_topic\_prefix >/connect  < mqtt\_topic\_prefix >/connect/< device\_id >  < mqtt\_topic\_prefix >/command/< device\_id >  < mqtt\_topic\_prefix >/response/< device\_id >  < mqtt\_topic\_prefix >/rsp\_status/< device\_id >  < mqtt\_topic\_prefix >/data/< device\_id>  < mqtt\_topic\_prefix >/gw\_status |
| mqtt\_password | The password used when connecting to the MQTT broker |

## JSON RPC

### Upstream

The following messages are sent via the upstream data broker.

Table 7 Gateway Upstream API

|  |  |
| --- | --- |
| **Command** | **Type** |
| behavior\_get\_all | Request / Response |
| behavior\_get | Request / Response |
| behavior\_put | Request / Response |
| cluster\_get\_config | Request / Response |
| cluster\_set\_config | Request / Response |
| downstream\_get\_mqtt\_status | Request / Response |
| downstream\_mqtt\_status | Notification |
| gpio\_clear\_mappings | Request / Response |
| gpio\_set\_mapping | Request / Response |
| inventory\_event | Notification |
| inventory\_get\_tag\_info | Request / Response |
| inventory\_get\_tag\_stats\_info | Request / Response |
| inventory\_read\_rate\_per\_second | Notification |
| inventory\_summary | Notification |
| inventory\_unload | Request / Response |
| oem\_cfg\_update\_status | Notification |
| remove\_device | Request / Response |
| scheduler\_get\_run\_state | Request / Response |
| scheduler\_run\_state | Notification |
| scheduler\_set\_run\_state | Request / Response |
| sensor\_config\_notification | Notification |
| sensor\_connection\_state\_notification | Notification |
| sensor\_get\_basic\_info | Request / Response |
| sensor\_get\_bist\_results | Request / Response |
| sensor\_get\_device\_ids | Request / Response |
| sensor\_get\_geo\_region | Request / Response |
| sensor\_get\_state | Request / Response |
| sensor\_get\_versions | Request / Response |
| sensor\_read\_state\_notification | Notification |
| sensor\_set\_geo\_region | Request / Response |
| sensor\_set\_led | Request / Response |
| sensor\_state\_summary | Notification |
| sensor\_update\_software | Request / Response |
| upstream\_get\_mqtt\_status | Request / Response |
| upstream\_mqtt\_status | Notification |

#### Behavior Get All

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "2",

"method" : "behavior\_get\_all"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "2",

"result" : [ {

"id" : "ClusterAllOn\_PORTS\_1",

"operation\_mode" : "NonContinuous",

"link\_profile" : 1,

"power\_level" : 30.5,

"selected\_state" : "Any",

"session\_flag" : "S1",

"target\_state" : "A",

"q\_algorithm" : "Dynamic",

"fixed\_q\_value" : 10,

"start\_q\_value" : 7,

"min\_q\_value" : 3,

"max\_q\_value" : 15,

"retry\_count" : 0,

"threshold\_multiplier" : 2,

"dwell\_time" : 4000,

"inv\_cycles" : 0,

"toggle\_target\_flag" : true,

"repeat\_until\_no\_tags" : false,

"perform\_select" : false,

"perform\_post\_match" : false,

"filter\_duplicates" : false,

"auto\_repeat" : false,

"delay\_time" : 0,

"toggle\_mode" : "OnInvCycle"

}, { ... }, {

"id" : "Manual\_WITH\_TID",

"operation\_mode" : "NonContinuous",

"link\_profile" : 1,

"power\_level" : 30.5,

"selected\_state" : "Any",

"session\_flag" : "S2",

"target\_state" : "A",

"q\_algorithm" : "Fixed",

"fixed\_q\_value" : 10,

"start\_q\_value" : 7,

"min\_q\_value" : 3,

"max\_q\_value" : 15,

"retry\_count" : 0,

"threshold\_multiplier" : 2,

"dwell\_time" : 4000,

"inv\_cycles" : 50,

"toggle\_target\_flag" : false,

"repeat\_until\_no\_tags" : true,

"perform\_select" : false,

"perform\_post\_match" : false,

"filter\_duplicates" : false,

"auto\_repeat" : false,

"delay\_time" : 0,

"toggle\_mode" : "OnInvCycle"

} ]

}

#### Behavior Get

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "0",

"method" : "behavior\_get",

"params" : {

"behavior\_id" : "ClusterAllSeq\_Ports\_1"

}

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "2",

"result" : [{

"id" : " ClusterAllSeq\_PORTS\_1",

"operation\_mode" : "NonContinuous",

"link\_profile" : 1,

"power\_level" : 30.5,

"selected\_state" : "Any",

"session\_flag" : "S1",

"target\_state" : "A",

"q\_algorithm" : "Dynamic",

"fixed\_q\_value" : 10,

"start\_q\_value" : 7,

"min\_q\_value" : 3,

"max\_q\_value" : 15,

"retry\_count" : 0,

"threshold\_multiplier" : 2,

"dwell\_time" : 4000,

"inv\_cycles" : 0,

"toggle\_target\_flag" : true,

"repeat\_until\_no\_tags" : false,

"perform\_select" : false,

"perform\_post\_match" : false,

"filter\_duplicates" : false,

"auto\_repeat" : false,

"delay\_time" : 0,

"toggle\_mode" : "OnInvCycle"

}]

}

#### Behavior Put

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "1",

"method" : "behavior\_put",

"params" : {

"id" : "Default",

"operation\_mode" : "NonContinuous",

"link\_profile" : 1,

"power\_level" : 30.5,

"selected\_state" : "Any",

"session\_flag" : "S1",

"target\_state" : "A",

"q\_algorithm" : "Dynamic",

"fixed\_q\_value" : 10,

"start\_q\_value" : 7,

"min\_q\_value" : 3,

"max\_q\_value" : 15,

"retry\_count" : 0,

"threshold\_multiplier" : 2,

"dwell\_time" : 10000,

"inv\_cycles" : 0,

"toggle\_target\_flag" : true,

"repeat\_until\_no\_tags" : false,

"perform\_select" : false,

"perform\_post\_match" : false,

"filter\_duplicates" : false,

"auto\_repeat" : true,

"delay\_time" : 0,

"toggle\_mode" : "OnInvCycle"

}

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "2",

"result" : [{

"id" : "Default",

"operation\_mode" : "NonContinuous",

"link\_profile" : 1,

"power\_level" : 30.5,

"selected\_state" : "Any",

"session\_flag" : "S1",

"target\_state" : "A",

"q\_algorithm" : "Dynamic",

"fixed\_q\_value" : 10,

"start\_q\_value" : 7,

"min\_q\_value" : 3,

"max\_q\_value" : 15,

"retry\_count" : 0,

"threshold\_multiplier" : 2,

"dwell\_time" : 10000,

"inv\_cycles" : 0,

"toggle\_target\_flag" : true,

"repeat\_until\_no\_tags" : false,

"perform\_select" : false,

"perform\_post\_match" : false,

"filter\_duplicates" : false,

"auto\_repeat" : true,

"delay\_time" : 0,

"toggle\_mode" : "OnInvCycle"

}]

}

Table 8 Behavior Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| id | The ID string assigned to this behavior |
| operation\_mode | The embedded RFID module transmit operation mode.  The valid values are "Continuous" and "NonContinuous".  The default value is "NonContinuous". |
| inventory\_mode | The embedded RFID module inventory mode.  The valid values are "EPConly" and "EPCplusTID".  The default value is "EPConly". |
| link\_profile | The RF Link Profile to be used for this behavior.  (see Table 48 Link Profile Parameters) The valid range is 0 – 4. |
| power\_level | The power output level in dBm to be used for this behavior. The valid range is 0 – 31.5. |
| dwell\_time | The maximum amount of time (ms) spent on a particular virtual port before switching to the next virtual port during an inventory cycle. If this parameter is zero, the “inv\_cycles" parameter may not be zero.  The valid range is 0 – 65535. |
| inv\_cycles | The maximum amount of inventory cycles to attempt on a particular virtual port before switching to the next virtual port during an inventory cycle. If this parameter is zero, the “dwell\_time" parameter may not be zero.  The valid range is 0 – 65535. |
| selected\_state | Specifies the state of the “SL" flag to be used for this behavior when specifying a select protocol operation. The valid values are:  “Any", “Deasserted" and “Asserted". |
| session\_flag | Specifies which inventory session flag is matched against the state specified by “target\_state". The valid values are “S0", “S1", “S2", “S3”. |
| target\_state | Specifies the state of the inventory session flag specified by “session\_flag" that are to apply the subsequent tag protocol operation.  The valid values are “A" and “B". |
| q\_algorithm | The specific Q algorithm being configured.  The valid values are “Fixed" and “Dynamic". When using a “Fixed" algorithm, the number of time slots is 2^Q. When using a “Dynamic" algorithm, the Smart Sensor Platform’s embedded module will vary the number of slots dynamically based on the number of tags responding. |
| fixed\_q\_value | The fixed Q value to use (valid when q\_algorithm = Fixed).  The valid range of this parameter is 0 – 15. |
| repeat\_until\_no\_tags | Specifies whether or not the singulation algorithm should continue until no more tags are singulated.  The valid values are “true" or “false". |
| start\_q\_value | The initial Q value to use at the beginning of an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| min\_q\_value | The minimum Q value that would ever be used during an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| max\_q\_value | The maximum Q value that would ever be used during an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| threshold\_multiplier | A 4X multiplier applied to the Q-adjustment threshold as part of the dynamic-Q algorithm.  The valid range of this parameter is 0 – 255. |
| retry\_count | The number of times to try another execution of the singulation algorithm before either toggling the target flag or terminating the operation.  The valid range of this parameter is 0 – 255. |
| toggle\_target\_flag | Specifies whether or not to toggle the targeted flag.  The valid values are “true" or “false". |
| toggle\_mode | When toggle\_target\_flag is true, this value specifies when to toggle the targeted flag. The valid values are “None”, “OnInvCycle", OnInvRound”, or “OnReadRate". |
| perform\_select | Specifies whether or not to perform a select command based on the previously configured criteria.  The valid values are “true" and “false". |
| perform\_post\_match | Specifies whether or not to perform a post singulation match based on the previously configured criteria.  The valid values are “true" and “false". |
| filter\_duplicates | Specifies whether or not the Intel® RFID Sensor Platform should filter out duplicate tag information before sending to the Gateway. The valid values are “true" or “false". |

Table 9 Link Profile Parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter / Profile Index | 0 | 1 | 2 | 3 | 4 |
| Modulation Type | DSB-ASK | PR-ASK | PR-ASK | DSB-ASK | DSB-ASK |
| Tari Duration (us) | 25 | 25 | 25 | 6.25 | 6.25 |
| Data 0/1 Difference | 1 | 0.5 | 0.5 | 0.5 | 0.5 |
| Pulse Width (us) | 12.5 | 12.5 | 12.5 | 3.13 | 3.13 |
| R-T Calculation (us) | 75 | 62.5 | 62.5 | 15.63 | 15.63 |
| T-R Calculation (us) | 200 | 85.33 | 71.11 | 20 | 33.33 |
| Divide Ratio | 8 | 21.33 | 21.33 | 8 | 21.33 |
| Data Encoding | FM0 | Miller-4 | Miller-4 | FM0 | FM0 |
| Pilot Tone | 1 | 1 | 1 | 1 | 1 |
| Link Frequency (kHz) | 40 | 250 | 300 | 400 | 640 |
| Data Rate (kbps) | 40 | 62.5 | 75 | 400 | 640 |

Table 10 Session Flag Persistence Values

|  |  |  |
| --- | --- | --- |
| Session | Tag Energized | Tag Not Energized |
| S0 | Indefinite | None |
| S1 | 500 ms < persistence < 5 s | 2 s < persistence |
| S2 | Indefinite | 2 s < persistence |
| S3 | Indefinite | 2 s < persistence |

#### Cluster Get Config

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "3",

"method" : "cluster\_get\_config"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "3",

"result" : {

"id" : "RetailUseCaseClusterConfigExample",

"clusters" : [ {

"id" : "BackStockCluster",

"personality" : null,

"facility\_id" : "BackStock",

"aliases" : [ ],

"behavior\_id" : "ClusterDeepScan\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150005" ] ],

"tokens" : [ ]

}, {

"id" : "SalesFloorCluster",

"personality" : null,

"facility\_id" : "SalesFloor",

"aliases" : [ ],

"behavior\_id" : "ClusterMobility\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150000" ] ],

"tokens" : [ ]

}, {

"id" : "SalesFloorExitCluster",

"personality" : "EXIT",

"facility\_id" : "SalesFloor",

"aliases" : [ ],

"behavior\_id" : "ClusterExit\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150004" ] ],

"tokens" : [ ]

} ]

}

}

#### Cluster Set Config

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "4",

"method" : "cluster\_set\_config",

"params" : {

"id" : "RetailUseCaseClusterConfigExample",

"clusters" : [ {

"id" : "BackStockCluster",

"personality" : null,

"facility\_id" : "BackStock",

"aliases" : [ ],

"behavior\_id" : "ClusterDeepScan\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150005" ] ],

"tokens" : [ ]

}, {

"id" : "SalesFloorCluster",

"personality" : null,

"facility\_id" : "SalesFloor",

"aliases" : [ ],

"behavior\_id" : "ClusterMobility\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150000" ] ],

"tokens" : [ ]

}, {

"id" : "SalesFloorExitCluster",

"personality" : "EXIT",

"facility\_id" : "SalesFloor",

"aliases" : [ ],

"behavior\_id" : "ClusterExit\_PORTS\_1",

"sensor\_groups" : [ [ "RSP-150004" ] ],

"tokens" : [ ]

} ]

}}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "4",

"result" : {

"id" : "RetailUseCaseClusterConfigExample",

"clusters" : [ {

...

}, {

...

}, {

...

} ]

}

}

Table 11 JSON Cluster Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| id | A string identifier for this cluster configuration. |
| clusters | A list of cluster objects (see below). |
| id | A string identifier for this particular cluster. |
| personality | The personality assigned to all sensors in this cluster. Valid values are: NONE, EXIT, POS, FITTING\_ROOM |
| facility\_id | The facility name assigned to all sensors in this cluster. |
| behavior\_id | The behavior name assigned to all sensors in this cluster. |
| aliases | The aliases assigned to all sensors in this cluster.  This is an array of strings (maximum of 4) that are used to alias the default location string of “RSP-xxxxxx-y” where xxxxxx is the last 6 characters of the MAC address and y is the antenna port (0 – 3). |
| sensor\_groups | A two-dimensional array of sensor device ids. All sensors in the same row will transmit at the same time. Each row will take turns transmitting in round-robin fashion. |

#### Downstream Get MQTT Status

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "5",

"method" : "downstream\_get\_mqtt\_status"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "5",

"result" : {

"connection\_state" : "DISCONNECTED",

"broker\_uri" : "tcp://debian-vbox.local:1883",

"subscribes" : ["rfid/rsp/connect",

"rfid/rsp/response/#"

"rfid/rsp/rsp\_status/#",

"rfid/rsp/data/#",

"rfid/gpio/connect",

"rfid/gpio/response/#",

"rfid/gpio/status/#"],

"publishes" : [ "rfid/rsp/command", "rfid/rsp/gw\_status" ]

}

}

Table 12 MQTT Status Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| result | The MQTT information summary object (see below). |
| connection\_state | The state of the upstream MQTT connection.  Valid values are: DISCONNECTED, CONNECTED |
| broker\_uri | The URI containing the protocol, address/hostname and port of the Downstream MQTT broker |
| subscribes | A list of strings representing the list of MQTT topics currently subscribed to. |
| publishes | A list of strings representing the list of MQTT topics currently publishing to. |

#### Downstream MQTT Status

##### JSON RPC Notification

{

"jsonrpc" : "2.0",

"method" : "downstream\_mqtt\_status"

"params" : {

"connection\_state" : "DISCONNECTED",

"broker\_uri" : "tcp://debian-vbox.local:1883",

"subscribes" : ["rfid/rsp/connect",

"rfid/rsp/response/#"

"rfid/rsp/rsp\_status/#",

"rfid/rsp/data/#",

"rfid/gpio/connect",

"rfid/gpio/response/#",

"rfid/gpio/status/#"],

"publishes" : ["rfid/rsp/command", "rfid/rsp/gw\_status"]

}

}

Table 13 MQTT Status Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | The MQTT information summary object (see below). |
| connection\_state | The state of the upstream MQTT connection.  Valid values are: DISCONNECTED, CONNECTED |
| broker\_uri | The URI containing the protocol, address/hostname and port of the Downstream MQTT broker |
| subscribes | A list of strings representing the list of MQTT topics currently subscribed to. |
| publishes | A list of strings representing the list of MQTT topics currently publishing to. |

#### GPIO Clear Mappings

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"method" : "gpio\_clear\_mappings",

"id": "1"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"result" : null,

"id" : "1"

}

#### GPIO Set Mapping

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "4",

"method" : "gpio\_set\_mapping",

"params" : {

"sensor\_device\_id" : "RSP-150001",

"gpio\_device\_id" : "remote-gpio",

"gpio\_info" : {

"index" : 2,

"name" : "gpio26",

"state" : "ASSERTED",

"direction" : "OUTPUT"

},

"function" : "SENSOR\_TRANSMITTING"

}

}

Table 14 GPIO Mapping Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sensor\_device\_id | A string corresponding to the sensor device id. |
| gpio\_device\_id | A string corresponding to the remote GPIO device hostname. |
| gpio\_info | A GPIO information object (see below). |
| index | An integer index for this GPIO assigned by the remote device. |
| name | A string name for this GPIO assigned by the remote device. |
| state | The requested state for this GPIO. Valid values are: ASSERTED, DEASSERTED |
| direction | The direction (assigned by the remote device) of this GPIO. Valid values are: INPUT, OUTPUT |
| function | The function beign mapped to this GPIO. Valid values are: START\_READING, STOP\_READING, SENSOR\_CONNECTED, SENSOR\_DISCONNECTED, SENSOR\_TRANSMITTING, SENSOR\_READING\_TAGS, NOT\_ASSIGNED |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"4"  
}

#### Inventory Event

##### JSON RPC Notification

{    
   "jsonrpc":"2.0",  
   "method":"inventory\_event",  
   "params":{

    "sent\_on":1424976117309,  
     "gateway\_id":"rsp-gateway-01",

    "data":[    
       {    
     "facility\_id":"Store87",

          "epc\_code":"30143639F8419145BEEF065F",

          "tid":"E28011606000020BCEC36DC1",

          "epc\_encode\_format":"unknown",

          "event\_type":"arrival",

          "timestamp":1424976117295,

     "location":"Back-Stock"

       }  
    ]  
 }

}

Table 15 Inventory Event Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| gateway\_id | A string corresponding to the Gateway hostname. |
| data | A list of RFID Item records (see below). |
| facility\_id | The facility assigned to the sensor this tag belongs to. |
| epc\_code | A string corresponding to the EPC of this tag record. |
| tid | A string corresponding to the TID of this tag record. |
| epc\_encode\_format | A string indicating how this EPC value was encoded. |
| event\_type | A string indicating the type of inventory event. Valid values are: arrival, departed, moved, returned, cycle\_count |
| timestamp | The millisecond timestamp of the last event from this tag. |
| location | The alias assigned to the sensor-port this tag belongs to. |

#### Inventory Get Tag Info

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "9",

"method" : "inventory\_get\_tag\_info",

"params" : {

"filter\_pattern" : "\*"

}

}

Table 16 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| filter\_pattern | A regular expression (regex) used to filter on the EPC value. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "9",

"result" : [ {

"epc" : "EPC000001",

"tid" : "TID000001",

"state" : "PRESENT",

"location" : "RSP-150005-0",

"last\_read\_on" : 1559685170392,

"facility\_id" : "BackStock"

}, {

"epc" : "EPC000002",

"tid" : "TID000002",

"state" : "PRESENT",

"location" : "RSP-150005-0",

"last\_read\_on" : 1559685170392,

"facility\_id" : "BackStock"

}, {

"epc" : "EPC000003",

"tid" : "TID000003",

"state" : "PRESENT",

"location" : "RSP-150005-0",

"last\_read\_on" : 1559685170392,

"facility\_id" : "BackStock"

} ]

}

Table 17 Tag Info Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| epc | A string corresponding to the EPC of this tag record. |
| tid | A string corresponding to the TID of this tag record. |
| state | The current state of this tag. Valid values are: UNKNOWN, PRESENT, EXITING, DEPARTED\_EXIT, DEPARTED\_POS |
| location | A string corresponding to the hostname/port or alias of the sensor this tag is associated with. |
| last\_read\_on | A millisecond timestamp of when this tag was last read. |
| facility\_id | The facility assigned to the sensor this tag belongs to. |

#### Inventory Get Tag Stats Info

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "9",

"method" : "inventory\_get\_tag\_stats\_info",

"params" : {

"filter\_pattern" : "\*"

}

}

Table 18 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| filter\_pattern | A regular expression (regex) used to filter on the EPC value. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "10",

"result" : {

"source\_aliases" : [ "RSP-150000-0", "RSP-150005-0"],

"epc\_map" : {

"EPC000001" : [ {

"source\_alias" : "RSP-150000-0",

"is\_location" : false,

"last\_read" : 1559685170392,

"n" : 2,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

}, {

"source\_alias" : "RSP-150005-0",

"is\_location" : true,

"last\_read" : 1559685168392,

"n" : 1,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

} ],

"EPC000003" : [ {

"source\_alias" : "RSP-150000-0",

"is\_location" : false,

"last\_read" : 1559685170392,

"n" : 2,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

}, {

"source\_alias" : "RSP-150005-0",

"is\_location" : true,

"last\_read" : 1559685168392,

"n" : 1,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

} ],

"EPC000002" : [ {

"source\_alias" : "RSP-150000-0",

"is\_location" : false,

"last\_read" : 1559685170392,

"n" : 2,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

}, {

"source\_alias" : "RSP-150005-0",

"is\_location" : true,

"last\_read" : 1559685168392,

"n" : 1,

"mean" : -95.0,

"std\_dev" : "-Infinity",

"min" : -95.0,

"max" : -95.0

} ]

}

}}

Table 19 Tag Stats Info Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| source\_aliasess | A list of all the source aliases that are included in this response. A tag read's source alias corresponds to the Alias that has been assigned the sensor device's antenna port that read the tag. By default it is the sensor device id and corresponding antenna port id. |
| epc\_map | A map, keyed by EPC (String) with a value that is a list of tag read statistics for each sensor that has read the tag. |
| source\_alias | A string corresponding to the source alias of the tag read. |
| is\_location | A Boolean that indicates if the tag is located at this device. |
| last\_read | A long Integer millisecond timestamp of when this tag was last read. |
| n | A long Integer number of tag reads in this distribution. |
| mean | A double representing the average RSSI from this device. |
| std\_dev | A double representing the standard deviation of RSSI from this device. |
| min | A double representing the minimum RSSI from this device. |
| max | A double representing the maximum RSSI from this device. |

#### Inventory Read-Rate per-Second

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"method" : "inventory\_read\_rate\_per\_second",

"params" : {

"read\_rate\_per\_second" : 154

}}

Table 20 Read-Rate per-Second Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| read\_rate\_per\_second | The cumulative number of tag reads per second averaged over the last 3 second period. |

#### Inventory Summary

##### JSON RPC Notification

{    
   "jsonrpc":"2.0",  
   "method":"inventory\_summary",  
   "params":{

"tag\_state\_summary":{

"PRESENT": 1260,

"EXITING": 21,

"DEPARTED\_EXIT": 44,

"DEPARTED\_POS": 2278

},

"tag\_read\_summary":{

"reads\_per\_second": 1102,

"within\_last\_01\_min": 1100,

"from\_01\_to\_05\_min": 80,

"from\_05\_to\_30\_min": 40,

"from\_30\_to\_60\_min": 30,

"from\_60\_min\_to\_24\_hr": 30,

"more\_than\_24\_hr": 1

}

}

}

Table 21 Inventory Summary Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| tag\_state\_summary | A Tag State Summary object (see below). |
| PRESENT | An integer number tags that are in the PRESENT state. |
| EXITING | An integer number tags that are in the DEPARTED state. |
| DEPARTED\_EXIT | An integer number tags that are in the DEPARTED\_EXIT state. |
| DEPARTED\_POS | An integer number tags that are in the DEPARTED\_POS state. |
| tag\_read\_summary | A Tag Read Summary object (see below). |
| reads\_per\_second | A long integer representing the cumulative read rate of all sensors connected to the Gateway. |
| within\_last\_01\_min | An integer representing the number of unique tags that were read in the last 1 minute. |
| from\_01\_to\_05\_min | An integer representing the number of unique tags that were last seen between 1 and 5 minutes ago. |
| from\_05\_to\_30\_min | An integer representing the number of unique tags that were last seen between 5 and 30 minutes ago. |
| from\_30\_to\_60\_min | An integer representing the number of unique tags that were last seen between 30 and 60 minutes ago. |
| from\_60\_min\_to\_24\_hr | An integer representing the number of unique tags that were last seen between 60 minutes and 24 hours ago. |
| more\_than\_24\_hr | An integer representing the number of unique tags that were last seen more than 24 hours ago. |

#### Inventory Unload

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "11",

"method" : "inventory\_unload"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "11",

"result" : null

}

#### OEM Configuration Update Status

##### JSON RPC Notification

{    
   "jsonrpc":"2.0",  
   "method":"oem\_cfg\_update\_status",  
   "params":{

    "sent\_on":1424976117309,  
      "device\_id":"RSP-5a778d",

    "region":"ETSI\_UPPER",  
      "file":"ETSI\_UPPER.freq.plan.txt",  
      "status":"IN\_PROGRESS",

      "current\_line\_num":120,

      "total\_lines":137,

      "message":null

}  
}

Table 22 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | A string corresponding to the sensor device id |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |
| file | The OEM Configuration filename currently being loaded. |
| status | A status string. Valid values are: IN\_PROGRESS, RESET\_RADIO, COMPLETE, ERROR, FAIL |
| current\_line\_num | The Integer line number currently being loaded. |
| total\_lines | The Integer number of lines in the OEM Configuration file. |
| message | A human readable message string. |

#### Remove Device

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "12",

"method" : "remove\_device",

"params" : {

"device\_id" : "RSP-150000"

}

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "12",

"result" : {

"device\_id" : "RSP-150000"

}

}

Table 23 Remove Device Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id to be removed. |

#### Scheduler Get Run State

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "13",

"method" : "scheduler\_get\_run\_state"

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "13",

"result" : {

"run\_state" : "FROM\_CONFIG",

"available\_states" : [ "INACTIVE", "ALL\_ON", "ALL\_SEQUENCED", "FROM\_CONFIG" ],

"clusters" : [ {

"id" : "BackStockCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterDeepScan\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

}, {

"id" : "SalesFloorCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterMobility\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

}, {

"id" : "SalesFloorExitCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterExit\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

} ]

}

}

#### Scheduler Run State

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"id" : "13",

"result" : {

"run\_state" : "FROM\_CONFIG",

"available\_states" : [ "INACTIVE", "ALL\_ON", "ALL\_SEQUENCED", "FROM\_CONFIG" ],

"clusters" : [ {

"id" : "BackStockCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterDeepScan\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

}, { ... }, {

"id" : "SalesFloorExitCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterExit\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

} ]

}

}

Table 24 Scheduler Summary Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| run\_state | A string run state of the scheduler. Valid values are: INACTIVE, ALL\_ON, ALL\_SEQUENCED, FROM\_CONFIG |
| available\_states | A list of all the valid run states. |
| clusters | A list of the clusters that the scheduler is using in this particular run state (see below). |
| id | A string identifier for this cluster. |
| personality | The personality assigned to all sensors in this cluster. Valid values are: NONE, EXIT, POS, FITTING\_ROOM |
| facility\_id | The facility name assigned to all sensors in this cluster. |
| behavior\_id | The behavior name assigned to all sensors in this cluster. |
| aliases | The aliases assigned to all sensors in this cluster. |
| sensor\_groups | A list of sensor groups where a group is a collection of one or more sensor. Sensors in a group will all read tags at the same time. The scheduler activates one group at a time in sequential order. |
| tokens | A list of sensor tokens (see below). Sensors that have been programmed with the same token are members of the same group. As describe previously, they will all read tags at the same time. The scheduler activates one (token) group at a time in sequential order. |
| username | The token user name takes on different values depending on usage context. For a cluster configuration it just identifies a particular token. |
| token | A 64 character string. Can be random or contain meta-data. |
| generatedTimestamp | The millisecond timestamp of when this token is valid. |
| expirationTimestamp | The millisecond timestamp of when this token expires. The value of -1 indicates the token never expires. |

#### Scheduler Set Run State

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "15",

"method" : "scheduler\_set\_run\_state",

"params" : {

"run\_state" : "ALL\_ON"

}

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "13",

"result" : {

"run\_state" : "FROM\_CONFIG",

"available\_states" : [ "INACTIVE", "ALL\_ON", "ALL\_SEQUENCED", "FROM\_CONFIG" ],

"clusters" : [ {

"id" : "BackStockCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterDeepScan\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

}, {

"id" : "SalesFloorCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterMobility\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

}, {

"id" : "SalesFloorExitCluster",

"personality" : null,

"facility\_id" : null,

"aliases" : [ ],

"behavior\_id" : "ClusterExit\_PORTS\_1",

"sensor\_groups" : [ ],

"tokens" : [ ]

} ]

}

}

#### Sensor Config

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"method" : "sensor\_config\_notification",

"params" : {

"device\_id" : "RSP-150000",

"facility\_id" : "SalesFloor",

"personality" : null,

"aliases" : [ "RSP-150000-0", "RSP-150000-1", "RSP-150000-2", "RSP-150000-3" ]

}

}

Table 25 Sensor Config Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| device\_id | A string representing the device id of the sensor. |
| facility\_id | The facility name assigned to this sensor. |
| personality | The personality assigned to this sensor.  Valid values are: NONE, EXIT, POS, FITTING\_ROOM |
| aliases | An array of strings (maximum of 4) that are used to alias “RSP-xxxxxx-y” where xxxxxx is the last 6 characters of the MAC address and y is the antenna port (0 – 3). |

#### Sensor Connection State

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"method" : "sensor\_connection\_state\_notification",

"params" : {

"device\_id" : "RSP-150000",

"connection\_state" : "DISCONNECTED"

}

}

Table 26 Sensor Config Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| device\_id | A string representing the device id of the sensor. |
| connection\_state | The state of the Gateway connection for this sensor.  Valid values are: DISCONNECTED, CONNECTED |

#### Sensor Get Basic Info

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "18",

"method" : "sensor\_get\_basic\_info",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 27 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "18",

"result" : {

"device\_id" : "RSP-150000",

"connection\_state" : "DISCONNECTED",

"read\_state" : "STOPPED",

"behavior\_id" : "Default",

"facility\_id" : "SalesFloor",

"personality" : null,

"aliases" : [ "RSP-150000-0", "RSP-150000-1", "RSP-150000-2", "RSP-150000-3" ],

"alerts" : [ ]

}

}

Table 28 Sensor Basic Info Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |
| connection\_state | The state of the Gateway connection to this sensor.  Valid values are: DISCONNECTED, CONNECTED |
| read\_state | The current read state of this sensor. Valid values are: STOPPED, STARTED, PEND\_STOP, PEND\_START |
| behavior\_id | A string representing the currently assigned RFID behavior. |
| facility\_id | A string representing the currently assigned Facility ID. |
| personality | The currently assigned Personality. Valid values are: NONE, EXIT, POS, FITTING\_ROOM |
| aliases | A list of strings representing the aliases assigned to each antenna port. These aliases are used when reporting the location of tag. |
| alerts | A list of Device Alert Details thrown from this sensor. |
| sent\_on | An integer millisecond timestamp when this alert was thrown. |
| device\_id | A string representing the device id of the sensor. |
| facility\_id | A string representing the Facility assigned to this sensor. |
| alert\_number | An integer alert number (see device\_alert for more details). |
| alert\_description | A string representing the description of this alert. |
| severity | A string representing the severity of this alert. Valid values are: info, warning, urgent, critical, unknown |

#### Sensor Get Built-In-Self-Test (BIST) Results

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "19",

"method" : "sensor\_get\_bist\_results",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 29 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "19",

"result" : {

"rf\_module\_error" : false,

"rf\_status\_code" : 0,

"ambient\_temp" : 0,

"rf\_module\_temp" : 0,

"time\_alive" : 0,

"cpu\_usage" : 0,

"mem\_used\_percent" : 0,

"mem\_total\_bytes" : 0,

"camera\_installed" : false,

"temp\_sensor\_installed" : false,

"accelerometer\_installed" : false,

"region" : "USA",

"rf\_port\_statuses" : [ {

"port" : 0,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 54,

"connected" : true

}, {

"port" : 1,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 19,

"connected" : true

}, {

"port" : 2,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 247,

"connected" : false

}, {

"port" : 3,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 197,

"connected" : false

} ],

"device\_moved" : false

}

}

Table 30 BIST Results Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| rf\_module\_error | Error in the Intel® RFID Sensor Platform's embedded RFID module.  The valid values are true and false. |
| rf\_status\_code | The error status code returned from the RFID module.  See Impinj® Indy® MAC Error Code Definitions. |
| ambient\_temp | Temperature in degrees Celsius as measured on the periphery of the Intel® RFID Sensor Platform circuit board. |
| rf\_module\_temp | Temperature in degrees Celsius as measured near the power amplifier (PA) of the embedded RFID module. |
| time\_alive | Time in milliseconds since the last Linux boot of the Intel® RFID Sensor Platform. |
| cpu\_usage | Total CPU utilization in percent, averaged over the last one second. |
| mem\_used\_percent | Total processor memory utilization (%). |
| mem\_total\_bytes | Total memory installed in bytes. |
| camera\_installed | The valid values are true and false. |
| temp\_sensor\_installed | The valid values are true and false. |
| accelerometer\_installed | The valid values are true and false. |
| region | A string representing the currently configured Geographic Region. |
| device\_moved | The pointing angle of the Intel® RFID Sensor Platform has changed. The valid values are "true and false. |

*A list of up to four RF Port Status Fields.*

|  |  |
| --- | --- |
| port | The RF antenna port currently being reported.  The valid values are 0 – 3. |
| forward\_power\_dbm10 | The forward power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| reverse\_power\_dbm10 | The reverse power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| connected | A Boolean value indicating whether or not this antenna port is properly connected.  The valid values are "true and false. |

#### Sensor Get Device ID’s

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "20",

"method" : "sensor\_get\_device\_ids"

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "20",

"result" : [ "RSP-150000", "RSP-150004", "RSP-150005" ]

}

Table 31 Remove Device Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| result | A list of strings representing the device ids of the sensors currently known to the Gateway. |

#### Sensor Get Geographic Region

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "21",

"method" : "sensor\_get\_geo\_region",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 32 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "21",

"result" : {

"region" : "USA"

}

}

Table 33 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |

#### Sensor Get State

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "23",

"method" : "sensor\_get\_state",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 34 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "23",

"result" : {

"hostname" : "RSP-150000",

"hwaddress" : "98:4f:ee:15:04:17",

"app\_version" : "19.2.5.14",

"module\_version" : "3.9",

"num\_physical\_ports" : 2,

"motion\_sensor" : true,

"camera" : false,

"wireless" : false,

"configuration\_state" : "unknown",

"operational\_state" : "unknown"

}

}

Table 35 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| hostname | The ID string assigned to this device. Typically corresponds to the device id referenced elsewhere. |
| hwaddress | The MAC address of the interface in use. |
| app\_version | The version string of the Intel® RFID Sensor Platform application. |
| module\_version | The version string of the embedded RFID module. |
| num\_physical\_ports | The number of antenna ports available on this device. |
| motion\_sensor | Whether or not this platform is equipped with a motion sensor. The valid values are true and false. |
| camera | Whether or not this platform is equipped with a camera. The valid values are true and false. |
| wireless | Whether or not this platform is equipped with a wireless module. The valid values are true and false |
| configuration\_state |  |
| operational\_state |  |

#### Sensor Get Versions

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "24",

"method" : "sensor\_get\_versions",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 36 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "24",

"result" : {

"app\_version" : "19.2.5.14",

"module\_version" : "3.9",

"platform\_id" : "H3000",

"platform\_support\_version" : "19.1.3.26-r0",

"pkg\_manifest\_version" : "19.2.5.14",

"uboot\_version" : "2019.04.20190426225448",

"linux\_version" : "4.19.34 #1 SMP PREEMPT Fri Apr 26 23:33:39 UTC 2019"

}

}

Table 37 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| app\_version | The version string of the Intel® RFID Sensor Platform application. |
| module\_version | The version string of the embedded RFID module. |
| platform\_id | Valid values H1000, H3000, H4000. |
| platform\_support\_version | Version of the platform support pkg. |
| pkg\_manifest\_version | Version of the package manifest version. |
| uboot\_version |  |
| linux\_version |  |

#### Sensor Read State

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"id" : "18",

"params" : {

"read\_state" : "STOPPED"

}

}

Table 38 Sensor Basic Info Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| read\_state | The current read state of this sensor. Valid values are: STOPPED, STARTED, PEND\_STOP, PEND\_START |

#### Sensor Set Geographic Region

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "22",

"method" : "sensor\_set\_geo\_region",

"params" : {

"devicd\_id" : "RSP-150000",

"region" : "USA"

}

}

Table 39 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "21",

"result" : {

"region" : "USA"

}

}

#### Sensor Set LED

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "25",

"method" : "sensor\_set\_led",

"params" : {

"device\_id" : "RSP-150000",

"led\_state" : "Disabled"

}

}

Table 40 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |
| led\_state | State of the Intel® RFID Sensor Platform LED indicator.  The valid values are “Normal", "Beacon", “Disabled" and "Test". |

##### JSON RPC Response

{    
  "jsonrpc":"2.0",  
 "id" : "25",

"result" : {

"led\_state" : "Disabled"

}

}

#### Sensor State Summary

##### JSON RPC Notification

{    
 "jsonrpc" : "2.0",

"method" : "sensor\_state\_summary",

"params" : {

"reading" : 0,

"connected" : 0,

"disconnected" : 3

}

}

Table 41 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| reading | An integer number of sensors that are currently reading tags. |
| connected | An integer number of sensors that are currently connected to the Gateway. |
| disconnected | An integer number of sensors that are no longer connected to the Gateway. |

#### Sensor Update Software

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "26",

"method" : "sensor\_update\_software",

"params" : {

"device\_id" : "RSP-150000"

}

}

Table 42 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |

##### JSON RPC Response

{    
  "jsonrpc":"2.0",  
 "id" : "26",

"result" : null

}

#### Upstream Get MQTT Status

##### JSON RPC Request

{

"jsonrpc" : "2.0",

"id" : "8",

"method" : "uptream\_get\_mqtt\_status"

}

##### JSON RPC Response

{

"jsonrpc" : "2.0",

"id" : "8",

"result" : {

"connection\_state" : "DISCONNECTED",

"broker\_uri" : "tcp://debian-vbox.local:1883",

"subscribes" : ["rfid/gw/command"],

"publishes" : ["rfid/gw/alerts","rfid/gw/events","rfid/gw/response","rfid/gw/notification" ]

}

}

Table 43 MQTT Status Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| result | The MQTT information summary object (see below). |
| connection\_state | The state of the upstream MQTT connection.  Valid values are: DISCONNECTED, CONNECTED |
| broker\_uri | The URI containing the protocol, address/hostname and port of the Downstream MQTT broker |
| subscribes | A list of strings representing the list of MQTT topics currently subscribed to. |
| publishes | A list of strings representing the list of MQTT topics currently publishing to. |

#### Upstream MQTT Status

##### JSON RPC Notification

{

"jsonrpc" : "2.0",

"method" : "uptream\_mqtt\_status"

"params" : {

"connection\_state" : "DISCONNECTED",

"broker\_uri" : "tcp://debian-vbox.local:1883",

"subscribes" : ["rfid/gw/command"],

"publishes" : ["rfid/gw/alerts","rfid/gw/events","rfid/gw/response","rfid/gw/notification"]

}

}

Table 44 MQTT Status Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | The MQTT information summary object (see below). |
| connection\_state | The state of the upstream MQTT connection.  Valid values are: DISCONNECTED, CONNECTED |
| broker\_uri | The URI containing the protocol, address/hostname and port of the Downstream MQTT broker |
| subscribes | A list of strings representing the list of MQTT topics currently subscribed to. |
| publishes | A list of strings representing the list of MQTT topics currently publishing to. |

### Downstream (Sensor)

The following messages are sent to the sensor on the downstream broker.

Table 45 Gateway Downstream Sensor API

|  |  |
| --- | --- |
| **Command** | **Type** |
| ack\_alert | Request / Response |
| apply\_behavior | Request / Response |
| connect | Request / Response |
| device\_alert | Notification |
| get\_bist\_results | Request / Response |
| get\_geo\_region | Request / Response |
| get\_state | Request / Response |
| get\_sw\_version | Request / Response |
| gw\_status\_update | Notification |
| heartbeat | Notification |
| inventory\_complete | Notification |
| inventory\_data | Notification |
| motion\_event | Notification |
| reboot | Request / Response |
| reset | Request / Response |
| shutdown | Request / Response |
| set\_device\_alert | Request / Response |
| set\_facility\_id | Request / Response |
| set\_geo\_region | Request / Response |
| set\_led | Request / Response |
| set\_motion\_event | Request / Response |
| software\_update | Request / Response |
| status\_update | Notification |
| oem\_cfg\_update\_status | Notification |

#### Acknowledge Alert

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"ack\_alert",  
   **"params"**:{

**"alert\_number"**:103,

**"acknowledge"**:true,

**"mute"**:false

   },  
   **"id"**:"12345"  
}

Table 46 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| alert\_number | The unique number identifying the type of alert.  The valid range for the Intel® RFID Sensor Platform is 100 – 199.  100 – RfModuleError (Boolean)  101 – HighAmbientTemp (degrees C)  102 – HighCpuTemp (degrees C)  103 – HighCpuUsage (% utilization)  104 – HighMemoryUsage (% of max memory)  151 – DeviceMoved (Boolean) |
| acknowledge | Temporarily silence current alerts of this type.  The valid values are true and false. |
| mute | Silence current and future alerts of this type.  The valid values are true and false. |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"12345"  
}

#### Apply Behavior

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"apply\_behavior",  
   **"params"**:{

**"action"**:"START",  
    **"action\_time"**:1424976117309,  
    **"behavior"**:{

**"id"**:"DefaultBehavior",

**"operation\_mode"**:"NonContinuous",

**"inventory\_mode"**:"EPConly",

**"link\_profile"**:1,

**"power\_level"**:30.5,

**"dwell\_time"**:5000,

**"inv\_cycles"**:0,

**"selected\_state"**:"Any",

**"session\_flag"**:"S1",

**"target\_state"**:"A",

**"q\_algorithm"**:"Dynamic",

**"fixed\_q\_value"**:10,

**"repeat\_until\_no\_tags"**:false,

**"start\_q\_value"**:3,

**"min\_q\_value"**:3,

**"max\_q\_value"**:15,

**"retry\_count"**:1,

**"threshold\_multiplier"**:7,

**"toggle\_target\_flag"**:true,

**"toggle\_mode"**:"OnInvCycle",

**"perform\_select"**:false,  
       **"perform\_post\_match"**:false,

**"filter\_duplicates"**:false,

**"auto\_repeat"**:true,

**"delay\_time"**:0  
      }

   },

**"id"**:"12345"  
}

Table 47 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| action | Specifies the action to be taken.  The valid values are “START" and “STOP". |
| action\_time | Specifies the millisecond epoch time to apply the behavior. If zero or not included, the behavior is applied immediately. |
| behavior | Optional set of behavior parameters (see below). |
| id | The ID string assigned to this behavior |
| operation\_mode | The embedded RFID module transmit operation mode.  The valid values are "Continuous" and "NonContinuous".  The default value is "NonContinuous". |
| inventory\_mode | The embedded RFID module inventory mode.  The valid values are "EPConly" and "EPCplusTID".  The default value is "EPConly". |
| link\_profile | The RF Link Profile to be used for this behavior.  (see Table 48 Link Profile Parameters) The valid range is 0 – 4. |
| power\_level | The power output level in dBm to be used for this behavior. The valid range is 0 – 31.5. |
| dwell\_time | The maximum amount of time (ms) spent on a particular virtual port before switching to the next virtual port during an inventory cycle. If this parameter is zero, the “inv\_cycles" parameter may not be zero.  The valid range is 0 – 65535. |
| inv\_cycles | The maximum amount of inventory cycles to attempt on a particular virtual port before switching to the next virtual port during an inventory cycle. If this parameter is zero, the “dwell\_time" parameter may not be zero.  The valid range is 0 – 65535. |
| selected\_state | Specifies the state of the “SL" flag to be used for this behavior when specifying a select protocol operation. The valid values are:  “Any", “Deasserted" and “Asserted". |
| session\_flag | Specifies which inventory session flag is matched against the state specified by “target\_state". The valid values are “S0", “S1", “S2", “S3”. |
| target\_state | Specifies the state of the inventory session flag specified by “session\_flag" that are to apply the subsequent tag protocol operation.  The valid values are “A" and “B". |
| q\_algorithm | The specific Q algorithm being configured.  The valid values are “Fixed" and “Dynamic". When using a “Fixed" algorithm, the number of time slots is 2^Q. When using a “Dynamic" algorithm, the Smart Sensor Platform’s embedded module will vary the number of slots dynamically based on the number of tags responding. |

|  |  |
| --- | --- |
| fixed\_q\_value | The fixed Q value to use (valid when q\_algorithm = Fixed).  The valid range of this parameter is 0 – 15. |
| repeat\_until\_no\_tags | Specifies whether or not the singulation algorithm should continue until no more tags are singulated.  The valid values are “true" or “false". |
| start\_q\_value | The initial Q value to use at the beginning of an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| min\_q\_value | The minimum Q value that would ever be used during an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| max\_q\_value | The maximum Q value that would ever be used during an inventory round (valid when q\_algorithm = Dynamic).  The valid range of this parameter is 0 – 15. |
| threshold\_multiplier | A 4X multiplier applied to the Q-adjustment threshold as part of the dynamic-Q algorithm.  The valid range of this parameter is 0 – 255. |
| retry\_count | The number of times to try another execution of the singulation algorithm before either toggling the target flag or terminating the operation.  The valid range of this parameter is 0 – 255. |
| toggle\_target\_flag | Specifies whether or not to toggle the targeted flag.  The valid values are “true" or “false". |
| toggle\_mode | When toggle\_target\_flag is true, this value specifies when to toggle the targeted flag. The valid values are “None”, “OnInvCycle", OnInvRound”, or “OnReadRate". |
| perform\_select | Specifies whether or not to perform a select command based on the previously configured criteria (see **Error! Reference source not found.**).  The valid values are “true" and “false". |
| perform\_post\_match | Specifies whether or not to perform a post singulation match based on the previously configured criteria (see **Error! Reference source not found.**). The valid values are “true" and “false". |
| filter\_duplicates | Specifies whether or not the Intel® RFID Sensor Platform should filter out duplicate tag information before sending to the Gateway. The valid values are “true" or “false". |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"12345"  
}

Table 48 Link Profile Parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter / Profile Index | 0 | 1 | 2 | 3 | 4 |
| Modulation Type | DSB-ASK | PR-ASK | PR-ASK | DSB-ASK | DSB-ASK |
| Tari Duration (us) | 25 | 25 | 25 | 6.25 | 6.25 |
| Data 0/1 Difference | 1 | 0.5 | 0.5 | 0.5 | 0.5 |
| Pulse Width (us) | 12.5 | 12.5 | 12.5 | 3.13 | 3.13 |
| R-T Calculation (us) | 75 | 62.5 | 62.5 | 15.63 | 15.63 |
| T-R Calculation (us) | 200 | 85.33 | 71.11 | 20 | 33.33 |
| Divide Ratio | 8 | 21.33 | 21.33 | 8 | 21.33 |
| Data Encoding | FM0 | Miller-4 | Miller-4 | FM0 | FM0 |
| Pilot Tone | 1 | 1 | 1 | 1 | 1 |
| Link Frequency (kHz) | 40 | 250 | 300 | 400 | 640 |
| Data Rate (kbps) | 40 | 62.5 | 75 | 400 | 640 |

Table 49 Session Flag Persistence Values

|  |  |  |
| --- | --- | --- |
| Session | Tag Energized | Tag Not Energized |
| S0 | Indefinite | None |
| S1 | 500 ms < persistence < 5 s | 2 s < persistence |
| S2 | Indefinite | 2 s < persistence |
| S3 | Indefinite | 2 s < persistence |

#### Connect to the Gateway (sensor)

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"connect",  
   **"params"**:{

**"hostname"**:"RSP-5a778d",  
      **"hwaddress"**:"98:4f:ee:5a:77:8d",  
      **"app\_version"**:"1.2.0",  
      **"module\_version"**:"1.1.0",

**"num\_physical\_ports"**:1,  
      **"motion\_sensor"**:true,

**"camera"**:false,  
      **"wireless"**:false,  
      **"configuration\_state"**:"Default",  
      **"operational\_state"**:"Idle"  
   },  
 **"id"**:"12345"  
}

Table 50 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| hostname | The Linux\* hostname of this device. |
| hwaddress | The MAC address of the interface in use. |
| app\_version | The version string of the Intel® RFID Sensor Platform application. |
| module\_version | The version string of the embedded RFID module. |
| num\_physical\_ports | The number of antenna ports available on this device. |
| motion\_sensor | Whether or not this platform is equipped with a motion sensor. The valid values are true and false. |
| camera | Whether or not this platform is equipped with a camera. The valid values are true and false |
| wireless | Whether or not this platform is equipped with a wireless module. The valid values are true and false |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result"**:{    
    **"sent\_on"**:1424976117309,

**"facility\_id"**:"Store57"

"software\_repos": [

"https://rsp-repo.local:80/all",

"https://rsp-repo.local:80/armv7at2hf-neon",

"https://rsp-repo.local:80/armv7at2hf-neon-mx6qdl",

"https://rsp-repo.local:80/hx000"

],

"ssh\_public\_key": "ecdsa-sha2-nistp521 AAAAE2VjZHNhLXNoYTItbmlzdHA1MjEAAAAIbmlzdHA1MjEAAACFBAH3SaiN50uYdhrYG7hBqpG3PL26FDiyW6/EXFLEhsABoLayyM+tAOztaOshQgtlIkJdCBTPmvp6skg9pPQtTrj5bwCOwjTLRr8j7lA+puWp7TOYAxefxHK+ShSXxdX0cT25WUPO+h5OypUTbHuzAqc5XNpY02j6mP+PzbesyKTQkzcsBQ== tshockley@tshock-U16"

   },  
   **"id"**:"12345"  
}

Table 51 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this response. |
| facility\_id | The ID string if the facility assigned to this RSP. |
| software\_repos | A list of strings representing the software repositories. |
| ssh\_public\_key | The public key used for SSH access. This key replaces the manufacturer’s public key. |

Table 52 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| rf\_module\_error | Error in the Intel® RFID Sensor Platform's embedded RFID module.  The valid values are true and false. |
| rf\_status\_code | The error status code returned from the RFID module.  See Impinj® Indy® MAC Error Code Definitions. |
| ambient\_temp | Temperature in degrees Celsius as measured on the periphery of the Intel® RFID Sensor Platform circuit board. |
| rf\_module\_temp | Temperature in degrees Celsius as measured near the power amplifier (PA) of the embedded RFID module. |
| time\_alive | Time in milliseconds since the last Linux boot of the Intel® RFID Sensor Platform. |
| cpu\_usage | Total CPU utilization in percent, averaged over the last one second. |
| mem\_used\_percent | Total processor memory utilization (%). |
| mem\_total\_bytes | Total memory installed in bytes. |
| camera\_installed | The valid values are true and false. |
| temp\_sensor\_installed | The valid values are true and false. |
| accelerometer\_installed | The valid values are true and false. |
| region | A string representing the currently configured Geographic Region. |
| device\_moved | The pointing angle of the Intel® RFID Sensor Platform has changed. The valid values are "true and false. |

*A list of four RF Port Status Fields.*

|  |  |
| --- | --- |
| port | The RF antenna port currently being reported.  The valid values are 0 – 3. |
| forward\_power\_dbm10 | The forward power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| reverse\_power\_dbm10 | The reverse power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| connected | A Boolean value indicating whether or not this antenna port is properly connected.  The valid values are "true and false. |

#### Device Alert

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"device\_alert",  
   **"params"**:{    
    **"**sent\_on**"**:1424976117309,

**"**device\_id**"**:"RSP-abcdef",  
    **"**facility\_id**"**:"CH11",  
    **"**alert\_number**"**:100,  
    **"**alert\_description**"**:"RfModuleError",  
      **"**severity**"**:"warning",  
      **"**optional**"**:{  
       **"**string**"**:"MTI\_Error",

**"**number**"**:769

}

   }  
}

Table 53 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform is located. |
| alert\_number | A unique number identifying the type of alert.  The valid range for the Intel® RFID Sensor Platform is 100 – 200.  100 – RfModuleError  101 – HighAmbientTemp  102 – HighCpuTemp  103 – HighCpuUsage  104 – HighMemoryUsage  151 – DeviceMoved |
| alert\_description | A corresponding human readable text description. |
| severity | A prioritized severity level of the alert.  The valid range of values is…  "info", "warning", "urgent", and "critical". |
| optional | A series of optional number or string parameters providing further information about the alert. |

#### Get Built-In-Self-Test (BIST) Results

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "19",

"method" : "get\_bist\_results",

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "19",

"result" : {

"rf\_module\_error" : false,

"rf\_status\_code" : 0,

"ambient\_temp" : 0,

"rf\_module\_temp" : 0,

"time\_alive" : 0,

"cpu\_usage" : 0,

"mem\_used\_percent" : 0,

"mem\_total\_bytes" : 0,

"camera\_installed" : false,

"temp\_sensor\_installed" : false,

"accelerometer\_installed" : false,

"region" : "USA",

"rf\_port\_statuses" : [ {

"port" : 0,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 54,

"connected" : true

}, {

"port" : 1,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 19,

"connected" : true

}, {

"port" : 2,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 247,

"connected" : false

}, {

"port" : 3,

"forward\_power\_dbm10" : 249,

"reverse\_power\_dbm10" : 197,

"connected" : false

} ],

"device\_moved" : false

}

}

Table 54 BIST Results Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| rf\_module\_error | Error in the Intel® RFID Sensor Platform's embedded RFID module.  The valid values are true and false. |
| rf\_status\_code | The error status code returned from the RFID module.  See Impinj® Indy® MAC Error Code Definitions. |
| ambient\_temp | Temperature in degrees Celsius as measured on the periphery of the Intel® RFID Sensor Platform circuit board. |
| rf\_module\_temp | Temperature in degrees Celsius as measured near the power amplifier (PA) of the embedded RFID module. |
| time\_alive | Time in milliseconds since the last Linux boot of the Intel® RFID Sensor Platform. |
| cpu\_usage | Total CPU utilization in percent, averaged over the last one second. |
| mem\_used\_percent | Total processor memory utilization (%). |
| mem\_total\_bytes | Total memory installed in bytes. |
| camera\_installed | The valid values are true and false. |
| temp\_sensor\_installed | The valid values are true and false. |
| accelerometer\_installed | The valid values are true and false. |
| region | A string representing the currently configured Geographic Region. |
| device\_moved | The pointing angle of the Intel® RFID Sensor Platform has changed. The valid values are "true and false. |

*A list of up to four RF Port Status Fields.*

|  |  |
| --- | --- |
| port | The RF antenna port currently being reported.  The valid values are 0 – 3. |
| forward\_power\_dbm10 | The forward power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| reverse\_power\_dbm10 | The reverse power measured by the embedded module in units of 10ths of a dBm.  The valid values range from 0 to 315. |
| connected | A Boolean value indicating whether or not this antenna port is properly connected.  The valid values are "true and false. |

#### Get Geographic Region

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"get\_geo\_region",  
   **"id"**:"11"  
}

##### JSON RPC Response

{

"**jsonrpc**": "2.0",

"**id**": "11",

"**result**": {

"region": "USA"

}

}

Table 55 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| result | A result object (see below). |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |

#### Get State

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "23",

"method" : "sensor\_get\_state",

}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "23",

"result" : {

"hostname" : "RSP-150000",

"hwaddress" : "98:4f:ee:15:04:17",

"app\_version" : "19.2.5.14",

"module\_version" : "3.9",

"num\_physical\_ports" : 2,

"motion\_sensor" : true,

"camera" : false,

"wireless" : false,

"configuration\_state" : "unknown",

"operational\_state" : "unknown"

}

}

Table 56 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| hostname | The ID string assigned to this device. |
| hwaddress | The MAC address of the interface in use. |
| app\_version | The version string of the Intel® RFID Sensor Platform application. |
| module\_version | The version string of the embedded RFID module. |
| num\_physical\_ports | The number of antenna ports available on this device. |
| motion\_sensor | Whether or not this platform is equipped with a motion sensor. The valid values are true and false. |
| camera | Whether or not this platform is equipped with a camera. The valid values are true and false. |
| wireless | Whether or not this platform is equipped with a wireless module. The valid values are true and false |
| configuration\_state |  |
| operational\_state |  |

#### Get Software Version

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"get\_sw\_version",  
   **"id"**:"12"  
}

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "24",

"result" : {

"app\_version" : "19.2.5.14",

"module\_version" : "3.9",

"platform\_id" : "H3000",

"platform\_support\_version" : "19.1.3.26-r0",

"pkg\_manifest\_version" : "19.2.5.14",

"uboot\_version" : "2019.04.20190426225448",

"linux\_version" : "4.19.34 #1 SMP PREEMPT Fri Apr 26 23:33:39 UTC 2019"

}

}

Table 57 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| app\_version | The version string of the Intel® RFID Sensor Platform application. |
| module\_version | The version string of the embedded RFID module. |
| platform\_id | Valid values H1000, H3000, H4000. |
| platform\_support\_version | Version of the platform support pkg. |
| pkg\_manifest\_version | Version of the package manifest version. |
| uboot\_version |  |
| linux\_version |  |

#### Gateway Status Update

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"gw\_status\_update",  
   **"params"**:{

**"sent\_on"**:1424976117309,  
      **"device\_id"**:"RSDGW11",

**"status"**:"ready"

}  
}

Table 58 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. When reporting a status of "lost", this field is optional. |
| device\_id | The ID assigned to the reporting device. |
| status | The reported status of the Gateway.  The possible values are “ready", “in\_reset", “shutting\_down", "firmware\_update" and “lost". |

The “lost" status message originates from the MQTT Broker. Its contents are registered during power-on as the “Last Will and Testament".

#### Heartbeat

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"heartbeat",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
      **"**device\_id**"**:"RSP-abcdef"

**"**facility\_id**"**:"CH11",  
     **"**location**"**:{},

**"**video\_url**"**:null  
 }  
}

Table 59 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform is located. |
| location | deprecated |
| video\_url | deprecated |

#### Inventory Complete

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"inventory\_complete",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
      **"**device\_id**"**:"RSP-abcdef",

**"**facility\_id**"**:"CH11"  
 }  
}

Table 60 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform (Intel® RSP). |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform (Intel® RSP) is located. |

#### Inventory Data

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"inventory\_data",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
    **"**period**"**:500,  
     **"**device\_id**"**:"RSP-abcdef",

**"**facility\_id**"**:"MainStore",

**"**location**"**:{},

**"**motion\_detected**"**:true,  
    **"**data**"**:[    
       {    
          **"**epc**"**:"1000000000000000000002A1",

**"**tid**"**:"E28011606000020BCEC36DC1",

**"**antenna\_id**"**:0,

**"**last\_read\_on**"**:1424976117295,

**"**rssi**"**:-582,  
            **"**phase**"**:63,  
          **"**frequency**"**:902750

       }  
    ]  
 }

}

Table 61 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| period | The period in milliseconds over which these tag reads were collected. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform is located. |
| location | deprecated |
| motion\_detected | A Boolean field that represents whether or not the Intel® RSP was detecting motion during the period specified above. |
| data | An array of RFID tag records (see below). |
| epc | The EPC of the tag associated with this record. |
| tid | The TID of the tag associated with this record.  This field is null when the inventory mode is EPC only. |
| antenna\_id | The physical antenna port used to discover this tag. |
| last\_read\_on | The millisecond timestamp of the last measurement. |
| rssi | A signed value representing the receive signal strength in units of 0.1 dBm of the backscatter signal from the RFID tag. |
| phase | The signed 7-bit phase offset of the received backscatter signal from the RFID tag. Valid range is from -64 to 63. |
| frequency | The frequency in kHz of the received backscatter signal from the RFID tag. |

#### Motion Event

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"motion\_event",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
      **"**device\_id**"**:"RSP-5a778d",

**"**facility\_id**"**:"CH11",  
      **"**image\_resolution**"**:null,  
      **"**image\_url**"**:null,

      "location": {}

}  
}

Table 62 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform is located. |
| image\_resolution | deprecated |
| image\_url | deprecated |
| location | deprecated |

#### Reboot

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"reboot",  
   **"id"**:"1"  
}

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"1"  
}

#### Reset

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"reset",  
   **"id"**:"1"  
}

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"1"  
}

#### Shutdown

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"shutdown",  
   **"id"**:"1"  
}

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"1"  
}

#### Set Device Alert

##### JSON RPC Request

{

"**jsonrpc**":"2.0",

"**method**":"set\_device\_alert",

"**params**":[

{

"alert\_number":103,

"severity":"warning",

"threshold":80,

"acknowledge":false,

"mute":false

}

],

"**id**":"12345"

}

Table 63 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| alert\_number | The unique number identifying the type of alert.  The valid range is 100 – 199.  100 – RfModuleError (Boolean)  101 – HighAmbientTemp (degrees C)  102 – HighCpuTemp (degrees C)  103 – HighCpuUsage (% utilization)  104 – HighMemoryUsage (% of max memory)  151 – DeviceMoved (Boolean) |
| severity | The prioritized severity level being configured.  The valid range of values is…  "info", "warning", "urgent", and "critical". |
| threshold | The value above/below, which will trigger the alert.  If the alert is Boolean, a value of 0 indicates to send the alert when the tested condition is false and a value of 1 indicates to send the alert when the tested condition is true. |
| acknowledge | Temporarily silence current alerts of this type.  The valid values are true and false. |
| mute | Silence current and future alerts of this type.  The valid values are true and false. |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"12345"  
}

#### Set Facility Identifier

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"set\_facility\_id",  
   **"params"**:"levi505",  
   **"id"**:"12345"  
}

Table 64 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| facility\_id | The ID string if the facility that this RSP is assigned to. |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"12345"  
}

#### Set Geographic Region

##### JSON RPC Request

{    
 "jsonrpc" : "2.0",

"id" : "22",

"method" : "set\_geo\_region",

"params" : {

"region" : "USA"

}

}

Table 65 Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| device\_id | A string representing the device id of the sensor. |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |

##### JSON RPC Response

{    
 "jsonrpc" : "2.0",

"id" : "21",

"result" : {

"region" : "USA"

}

}

#### Set LED

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"set\_led",  
   **"params"**:"Disabled",  
   **"id"**:"12345"  
}

Table 66 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | State of the Intel® RFID Sensor Platform LED indicator.  The valid values are “Normal", "Beacon", “Disabled" and "Test". |

##### JSON RPC Response

{    
   "jsonrpc":"2.0",  
   "result":true,

   "id":"12345"  
}

#### Set Motion Event

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"set\_motion\_event",  
   **"params"**:{

**"send\_events"**:true,  
      **"capture\_images"**:true

   },  
   **"id"**:"12345"  
}

Table 67 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| send\_events | Specifies whether or not the Intel® RFID Sensor Platform will send the "motion\_event" indication when it detects heat in motion. The valid values are true and false. The default value is true. |
| capture\_images | Specifies whether or not the Intel® RFID Sensor Platform will also capture an image (if camera equipped) using the default camera settings. The valid values are true and false. The default value is true. |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"12345"  
}

#### Software Update

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"software\_update",  
   **"id"**:"1"  
}

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"1"  
}

#### Status Update

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"status\_update",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
      **"**device\_id**"**:"RSP-abcdef",  
    **"**facility\_id**"**:"CH11",

**"**status**"**:"ready"

}  
}

Table 68 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| facility\_id | The ID assigned to the facility where the reporting Intel® RFID Sensor Platform is located. |
| status | The reported status of the Intel® RFID Sensor Platform.  Valid values are: “ready", “in\_reset", “shutting\_down", "firmware\_update" and “lost". |

The “lost" status message originates from the MQTT Broker. It is registered during power-on as the “Last Will and Testament".

#### OEM Configuration Update Status

##### JSON RPC Notification

{    
   "jsonrpc":"2.0",  
   "method":"oem\_cfg\_update\_status",  
   "params":{

    "sent\_on":1424976117309,  
      "device\_id":"RSP-5a778d",

    "region":"ETSI\_UPPER",  
      "file":"ETSI\_UPPER.freq.plan.txt",  
      "status":"IN\_PROGRESS",

      "current\_line\_num":120,

      "total\_lines":137,

      "message":null

}  
}

Table 69 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. |
| device\_id | The ID assigned to the reporting Intel® RFID Sensor Platform. |
| region | A string representing the currently configured geographic region of operation. Valid values are:  AUSTRALIA,  BRAZIL,  CHINA,  ETSI,  ETSI\_UPPER,  HONG\_KONG,  INDIA,  INDONESIA,  JAPAN,  KOREA,  MALAYSIA,  NEW\_ZEALAND,  RUSSIA,  SINGAPORE,  TAIWAN,  THAILAND,  USA,  VIETNAM,  UNKNOWN |
| file | The OEM Configuration filename currently being loaded. |
| status | A status string. Valid values are: IN\_PROGRESS, RESET\_RADIO, COMPLETE, ERROR, FAIL |
| current\_line\_num | The Integer line number currently being loaded. |
| total\_lines | The Integer number of lines in the OEM Configuration file. |
| Message | A human readable message string. |

### Downstream (GPIO Device)

The following messages are sent to the GPIO Devices on the downstream broker.

Table 70 Gateway Downstream GPIO Device API

|  |  |
| --- | --- |
| **Command** | **Type** |
| gpio\_connect | Request / Response |
| gpio\_input | Notification |
| gpio\_set\_gpio | Request / Response |

#### Connect to the Gateway (gpio device)

##### JSON RPC Request

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"gpio\_connect",

**"id"**:"12345"  
}

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",

**"result"**:{    
    **"sent\_on"**:1424976117309

}

**"id"**:"12345"  
}

Table 71 JSON Response Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this response. |

#### GPIO Input

##### JSON RPC Notification

{    
   **"jsonrpc"**:"2.0",  
   **"method"**:"gpio\_input",  
   **"params"**:{

**"**sent\_on**"**:1424976117309,  
      **"**device\_id**"**:"RSDGW11",

"gpio\_info": {

"index": 2,

"name": "gpio26",

"state": "ASSERTED",

"direction": "OUTPUT"

}

}  
}

Table 72 JSON Notification Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| sent\_on | The millisecond timestamp of this indication. When reporting a status of "lost", this field is optional. |
| device\_id | The ID assigned to the reporting device. |
| gpio\_info | A GPIO Info object (see below). |
| index | An integer index for this GPIO assigned by the remote device. |
| name | A string name for this GPIO assigned by the remote device. |
| state | The requested state for this GPIO. Valid values are: ASSERTED, DEASSERTED |
| direction | The direction (assigned by the remote device) of this GPIO. Valid values are: INPUT, OUTPUT |

#### Set GPIO

##### JSON RPC Request

{    
 "**jsonrpc**": "2.0",

"**id**": "4",

"**method**": "gpio\_set\_gpio",

"**params**": {

"index": 2,

"name": "gpio26",

"state": "ASSERTED",

"direction": "OUTPUT"

}

}

Table 73 JSON Request Parameters

|  |  |
| --- | --- |
| Parameter | Definition |
| params | A params object (see below). |
| index | An integer index for this GPIO assigned by the remote device. |
| name | A string name for this GPIO assigned by the remote device. |
| state | The requested state for this GPIO. Valid values are: ASSERTED, DEASSERTED |
| direction | The direction (assigned by the remote device) of this GPIO. Valid values are: INPUT, OUTPUT |

##### JSON RPC Response

{    
   **"jsonrpc"**:"2.0",  
   **"result":**true**,**  
   **"id"**:"4"  
}