Expert User Guide

Validation Client

Company	Represented by	Date	Sign
NodOn	*TG*		

Modification History

Revision	Date	Author(s)	Approved by	Description
V1.0	21/04/2022	AP	AP	Creation
V1.1	6/10/2022	AP	AP	Add OTA Clusters info
V1.2	11/01/2023	AP	AP	Update OTA Clusters info
V1.3	06/01/2023	AP	NT	Add Clusters table, metering and over current / temperature info
V1.4	28/11/2023	AP	AP	Update Versioning info
V1.5	28/06/2024	AP	AP	Remove Idenitfy as Client

PROJECT INFORMATION

Customer:	NodOn
Product Designation:	SIN-4-FP-21
Project Reference:	P2020
Product Owner	AP
Project Manager:	NT

Table des matières

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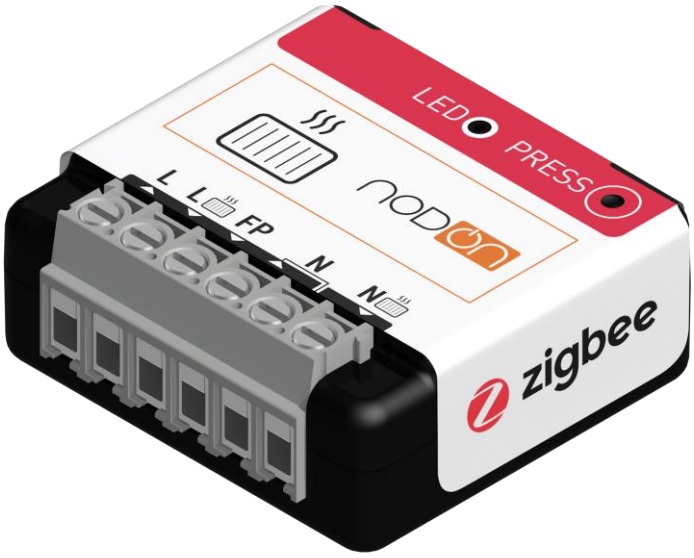
1. DEVICE TYPE

Reference	Product Name	Zigbee Product Type
SIN-4-FP-21	Zigbee Fil Pilote Relay Switch	Smart Plug (0x0051)

Product Description:



Key Features:

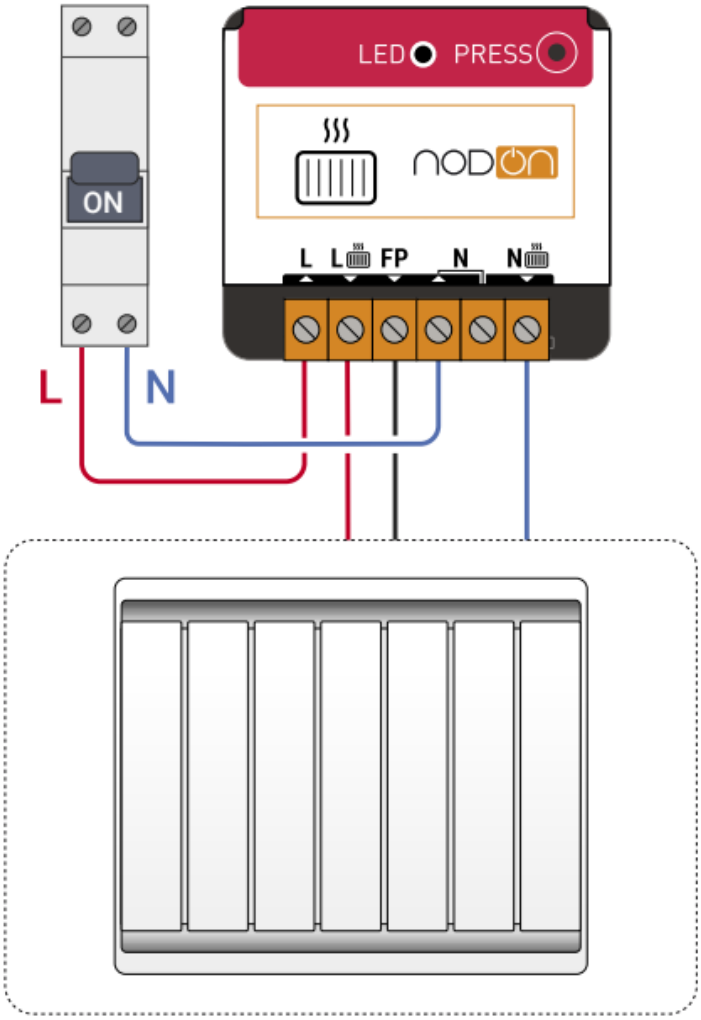
- Slot in Module, placed behind walls
- Wireless control of Fil Pilote Header
- Based on Zigbee protocol
- Powered by 110-230V AC network
- Output power: Max 16A
- Metering capabilities: Power and Energy measurement

2. SIN-4-FP-21 USE

2.1. Set-up

The device has a 6 poles connector to connect:

- Live wire, to power the Module from electrical grid
- Live wire, to connect to the Live of the Heater
- Fil Pilote wire, to connect to the Fil Pilote of the Heater
- Neutral wire, to power the Module from electrical grid
- Neutral wire, if a second wire is needed
- Neutral wire, to connect to the Neutral of the Heater



2.2. Power ON

2.2.1. Led Behavior

When the product is powered ON, the LED will be:

- Solid Green if the Device is in a Zigbee Network,
- Blinking in Orange if the Device is not in a Zigbee Network,
  - The Device will look for a Zigbee Network for 15 minutes.
- Solid Orange after 15 minutes if the Device is not in a Zigbee Network.

2.3. Button Actions

The product has one button, which can make several actions depending on how long the button is pressed.

Button Action	Device Actions
Single Press	Toggle the Fil Pilote Mode (Comfort -> No-Frost -> Comfort, …)
	If device is in Reset Mode, perform a Reset of the device.
	If device is in Identification, stop Identification.
Double Press	If device is not included in a Zigbee Network, start Network Search for 15 minutes: - Start Touchlink Commissioning for 8s, - Start Z3 Network Steering then.
	If device is in Network Search, abort the Network Search.
	If device is already in a Network: - Start Green Power Commissioning for 1 minute, - Start Touchlink Steering for 1 minute, - Start Z3 Permit Join for 1 minute, - Start Binding Switch Mode for 1 minute. If process already in progress, stop it.
Triple Press	Start Z3 Identification on Endpoint 1.
Hold Press (> 5 sec)	When button released: - If device is already in a Network, enters in Reset Mode, - If device is not in a Network, creates a Z3 distributed Network.

Notes:

- *Other actions on button are ignored.*

2.4. Zigbee Pairing Mode

2.4.1. Network Steering

During Network Steering Procedure, the Device broadcasts a Device Announcement and can be added into a new Zigbee Network.
Once included into a Zigbee Network, the SIN-4-FP-21 becomes a router of the Network and stops broadcasting the device announcement.
The Network Steering Procedure lasts for 15 minutes if it does not find any Zigbee Network to join.

If not included in a Zigbee Network, the Device enters in Network Steering Procedure when:

- The device is powered ON,
- The button is double-pressed,
- The device is reset.

If the device does not find any Zigbee Network to join, the Network Steering Procedure stops when:

- The device is powered OFF,
- The button is pressed (any action),
- The process timeouts (after 15 minutes).

During Network Steering Procedure the LED blinks Orange.
If the Network Steering Procedure ends successfully, the LED blinks twice in Green and turns Green.
If the Network Steering Procedure stops, the LED blinks twice in Red and turns Orange.

2.4.2. Permit Join

During Permit Join Procedure, the Device allows other Zigbee devices to join the Network.
The Permit Join Procedure lasts for 60 seconds.

The Device enters in Permit Join Procedure when:

- The Device has joined a Zigbee Network,
- The button is double-pressed (if the Device is already in a Zigbee Network).

During Permit Join Procedure the LED Blinks Green.

2.5. Bluetooth Advertising Mode

During Bluetooth Advertising Mode, the Device broadcasts a BLE Advertisement and can be connected to a Smartphone.
The SIN-4-FP-21 stays in Bluetooth Advertising Mode as long it has not established a Bluetooth Connection with another device

The Device enters Bluetooth Advertising Mode as soon as it is powered ON.

2.6. Reset Mode

The device enters in Reset Mode when the button is pressed for more than 5 seconds.

When the device is in Reset Mode, the Reset is activated by doing a Short Press on the button.
While in Reset Mode, the reset can be aborted by doing any other action on the button, or after a 30-second timeout.

2.7. Led Behavior

When Powered ON and included in a Network, the LED stays GREEN.

Device Status	Led behavior
Powered ON – Included in a Network	LED stays "*GREEN*"
Powered ON – Not included in a Network	LED stays "*ORANGE*"
Zigbee Pairing Mode	LED blinks "*ORANGE*"
Zigbee Pairing Success	LED blinks "*GREEN*" twice and turns "*GREEN*"
Zigbee Pairing Fail	LED blinks "*RED*" twice and turns "ORANGE"
Zigbee Permit Join	LED blinks "*GREEN*"
Reset Mode	LED blinks "*ORANGE*"
Reset Mode Validation	LED blinks "*RED*" *and* "GREEN" *twice and turns* "ORANGE"
Reset Mode Abortion	LED blinks "*GREEN*" twice and turns back into previous state

2.8. Metering

The SIN-4-FP-21 is capable of measuring the power consumption of the Appliance which is connected.
The device reports:

- Instant Power Consumption (W),
- Cumulative Energy (Wh)

in Zigbee, through the Metering Cluster.

The SIN-4-FP-21 saves Cumulative Energy when it is shut down and recovers this Energy when powered back. The Cumulative Energy is reset to 0 when the device is reset.

2.9. Over Current / Temperature

As the SIN-4-FP-21 is capable of measuring the power consumption, it will automatically set Fil Pilote Mode to No Frost if the measured intensity is higher than 16.5A for more than 30 seconds to protect the device and avoid overheating. In this case it won't be turned back to previous mode automatically.

The SIN-4-FP-21 is also capable of measuring its own temperature. If the device is still overheating with a load less than 16.5A, it will automatically set Fil Pilote Mode to No Frost if the measured temperature is

higher than 85°C inside the product for more than 20 seconds. In this case it won't be turned back to previous mode automatically.

The SIN-4-FP-21 is also equipped with a resettable fuse, so in case the device is still overheating, the fuse will shut down the whole device if the temperature inside the product exceeds 90°C. In case the fuse tripped, it will automatically go off when the temperature inside the product decreases below 60°C.

2.10. Default Settings

When reset to Defaults Settings, the SIN-4-FP-21 is in the following state:

- Fil Pilote Mode is No Frost,
- Cumulative Energy is reset to 0,
- Out of any Zigbee Network,
- Zigbee parameters are clear and set to default values,
- Disconnected from any Bluetooth Device.

3. ZIGBEE PROTOCOL

Following the Zigbee Protocol, the SIN-4-FP includes 3 Application Endpoints:

- **Endpoint #0**
  - Purpose: Zigbee Device Object
- **Endpoint #1**
  - Purpose: Fil Pilote Control
  - Device Type: HA Smart Plug Device
  - Device ID: 0x0051
- **Endpoint #242:**
  - Purpose: Zigbee Green Power
  - Device ID: 0x0061

Zigbee Clusters Supported					
Cluster ID	Description	Client Side	Endpoint #	Server Side	Endpoint #
0x0000	Basic	☐		☒	1
0x0003	Identify	☒	1	☐	
0x0004	Groups	☐		☒	1
0x0005	Scenes	☐		☒	1
0x0006	OnOff	☐		☒	1
0x0021	Green Power	☒	242	☒	242
0x0702	Simple Metering	☐		☒	1
0x1000	Touchlink	☐		☒	1
0xFC00	FilPilote	☐		☒	1

3.1. Endpoint #0: Zigbee Device Object

The ZDO (Zigbee Device Object) provides network management capabilities to the Device. It is implemented to respect the Zigbee Certified Platform and to be compatible with other Zigbee Devices.

3.2. Endpoint #1: Fil Pilote Control

The Fil Pilote Control Endpoint enables the control of the Heater connected to the SIN-4-FP.
It is based on:

- **Device Type:** Home Automation Smart Plug
- **Device Identifier:** 0x0051

It supports the following Clusters:

3.2.1. Basic

The Device supports the Basic Cluster (0x0000) as Server to provide some basic information about the Device.

3.2.1.1. Attributes Supported

- ***ZCLVersion***
  - **Attribute:** 0x0000
  - **Type:** unsigned8, read-only
  - **Description:** Version of the Cluster Library
- ***ApplicationVersion***
  - **Attribute:** 0x0001
  - **Type:** unsigned8, read-only
  - **Description:** Version of the current Firmware
- ***StackVersion***
  - **Attribute:** 0x0002
  - **Type:** unsigned8, read-only
  - **Description:** Version of the current Stack
- ***HWVersion***
  - **Attribute:** 0x0003
  - **Type:** unsigned8, read-only
  - **Description:** Version of the current Hardware – not supported yet, set to 0x00
- ***ManufacturerName***
  - **Attribute:** 0x0004
  - **Type:** string, read-only
  - **Description:** “NodOn”
- ***ModelIdentifier***
  - **Attribute:** 0x0005
  - **Type:** string, read-only
  - **Description:** “SIN-4-FP-21”

- ***DateCode***
  - **Attribute:** 0x0006
  - **Type:** string, read-only
  - **Description:** Date of the manufacturing of the Device – not supported yet, set to 2020
- ***PowerSource***
  - **Attribute:** 0x0007
  - **Type:** enum8, read-only
  - **Description:** Specifies the source of power available to the device – Set to 0x01: Mains (single phase).
- ***DisableLocalConfig***
  - **Attribute:** 0x0014
  - **Type:** bitmap8, read-write
  - **Description:** Allows local device configuration to be disabled – Set to 0x00 by default: Configuration enabled
- **SwBuildID**
  - **Attribute:** 0x4000
  - **Type:** string
  - **Description:** Version of the Firmwares of the module with following format "Va.b.c-d.e.f" where:
    - "a" is Major of Firmware 1,
    - "b" is Minor of Firmware 1,
    - "c" is Patch of Firmware 1,
    - "d" is Major of Firmware 2,
    - "e" is Minor of Firmware 2,
    - "f" is Patch of Firmware 2.

    For example, V2.31.0-1.4.1 means:
    - V2.31.0 for Firmware 1,
    - V1.4.1 for Firmware 2.

3.2.1.2. Commands Supported

- ***Reset to factory defaults***
  - **Command:** 0x00
  - **Description:** The *Reset to factory defaults* command allows the Device to reset all the attributes of all its clusters to their factory defaults.

3.2.2. Identify (Server)

The Device supports the Identify Cluster (0x0003) as Server to help the user to identify his product once installed behind the heater.

In the Identify Mode, the Device toggles the Fil Pilote every second (it switches alternatively between Comfort and No-Frost…) and the LED glows in Green.

3.2.2.1. Attributes Supported

- ***IdentifyTime***
  - **Attribute:** 0x0000
  - **Type:** unsigned16
  - **Description:** The *IdentifyTime* attribute specifies the remaining length of time, in seconds, that the device will continue to identify itself

3.2.2.2. Commands Supported

- ***Identify***
  - **Command:** 0x00
  - **Description:** The *Identify* command starts or stops the receiving device identifying itself.
- ***Identify Query***
  - **Command:** 0x01
  - **Description:** The *Identify Query* command allows the sending device to request the target or targets to respond if they are currently identifying themselves.

3.2.3. Groups

The Device supports the Groups Cluster (0x0004) as Server and so can be added to or removed from groups and can be addressed using the corresponding group address.

3.2.3.1. Attributes Supported

- ***NameSupport***
  - **Attribute:** 0x0000
  - **Type:** bitmap8, read-only
  - **Description:** Value set to 1 ; the device supports storing names for groups.

3.2.3.2. Commands Supported

- ***Add Group***
  - **Command:** 0x00
  - **Description:** The *Add Group* command allows to add this endpoint to a group.

- ***View Group***
  - **Command:** 0x01
  - **Description:** The *View Group* command allows to request that the device respond with the group name the endpoint belongs to
- ***Get Group Membership***
  - **Command:** 0x02
  - **Description:** The *Get Group Membership* command allows to request that the device respond with the set of groups the endpoint belongs to
- ***Remove Group***
  - **Command:** 0x03
  - **Description:** The *Remove Group* command allows to remove this endpoint from the specified group.
- ***Remove All Groups***
  - **Command:** 0x04
  - **Description:** The *Remove All Groups* command allows to remove this endpoint from all groups.
- ***Add Group if Identifying***
  - **Command:** 0x05
  - **Description** The *Add Group if Identifying* command allows to add this endpoint to a group, if the endpoint is identifying.

3.2.4. Scenes

The Device supports the Scenes Cluster (0x0005) as Server and so can be associated to a specific Scene.

3.2.4.1. Attributes Supported

- ***SceneCount***
  - **Attribute:** 0x0000
  - **Type:** unsigned8, read-only
  - **Description:** The *SceneCount* attribute specifies the number of scenes currently in the device's scene table.
- ***CurrentScene***
  - **Attribute:** 0x0001
  - **Type:** unsigned8, read-only
  - **Description:** The *CurrentScene* attribute holds the Scene ID of the scene last invoked.
- ***CurrentGroup***
  - **Attribute:** 0x0002
  - **Type:** unsigned16, read-only
  - **Description:** The *CurrentGroup* attribute holds the Group ID of the scene last invoked, or 0x0000 if the scene last invoked is not associated with a group.

- ***SceneValid***
  - **Attribute:** 0x0003
  - **Type:** bool, read-only
  - **Description:** The *SceneValid* attribute indicates whether the state of the device corresponds to that associated with the *CurrentScene* and *CurrentGroup* attributes.
- ***NameSupport***
  - **Attribute:** 0x0004
  - **Type:** unsigned8, read-only
  - **Description:** Value set to 0 ; the device does not support storing names for scenes.

3.2.4.2. Commands Supported

- ***Add Scene***
  - **Command:** 0x00
  - **Description:** The *Add Scene* command allows to add a Scene in the Scene Table.
- ***View Scene***
  - **Command:** 0x01
  - **Description:** The *View Scene* command allows to request that the device respond with the scene field set, name, and transition times of the Scene
- ***Remove Scene***
  - **Command:** 0x02
  - **Description:** The *Remove Scene* command allows to remove a Scene from the Scene Table
- ***Remove All Scenes***
  - **Command:** 0x03
  - **Description:** The *Remove All Groups* command allows to remove all entries from the Scene Table with the specified Group ID.
- ***Store Scene***
  - **Command:** 0x04
  - **Description** The *Store Scene* command allows the device to add an entry to the Scene Table with the specified Group ID, Scene ID, and its current state.
- ***Recall Scene***
  - **Command:** 0x05
  - **Description** The *Recall Scene* command allows the device to retrieve the values from the previously stored field set.
- ***Get Scene Membership***
  - **Command:** 0x06
  - **Description** The *Get Scene Membership* command allows the device to return the set of Scenes currently stored.

3.2.5. On/Off

The Device supports commands On/Off Cluster as Server to allow the control of the Fil Pilote Heater wired to the Device, in a deprecated mode, when the Gateway does not integrate the Fil Pilote Cluster.
When controlled with the On/Off Cluster, the SIN-4-FP acts as:

- Comfort when receiving a On Command,
- No-Frost when receiving a Off Command.

3.2.5.1. Attributes Supported

- ***On/Off***
  - **Attribute:** 0x0000
  - **Type:** bool
  - **Description:** Value is set to 0x00 for Off (Anti-Freeze Mode) and 0x01 for On (Comfort Mode)
- ***GlobalSceneControl***
  - **Attribute:** 0x4000
  - **Type:** bool
  - **Description:** Value is set to True after the reception of a command which causes the *OnOff* attribute to be set to True, such as a standard *On* command and set to False after reception of a *Off with effect* command.
- ***OnTime***
  - **Attribute:** 0x4001
  - **Type:** uint16
  - **Description:** Specifies the length of time (in 1/10^{ths} seconds) that the “On” (= Comfort Mode) state will be maintained before automatically transitioning to the “Off” (= Anti-Freeze Mode) state when using the *On with timed off* command.
- ***OffWaitTime***
  - **Attribute:** 0x4002
  - **Type:** uint16
  - **Description:** Specifies the length of time (in 1/10^{ths} seconds) that the “Off” (= Anti-Freeze Mode) state will be guarded to prevent an “On” command turning back to its “On” (= Comfort Mode) state.

3.2.5.2. Commands Supported

- ***Off***
  - **Command:** 0x00
  - **Description:** Set the Fil Pilote Mode to No-Frost Mode.
- ***On***
  - **Command:** 0x01

  - **Description:** Set the Fil Pilote Mode to Comfort Mode.
- ***Toggle***
  - **Command:** 0x02
  - **Description:** If the SIN-4-FP is in Comfort Mode, it goes to No-Frost Mode. If it is in No-Frost Mode, it goes in Comfort Mode.
- ***Off with effect***
  - **Command:** 0x40
  - **Description:** Allow the SIN-4-FP to be turned Off (Anti-Freeze) using enhanced ways of fading
- ***On with recall global scene***
  - **Command:** 0x41
  - **Description:** Allow the recall of the settings when the SIN-4-FP was turned Off (Anti-Freeze)
- ***On with timed off***
  - **Command:** 0x42
  - **Description:** Allow the SIN-4-FP to be turned On (Comfort Mode) for a specific duration with a guarded Off (No-Frost) duration.

3.2.6. Fil Pilote

The Device supports Fil Pilote Cluster (0xFC00) as Server to allow the control of the Fil Pilote Heater wired to the Device.
The Fil Pilote Cluster is a Manufacturer Cluster and must be specifically integrated by the Controller.

3.2.6.1. Attributes Supported

- ***Mode***
  - **Attribute:** 0x0000
  - **Type:** uint8
  - **Description:** Value of the current Mode
    - **0x00:** Mode OFF
    - **0x01:** Mode Comfort
    - **0x02:** Mode Eco
    - **0x03:** Mode Anti-Freeze
    - **0x04:** Mode Comfort-1
    - **0x05:** Mode Comfort-2

3.2.6.2. Commands Supported

- ***Set Mode***
  - **Command:** 0x00
  - **Description:** Set the Fil Pilote Mode
  - **Values:**
    - **0x00:** Mode OFF

- **0x01:** Mode Comfort
- **0x02:** Mode Eco
- **0x03:** Mode Anti-Freeze
- **0x04:** Mode Comfort-1
- **0x05:** Mode Comfort-2

3.2.7. Metering

The Device supports Metering Cluster (0x0702) as Server to allow the report of the Power and Energy measurement of the Heater.

3.2.7.1. Attributes Supported

- ***CurrentSummationDelivered***
  - **Attribute:** 0x0000
  - **Type:** uint48
  - **Description:** Represent the most recent summed value of Energy and consumed in the premises.
- ***DefaultUpdatePeriod***
  - **Attribute:** 0x000A
  - **Type:** uint8
  - **Description:** Represents the interval (in seconds) at which the *InstantaneousDemand* attribute is updated when not in fast poll mode.
- ***Status***
  - **Attribute:** 0x0200
  - **Type:** map8
  - **Description:** Provides indicators reflecting the current error conditions found by the SIN-4-FP.
- ***UnitOfMeasure***
  - **Attribute:** 0x0300
  - **Type:** enum8
  - **Description:** Provides a label for the Energy being measured by the SIN-4-FP.

- ***Multiplier***
  - **Attribute:** 0x0301
  - **Type:** uint24
  - **Description:** Provides a value to be multiplied against a raw or uncompensated sensor count of Energy being measured by the SIN-4-FP.
- ***Divisor***
  - **Attribute:** 0x0302

  - **Type:** uint24
  - **Description:** Provides a value to divide the results of applying the Multiplier Attribute against a raw or uncompensated sensor count of Energy being measured by the SIN-4-FP.
- ***Summation formatting***
  - **Attribute:** 0x0303
  - **Type:** map8
  - **Description:** Provides a method to properly decipher the number of digits and the decimal location of the values found in the *Summation Information Set* of attributes.
- ***Demand formatting***
  - **Attribute:** 0x0304
  - **Type:** map8
  - **Description:** Provides a method to properly decipher the number of digits and the decimal location of the values found in the Demand-related attributes.
- ***MeteringDeviceType***
  - **Attribute:** 0x0306
  - **Type:** map8
  - **Description:** Provides a label for identifying the type of metering device present.
    - **Value:** 0 – Electric Metering
- ***Instantaneous Demand***
  - **Attribute:** 0x0400
  - **Type:** int24
  - **Description:** Represents the current Demand of Energy delivered at the premises

3.2.8. Over-the-Air Upgrade Cluster

The Device supports the Over-the-Air Upgrade Cluster as Client to be able to upgrade its Firmware.
The SIN-4-FP-21 includes two Firmwares which can be both upgraded:

- The Image Type for Firmware 1 is 0x0006,
- The Image Type for Firmware 2 is 0x0106.

Note:

- *You may request the latest Firmwares from NodOn to upgrade devices using your own OTA Server.*

3.2.8.1. Attributes Supported

- ***UpgradeServerID***
  - **Attribute:** 0x0000
  - **Type:** EUI64
  - **Description:** Used to store the IEEE address of the upgrade server resulted from the discovery of the upgrade server's identity.
  - **Default value:** 0xFFFFFFFFFFFFFFFF

- ***ImageUpgradeStatus***
  - **Attribute:** 0x0006
  - **Type:** enum8 (0x00 – 0x06)
  - **Description:** Indicates where the client device is at in terms of download and upgrade process.
  - **Default value:** 0x00 (Normal)

3.3. Endpoint #242: Zigbee Green Power

This Endpoint provides the Zigbee Green Power feature, including support for Green Power Devices through the Green Power Cluster.

4. BLUETOOTH PROTOCOL

Bluetooth Protocol can be used to update the Firmware of the Module.

4.1. Advertising Mode

The Device can enter in Bluetooth Advertinsng Mode when:

- It is powered ON,
- It is simple-pressed.
-

While in Advertising Mode, the Device broadcasts Advertising Frames containing:

- Manufacturer Identifier,
- Brand Identifier,
- Radio Protocol,
- Device type,
- Firmware 1 Version,
- Firmware 2 Version,
- Serial Number.

By identifying Device Type and Firmware Versions, it is possible to know if the Device needs to be updated or not.

The entire payload of Advertising Frames is specified in Annex 1.

4.2. Connected Mode

Once connected, the Device has access to the OTA Service

4.2.1. Service and characteristics

The Device implements an OTA Service.
The OTA Service characteristics are described in the following table. The UUID value of the service itself is: **1d14d6eefd63-4fa1- bfa4-8f47b42119f0**.

Characteristic	UUID	Type	Length	Support	Properties
OTA Control Attribute	F7BF3564-FB6D-4E53-88A4-5E37E0326063	Hex	1 byte	Mandatory	Write
OTA Data Attribute[1]	984227F3-34FC-4045-A5D0-2C581F81A153	Hex	Variable, max 244 bytes	Mandatory	Write without response, Write

4.2.2. Control Commands

The possible control words written are described in the following table.

Hex value	Description
0x00	OTA client initiates the upgrade procedure by writing value 0.
0x03	After the entire GBL file has been uploaded the client writes this value to indicate that upload is finished.
0x04	Request the target device to close connection. Typically the connection is closed by OTA client but using this control value it is possible to request that disconnection is initiated by the OTA target device.
Other values	Other values are reserved for future use and must not be used by application.

4.2.3. Data Commands

Files Data can be sent through the Data Attribute.

Annex 1 : Advertising Format

	Advertising Data																													
Index (bytes)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	Flag Field		Short Name Field										Manufacturer Field																	
Meaning	Flag Type	Flag Value	Short Name Length	Short Name Type	Short Name								Manuf Length	Manuf Type	Manuf ID		Manuf Brand	Manuf Protocol	Manuf Device Type	Manuf Fw 1 Version			Manuf Fw 2 Version			Manuf Serial Number				
Example Values	02	09	08	01	'S'	'I'	'N'	'-'	'1'	'2'	'3'	'4'	0F	01	02	59	01	04	01	01	00	00	01	00	00	01	23	45	67	

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