



# Certified Capability List

This Capability List is based on a certification session performed by the *TALQ Certification Tool (v2.6.2-online.2)* on 2025-04-01 12:40:34.799 +0300.

The Capability List is a consolidated list of TALQ features which are implemented in a product.

The tool has successfully performed 93 tests.

## Product details

**Product Name** Flashnet IoT Platform

**Company** Flashnet

**Type** GATEWAY

### Notes

**Generated on** 2025-04-01 12:40:34.799 +0300

**Supported profiles**

- Environmental Monitoring
- Lighting

**API version certified:** 2.6.2

**Certification performed by app version:** 2.6.2-online.2

## Functional tests

The Functional Tests help customers understand the capabilities of a TALQ-certified product. All functional test cases are presented to provide comprehensive context, and successful completion of each test is indicated with a tick mark. Each Functional Test is related to a set of required TALQ technical test cases.

### Configuring

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#### Support light point control features ✓

The Gateway successfully connects to a CMS and transmits its capabilities for light point control features and services. **CFG-1**

#### Support cabinet control lighting features

**CFG-2**

The Gateway successfully connects to a CMS and transmits its capabilities for cabinet control lighting features and services.

### Support sensor-based light point control features

The Gateway successfully connects to a CMS and transmits its capabilities for sensor-based light point control features **CFG-3** and services.

### Discovery of the network of devices ✓

The Gateway transmits all its devices to the CMS together with their configuration and asset information. **CFG-4**

### Initialize light point electrical alarm thresholds ✓

The Gateway is able to receive the light point electrical alarm thresholds from the CMS, including Lamp Voltage Too High/Low, Lamp Current Too High/Low, Active Power Too High/Low and Power Factor Too Low **CFG-5**

### Initialize and change the cabinet control alarm thresholds ✓

The Gateway is able to receive the cabinet control electrical alarm thresholds from the CMS, including < to be defined > **CFG-6**

### Initialize and change the light point parameters

The Gateway is able to receive the light point parameters from the CMS. **CFG-7**

### Initialize and change a group of luminaires ✓

The Gateway is able to handle a command from the CMS to set or change a group of light points to assign them a control program. **CFG-8**

### Change the sampling frequency for measurements ✓

The Gateway is able to change the sampling of measurements and properly reflected in the next data log sent to the CMS. **CFG-9**

### Change the reporting frequency for measurements ✓

The Gateway is able to change the reporting frequency (how often it sends data logs to the CSM) for measurements. **CFG-10**

### Update the firmware of the hardware devices

The Gateway supports data package service and accepts a data package to update firmware on a physical device. **CFG-11**

## Monitoring

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**Measure and report basic electrical values (Current/Voltage/Active Power/Power Factor)**

The Gateways sends "valid values" for electrical values including mains voltage, current, active power and power factor **MTG-1** to the CMS using one of the data logging service.

**Measure and report cumulating energy counter**

The Gateways sends "valid growing values" for energy counter to the CMS using one of the data logging service. **MTG-2**

**Report lamps' number of operating hours**

The Gateways sends "valid growing values" for lamp operating hours counter to the CMS using one of the data logging service. **MTG-3**

**Report lamps' number of switch-on counter**

The Gateways sends "valid growing values" for lamp switch-on counter to the CMS using one of the data logging service. **MTG-4**

**Report lamps' number of supply loss counter**

The Gateways sends "valid growing values" for supply loss count to the CMS using one of the data logging service. **MTG-5**

**Monitor the lamp level feedback when a manual override command is sent**

The Gateway receives a manual override command, sends it to the device and can report, using on-demand read as well as a data logger service, that the lamp level feedback is getting close to the command. **MTG-6**

**Report temperature**

The Gateways sends temperature values to the CMS using one of the data logging service. **MTG-8**

**Report presence detection**

The Gateways sends presence detection values to the CMS using one of the data logging service. **MTG-9**

**Report noise level**

The Gateways sends noise level values to the CMS using one of the data logging service. **MTG-10**

**Report light level**

The Gateways sends light level values to the CMS using one of the data logging service. **MTG-11**

**Report firmware updating process**

The Gateway is able to report the firmware update events

**MTG-12****Controlling****5 of 7****Manual control over a light point** ✓

The Gateway properly receives and handles a manual override command sent by the CMS for one single light point

**CTR-1****Manual control over a group of light points** ✓

The Gateway properly receives and handles a manual override command sent by the CMS for a group of light points

**CTR-2****Manual control with a delay** ✓

The Gateway properly receives and handles a manual override command that includes a delay, sent by the CMS for one single light point.

**CTR-3****Manual control with a ramp** ✓

The Gateway properly receives and handles a manual override command that includes a rampup, sent by the CMS for one single light point.

**CTR-4****Automatic switch light on/off based on photocell value**

The Gateway can properly execute a control program that switches the light ON and OFF based on a local photocell value on a single light point.

**CTR-5****Automatic change of light level when presence detected**

The Gateway can properly execute a control program that changes the light dimming level based on a local presence sensor on a single light point.

**CTR-6****Automatic change of light level when noise detected** ✓

The Gateway can properly execute a control program that changes the light dimming level based on a local noise sensor on a single light point.

**CTR-7****Alarming****4 of 5****Report lighting alarms to the CMS** ✓

The Gateway can produce lighting alarms and send them to the CMS using one of the data logger services. **ALR-1**

**Report electrical alarms to the CMS** ✓

The Gateway can produce electrical alarms and send them to the CMS using one of the data logger services. **ALR-2**

**Report invalid program and calendar** ✓

The Gateway can produce invalid calendar and control program alarms and send them to the CMS using one of the data logger services. **ALR-3**

**Report activity for sensor based lighting**

The Gateway can send an event in case of activity detected and send them to the CMS using one of the data logger services. **ALR-4**

**Request the status of the alarm** ✓

The Gateway can report the status of the alarms as a response to a request from the CMS **ALR-5**

**Programming**

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**Fix time switching+dimming control program that applies to all days in the year** ✓

The Gateway can receive and execute a control program that switches and dims a light point at fix time all days in the year. **PRG-1**

**Astro-clock switching + fix time dimming control program that applies to all days in the year** ✓

The Gateway can receive and execute a control program that switches a light point at sunrise/sunset +/- few minutes and dim it during an astro-clock active period, all days in the year. **PRG-2**

**Photocell switching + fix time dimming control program that applies to all days in the year**

The Gateway can receive and execute a control program that switches a light point when photocell indicates darkness and dim it during the photocell active period, all days in the year. **PRG-3**

**Photocell and astro-clock switching + fix time dimming control program that applies to all days in the year**

The Gateway can receive and execute a control program that switches a light point when photocell indicates darkness or at sunrise/sunset +/- few minutes (the earlier for switch ON/OFF) and dim it during the photocell active period, all days in the year. **PRG-4**

**Part night switching program** ✓

The Gateway can receive and execute a control program that switches a light point OFF at fixed time in the middle of the night. **PRG-5**

**Support exceptional periods (e.g., Sept 10th to Oct 16th)** ✓

The Gateway can receive and execute a calendar that has a default rule for all days in the year and another higher priority calendar that applies from DAY 1 to DAY 2. **PRG-6**

**Support exceptional week days (e.g., every Saturday and Sunday)** ✓

The Gateway can receive and execute a calendar that has a default rule for all days in the year and another higher priority calendar that applies every Saturday night and Sunday night, every day in the year. **PRG-7**

**Support exceptional week days (e.g., every Saturday and Sunday) and exceptional periods (e.g., Sept 10th to Oct 16th)** ✓

The Gateway can receive and execute a calendar that has a default rule for all days in the year, another higher priority calendar that applies every Saturday night and Sunday night, every day in the year and another higher priority calendar that applies to every saturday between DAY 1 and DAY 2. **PRG-8**

**Support dynamic lighting program based on sensor detection**

The Gateway can receive and execute a control program that has rule based on presence sensor. **PRG-9**

## Capability list

### Security

Enabled ✓

### Functions

#### Basic

The Basic function describes the properties related to the physical asset to which the logical device is associated, such as identification (assetId) and location information.

#### Attributes

#	Attribute	Description
✓	assetId	Customer identifier of the asset. If multiple devices have the same assetId it means they belong to the same asset.

✓ hwType	Hardware type of the device.
✓ hwVersion	Hardware revision of the device.
✓ swType	Software type of device. This attribute may be useful if the same hardware supports multiple firmware versions with different functions.
✓ swVersion	Software version installed on the device.
✓ installationDate	The installation date of Physical Device.
✓ deviceReset	The physical device containing the logical device was reset.
✓ currentTime	Current time of the device defined as local time with time zone designator. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TimeFunction.currentTime instead.]
✓ commandConfirmation	Allows the CMS to reboot, factory reset or configuration reset of the device. Before rebooting or resetting the device this attribute has to be true. Default value = false
✓ reboot	Reboot the device. This operational attribute requires the commandConfirmation attribute value to be set to true.
✓ operatingHours	Number of operating hours of the device.

### Events

#	Event type	Description
✓	deviceReset	The physical device containing the logical device was reset

### Communication

The Communication Function contains attributes related to the communication within the ODN, and between ODN devices and Gateways. Although communication within the ODN is outside the scope of the TALQ Smart City Protocol, this Function enables access to a minimum set of configuration and state information of the ODN communication interface in order to facilitate system management from the CMS.

### Attributes

#	Attribute	Description
✓	communicationType	Type of communication technology implemented by the ODN (e.g. power line, wireless).
✓	physicalAddress	Physical address of the device. For example, IEEE MAC address. This attribute can be used to map between logical and physical devices. The format is specific to the ODN implementation.
✓	communicationQuality	Indicator of the quality of the communication with the device. 100% means good quality.
✓	communicationFailure	This attribute is updated by the ODN when the communication function is not operating as expected.

### Events

#	Event type	Description
✓	communicationFailure	This event is generated by the ODN when the communication function is not operating as expected

### Gateway

The Gateway function includes the necessary attributes to enable the communication between the CMS and the Gateway according to the TALQ Specification.

### Attributes

#	Attribute	Description
✓	cmsUri	Base URI for TALQ communication that allows the Gateway to access the CMS. Must be an absolute URI. Other URI's for accessing CMS can be relative to this base.
✓	cmsAddress	CMS UUID address
✓	gatewayUri	Base URI for TALQ communication that allows the CMS to access the Gateway. Must be an absolute URI. Other URI's for accessing Gateway can be relative to this base.
✓	gatewayAddress	Gateway UUID address
✓	retryPeriod	Time duration before the Gateway retransmits a message for which expected response has not been received. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new GatewayFunction.gatewayRetryPeriod instead.]
✓	crlUrn	URI where the Gateway can obtain the Certification Revocation List (CRL).
✓	vendor	Vendor identification.

### Lamp Actuator

The Lamp Actuator function includes attributes related to lighting control and it represents the smallest unit for control purposes. In practice, however, a Lamp Actuator function can control combinations of several lamps and control gear but all in the same way, as if they are all one individual unit.

### Attributes

#	Attribute	Description
✓	lampTypeId	TALQ Address of an existing lampType.
✓	defaultLightState	Sets the default light output for the lamp actuator. This shall be applicable if no other command is active. This attribute shall be set to 100% as default value.
✓	targetLightCommand	Latest command for the lamp actuator.
✓	feedbackLightCommand	This attribute reflects the command in effect and it might deviate from the actualLightState due to propagation time or due to internal ODN specific mechanisms to handle the priority of the requests.
✓	actualLightState	This attribute should reflect the physical state of the light source as much as possible, including factors such as CLO. It may be calculated or measured, depending on the specific ODN implementation, which is outside the scope of this specification.
✓	calendarID	TALQ Address of the calendar controlling this lamp actuator. If this attribute is empty, the behavior shall be determined by the ODN. If the attribute is invalid, the ODN shall trigger a generic invalid address event and the behavior shall be determined by the ODN.
✓	invalidCalendar	The lamp actuator function has been allocated a calendar that it cannot implement.
✓	invalidProgram	The lamp actuator function has been allocated a control program that it cannot implement.
✓	lightStateChange	Light state has changed.
✓	calendarChange	The calendar applicable to the lamp actuator has changed.



## Events

#	Event type	Description
✓	lightStateChange	Light state has changed
✓	invalidCalendar	The lamp actuator function has been allocated a calendar that it cannot implement
✓	invalidProgram	The lamp actuator function has been allocated a control program that it cannot implement
✓	calendarChange	The calendar applicable to the lamp actuator has changed

## Lamp Monitor

The Lamp Monitor function enables monitoring of lamp parameters. A Lamp Monitor function should be associated with a specific lamp/control gear combination. Multiple lamp monitor functions may be implemented by a single device.

## Attributes

#	Attribute	Description
✓	switchOnCounter	Cumulative number of ON/OFF cycles since installation of the lamp. The wrap around value is $2e32 - 1$ .
✓	operatingHours	Number of hours the lamp is on. This is the value used in CLO and may be set by the CMS.
✓	temperature	Temperature of the device implementing this function. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperature instead.]
✓	supplyVoltage	RMS supply volts when supplyType is AC, supply voltage (V) when supplyType is DC.
✓	supplyCurrent	RMS supply current (A) when supplyType is AC, supply current (A) when supplyType is DC.
✓	activePower	Active power.
✓	reactivePower	Reactive power.
✓	apparentPower	Apparent Power.
✓	powerFactor	Active power/Apparent power.
✓	activeEnergy	Cumulative active energy (since installation or counter reset).
✓	lampFailure	The lamp is not operating as it is supposed to (e.g. the lamp is broken). This event shall be used to detect a situation where the lamp (or LED module(s)) should be lit, but produce no light. This could be detected by the current flowing or power consumed.
✓	dimmingFailure	The lamp is not dimming as it is supposed to (e.g. the driver is not connected properly). This event shall be used to detect a situation where the lamp (or LED module(s)) is lighting at a dimming level which is different from the expected dimming level, taking into account the programmed (or manual) level as well any correction (e.g. virtual power, constant light output).
✓	currentTooHigh	Supply current is above the highCurrentThreshold defined in the lamp type.
✓	currentTooLow	Supply current is below the lowCurrentThreshold defined in the lamp type.
✓	powerFactorTooLow	The power factor is below powerFactorThreshold.

✓ highTemperature	Indicates temperature is above the high threshold [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperatureTooHigh instead.]
✓ relayFailure	Set in case of internal relay is failing (e.g. it may be stuck in either on or off position). Typically if contactor error is used as well.
✓ absoluteLampPowerTooHigh	Indicates the power is above the lampPowerHighThreshold in the lamp type
✓ absoluteLampPowerTooLow	Indicates the power is below the lampPowerLowThreshold in the lamp type
✓ controlGearCommFailure	Indicates failure of the control gear.
✓ cyclingFailure	Indicates the lamp is constantly switching ON and OFF in an unexpected manner. This event shall be used to indicate a lamp which cycles while it should be on. The actual detection algorithm is outside the scope of this specification.
✓ supplyLoss	Indicates loss of mains power.
✓ leakageDetected	Indicates that an earth leakage fault has been detected.
✓ supplyVoltageTooHigh	Level of supply voltage is above the highLampVoltageThreshold.
✓ supplyVoltageTooLow	Level of supply voltage is below the lowSupplyVoltageThreshold.
✓ highSupplyVoltageThreshold	Supply voltage above which the supplyVoltageTooHigh event is triggered.
✓ lowSupplyVoltageThreshold	Supply voltage below which the supplyVoltageTooLow event is triggered.

## Events

#	Event type	Description
✓	currentTooHigh	Supply current is above the highCurrentThreshold defined in the lamp type
✓	currentTooLow	Supply current is below the lowCurrentThreshold defined in the lamp type
✓	powerFactorTooLow	The power factor is below powerFactorThreshold
✓	lampFailure	The lamp is not operating as it is supposed to (e.g. the lamp is broken). This event shall be used to detect a situation where the lamp (or LED module(s)) should be lit, but produce no light. This could be detected by the current flowing or power consumed.
✓	dimmingFailure	The lamp is not dimming as it is supposed to (e.g. the driver is not connected properly). This event shall be used to detect a situation where the lamp (or LED module(s)) is lighting at a dimming level which is different from the expected dimming level, taking into account the programmed (or manual) level as well any correction (e.g. virtual power, constant light output).
✓	highTemperature	Indicates temperature is above the high threshold
✓	relayFailure	Set in case of internal relay is failing
✓	absoluteLampPowerTooHigh	Indicates the power is above the lampPowerHighThreshold in the lamp type
✓	absoluteLampPowerTooLow	Indicates the power is below the lampPowerLowThreshold in the lamp type
✓	controlGearCommFailure	Indicates failure of the control gear
✓	cyclingFailure	Indicates the lamp is constantly switching ON and OFF in an unexpected manner
✓	supplyLoss	Indicates loss of mains power
✓	leakageDetected	Indicates that an earth leakage fault has been detected
✓	supplyVoltageTooHigh	Level of supply voltage is above the highLampVoltageThreshold.

- ✓ supplyVoltageTooLow Level of supply voltage is below the lowSupplyVoltageThreshold.

## Electrical Meter

The electrical meter function supports electrical metering capabilities including measurements of voltage, current, power, energy, and power factor. This function may be associated with Luminaire Controllers, Cabinet Controllers or electrical meters installed in switch boxes. ODNs may implement both single phase and three phase meters. Typically meters within a control device will be single phase and stand-alone meters. A street side cabinet may have single phase or three phase meters.

### Attributes

#	Attribute	Description
✓	phase1VoltageHighThreshold	RMS voltage above which the phase1VoltageTooHigh event is triggered.
✓	phase1VoltageLowThreshold	RMS voltage below which the phase1VoltageTooLow event is triggered.
✓	phase2VoltageHighThreshold	RMS voltage above which the phase2VoltageTooHigh event is triggered.
✓	phase2VoltageLowThreshold	RMS voltage below which the phase2VoltageTooLow event is triggered.
✓	phase3VoltageHighThreshold	RMS voltage above which the phase3VoltageTooHigh event is triggered.
✓	phase3VoltageLowThreshold	RMS voltage below which the phase3VoltageTooLow event is triggered.
✓	neutralCurrentHighThreshold	RMS current above which the neutralCurrentTooHigh event is triggered.
✓	phase1CurrentHighThreshold	RMS current above which the phase1CurrentTooHigh event is triggered.
✓	phase1CurrentLowThreshold	RMS current below which the phase1CurrentTooLow event is triggered.
✓	phase2CurrentHighThreshold	RMS current above which the phase2CurrentTooHigh event is triggered.
✓	phase2CurrentLowThreshold	RMS current below which the phase2CurrentTooLow event is triggered.
✓	phase3CurrentHighThreshold	RMS current above which the phase3CurrentTooHigh event is triggered.
✓	phase3CurrentLowThreshold	RMS current below which the phase3CurrentTooLow event is triggered.
✓	phase1ActivePowerHighThreshold	Power above which the phase1ActivePowerTooHigh event is triggered.
✓	phase1ActivePowerLowThreshold	Power below which the phase1ActivePowerTooLow event is triggered.
✓	phase2ActivePowerHighThreshold	Power above which the phase2ActivePowerTooHigh event is triggered.
✓	phase2ActivePowerLowThreshold	Power below which the phase2ActivePowerTooLow event is triggered.
✓	phase3ActivePowerHighThreshold	Power above which the phase3ActivePowerTooHigh event is triggered.
✓	phase3ActivePowerLowThreshold	Power below which the phase3ActivePowerTooLow event is triggered.
✓	totalActiveEnergy	Total cumulative kWh measured by the meter since installation date (or counter reset).
✓	totalReactiveEnergy	Total cumulative kVarh measured by the meter since installation date (or counter reset).
✓	frequency	Frequency on the line.

✓ phase1PowerFactor	Power factor on phase 1.
✓ phase2PowerFactor	Power factor on phase 2.
✓ phase3PowerFactor	Power factor on phase 3.
✓ phase1Voltage	RMS Voltage between phase 1 and neutral.
✓ phase2Voltage	RMS Voltage between phase 2 and neutral.
✓ phase3Voltage	RMS Voltage between phase 3 and neutral.
✓ neutralCurrent	RMS current on neutral.
✓ phase1Current	RMS current on phase 1.
✓ phase2Current	RMS current on phase 2.
✓ phase3Current	RMS current on phase 3.
✓ phase1ActivePower	Active Power on phase 1.
✓ phase2ActivePower	Active Power on phase 2.
✓ phase3ActivePower	Active Power on phase 3.
✓ phase1ApparentPower	Apparent Power on phase 1.
✓ phase2ApparentPower	Apparent Power on phase 2.
✓ phase3ApparentPower	Apparent Power on phase 3.
✓ phase1ReactivePower	Reactive Power on phase 1.
✓ phase2ReactivePower	Reactive Power on phase 2.
✓ phase3ReactivePower	Reactive Power on phase 3.
✓ phase1VoltageTooHigh	Indicates phase 1 supply voltage is above the phase1VoltageHighThreshold.
✓ phase1VoltageTooLow	Indicates phase 1 supply voltage is below the phase1VoltageLowThreshold.
✓ phase2VoltageTooHigh	Indicates phase 2 supply voltage is above the phase2VoltageHighThreshold.
✓ phase2VoltageTooLow	Indicates phase 2 supply voltage is below the phase2VoltageLowThreshold.
✓ phase3VoltageTooHigh	Indicates phase 3 supply voltage is above the phase3VoltageHighThreshold.
✓ phase3VoltageTooLow	Indicates phase 3 supply voltage is below the phase3VoltageLowThreshold.
✓ neutralCurrentTooHigh	Indicates the neutral current is above the neutralCurrentHighThreshold.
✓ phase1CurrentTooHigh	Indicates the phase 1 current is above the phase1CurrentHighThreshold.
✓ phase1CurrentTooLow	Indicates the phase 1 current is below the phase1CurrentLowThreshold.
✓ phase2CurrentTooHigh	Indicates the phase 2 current is above the phase2CurrentHighThreshold.
✓ phase2CurrentTooLow	Indicates the phase 2 current is below the phase2CurrentLowThreshold.
✓ phase3CurrentTooHigh	Indicates the phase 3 current is above the phase3CurrentHighThreshold.

✓ phase3CurrentTooLow	Indicates the phase 3 current is below the phase3CurrentLowThreshold.
✓ phase1ActivePowerTooHigh	Indicates the phase 1 active power is above the phase1ActivePowerHighThreshold.
✓ phase1ActivePowerTooLow	Indicates the phase 1 active power is below the phase1ActivePowerLowThreshold.
✓ phase2ActivePowerTooHigh	Indicates the phase 2 active power is above the phase2ActivePowerHighThreshold.
✓ phase2ActivePowerTooLow	Indicates the phase 2 active power is below the phase2ActivePowerLowThreshold.
✓ phase3ActivePowerTooHigh	Indicates the phase 3 active power is above the phase3ActivePowerHighThreshold.
✓ phase3ActivePowerTooLow	Indicates the phase 3 active power is below the phase3ActivePowerLowThreshold.
✓ supplyLoss	Indicates loss of supply (power).

## Events

#	Event type	Description
✓	neutralCurrentTooHigh	Indicates the neutral current is above the neutralCurrentHighThreshold
✓	phase1VoltageTooHigh	Indicates phase 1 supply voltage is above the phase1VoltageHighThreshold
✓	phase1VoltageTooLow	Indicates phase 1 supply voltage is below the phase1VoltageLowThreshold
✓	phase1CurrentTooHigh	Indicates the phase 1 current is above the phase1CurrentHighThreshold
✓	phase1CurrentTooLow	Indicates the phase 1 current is below the phase1CurrentLowThreshold
✓	phase1ActivePowerTooHigh	Indicates the phase 1 active power is above the phase1ActivePowerHighThreshold
✓	phase1ActivePowerTooLow	Indicates the phase 1 active power is below the phase1ActivePowerLowThreshold
✓	phase2VoltageTooHigh	Indicates phase 2 supply voltage is above the phase2VoltageHighThreshold
✓	phase2VoltageTooLow	Indicates phase 2 supply voltage is below the phase2VoltageLowThreshold
✓	phase2CurrentTooHigh	Indicates the phase 2 current is above the phase2CurrentHighThreshold
✓	phase2CurrentTooLow	Indicates the phase 2 current is below the phase2CurrentLowThreshold
✓	phase2ActivePowerTooHigh	Indicates the phase 2 active power is above the phase2ActivePowerHighThreshold
✓	phase2ActivePowerTooLow	Indicates the phase 2 active power is below the phase2ActivePowerLowThreshold
✓	phase3VoltageTooHigh	Indicates phase 3 supply voltage is above the phase3VoltageHighThreshold
✓	phase3VoltageTooLow	Indicates phase 3 supply voltage is below the phase3VoltageLowThreshold
✓	phase3CurrentTooHigh	Indicates the phase 3 current is above the phase3CurrentHighThreshold
✓	phase3CurrentTooLow	Indicates the phase 3 current is below the phase3CurrentLowThreshold
✓	phase3ActivePowerTooHigh	Indicates the phase 3 active power is above the phase3ActivePowerHighThreshold
✓	phase3ActivePowerTooLow	Indicates the phase 1 active power is below the phase2ActivePowerLowThreshold

- ✓ supplyLoss Indicates loss of supply (power).

### Light Sensor

A Light Sensor function models the output of light sensor. This function is optional for both CMS and Gateway, but when supported the requirements in this section shall apply.

#### Attributes

#	Attribute	Description
✓	lightLevel	Illuminance level.

#### Events

#	Event type	Description
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### Binary Sensor

A Binary Sensor function can be used to model any sensor that provides a digital, binary output. This function is optional for both CMS and Gateway, but when supported the requirements in this section shall apply.

#### Attributes

#	Attribute	Description
✓	level	Sensor Output level.

#### Events

#	Event type	Description
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### Generic Actuator

The Generic Actuator function includes attributes related to generic control and it represents the smallest unit for control purposes.

#### Attributes

#	Attribute	Description
✓	defaultState	Sets the default state output for the generic actuator. This shall be applicable if no other command is active.
✓	actualState	This attribute should reflect the physical state of the source as much as possible. It may be calculated or measured, depending on the specific ODN implementation, which is outside the scope of this specification.
✓	targetCommand	Latest command for the generic actuator.
✓	feedbackCommand	This attribute reflects the command in effect and it might deviate from the actualState due to propagation time or due to internal ODN specific mechanisms to handle the priority of the requests.
✓	stateChange	The state has changed.
✓	calendarID	TALQ Address of the calendar controlling this generic actuator. If this attribute is empty, the behavior shall be determined by the ODN. If the attribute is invalid, the ODN shall trigger a generic invalid address event and the behavior shall be determined by the ODN.

- ✓ **invalidCalendar** This event is generated when a calendar has been allocated and can not be implemented it.
- ✓ **calendarChange** This event is generated when the calendar applicable to the actuator has changed.

### Events

#	Event type	Description
✓	stateChange	The state has changed.
✓	invalidCalendar	This event is generated when a calendar has been allocated and can not be implemented it.
✓	calendarChange	This event is generated when the calendar applicable to the actuator has changed.

### Particulate Matter Sensor

The Particulate Matter Sensor function allows a CMS to monitor the PM10, PM2.5 and PM1 in a device and send events in case the value is above/below configurable thresholds.

#### Attributes

#	Attribute	Description
✓	pm1	Level of pm1 measured by the sensor. (micrograms/m3)
✓	pm2-5	Level of pm2-5 measured by the sensor. (micrograms/m3)
✓	pm10	Level of pm10 measured by the sensor. (micrograms/m3)

#### Events

#	Event type	Description
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### Presence Sensor

The Presence Sensor function allows a CMS to detect presence. This function may be used in Parking Place detectors as well as in dynamic outdoor lighting scenario.

#### Attributes

#	Attribute	Description
✓	presenceStatus	Presence status.
✓	presenceStatusChanged	Indicates the presence status changed.

#### Events

#	Event type	Description
✓	presenceStatusChanged	Indicates the presence status changed.

### Battery Level Sensor

The Battery Level Sensor function allows to measure the charge of the battery, monitor the battery and send events in case the value is above/below configurable thresholds.

#### Attributes

#	Attribute	Description
✓	batteryLevel	Battery level.

**Events**

#	Event type	Description
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### Location Sensor\*

The Location Sensor Function is used to indicate that an object has changed position attributes configurable by the CMS or based on internal setup of the vendor. For example, a specific location (latitude, longitude) of a device could be defined by the vendor. If the device is equipped with a GPS, it could send a specific event indicating that its position is different to the one defined by the CMS. We might also want to let the configuration to the vendor itself and simply define events notifying the CMS that the default configuration has changed. For example, a garbage bin could have its location defined based on a sensor placed on the floor. If the bin is not above this sensor, the vendor will trigger an event. In this last case, the CMS does not need to configure anything.

### Attributes

#	Attribute	Description
✓	expectedLocation	Nominal location of the device
✓	locationChangedThreshold	Distance (meters)
✓	location	Location of the device
✓	locationChanged	Triggered when the difference between location and expectedLocation is above locationChangedThreshold

### Events

#	Event type	Description
✓	locationChanged	Triggered when the difference between location and expectedLocation is above locationChangedThreshold

### Accelerometer\*

The Accelerometer Function is used to indicate that an object has had an impact with another object and to report its acceleration.

### Attributes

#	Attribute	Description
✓	impactDetectedAccelerationThreshold	Threshold for acceleration above which impactDetected is triggered (g)
✓	accelerationSamplingPeriod	In seconds
✓	acceleration	Maximum acceleration of the device (g) over accelerationSamplingPeriod
✓	impactDetected	Indicates that the acceleration is above impactDetectedAccelerationThreshold

### Events

#	Event type	Description
✓	impactDetected	Indicates that the acceleration is above impactDetectedAccelerationThreshold



**Orientation\***

The Orientation function is used to indicate that an object has changed orientation based on attributes configurable by the CMS or based on internal setup of the vendor. The target orientation of the object could be configured by the CMS or could be handled by the vendor. In the latter case, the configuration is let to the vendor itself and events are triggered depending on internal configuration.

**Attributes**

#	Attribute	Description
✓	orientationChangedThreshold	Threshold above which orientationChanged is triggered
✓	orientation	Orientation of the device
✓	orientationChanged	Triggered when orientation differs from expectedOrientation by more than orientationChangedThreshold on any angle, or when the device determines itself that its orientation has changed.

**Events**

#	Event type	Description
✓	orientationChanged	Triggered when orientation differs from expectedOrientation by more than orientationChangedThreshold on any angle, or when the device determines itself that its orientation has changed.

**Gas Sensor\***

The Gas Sensor function allows to measure the gas concentration and sends events if the level is above the configured thresholds.

**Attributes**

#	Attribute	Description
✓	gasConcentration	Gas concentration (ppm)
✓	gasName	Type of gas: CO, CO2, O2, O3, NO, NO2, SO2, NH3, CH4, H2, H2S, HCl, HCN, PH3, ETO, Other. If Other is selected, then gasOtherName shall be used.
✓	gasOtherName	Type of gas if it is not included in the Enum list of gases for gasName

**Events**

#	Event type	Description
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**Simple Actuator**

The Simple Actuator function includes attributes related to generic control and it represents the smallest unit for control purposes.

**Attributes**

#	Attribute	Description
✓	defaultState	Sets the default state output for the simple actuator. This shall be applicable if the actuator is not under an override control (OverrideCommand).

- ✓ **actualState** This attribute should reflect the physical state of the source as much as possible. It may be calculated or measured, depending on the specific ODN implementation, which is outside the scope of this specification.

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- ✓ **targetCommand** Latest command for the simple actuator.

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- ✓ **feedbackCommand** This attribute reflects the command in effect and it might deviate from the actualState due to propagation time or due to internal ODN specific mechanisms to handle the priority of the requests.

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- ✓ **stateChange** The state has changed.

**Events**

#	Event type	Description
✓	stateChange	The state has changed.

**Time\***

The Time function includes attributes related to generic control and it represents the smallest unit for control purposes.

**Attributes**

#	Attribute	Description
✓	timeZone	Time zone of the device. Time zone may be expressed in two formats. where is a time zone as defined in the zone.tab of the IANA timezone database [IANA]; and stdoffset[dst[offset] [,start[/time],en d[/time]]] as defined by the Open Group for posix systems [POSIX].
✓	currentTime	Current time of the device defined as local time with time zone designator.

**Events**

#	Event type	Description
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**Segment Monitor\***

The Segment Monitor function enables monitoring of segment parameters. Multiple segment monitor functions may be implemented by a single device.

**Attributes**

#	Attribute	Description
✓	actualState	This attribute should reflect the physical relay state (ON, OFF) of the source as much as possible. It may be calculated or measured, depending on the specific ODN implementation, which is outside the scope of this specification.

**Events**

#	Event type	Description
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**Noise Monitoring Sensor\***

This sensor function enables monitoring basic noise data.

**Attributes**

#	Attribute	Description
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✓ noise Output noise. (dB)

## Events

#	Event type	Description
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## Atmospheric Sensor\*

This sensor function enables monitoring basic atmospheric data such as barometric pressure, humidity, and temperature. This function complies with WMO standards as reported in the 'Guide to Instruments and Methods of Observation (WMO-No. 8) / Volume I - Measurement of Meteorological Variables'

### Attributes

#	Attribute	Description
✓	airTemperature	Temperature (°C)
✓	relativeHumidity	Relative humidity (%)
✓	atmosphericPressure	Atmospheric pressure normalized to sea level (hPa)

## Wind Sensor\*

This sensor function enables monitoring wind speed and direction. This function complies with WMO standards as reported in the 'Guide to Instruments and Methods of Observation (WMO-No. 8) / Volume I - Measurement of Meteorological Variables'

### Attributes

#	Attribute	Description
✓	windSpeed	Wind speed (m/s)
✓	windDirection	Wind direction in degrees (Relative to True north)

## Precipitation Sensor\*

This sensor function enables monitoring precipitation, defined as the liquid or solid products of the condensation of water vapour falling from clouds, in the form of rain, drizzle, snow, snow grains, snow pellets, hail and ice pellets; or falling from clear air in the form of diamond dust. This function complies with WMO standards as reported in the 'Guide to Instruments and Methods of Observation (WMO-No. 8) / Volume I - Measurement of Meteorological Variables'

### Attributes

#	Attribute	Description
✓	precipitationRate	Intensity of precipitation (mm/h)

## Sky Sensor\*

This sensor function enables monitoring of other atmospheric phenomena. This function complies with WMO standards as reported in the 'Guide to Instruments and Methods of Observation (WMO-No. 8) / Volume I - Measurement of Meteorological Variables'

### Attributes

#	Attribute	Description
✓	solarDirectRadiation	Total solar irradiance (W/m <sup>2</sup> )

**Gully Sensor\***

The Gully Sensor measures properties associated with street drains or gullies.

**Attributes**

#	Attribute	Description
✓	overfull	Indicates that the gully is overfull

**Events**

#	Event type	Description
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**Water Flow Sensor\***

The water flow sensor function measures the water flow rate.

**Attributes**

#	Attribute	Description
✓	flowRate	Rate of water flow (m3/s)

**Events**

#	Event type	Description
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**Water Quality Sensor\***

The water quality sensor function measures the quality of the water in the drinkable water distribution network, in water tanks or in lakes and rivers.

**Attributes**

#	Attribute	Description
✓	pH	Current or last value of the pH measured by the sensor.

**Events**

#	Event type	Description
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**Services****Configuration Service**

The TALQ Configuration Service enables discovery and configuration of devices and services

**Options**

#	Option	Value	Description
✓	commissioningSupported*		This ODN can support commissioning from the CMS side.

✓ devicesPaginationSupported\* This ODN can support pagination of devices.

**Control Service**

The Control service describes the mechanisms to operate the actuator functions in order to enable schedule based and override control

**Options**

#	Option	Value	Description
✓	supportedTypes	<ul style="list-style-type: none"> <li>AbsoluteActivePeriod</li> <li>AstroClockActivePeriod</li> <li>AstroClockTimeControl*</li> <li>ccDate*</li> <li>ccDay*</li> </ul>	Control Program and calendar options supported are defined by announcing support for the given modes
✓	maximumCalendars		Maximum number of calendars supported
✓	maximumPrograms		Maximum number of control programs supported
✓	maxProgramsPerCalendar		Maximum number of control programs per calendar
✓	maxSwitchPointsPerProgram		Maximum number of switching points per control program
✓	maxActivePeriodsPerProgram		Maximum number of active periods per control program
✓	dayOffset	<ul style="list-style-type: none"> <li>1</li> <li>2</li> </ul>	Offset of start of day
✓	ccDateSupport	<ul style="list-style-type: none"> <li>f</li> <li>u</li> <li>l</li> <li>l</li> </ul>	Indicates the ccDate options supported
✓	ccDaySupport	<ul style="list-style-type: none"> <li>n</li> <li>o</li> <li>O</li> <li>c</li> <li>c</li> <li>u</li> <li>r</li> <li>r</li> <li>e</li> <li>n</li> <li>c</li> <li>e</li> <li>s</li> </ul>	Indicates the ccDay options supported
✓	programSecondsSupported*		Indicates whether the field of seconds is supported in programs.

**Events**

#	Event Type	Description
✓	invalidCalendar	An invalid calendar has been provided by the CMS to the ODN

- ✓ **invalidProgram** A control program has been provided by the CMS, which cannot be implemented by the ODN

## Data Collection Service

The TALQ Data Collection Service is a provision to configure how ODN measurements, status information and events are logged, and when or under what conditions the logged data is transferred to the CMS

### Options

#	Option	Value	Description
✓	supportedModes	<ul style="list-style-type: none"> <li>• EventRecordingMode</li> <li>• PeriodicRecordingMode</li> <li>• VendorRecordingMode</li> <li>• ImmediateReportingMode</li> <li>• ScheduledReportingMode</li> </ul>	Recording and Reporting modes supported
✓	maximumDataLogs		Maximum number of data loggers supported
✓	loggableAttributes	<ul style="list-style-type: none"> <li>• cls:FRE_v1_8/LampMonitorFunction/operatingHours</li> <li>• cls:FRE_v1_8/LampMonitorFunction/supplyVoltage</li> <li>• cls:FRE_v1_8/LampMonitorFunction/supplyCurrent</li> <li>• cls:FRE_v1_8/LampMonitorFunction/activePower</li> <li>• cls:FRE_v1_8/LampMonitorFunction/reactivePower</li> <li>• cls:FRE_v1_8/LampMonitorFunction/apparentPower</li> <li>• cls:FRE_v1_8/LampMonitorFunction/powerFactor</li> <li>• cls:FRE_v1_8/LampMonitorFunction/activeEnergy</li> <li>• cls:FRE_v1_8/LampMonitorFunction/switchOnCounter</li> <li>• cls:FRE_v1_8/LampActuatorFunction/operatingHours</li> <li>• cls:FRE_v1_8/LampActuatorFunction/feedbackLightCommand</li> </ul>	List of descriptions of the attributes within device classes that can be logged using periodic recording
✓	samplingPeriodSupported		Indicates whether the ODN supports periodic sampling for a data logger in periodic recording mode
✓	attributeScopeSupported		Indicates whether the ODN supports filtering attributes by scope (attributeScope); for a data logger in periodic or vendor recording mode.

### Events

#	Event Type	Description
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- ✓ **invalidLoggerConfig** The CMS has provided a data logger configuration that cannot be implemented by the ODN

### On Demand Data Request Service

This service provides the mechanism to access attributes in the logical devices by requesting attribute values from the ODN

### Group Management Service

This service provides the mechanisms to define and manage groups

#### Options

#	Option	Value	Description
✓	maximumNumberOfGroups		Maximum number of groups per Gateway
✓	maximumGroupSize		Maximum number of group members per group

### Test Service

This service provides a mechanism to reduce the human intervention during the certification tests, enabling the certification tests to maximise automation

## Objects

### Lamp type

The lamp type consists of a set of attributes that together characterize a given lamp and control gear combination. When modelling a Lighting ODN with many luminaires, there are attributes' values that are the same for many lamps, e.g.: the expected consumed power of the lamp and control gear (wattage) would be the same for many lamp monitors. The concept of LampType is created to avoid including the same attributes' values in every lamp monitor and actuator of the same type, for this reason a reference to a lamp type is included in the lamp actuator and lamp monitor functions, as these attributes are required for proper operation of these functions. Thus, the definition of lamp types enables the CMS to efficiently set attributes in many lamp actuators/monitors by just setting the address of the 'lampType' attribute in each function. Lamp types can be created by both CMS and TALQ Gateway as separate entities. The TALQ Gateway shall announce any lamp type it has to the CMS as part of the initial configuration. In addition to the initial configuration, the TALQ Gateway shall also announce the lamp type whenever it changes. The CMS may also send lamp types to the TALQ Gateway.

#### Properties

#	Property	Description
✓	name	Descriptive name of the lamp type
✓	address	TALQ Address of the lamp type
✓	controlType	Type of control/dimming interface between the lamp actuator function and the control gear or within the control gear in case lamp actuator is embedded in the control gear
✓	lowCurrentThreshold	Level of the luminaire RMS supply current under which the ODN shall detect a currentTooLow event
✓	highCurrentThreshold	Level of the luminaire RMS supply current above which the ODN shall detect a currentTooHigh event

- ✓ lampPowerHighThreshold The absolute number of watts above which the absolutLampPowerTooHigh event is triggered
- ✓ lampPowerLowThreshold The absolute number of watts below which the absolutLampPowerTooLow event is triggered
- ✓ powerFactorThreshold The threshold below which powerFactorTooLow event is triggered

### Event log data

Event log data contains a single event, with eventType and value, in each single log entry. It also includes information about whether the log denotes the start or end of the event. Furthermore additional information can be added with the info attribute.

### Properties

#	Property	Description
✓	eventType	Identifier of event reported
✓	srcAddress	Address of Logical device or function within a logical device which is the source of the event or to which this event applies
✓	startEndFlag	If the event denotes either the start or end of a 'special' period, this flag shall be included

### Command

A command defines a type of control action that can be applied to a function. Commands can be generated by a manual override action or by a control program.

### Properties

#	Property	Description
✓	state	Light state to be applied to the lamp actuator
✓	reason	Indicates the command was triggered by override, sensor or control program
✓	cmsRefId	CMS reference, which can be used for data logging. The cmsRefId in a Command is a free text to be used by the CMS for any purpose, e.g: to differentiate contexts. It is a token that allows the CMS to match client requests to the original notification.
✓	refAddress	Reference to the source of the command, e.g. sensor or control program
✓	start	Time when the control action resulting from command shall start. This attribute is used only with override commands to set a time to start an override action. If not specified, the override command starts immediately.
✓	expiration	Time when the control action resulting from command shall be terminated. This attribute is used only with override commands to set a time to stop an override action. After the expiration of an override command, the system should go back to the state defined by the active control program. If not specified, there is no expiration for the override command.

### Group

A group is set of entities that can be addressed by the same group address. Devices and functions within devices can be assigned to a group. A group may also include other groups as members.

### Properties

#	Property	Description
✓	address	Group address



✓	members	TALQ Addresses of members of the group
✓	purpose	Main purpose of the group

\*: The Certification Test Tool is designed to provide a high level of confidence that complementary systems can communicate successfully. As both the protocol and the test tool evolve, all mandatory and other core tests are confirmed by comparison with real-life scenarios (plug-fest or similar). Some tests of optional and more peripheral features may not yet have been confirmed in this way; such features are identified with an asterisk (\*).

This Capability List is based on a certification session performed by the TALQ Certification Tool (v2.6.2-online.2) on 2025-04-01 12:40:34.799 +0300.

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