



## Certified Capability List

This Capability List is based on a certification session performed by the *TALQ Certification Tool (v2.2.0)* on 2020-05-21 17:04:36.209 +0300.

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

The tool has successfully performed 54 tests.

## Product details

**Product Name** inteliLIGHT CMS

**Company** Flashnet

**Type** CMS

**URL** https://localhost:8096

**Notes**

**Generated on** 2020-05-21 17:04:36.209 +0300

**Supported profiles** • LIGHTING

**Certification performed by app version:** 2.2.0

## 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
✓	displayName	Display name of the asset.
✓	assetId	Customer identifier of the asset. If multiple devices have the same assetId it means they belong to the same asset.
✓	serial	Serial number of the device.
✓	hwType	Hardware type of the device.
✓	swVersion	Software version installed on the device.
✓	location	Latitude, Longitude and Altitude.
✓	timeZone	Time zone of the device. Time zone may be expressed in two formats. <timezone> where <timezone> is a time zone as defined in the zone.tab of the IANA timezone database [IANA]; and stdoffset[dst[offset][,start[/time],end[/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
✓	deviceReset	The physical device containing the logical device was reset
✓	batteryMode	Device operating in battery mode
✓	installationMode	Device is being installed
✓	maintenanceMode	Device is undergoing maintenance
✓	cabinetDoorOpen	Cabinet door is open
✓	batteryShutdown	Indicates the device has shut down due to battery discharge
✓	locationUpdated	Indicates the location of a device has changed

## 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. |
| ✓ parentAddress   | TALQ Address of the parent device, e.g. gateway. It shall point to a specific communication function.  |

## 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  |
| ✓ | 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  |
|---|--------------------|--|
| ✓ | 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.

## 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

## 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
✓	numberOfLamps	Number of lamps being monitored by the lamp monitor function.
✓	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.
✓	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.
✓	powerFactor	Active power/Apparent power.
✓	powerFactorSense	Phase sense of power factor.
✓	activeEnergy	Cumulative active energy (since installation or counter reset).

## Events

#	Event type	Description
✓	lampPowerTooHigh	Lamp power is greater than expected lamp power + lampPowerTolerance
✓	lampPowerTooLow	Lamp power is smaller than expected lamp power - lampPowerTolerance
✓	lampVoltageTooHigh	Level of lamp voltage (not supply voltage) is greater than highLampVoltageThreshold.
✓	lampVoltageTooLow	Level of lamp voltage (not supply voltage) is smaller than lowLampVoltageThreshold.
✓	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
✓	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
✓	contactorError	Indicates error in contactor
✓	lampUnexpectedOn	Indicates lamp is unexpectedly on
✓	leakageDetected	Indicates that an earth leakage fault has been detected

## 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
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✓ totalPower	Sum of the active power consumed on phase 1, 2 and 3, or just the power for a single phase meter.
✓ totalActiveEnergy	Total cumulative kWh measured by the meter since installation date (or counter reset).
✓ totalPowerFactor	Total active power divided by total apparent power.
✓ supplyVoltage	Average between Phase1 RMS Voltage, Phase2 RMS Voltage and Phase3 RMS Voltage, or in the case of a single phase meter just the RMS supply voltage.
✓ totalCurrent	Sum of the RMS currents on phase 1, 2 and 3.
✓ averageCurrent	Average RMS current on phase 1, 2 and 3.

## Events

#	Event type	Description
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## Photocell

A Photocell function models the capabilities of a photocell that can be used for lighting control. This function shall be supported by the CMS and optionally by the ODNs (Gateway).

### Attributes

#	Attribute	Description
✓	onLevel	Illuminance level at which the photocell switches to on state.
✓	offLevel	Illuminance level at which the photocell switches to off state.
✓	photocellOutput	Output state of the photocell. Possible values are ON (means the illuminance level has fallen below the onLevel) and OFF (means the illuminance level has risen above the offLevel).

### Events

#	Event type	Description
✓	photocellOutputOn	The photocell output has changed to ON

## 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
✓	levelHighThreshold	Light level above which a levelTooHigh event is triggered.
✓	levelLowThreshold	Light level below which a levelTooLow event is triggered.

- ✓ lightLevel Illuminance level.

### Events

#	Event type	Description
✓	levelTooHigh	Indicates the light level is above the levelHighThreshold
✓	levelTooLow	Indicates the light level is below the levelLowThreshold

### 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
✓	sensorOutputOn	Indicates the sensor output changed to ON

### Generic Sensor

A Generic Sensor function can be used to model any sensor that provides an analog or multilevel output. This function is optional for both CMS and Gateway, but when supported the requirements in this section shall apply.

#### Attributes

#	Attribute	Description
✓	levelHighThreshold	Threshold above which a levelTooHigh event is triggered.
✓	levelLowThreshold	Threshold below which a levelTooLow event is triggered.
✓	level	Sensor Output level.

### Events

#	Event type	Description
✓	levelTooHigh	Indicates the sensor output level is above the levelHighThreshold
✓	levelTooLow	Indicates the sensor output level is below the levelLowThreshold

### 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.
✓	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.

### 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.
✓	invalidProgram	This event is generated when a control program has been allocated and can not be implemented it.
✓	programChange	This event is generated when the control program applicable to the actuator has changed.
✓	calendarChange	This event is generated when the calendar applicable to the actuator has changed.
✓	targetCommandChange	This event is generated when the targetCommand has changed.

### Temperature Sensor

The Temperature Sensor function allows a CMS to monitor the temperature in a device and send events in case the value is above/below configurable thresholds.

### Attributes

#	Attribute	Description
✓	temperatureHighThreshold	Threshold above which a temperatureTooHigh event is triggered.



- ✓ temperatureLowThreshold Threshold below which a temperatureTooLow event is triggered.
- ✓ fireDetectionThreshold Threshold above which a fireDetected event is triggered.
- ✓ temperature Output temperature.

## Events

#	Event type	Description
✓	temperatureTooHigh	Indicates the output temperature is above the temperatureHighThreshold.
✓	temperatureTooLow	Indicates the output temperature is below the temperatureLowThreshold.
✓	fireDetected	Indicates the output temperature is above the fireDetectionThreshold.

## Humidity Sensor

The Humidity Sensor function allows a CMS to monitor the humidity in a device and send events in case the value is above/below configurable thresholds.

### Attributes

#	Attribute	Description
✓	humidityLowThreshold	talq.feature.attribute.HumiditySensorFunction.humidityLowThreshold.desc
✓	humidityHighThreshold	Threshold above which a humidityTooHigh event is triggered.
✓	humidity	Output humidity.

### Events

#	Event type	Description
✓	humidityTooHigh	Indicates the output humidity is above the humidityHighThreshold.

## 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
✓	pm1HighThreshold	Threshold above which a pm1TooHigh event is triggered.
✓	pm2-5HighThreshold	Threshold above which a pm2-5TooHigh event is triggered.
✓	pm10HighThreshold	Threshold above which a pm10TooHigh event is triggered.
✓	pm1	Output pm1.
✓	pm2-5	Output pm2-5.

- ✓ pm10 Output pm10.

### Events

#	Event type	Description
✓	pm1TooHigh	Indicates the output pm1 is above the pm1HighThreshold.
✓	pm2-5TooHigh	Indicates the output pm2-5 is above the pm2-5HighThreshold.
✓	pm10TooHigh	Indicates the output pm10 is above the pm10HighThreshold.

### 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.

#### Events

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

### Movement Sensor

The Movement Sensor function allows a CMS to detect movement. This function may be used in a Waste Container sensor to detect that container gets emptied or is not in the proper position, as well as in asset tracking applications.[DEPRECATED: This function has been deprecated and it will be removed in the next MAJOR release. Please use the new LocationSensorFunction instead.]

#### Attributes

#	Attribute	Description
✓	movementThreshold	Threshold above which a movementDetected event is triggered.
✓	movementDetected	Indicates the movement is above the movementThreshold.

#### Events

#	Event type	Description
✓	movementDetected	Indicates the movement is above the movementThreshold.
✓	notInProperPosition	Indicates the sensor is not in proper position.

### 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
✓	powerSource	The power source of battery.
✓	batteryLevelLowThreshold	Threshold below which a batteryLevelTooLow event is triggered.
✓	batteryLevel	Battery level.

### Events

#	Event type	Description
✓	batteryLevelTooLow	talq.feature.event.BatteryLevelSensorFunction.batteryLevelTooLow.desc

### Filling Level Sensor

The Filling Level Sensor function allows to measure how full a container is and send events in case the value is above/below configurable thresholds.

### Attributes

#	Attribute	Description
✓	levelHighThreshold	Threshold (m) above which a fillingHeight event is triggered.
✓	containerHeight	Container height (m).
✓	containerVolume	Container volume (m <sup>3</sup> ).
✓	fillingHeight	Filling container height (m).
✓	fillingPercentage	Filling percentage.
✓	contentsType	Indicates de type of contents in the container. Some technologies, such as ultrasonic sensors, need this information in order to measeure accurately. Possible values are: mixed waste, organic, paper, plastics, glass, liquid, clothing, electronics, metal or other. If other is selected, then contentsOtherType shall be used.
✓	contentsOtherType	Type of contents if it is not included in the Enum list of contents for contentsType.

### Events

#	Event type	Description
✓	containerFull	Indicates the container filling height is above levelHighThreshold.

### 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

### Events

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

### Fluid Level Sensor\*

The Fluid Level Sensor function allows to collect data and events about fluid levels. It could be used to measure fluid levels in channels, lakes, containers, etc.

### Attributes

#	Attribute	Description
✓	fluidLevelTooHighThreshold	Threshold above which fluidLevelTooHighThreshold is triggered. In meters
✓	fluidLevelTooLowThreshold	Threshold below which fluidLevelTooLowThreshold is triggered. In meters
✓	distanceSensorBottom	Distance between the sensor and the bottom of the channel, lake, container, etc. In meters
✓	fluidLevel	Fluid level in meters

### Events

#	Event type	Description
✓	fluidLevelTooHigh	Triggered when fluidLevel is above fluidLevelTooHighThreshold
✓	fluidLevelTooLow	Triggered when fluidLevel is below fluidLevelTooLowThreshold

## Services

### Configuration Service

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

#### Options

#	Option	Value	Description
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### 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
✓	dayOffset	<ul style="list-style-type: none"> <li>1</li> <li>2</li> </ul>	Offset of start of day
✓	ccDateSupport		Indicates the ccDate options supported

#### 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>VendorRecordingMode*</li> <li>EventRecordingMode</li> <li>ImmediateReportingMode</li> </ul>	Recording and Reporting modes supported

#### Events

#	Event Type	Description
✓	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
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### Test Service

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

## Objects

### Event log data

#### 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
✓	info	a string providing more information on the event
✓	attributes	A sequence of attribute values logged together with the event

### Command

#### Properties

#	Property	Description
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✓ 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
✓ 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.
✓ rampToLevelTime*	The time (in seconds) taken for the value to ramp to the specified level. The change will be finished rampToLevelTime seconds after: the scheduled time if the change comes from a control program; the reception of the request, or the command.start time attribute, if the change comes from an override command, or; the sensor event is raised if the control is sensor-based. If actions related to one command remain to be completed when a subsequent command is received, the subsequent command shall take precedence.
✓ rampFromLevelTime*	The time (in seconds) taken for the value to ramp to the specified level. The change will be finished rampFromLevelTime seconds after: the scheduled time if the change comes from a control program; the reception of the request if the change comes from an override command; expiry of the related command, or; the sensor event is lowered and the hold time subsequently expires if the control is sensor-based. If actions related to one command remain to be completed when a subsequent command is received, the subsequent command shall take precedence.

## Group

### Properties

#	Property	Description
✓	address	Group address
✓	members	TALQ Addresses of members 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 (v2.2.0) on 2020-05-21 17:04:36.209 +0300.

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