Certified Capability List

This Capability List is based on a certification session performed by the *TALQ Certification Tool (v2.3.0-update.11) on 2021-08-03 22:12:33.431 +0000.*

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

The tool has succesfully performed *75 tests*.

Product details

Product Name	Gateway SmartCity
Company	Sicom Electronics International S.A.
Type	GATEWAY
Notes	
Generated on	2021-08-03 22:12:33.431 +0000
Supported profiles	• Lighting • Waste Management
API version certified:	2.3.0
Certification performed by app version:	2.3.0-update.11

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.
✔	hwVersion	Hardware revision of the device.
✔	swVersion	Software version installed on the device.
✔	installationDate	The installation date of Physical Device.
✔	location	Latitude, Longitude and Altitude. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new LocationSensorFunction.location instead.]
✔	softwareUpdating	Indicates software updating is in progress.
✔	installationMode	Device is being installed.
✔	maintenanceMode	Device is undergoing maintenance, where maintenance may include hardware or software related maintenance actions.
✔	locationUpdated	Indicates the location of a device has changed, but detecting the change is outside the scope of the TALQ Specification. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new LocationSensorFunction.locationChanged instead.]
✔	ntpServers	List of NTP servers to use for time synchronization (Hostname or IP address). [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TimeFunction.ntpServers instead.]
✔	ntpSynchPeriod	Number of hours between two time synchronization updates. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TimeFunction.ntpSynchPeriod instead.]
✔	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.]

Events

#	Event type	Description
✔	deviceReset	The physical device containing the logical device was reset
✔	softwareUpdating	Indicates software updating is in progress
✔	installationMode	Device is being installed
✔	maintenanceMode	Device is undergoing maintenance
✔	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).
✔	logicalAddress	Logical address for communication within the ODN scope (IP address, Short Address, ...).
✔	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.
✔	timeToLive	Number of times a packet can be forwarded within the ODN.
✔	transmitPower	Transmit power used by the device within the ODN.
✔	numberOfHops	Number of hops between the gateway and the ODN device represented by the device including this function.

✔	communicationQuality	Indicator of the quality of the communication with the device. 100% means good quality.

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.
✔	currentReleaseId	Release ID of currently deployed release. This is used in the data package service.

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
✔	outputPort	Identifier of the output port that is controlled by the lamp actuator.
✔	standbyMode	Defines the behavior of the lamp actuator when output level is set to zero. If OFF, light output level is zero with no power to the lamp control gear. If ON, light output level is zero but power is delivered to the lamp control gear (standby mode).
✔	cloEnabled	Determines whether a Constant Light Output (CLO) correction factor is used. CLO is used to compensate for lumen output degradation over the life time of the lamp. If CLO is enabled, lamps are dimmed part of the 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.
✔	targetLightCommandChange	The targetLightCommand operational attribute has changed.
✔	programChange	The control program applicable to the lamp actuator has changed (these are the points at which the calendar changes the program).
✔	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
✔	targetLightCommandChange	The targetLightCommand operational attribute has changed
✔	programChange	The control program applicable to the lamp actuator has changed
✔	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).
✔	supplyLossCount	Incrementing count of supply losses. The wrap around value is 2e32 - 1.
✔	lampPowerTooHigh	Lamp power is greater than expected lamp power + lampPowerTolerance.
✔	lampPowerTooLow	Lamp power is smaller than expected lamp power - lampPowerTolerance
✔	currentTooHigh	Supply current is above the highCurrentThreshold defined in the lamp type.
✔	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 isused as well.
✔	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.
✔	lampUnexpectedOn	Indicates lamp is unexpectedly on.
✔	leakageDetected	Indicates that an earth leakage fault has been detected.

Events

#	Event type	Description
✔	lampPowerTooHigh	Lamp power is greater than expected lamp power + lampPowerTolerance
✔	lampPowerTooLow	Lamp power is smaller than expected lamp power - lampPowerTolerance
✔	currentTooHigh	Supply current is above the highCurrentThreshold defined in the lamp type
✔	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.
✔	highTemperature	Indicates temperature is above the high threshold
✔	relayFailure	Set in case of internal relay is failing
✔	cyclingFailure	Indicates the lamp is constantly switching ON and OFF in an unexpected manner
✔	supplyLoss	Indicates loss of mains power
✔	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
✔	totalPowerHighThreshold	Power above which the totalPowerTooHigh event is triggered.
✔	totalPowerLowThreshold	Power below which the totalPowerTooLow event is triggered.
✔	powerfactorThreshold	Power factor below which the powerfactorTooLow event is triggered.
✔	phase1PowerfactorLowThreshold	Phase 1 power factor below which the phase1PowerfactorTooLow event is triggered.
✔	phase2PowerfactorLowThreshold	Phase 2 power factor below which the phase2PowerfactorTooLow event is triggered.
✔	phase3PowerfactorLowThreshold	Phase 3 power factor below which the phase3PowerfactorTooLow event is triggered.
✔	supplyVoltageHighThreshold	Supply voltage above which the supplyVoltageTooHigh event is triggered.
✔	supplyVoltageLowThreshold	Supply voltage below which the supplyVoltageTooLow event is triggered.
✔	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.
✔ totalCurrentHighThreshold	RMS current above which the currentTooHigh event is triggered.
✔ totalCurrentLowThreshold	RMS current below which the currentTooLow 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.
✔ totalPower	Sum of the active power consumed on phase 1, 2 and 3, or just the power for a single phase meter.
✔ totalVA	Sum of the apparent power consumed on phase 1, 2 and 3, or just the apparent power for a single phase meter.
✔ totalVAR	Sum of the reactive power consumed on phase 1, 2 and 3, or just the reactive power for a single phase meter.
✔ maxDemandPower	Maximum peak power consumption.
✔ 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).
✔ totalApparentEnergy	Total cumulative kVAh measured by the meter since installation date (or counter reset).
✔ frequency	Frequency on the line.
✔ totalPowerFactor	Total active power divided by total apparent power.
✔ totalPowerFactorSense	Sense of power factor (lead or lag).
✔ phase1PowerFactor	Power factor on phase 1.
✔ phase1PowerFactorSense	Sense of power factor (lead or lag).
✔ phase2PowerFactor	Power factor on phase 2.
✔ phase2PowerFactorSense	Sense of power factor (lead or lag).
✔ phase3PowerFactor	Power factor on phase 3.
✔ phase3PowerFactorSense	Sense of power factor (lead or lag).
✔ 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.
✔ phase1Voltage	RMS Voltage between phase 1 and neutral.
✔ phase2Voltage	RMS Voltage between phase 2 and neutral.
✔ phase3Voltage	RMS Voltage between phase 3 and neutral.

✔ voltagePhase1Phase2	RMS Voltage between phase 1 and phase 2.
✔ voltagePhase2Phase3	RMS Voltage between phase 2 and phase 3.
✔ voltagePhase3Phase1	RMS Voltage between phase 3 and phase 1.
✔ totalCurrent	Sum of the RMS currents on phase 1, 2 and 3.
✔ averageCurrent	Average RMS current on phase 1, 2 and 3.
✔ 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.
✔ phase1ActiveEnergy	Cumulative active energy on phase 1.
✔ phase2ActiveEnergy	Cumulative active energy on phase 2.
✔ phase3ActiveEnergy	Cumulative active energy on phase 3.
✔ worstCurrentTHD	Worst value for Total Harmonic Distortion on current (all 3 phases).
✔ phase1CurrentTHD	Total Harmonic Distortion on current for phase 1.
✔ phase2CurrentTHD	Total Harmonic Distortion on current for phase 2.
✔ phase3CurrentTHD	Total Harmonic Distortion on current for phase 3.
✔ worstVoltageTHD	Worst Total Harmonic Distortion on voltage (all 3 phases).
✔ averageVoltageTHD	Average value of Total Harmonic Distortion on voltage.
✔ phase1VoltageTHD	Total Harmonic Distortion on voltage for phase 1.
✔ phase2VoltageTHD	Total Harmonic Distortion on voltage for phase 2.
✔ phase3VoltageTHD	Total Harmonic Distortion on voltage for phase 3.
✔ phase1_2VoltageTHD	Total Harmonic Distortion on voltage between phase 1 and phase 2.
✔ phase2_3VoltageTHD	Total Harmonic Distortion on voltage between phase 2 and phase 3.
✔ phase3_1VoltageTHD	Total Harmonic Distortion on voltage between phase 3 and phase 1.
✔ supplyLossCount	Incrementing count of supply losses. In the case of 3 phases the count of losses on all three phases together. The wrap around value is 2e32 - 1.
✔ phase1SupplyLossCount	Incrementing count of supply losses on Phase 1. The wrap around value is 2e32 - 1.
✔ phase2SupplyLossCount	Incrementing count of supply losses on Phase 2. The wrap around value is 2e32 - 1.
✔ phase3SupplyLossCount	Incrementing count of supply losses on Phase 3. The wrap around value is 2e32 - 1.
✔ totalPowerTooHigh	Indicates total power is above the totalPowerHighThreshold.
✔ totalPowerTooLow	Indicates total power is below the totalPowerLowThreshold.
✔ supplyVoltageTooHigh	Indicates supply voltage is above the supplyVoltageHighThreshold.
✔ supplyVoltageTooLow	Indicates supply voltage is below the supplyVoltageLowThreshold.

✔	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.
✔	totalCurrentTooHigh	Indicates the current is above the totalCurrentHighThreshold.
✔	totalCurrentTooLow	Indicates the current is below the totalCurrentLowThreshold.
✔	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.

Events

#	Event type	Description
✔	totalPowerTooHigh	Indicates total power is above the totalPowerHighThreshold
✔	totalPowerTooLow	Indicates total power is below the totalPowerLowThreshold
✔	supplyVoltageTooHigh	Indicates supply voltage is above the supplyVoltageHighThreshold
✔	supplyVoltageTooLow	Indicates supply voltage is below the supplyVoltageLowThreshold
✔	totalCurrentTooHigh	Indicates the current is above the totalCurrentHighThreshold
✔	totalCurrentTooLow	Indicates the current is below the totalCurrentLowThreshold
✔	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

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).
✔	photocellOutputOn	The photocell output has changed to ON.

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.
✔	levelTooHigh	Indicates the light level is above the levelHighThreshold.
✔	levelTooLow	Indicates the light level is below the levelLowThreshold.

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.
✔	sensorOutputOn	Indicates the sensor output changed to ON.

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.
✔	levelTooHigh	Indicates the sensor output level is above the levelHighThreshold.
✔	levelTooLow	Indicates the sensor output level is below the levelLowThreshold.

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.
✔	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.
✔	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.

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.
✔	temperature	Output temperature.
✔	temperatureTooHigh	Indicates the output temperature is above the temperatureHighThreshold.
✔	temperatureTooLow	Indicates the output temperature is below the temperatureLowThreshold.

Events

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

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
✔	humidityHighThreshold	Threshold above which a humidityTooHigh event is triggered.
✔	humidity	Output humidity.
✔	humidityTooHigh	Indicates the output humidity is above the humidityHighThreshold.

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 (micrograms/m3) above which a pm1TooHigh event is triggered.
✔	pm2-5HighThreshold	Threshold (micrograms/m3) above which a pm2-5TooHigh event is triggered.
✔	pm10HighThreshold	Threshold (micrograms/m3) above which a pm10TooHigh event is triggered.
✔	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)
✔	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.

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.
✔	presenceStatusChanged	Indicates the presence status changed.

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.

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.
✔	batteryLevelTooLow	Indicates the battery level is below the batteryLevelLowThreshold.

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^3).
✔	fillingHeight	Filling container height (m).
✔	fillingPercentage	Filling percentage.

Events

#	Event type	Description

Solar Battery Charger*

A solar battery charger is used to charge a battery with solar energy. Typical use cases are energy demanding off-grid applications like solar lighting, solar vehicle charging (cars and bikes), public transit information, traffic control, public security (CCTV) and many more.

Attributes

#	Attribute	Description
✔	inputVoltage	Measured DC voltage of the charger input (V).
✔	inputCurrent	Measured DC current of the charger input (A).
✔	outputVoltage	Output voltage (V).
✔	outputCurrent	Output current (A).
✔	chargerTemperature	Measured temperature of the charger circuit (C). [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperature with applicationType=Charger instead.]
✔	PVTemperature	Measured temperature of the attached photovoltaic module (C). [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperature with applicationType=PVT instead.]

✔	accumulatedEnergy	Accumulated energy yield since accumulatedSince (Wh).
✔	startChargeInputVoltage	Configuration parameter to set input voltage thresholds at different temperatures at which the battery charger shall start charging the battery (V, C). The values are stored as a list of KVPs (Key-Value Pair), where the key is the temperature and the value is the voltage.
✔	endChargeInputVoltage	Configuration parameter to set input voltage thresholds at different temperatures at which the battery charger shall cease charging the battery (V, C). The values are stored as a list of KVPs (Key-Value Pair), where the key is the temperature and the value is the voltage.
✔	lowTemperatureThreshold	Threshold above which the lowTemperature event is triggered (C). [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperatureTooLowThreshold instead.]
✔	highPowerThreshold	Threshold above which the highPower event is triggered (W).
✔	accumulatedSince	Indicates the date and time at which accumulatedEnergy is reset to zero. The Gateway may change this value with the actual one depending on implementation.
✔	highTemperature	Indicates the measured temperature is above the high temperature threshold. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperatureTooHigh instead.]
✔	lowTemperature	Indicates the measured temperature is below the low temperature threshold. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperatureTooLow instead.]
✔	highPower	Indicates the power exceeds highPowerThreshold.
✔	charging	Indicates whether the battery is being charged.

Events

#	Event type	Description
✔	highTemperature	Indicates the measured temperature is above the high temperature threshold.
✔	lowTemperature	Indicates the measured temperature is below the low temperature threshold.
✔	highPower	Indicates the power exceeds highPowerThreshold.
✔	charging	Indicates whether the battery is being charged.

Battery Management System*

A battery management system is used to monitor the charging and discharging of a battery and protect the battery. Typical use cases are (off-grid) applications like solar lighting, solar vehicle charging (cars and bikes), public transit information, traffic control, public security (CCTV) and many more, where the battery is charged and discharged on a regular basis.

Attributes

#	Attribute	Description
✔	batteryChemistry	Attribute to define the battery chemistry. (e.g.: Lead Acid, Lithium-Iron-Phosphate (LiFePO4), Nickel-Metal-Hydrid (NiMH), Lithium-Titanate-Oxide (LTO), ...)
✔	nominalVoltage	Attribute to set the nominal voltage of the battery in V (at room temperature). This can be used to calculate the capacity and to configure the BMS.
✔	nominalCapacity	Attribute to set the nominal capacity of the battery in Ah (at room temperature).
✔	batteryVoltage	Measurement of the battery voltage in V
✔	batteryCurrent	Measurement of the battery current in A. This value can be negative due to polarity.
✔	batteryLevel	Percentage
✔	estimatedCapacity	This attribute gives an estimated remaining capacity of the battery in Ah. This depends very much on the wear and age of the battery.

✔	temperature	Temperature at the battery in C. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperature with applicationType=Battery instead.]
✔	batteryEOCVoltageTemperatureMap	End of charge voltages (V) of the battery for various temperatures (C)
✔	batteryEODVoltageTemperatureMap	End of discharge voltages (V) of the battery for various temperatures (C)
✔	batteryFullThreshold	Level threshold to indicate that the battery is full.
✔	batteryEmptyThreshold	Level threshold to indicate that the battery is empty.
✔	overCurrentChargeThreshold	Maximum charge current threshold (A)
✔	overCurrentDischargeThreshold	Maximum discharge current threshold (A)
✔	batteryFull	Indicates that the battery is full.
✔	batteryEmpty	Indicates that the battery is empty.
✔	overCurrentCharge	Indicates that the charge current is higher than the threshold.
✔	overCurrentDischarge	Indicates that the discharge current is higher than the threshold.
✔	highTemperature	Indicates that the measured temperature is higher than the threshold. [DEPRECATED: This attribute has been deprecated and it will be removed in the next MAJOR release. Please use the new TemperatureSensorFunction.temperatureTooHigh instead.]

Events

#	Event type	Description
✔	batteryFull	Indicates that the battery is full.
✔	batteryEmpty	Indicates that the battery is empty.
✔	overCurrentCharge	Indicates that the charge current is higher than the threshold.
✔	overCurrentDischarge	Indicates that the discharge current is higher than the threshold.
✔	highTemperature	Indicates that the measured temperature is higher than the threshold.

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
✔	locationChangedThreshold	Distance (meters)
✔	location	Location of the device

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
✔	accelerationX	Maximum acceleration on the X axis (g) over accelerationSamplingPeriod
✔	accelerationY	Maximum acceleration on the Y axis (g) over accelerationSamplingPeriod
✔	accelerationZ	Maximum acceleration on the Z axis (g) over accelerationSamplingPeriod
✔	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
✔	expectedOrientation	Nominal orientation of the device
✔	orientationChangedThreshold	Threshold above which orientationChanged is triggered
✔	orientation	Orientation of the device

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.

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
✔	fluidLevelTooHigh	Triggered when fluidLevel is above fluidLevelTooHighThreshold
✔	fluidLevelTooLow	Triggered when fluidLevel is below fluidLevelTooLowThreshold

Events

#	Event type	Description
✔	fluidLevelTooHigh	Triggered when fluidLevel is above fluidLevelTooHighThreshold

✔	fluidLevelTooLow	Triggered when fluidLevel is below fluidLevelTooLowThreshold

Waste Container*

The Waste Container function allows to log when the container is collected and send events in case the date is above a configurable thresholds. Additionlly it sends events when the contents or container are tampered.

Attributes

#	Attribute	Description
✔	lastCollectionDate	Last collection date.
✔	collectionLateThreshold	Threshold (days) since last collection date above which a collection late event is triggered.
✔	containerTampered	Indicates that the container is being tampered, or some parts are being removed.
✔	contentsTampered	Indicates that the contents are being tampered or stolen.
✔	wasteType	Indicates de type of waste in the container. Possible values are: mixed waste, organic, paper, plastics, glass, liquid, clothing, electronics, metal or other. If other is selected, then wasteOtherType shall be used.
✔	wasteOtherType	Type of waste if it is not included in the Enum list of contents for wasteType.

Events

#	Event type	Description
✔	containerTampered	Indicates that the container is being tampered, or some parts are being removed.
✔	contentsTampered	Indicates that the contents are being tampered or stolen.

Weight Sensor*

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

Attributes

#	Attribute	Description
✔	weightLowThreshold	Threshold (in kg) below which a weightTooLow event is triggered.
✔	weightHighThreshold	Threshold (in kg) above which a weightTooHigh event is triggered.
✔	weight	Output weight in kg.
✔	weightTooLow	Indicates the output weight is below the weightLowThreshold.
✔	weightTooHigh	Indicates the output weight is above the weightHighThreshold.

Events

#	Event type	Description
✔	weightTooLow	Indicates the output weight is below the weightLowThreshold.
✔	weightTooHigh	Indicates the output weight is above the weightHighThreshold.

Services

Configuration Service

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

Options

#	Option	Value	Description

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	• AbsoluteActivePeriod • DynamicControl* • ExternalControlEffect* • ccDate* • ccDay*	Control Program and calendar options supported are defined by announcing support for the given modes
✔	maxNumberOfPowerFactorThresholdDimmingCurveItems*		Maximum number of items at the powerFactorThresholdDimmingCurve of the LampType.
✔	maxNumberOfLumenDepreciationCurveItems*		Maximum number of items at the lumenDepreciationCurve of the LampType.

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	• EventRecordingMode • PeriodicRecordingMode • VendorRecordingMode • ImmediateReportingMode • ScheduledReportingMode	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

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

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

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
✔	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.

*: 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 (*).