EN

akYtec IoT devices
communication protocol description

Contents

1 Description of the protocol

This exchange protocol is designed to work with devices developed by Akytec. The protocol provides the ability to exchange data between end-devices and cloud platforms, monitor current state, exchange commands. protocol is a binary half-duplex protocol optimized for operation on low-speed communication channels. Protocol is based on RFC8949 (CBOR) binary data representation format.

Data from devices is transmitted as a set of “frames”. Each frame is an object containing complete information on any measurement or event. One data packet from a device may consist of one or more consecutive frames. The number of frames in one packet is variable and depends on the limitations of the data transmission channel, as well as on the number of frames available in the built-in queue of the device at the time of transmission.

Each frame from the device is an CBOR “map” type object, that contains a set of “**data units**”, that could be:

- Metrics
- Settings
- Commands

Every data unit is represented as record in “map” object – {UUID: VALUE}, where:

- ID – unique data unit identifier
- VALUE – data

Field VALUE can contain single value or CBOR array, in case if data unit is complex data. An example of composite data unit is LoRaWAN radio signal quality parameters, that contain two values – RSSI and SNR.

Commands must be sent to port 10.

Table 1 akYtec protocol data units description

ID	Name	Direction	Description	Type	Units	Example	Explanation	
Metrics								
0	Timestamp	UP	Frame generation timestamp unixtime (UTC)	integer	seconds	1698240094	Wed Oct 25 2023 13:21:34 GMT+0000	
1	Serial	UP	Device unique serial number	integer	--	123456	Device serial number is 123456	
2	Battery voltage	UP	Device battery voltage	integer	mV	5500	Device battery voltage is 5500 mV or 5.5 V	
3	Power voltage	UP	External power voltage	integer	mV	14200	External power voltage is 14200 mV or 14.2 V	
4	Uptime	UP	Device working time since last reboot	integer	seconds	86400	Device last reboot was 86400 seconds ago	
5	Version	UP	Device firmware version [major, minor]	[integer, integer]	--	[10, 7]	Device firmware version is 10.7	
6	ICCID	UP	Unique identifier of SIM-card installed in device	integer	--	1234567890123456789	SIM ICCID is 1234567890123456789	
7	IMEI	UP	Device modem IMEI	integer	--	123456789012345	Device IMEI is 123456789012345	
8	Tamper	UP	Device enclosure state: Guard input pin number 0; 0 – closed 1 – opened	boolean	--	[1]	Device enclosure is opened	
9	MCU temperature	UP	Device MCU temperature multiplied by 10	integer	°C	-145	Device temperature is -14.5 °C	
10	LoRaWAN signal	UP	LoRaWAN signal quality at last data exchange: [<RSSI>, <SNR>]	[integer, integer]	dBm	[-85, -5]	RSSI is -85 SNR is -5	
11	Nb-IoT signal	UP	Nb-IoT signal quality at last data exchange: [<RSSI>, <SNR>]	[integer, integer]	dBm	[-74, 2]	RSSI is -74 SNR is 2	
12	Analog input	UP	Device analog input readings: [<InputNumber>, <Readings>]	[integer, integer]	[--, mV]	[2, 9200]	Device analog input 2 voltage is 9200 mV or 9.2 V	not used
13	Guard input	UP	Device guard input readings: [<InputNumber>, <Readings>] <Readings>: 0 – Normal, 1 – Alarm, 2 – Alarm Permanent	[integer, Boolean]	[--, --]	{13: [1, 1]}	Device guard input 1 is in alarm state Alarm	
14	Pulse input	UP	Device pulse input readings: [<InputNumber>, <Readings>]	[integer, integer]	[--, counter]	[2, 1023654]	Number of pulses on pulse input 2 of device is 1023654	

ID	Name	Direction	Description	Type	Units	Example	Explanation	
15	Open drain output	UP	Device open drain output state: [<OutputNumber>, <EventCode>, <State>] <EventCode> : 0 – manual mode, 1 – auto mode <State>: 1 – on, 0 – off	[integer, boolean, boolean]	[--, --, --]	[1, 0, 0]	Device open drain output 1 is closed manual mode	{0:12321, 15:[1,1,0]}
16	Modbus	UP	Data read from an externally connected device via the Modbus RTU interface: [<SlaveAddr>, <RegisterAddr>, <Readings>]	[integer, integer, integer]	[--, --, --]	[10, 0, 12254781]	Data from external connected device address devise 10, start register 0 , value is 12254781	
17	MBus	UP	Data, that was readed from external connected device via M Bus interface: array, include: [Timestamp, <RSP_UD>, <SlaveSerial>, //format little-endian <Medium>, // 8.4.1 Measured Medium Variable Structure <Status>, // M-BUS specification package Status <DIF>, // 8.4.2 Data Field Codes [<DIFE >], // 0-10 bytes 6.3.2 Variable Data Blocks <VIF>, // 8.4.3. Codes for VIF [<VIFE>], // 0-10 bytes 8.4.5 Codes for VIFE [<DATA>]] // 1-12 bytes readings in acc. with M Bus spec For values of <RSP_UD>, <SlaveSerial>, <Medium>, <Status>, <DIF>, <DIFE>, <VIF>, <VIFE>, <DATA> refer to M Bus specification	[data]		[B850C365 00 9524437200 02 00 00 00]	timestamp unixtime format little-endian RSP_UD SlaveSerial format little-endian for example: 0xB850C365 convert to 0x65C350B8 -> 1707299000 (Dec) MBus data: for example: 00952443720002000000 SlaveSerial -> 0x95244372 -> 0x72432495	
18	4-20 mA input	UP	Device 4-20 mA input readings: [<InputNumber>, <Readings>]	[integer, integer]	[--, uA]	[2, 9450]	Device 4-20 mA input 2 current is 9450 uA or 9.450 mA	not used
19	0-10 V input	UP	Device 0-10 V input readings: [<InputNumber>, <Readings>]	[integer, integer]	[--, mV]	[1, 5250]	Device 0-10 mA input 1 voltage is 5250 mV or 5.25 V	not used
20	Temperature input	UP	Device temperature input readings multiplied by 10: [<InputNumber>, <Readings>]	[integer, integer]	[--, °C]	[3, -25]	Device temperature input 3 readings is -2.5 °C	not used

ID	Name	Direction	Description	Type	Units	Example	Explanation	
			Settings					
1000	General setting		[<DataSendPeriodMinutes>, <Turn off indication>, <Antenna type>] <DataSendPeriodMinutes>: Period of data send attempts in minutes. Data will be sent only if device internal queue is not empty. Data may have values:1,5,10,30,60,240,360,720,1440. <Turn off indication>: 0 – enable indication, 1 – disable indication. <Antenna type>: 1 – external, 0 – internal	[integer, boolean, boolean]	[min, – –]	[30, 0, 0]	data sending period 30 min indication enabled internal antenna	
1001	LoRaWAN settings	UP/DOWN	[<Activation in network>, <Region>, <ADR>, <Starting speed>, <Synchronization period>, <RejoinPeriodMinutes>, <Confirmation>] <Activation in network>: 0 – ABP, 1 – OTAA <Region>: 0 – EU868, 1 – US915, 2 – AS923, 3 – RU864 <ADR>: 0 - Disabled, 1 – Enabled <Starting speed>: 0 – DR0, 1 – DR1, 2 – DR2, 3 – DR3, 4 – DR4, 5 – DR5. <Synchronization period> (MIn)Period of time synchronization with the network. <RejoinPeriodMinutes>(Min): Period of join network attempts if device not joined to the network <Confirmation>: 0 – Disabled, 1 – Enabled	[integer, integer, boolean, integer, integer, integer, boolean]		[1, 3, 1, 0, 20, 60, 1]	OTAA EU868, ADR , DR0, Synchronization time period 20 min, Rejoin period is 60 minutes, Confirmation enabled	
1002	Nb-IoT settings	UP/DOWN	[<DataSendPeriodMinutes >, <MqttAddress>, <MqttPort>, <MqttTopic>] <DataSendPeriodMinutes>: Period of data send attempts in minutes. Data will be sent only if device internal queue is not empty. <MqttAddress>: Address of server data should be sent to <MqttPort>: Port on server data should be sent to <MqttTopic>: Topic, data should be published to. Device					not used

ID	Name	Direction	Description	Type	Units	Example	Explanation	
			will append "/<Serial>" to the end of the topic, where <Serial> is serial number of device.					
1003	Analog input settings	UP/DOWN	[<InputNumber>, <IsEnabled>, <FrameGenerationPeriod>, <TriggerDataTransmission>] <InputNumber>: Input number on the device board <IsEnabled>: 0 – Disabled, 1 – Enabled, <FrameGenerationPeriod>: 0 – 1 hour, 1 – 4 hours, 2 – 12 hours, 3 – 24 hours <TriggerDataTransmission>: 0 – no trigger, data will be just inserted in queue and sent in according with radio data send period setting, 1 – trigger data transmission when frame is generated	[integer, boolean, integer, boolean]	[--, --, Hour, --]	[1, 1, 2, 1]	Analog input 1 is enabled, generate data frame every 12 hours and trigger data transmission procedure.	not used
1004	Digital input settings	UP/DOWN	[<InputNumber>, <InputMode>, <FrameGenerationPeriod>, <TriggerDataTransmission>, <TriggerMormDataTransmission>, <Permanent anti-bounce>, <Automatic alarm reset>] <InputNumber>: Input number on the device board <InputMode>: 0 – Pulse, 1 – AlarmOpen, 2 – AlarmClose , 3 – Disabled. <FrameGenerationPeriod>(min): [1,5,10,15,30,60,240,360,720,1440] <TriggerDataTransmission>: 0 – no trigger, data will be just inserted in queue and sent in according with radio data send period setting, 1 – trigger data transmission when frame is generated <TriggerMormDataTransmission>: 0 – no trigger, data will be just inserted in queue and sent in according with radio data send period setting, 1 – trigger data transmission when frame is generated <Permanent anti-bounce>:(mS) [3 - 255] <Automatic alarm reset>(Sec.). Automatic alarm reset when the security input is restored 0 – manual reset	[integer, integer, integer, boolean, boolean, integer, integer]	[--, --, min, – --, mS, S]	[1, 0, 60, 0, 0, 5, 0]	Input 1 is enabled, configured as pulse input that generate data frame every 1 hour and not trigger data transmission procedure. Perind anti-bounce 5 mS. Manual reset alarm. {1004:[1,0,60,0,0,5,0]} A11903EC870100183C00000500	

ID	Name	Direction	Description	Type	Units	Example	Explanation	
1005	RS485 settings	UP/DOWN	Device RS485 interface settings: [<Speed>, <Parity>] <Speed>: 0 – 2400, 1 – 4800, 2 – 9600, 3 – 14400, 4 – 19200, 5 – 38400, 6 – 57600 <Parity>: 0 – None, 1 – Even, 2 – Odd	[integer, integer]		[2, 0]	9600 bps no parity Parity – None	not used
1006	ModBus general settings	UP/DOWN	<ModbusEnabled>, <PollPeriod>, <initiate data transfer>, <Operation from backup battery>, <Constant monitoring>, <Start polling all measurements> <ModbusEnabled>: 1 – On, 0 – Off. <PollPeriod>: (Min)Period of polling slave for data to check if readings is in/out of thresholds 1 – 1 min, 5 – 5min, 10 – 10 min, 30 – 30min, 60 – 1hour, 240 – 4 hours, 360 – 6 hours, 720 – 12 hours, 1440 – 24 hours. <Initiate data transfer>: 0 – Off, 1 – ALWAYS, 2 – If state changed <Operation from backup battery>: 1 – On, 0 – Off. <Constant monitoring>: 1 – On, 0 – Off. <Start polling all measurements>: 1 – On, 0 – Off.	[boolean, integer, integer, boolean, boolean, boolean]	[-- min, --, --, --, –]	[1, 30, 0, 0, 0, 1]	Modbus enabled Poll period 30 min initiate data transfer – off Operation from backup battery – off Constant monitoring – off Start polling all measurements – on	
1007	ModBus settings	UP/DOWN	[<MeasurementNumber>, <MeasurementEnabled>, <SlaveAddress>, <BaudRate>, <Parity>, <Warm-up time>, <ModbusFunction>, <StartRegister>, <RegisterCount>, <Endian>, <IsSigned>, <HighThreshold>, <LowThreshold>] <MeasurementNumber>: Measurement number from 1 to 10 <MeasurementEnabled>: 0 – Disabled, 1 – Enabled	[integer, integer, integer, integer, integer, integer, integer, integer, integer, integer, integer, boolean, integer, integer]		[2, 1, 20, 3, 1, 1, 3, 0, 10, 1, 0, -1000, 1000]	Measurement #2 Enabled Slave with address 14 BaudRate: 9600 Parity: None Warm-up time 1 Sec. ModbusFunction: holding registers StartRegister: 0 RegisterCount: 10 Endian: big endian IsSigned: not signed Low threshold is -1000 High threshold is 1000	

ID	Name	Direction	Description	Type	Units	Example	Explanation	
			<SlaveAddress>: Modbus slave device address on bus <BaudRate>: 0 – 1200, 1 – 2400, 2 – 4800, 3 –9600, 4 – 14400, 5 – 19200, 6 – 28800, 7 – 31250, 8 – 38400, 9 – 57600, 10 – 76800, 11 – 115200 <Parity>: 0 – None, 1 – Even, 2 – Odd <Warm–up time> <ModbusFunction>: 1 – coils, 2 –inputs, 3 – holding registers, 4 – input registers <StartRegister>: Address of first register to read <RegisterCount>: Count of registers to read from 1 to 4 <Endian> : 0 – little endian, 1 – big endian, 2 – little endian byte swap, 3 – big endian byte swap. <IsSigned>: 0 – not signed, 1 – signed <HighThreshold>: high threshold of readed value <LowThreshold>: low threshold of readed value					
1008	MBus general settings	UP/DOWN	[< MeasurementEnabled >, <FrameGenerationPeriodMinutes>] < MeasurementEnabled >: 0 – Disabled, 1 – Enabled <FrameGenerationPeriodMinutes>: Period of measurement frame generation: 1 – 1 min, 5 – 5 min, 10 – 10 min, 30 – 30 min, 60 – 1 hour, 240 – 4 hours, 360 – 6 hours, 720 – 12 hours, 1440 – 24 hours.	[boolean, integer]		[1, 5]	Enabled measurement Frame generation period 5 minutes	
1009	MBus settings	UP/DOWN	[<MeasurementNumber>, <SlaveSerial>, <BaudRate>, <MeasurementParameter> <MeasurementNumber>: Measurement number from 1 to 10 <SlaveSerial>: M Bus slave device serial number (secondary address) <BaudRate>: 0 – 300, 1 – 600, 2 – 1200, 3 – 2400, 4 – 4800, 5 – 9600 <MeasurementParameter> Measurement parameter from 1 to 10	[integer, integer, integer, integer]		[1, 98765, 4, [3,4,5]]	M-Bus measurement #1 Slave serial (secondary address) is 987654 BaudRate – 4800 Poll slave and generate frame every hour Measurement parameter 3,4,5	
1010	4-20 mA input settings		RFU					
1011	0-10 V input settings		RFU					

ID	Name	Direction	Description	Type	Units	Example	Explanation	
1012	Temperature input settings		RFU					
1013	GNSS geolocation settings		RFU					
1014	Setting of Open Drain		[<Alarm mode>, <Alarm output control. In1>, <Alarm output control. In2>, <Alarm output control. In3>, <Alarm output control. In4>] <Alarm mode>: 1 – On, 0 – Off. <Alarm output control. In (N): 1 – On, 0 – Off	[boolean, boolean, boolean, boolean, boolean]		[1, 1, 1, 1, 1]	Open collector enabled by alarm Input 1 controls the open collector automatically in security mode. Input 2 controls the open collector automatically in security mode, if available. if there is no such input – 0	
Commands								
2001	Reboot	UP/DOWN	Restart device	integer		[1]	Restart device example: {2001:[1]}	
2002	Reset to defaults	UP/DOWN	Reset device to factory default settings	integer		[1]	Reset device to the factory default settings {2002:[1]}	
2003	Set device time	UP/DOWN	Set device time to value in unixtime (UTC) format	integer	seconds	1698240094	Set device time to Wed Oct 25 2023 13:21:34 GMT+0000	For Nb-IOT only
2004	Open drain management	UP/DOWN	Manage device open drain [<State>, <TimeAutoMode>] <State>: 0 – off, 1 – on. <TimeAutoMode>:(Min)switching time to automatic mode for **CI201-LW** always – 0.	[boolean, integer]		[1, 60]	Open drain on. Switches to automatic mode after 60 minutes {2004:[1,60]}	
2005	Start all measurements	UP/DOWN	Start all measurements	integer		[1]	{2005:[1]}	
2006	Send packet	UP/DOWN	Send packet	integer		[1]	{2006:[1]}	
2007	Manual reset alarm	UP/DOWN	Manual reset alarm	integer		[1]	{2007:[1]}	
2008	Find device	UP/DOWN	Find device	integer		[1]	{2008:[1]}	
2009	Erase flash	UP/DOWN	Erase flash	integer		[1]	{2009:[1]}	
2010	Reset counters	UP/DOWN	Reset counters	integer		[1]	{2010:[1]}	
2011	Reset flag open device	UP/DOWN	Reset flag open device	integer		[1]	{2011:[1]}	
2012	Rejoin	UP/DOWN	Rejoin	integer		[1]	{2012:[1]}	

2 Examples of akYtec protocol data frames

Frame description	Diagnostic notation	Annotated HEX

Device information frame.
Should be sent after every device restart and every 48 hours.
Contains data units:
• Timestamp
• Serial number
• Firmware version
• MCU temperature
• Uptime
• Tamper
• Voltage battery
• External voltage
• LoRaWAN signal
	{
	0: 1702733757,
	1: 72012345,
	5: [0, 1],
	9: 0,
	4: 45,
	8: 0,
	2: 6303,
	3: 10848,
	10: [-42, 14]
	}
		A9 # map(9)
		00 # unsigned(0)
		1A 657DA7BD # unsigned(1702733757)
		01 # unsigned(1)
		1A 044AD239 # unsigned(72012345)
		05 # unsigned(5)
		82 # array(2)
		00 # unsigned(0)
		01 # unsigned(1)
		09 # unsigned(9)
		00 # unsigned(0)
		04 # unsigned(4)
		18 2D # unsigned(45)
		08 # unsigned(8)
		00 # unsigned(0)
		02 # unsigned(2)
		19 189F # unsigned(6303)
		03 # unsigned(3)
		19 2A60 # unsigned(10848)
		0A # unsigned(10)
		82 # array(2)
		38 29 # negative(41)
		0E # unsigned(14)

Digital input 1 data frame (input is configured as pulse). Could be sent periodically. Contains data units:
• Timestamp
• Pulse input 1 data
	{
	0: 1702733757, // Sat Dec 16 2023 13:35:57 GMT+0000
	14:[1, 10] // 10 pulses on input 1
	}
		A2 # map(2)
		00 # unsigned(0)
		1A 657DA7BD # unsigned(1702733757)
		0E # unsigned(14)
		82 # array(2)
		01 # unsigned(1)
		0A # unsigned(10)

Guard input 3 data frame. Could be sent periodically or based on alarms. Contains data units:
• Timestamp
• Guard input 3 data
	{
	0: 1702733757, // Sat Dec 16 2023 13:35:57 GMT+0000
	13:[3, 1] // Guard input 3 is in alarm state
	}
		A2 # map(2)
		00 # unsigned(0)
		1A 657DA7BD # unsigned(1702733757)
		0D # unsigned(13)
		82 # array(2)
		03 # unsigned(3)
		01 # unsigned(1)

3 Examples commands for devices

Table 2 Settings end commands used for CI200-LW

Settings/ Commands	Direction	DOWN	UP	Sending period	Period make frame
1000	UP/DOWN	{1000:[1,0,0]}	{0:72012345, 1000:[1,0,0]}	Command	
1001	UP/DOWN	{1001:[1,3,1,0,20,60,1]}	{0:72012345,1001:[1,3,1,0,20,60,1]}	Command	
1004	UP/DOWN	{1004:[1,0,60,0,0,5,0]}	{0:72012345,1004:[1,0,60,0,0,5,0]}	Command	
1014	UP/DOWN	{1014:[0,1,1,1,1]}	{0:72012345,1014:[0,1,1,1,1]}	Command	
2001	DOWN	{2001:[1]}		Command	
2002	UP/DOWN	{2002:[1]}	{0:72012345,2002:[1]}	Command	
2004	UP/DOWN	{2004:[1,5]}	{0:72012345,2004:[1,5]}	Command	
2005	UP/DOWN	{2002:[1]}	{0:72012345,2005:[1]}	Command	
2006	UP/DOWN	{2006:[1]}	{0:72012345,2006:[1]}	Command	
2007	UP/DOWN	{2007:[1]}	{0:72012345,2007:[1]}	Command	
2008	UP/DOWN	{2008:[1]}	{0:72012345,2008:[1]}	Command	
2009	UP/DOWN	{2009:[1]}	{0:72012345,2009:[1]}	Command	
2010	UP/DOWN	{2010:[1]}	{0:72012345,2010:[1]}	Command	
Device information frame include frames: (0,5,9,4,8,2,3,10)	UP		{0: 1706845405, 1: 73012347, 5: [0, 1], 9: 0, 4: 45, 8: 0, 2: 6303, 3: 10848, 10: [-42, 14]}	48 hours. Every data sending	48 hours. Every data sending
13	UP		{1: 72012345, 13:[1,0]}	Setting	State change
14	UP		{1: 72012345, 14:[2,4558]}	Setting	Setting
15	UP		{1: 72012345, 15:[1,0]}	Setting	State change

Table 3 Settings end commands used for IC-EL-LW

Settings/ Commands	Direction	DOWN	UP	Sending period	Period make frame
1000	UP/DOWN	{1000:[1,0,0]}	{0:72012345, 1000:[1,0,0]}	Command	
1001	UP/DOWN	{1001:[1,3,1,0,20,60,1]}	{0:72012345,1001:[1,3,1,0,20,60,1]}	Command	
1004	UP/DOWN	{1004:[1,0,60,0,0,5,0]}	{0:72012345,1004:[1,0,60,0,0,5,0]}	Command	
1014	UP/DOWN	{1014:[0,1,1,1,1]}	{0:72012345,1014:[0,1,1,1,1]}	Command	
2001	DOWN	{2001:[1]}		Command	
2002	UP/DOWN	{2002:[1]}	{0:72012345,2002:[1]}	Command	
2004	UP/DOWN	{2004:[1,0]}	{0:72012345,2004:[1,0]}	Command	
2005	UP/DOWN	{2002:[1]}	{0:72012345,2005:[1]}	Command	
2006	UP/DOWN	{2006:[1]}	{0:72012345,2006:[1]}	Command	
2007	UP/DOWN	{2007:[1]}	{0:72012345,2007:[1]}	Command	
2008	UP/DOWN	{2008:[1]}	{0:72012345,2008:[1]}	Command	
2009	UP/DOWN	{2009:[1]}	{0:72012345,2009:[1]}	Command	
2010	UP/DOWN	{2010:[1]}	{0:72012345,2010:[1]}	Command	
Device information frame include frames: (0,5,9,4,8,2,3,10)	UP		{0: 1706845405, 1: 73012347, 5: [0, 1], 9: 0, 4: 45, 8: 0, 2: 6303, 3: 10848, 10: [-42, 14]}	48 hours. Every data sending	48 hours. Every data sending
13	UP		{1: 72012345, 13:[1,0]}	Setting	State change
14	UP		{1: 72012345, 14:[2,4558]}	Setting	Setting
15	UP		{1: 72012345, 15:[1,0]}	Setting	State change

Table 4 Settings end commands used for IC-RS-LW v0.0

Settings/Commands	Direction	DOWN	UP	Sending period	Period make frame
1000	UP/DOWN	{1000: [1,0,0]}	{0:72012345, 1000:[1,0,0]}	Command	
1001	UP/DOWN	{1001: [1,3,1,0,20,60,1]}	{0:72012345,1001:[1,3,1,0,20,60,1]}	Command	
1004	UP/DOWN	{1004: [1,0,60,0,0,5,0]}	{0:72012345,1004:[1,0,60,0,0,5,0]}	Command	
1006	UP/DOWN	{1006: [1,30,0,0,0,1]}	{0: 72012399, 1006: [1, 30, 0, 0, 0, 1]}	Command	
1007	UP/DOWN	{1007: [2,1,20,3,1,1,3,0,10,1,0,-1000, 1000]}	{0: 1706774091, 1007: [2, 1, 20, 3, 1, 1, 3, 0, 10, 1, 0, -1000, 1000]}	Command	
1014	UP/DOWN	{1014:[0,1,1,1,1]}	{0:72012345,1014:[0,1,1,1,1]}	Command	
2001	DOWN	{2001:[1]}		Command	
2002	UP/DOWN	{2002:[1]}	{0:72012345,2002:[1]}	Command	
2004	UP/DOWN	{2004:[1,5]}	{0:72012345,2004:[1,5]}	Command	
2005	UP/DOWN	{2002:[1]}	{0:72012345,2005:[1]}	Command	
2006	UP/DOWN	{2006:[1]}	{0:72012345,2006:[1]}	Command	
2007	UP/DOWN	{2007:[1]}	{0:72012345,2007:[1]}	Command	
2008	UP/DOWN	{2008:[1]}	{0:72012345,2008:[1]}	Command	
2009	UP/DOWN	{2009:[1]}	{0:72012345,2009:[1]}	Command	
2010	UP/DOWN	{2010:[1]}	{0:72012345,2010:[1]}	Command	
Device information frame include frames: (0,5,9,4,8,2,3,10)	UP		{0: 1706845405, 1: 73012347, 5: [0, 1], 9: 0, 4: 45, 8: 0, 2: 6303, 3: 10848, 10: [-42, 14]}	48 hours. Every data sending	48 hours. Every data sending
13	UP		{1: 72012345, 13:[1,0]}	Setting	State change
14	UP		{1: 72012345, 14:[2,4558]}	Setting	Setting
15	UP		{1: 72012345, 15:[1,0]}	Setting	State change
16	UP		{0: 1707308520, 16: [1, 0, 12254781819181063492]}	Setting	Setting

Table 5 Settings end commands used for IC-WMBUS-LW v0.1

Settings/Commands	Direction	DOWN	UP	Sending period	Period make frame
1000	UP/DOWN	{1000:[1,0,0]}	{0:72012345, 1000:[1,0,0]}	Command	
1001	UP/DOWN	{1001:[1,3,1,0,20,60,1]}	{0:72012345,1001:[1,3,1,0,20,60,1]}	Command	
1004	UP/DOWN	{1004:[1,0,60,0,0,5,0]}	{0:72012345,1004:[1,0,60,0,0,5,0]}	Command	
1014	UP/DOWN	{1014:[0,1,1,1,1]}	{0:72012345,1014:[0,1,1,1,1]}	Command	
1008	UP/DOWN	{1008:[1,30]}	{0:72012345,1008:[1,30]}	Command	
1009	UP/DOWN	{1009:[1,74954825,3,[4,5,9]]}	{0: 1706844407, 1009: [1, 74954825, 3, [4, 5, 9]]}	Command	
2001	DOWN	{2001:[1]}		Command	
2002	UP/DOWN	{2002:[1]}	{0:72012345,2002:[1]}	Command	
2004	UP/DOWN	{2004:[1,5]}	{0:72012345,2004:[1,5]}	Command	
2005	UP/DOWN	{2002:[1]}	{0:72012345,2005:[1]}	Command	
2006	UP/DOWN	{2006:[1]}	{0:72012345,2006:[1]}	Command	
2007	UP/DOWN	{2007:[1]}	{0:72012345,2007:[1]}	Command	
2008	UP/DOWN	{2008:[1]}	{0:72012345,2008:[1]}	Command	
2009	UP/DOWN	{2009:[1]}	{0:72012345,2009:[1]}	Command	
2010	UP/DOWN	{2010:[1]}	{0:72012345,2010:[1]}	Command	
Device information frame include frames: (0,5,9,4,8,2,3,10)	UP		{0: 1706845405, 1: 73012347, 5: [0, 1], 9: 0, 4: 45, 8: 0, 2: 6303, 3: 10848, 10: [-42, 14]}	48 hours. Every data sending	48 hours. Every data sending
13	UP		{1: 72012345, 13:[1,0]}	Setting	State change
14	UP		{1: 72012345, 14:[2,4558]}	Setting	Setting
15	UP		{1: 72012345, 15:[1,0]}	Setting	State change
17	UP		{17: h'C261C365009524437206300266DC00'}	Setting	Setting