UG600: Simplicity SDK EZSP Reference Guide

This version of UG600 has been deprecated. For the latest version, see docs.silabs.com.

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The EmberZNet Serial Protocol (EZSP) defined in this document is the protocol used by a host application processor to interact with the EmberZNet PRO stack running on a Network Co-Processor (NCP). EZSP messages are sent between the host and the NCP over either a Serial Peripheral Interface (SPI) or a Universal Asynchronous Receiver/Transmitter (UART) interface.

KEY POINTS

- Itemizes what's new for EZSP since the previous release of EmberZNet PRO.
- Defines the fields in an EZSP frame.
- Defines the protocol format, including type definitions, structure definitions, and named values.
- Provides details for all types of EZSP frames: name, ID, description, command parameters, and response parameters.

This document is up to date with EmberZNet PRO Release 8.1. See section 1 What's New for a list of what has changed since the previous release.

Following the release of Zigbee EmberZNet v8, included in Simplicity SDK, several API and type definitions have changed. For more information, please visit https://docs.silabs.com/zigbee/8.0.0/zigbee-api-ref-v7-vs-v8/02-renaming-changes-in-zigbee.

Contents

1 What's New

The initial creation of this document is based on UG100. Note that EZSP for Gecko SDK suite (GSDK) releases will continue to be described by UG100. This document applies specifically to EmberZNet versions (8.0 and later) released as part of the Simplicity SDK suite.

2 EmberZNet Serial Protocol

All EZSP frames begin with the same three fields: sequence, frame control, and frame ID. The format of the rest of the frame depends on the frame ID. Figure 1 defines the format for all frame IDs. Most of the frames have a fixed length. A few, such as those containing application messages, are of variable length. The frame control indicates the direction of the message (command or response). For commands, the frame control also contains power management information (SPI interface only). For responses, the frame control also contains status information.

The host initiates a two-message transaction by sending a command message to the NCP. The NCP then sends a response message to the host. When connected using the SPI interface, if the NCP needs to communicate a callback to the host, it will indicate this using the interrupt line and then wait for the host to send the `callback` command. When connected using the UART interface, the NCP can send callbacks to the host asynchronously as soon as they occur.

When a command contains an application message, the host must supply a one-byte tag. This tag is used in future commands and responses to refer to the message. For example, when sending a message, the host provides both the message contents and a tag. The tag is then used to report the fate of the message in a later response from the NCP.

Silicon Labs designed EZSP to be very familiar to customers who have used the EmberZNet PRO stack Application Programming Interface (AP)I. The majority of the commands and responses are functionally identical to those found in EmberZNet PRO. The variations are due mainly to the timing differences of running the application on a separate processor across a serial interface.

2.1 EZSP Protocol Version

The EZSP Protocol Version identifies the version number of the EZSP API. This version number changes across EmberZNet PRO software releases when the EZSP API changes in a way that is not backward-compatible. To interoperate, the host and NCP must use compatible EZSP protocol versions. Following NCP reset, the host first issues the `version` command to the NCP to confirm that the two are operating with compatible versions. If they are not, operation cannot proceed. This document describes current EZSP version that is identified by the macro EZSP_PROTOCOL_VERSION and stack type 2 (mesh).

The macro EZSP_PROTOCOL_VERSION is updated to correspond to a change that affects the protocol. The EZSP Protocol Version for this EmberZNet PRO software release is **16**.

2.2 Byte Order

All multiple octet fields are transmitted and received with the least significant octet first, also referred to as “little endian”. This is the same byte order convention specified by 802.15.4 and ZigBee. Note that EUI64 fields are treated as a 64-bit number and are therefore transmitted and received in little endian order. Each individual octet is transmitted and received by the SPI or UART interface. See *AN706: EZSP-UART Host Interface Guide* and *AN711: EZSP-SPI Host Interface Guide*, for more information about the UART and SPI interfaces respectively.

2.3 Conceptual Overview

This section provides an overview of the concepts that are specific to EZSP or that differ from the EmberZNet PRO stack API. The commands and responses mentioned in this overview are described in more detail later in this document.

2.3.1 Stack Configuration

To ensure that the NCP and the host agree on the protocol format, the first command sent by the host after the NCP has reset must be the `version` command. There are a number of configuration values that affect the behavior of the stack. The host can read these values at any time using the `getConfigurationValue` command. After the NCP has reset, the host can modify any of the default values using the `setConfigurationValue` command. The host must then provide information about the application endpoints using the `addEndpoint` command.

The following table gives the minimum and maximum values for each of the configuration values. Also listed is the RAM cost—the number of bytes of additional RAM required to increase the configuration value by one. Because the total amount of RAM is fixed, the additional RAM required must be made available by reducing one of the other configuration values.

Note: Due to code size constraints, Silicon Labs does not bound check any EZSP values on the NCP. Silicon Labs recommends implementing bound checks on the host side.

Table 2-1. Configuration Values

Configuration Value	Min.	Max.	Units	RAM Cost	Description
SL_ZIGBEE_EZSP_CONFIG_PACKET_BUFFER_COUNT	5	253	packet buffers	39	The number of packet buffers available to the stack. When set to the special value 0xFF, the NCP will allocate all remaining configuration RAM towards packet buffers, such that the resulting count will be the largest whole number of packet buffers that can fit into the available memory.
SL_ZIGBEE_EZSP_CONFIG_NEIGHBOR_TABLE_SIZE	16	26	neighbors	18	The maximum number of router neighbors the stack can keep track of. A neighbor is a node within radio range.
SL_ZIGBEE_EZSP_CONFIG_APS_UNICAST_MESSAGE_COUNT	0		messages	6	The maximum number of APS retried messages the stack can be transmitting at any time.
SL_ZIGBEE_EZSP_CONFIG_BINDING_TABLE_SIZE	0	127	entries	2	The maximum number of non-volatile bindings supported by the stack.
SL_ZIGBEE_EZSP_CONFIG_ADDRESS_TABLE_SIZE	0		entries	12	The maximum number of EUI64 to network address associations that the stack can maintain for the application. (Note: The total number of such address associations maintained by the NCP is the sum of the value of this setting and the value of ::EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE.).
SL_ZIGBEE_EZSP_CONFIG_MULTICAST_TABLE_SIZE	0		entries	4	The maximum number of multicast groups that the device may be a member of.
SL_ZIGBEE_EZSP_CONFIG_ROUTE_TABLE_SIZE	0		entries	6	The maximum number of destinations to which a node can route messages. This includes both messages originating at this node and those relayed for others.
SL_ZIGBEE_EZSP_CONFIG_DISCOVERY_TABLE_SIZE	0		entries	10	The number of simultaneous route discoveries that a node will support.
SL_ZIGBEE_EZSP_CONFIG_BROADCAST_ALARM_DATA_SIZE	0	16	bytes	1	The size of the alarm broadcast buffer.
SL_ZIGBEE_EZSP_CONFIG_UNICAST_ALARM_DATA_SIZE (A)	0	16	bytes	(C)	The size of the unicast alarm buffers allocated for end device children.
SL_ZIGBEE_EZSP_CONFIG_STACK_PROFILE	0			0	Specifies the stack profile.
SL_ZIGBEE_EZSP_CONFIG_SECURITY_LEVEL	0	5		0	The security level used for security at the MAC and network layers. The supported values are 0 (no security) and 5 (payload is encrypted and a four-byte MIC is used for authentication).

Configuration Value	Min.	Max.	Units	RAM Cost	Description
SL_ZIGBEE_EZSP_CONFIG_MAX_HOPS (B)	0		hops	0	The maximum number of hops for a message.
SL_ZIGBEE_EZSP_CONFIG_MAX_END_DEVICE_CHILDREN (C)	0	64	children	9 + (A)	The maximum number of end device children that a router will support.
SL_ZIGBEE_EZSP_CONFIG_INDIRECT_TRANSMISSION_TIMEOUT	0	30000	milli-seconds	0	The maximum amount of time that the MAC will hold a message for indirect transmission to a child.
SL_ZIGBEE_EZSP_CONFIG_END_DEVICE_POLL_TIMEOUT	0	14	2^(D) seconds	0	The maximum amount of time that an end device child can wait between polls. If no poll is heard within this timeout, then the parent removes the end device from its tables. The timeout corresponding to a value of zero is 10 seconds. The timeout corresponding to a nonzero value N is 2^N minutes, ranging from 2^1 = 2 minutes to 2^14 = 16384 minutes.
SL_ZIGBEE_EZSP_CONFIG_MOBILE_NODE_POLL_TIMEOUT	0		quarter seconds	0	The maximum amount of time that a mobile node can wait between polls. If no poll is heard within this timeout, then the parent removes the mobile node from its tables.
SL_ZIGBEE_EZSP_CONFIG_RESERVED_MOBILE_CHILD_ENTRIES	0	(C)	entries	0	The number of child table entries reserved for use only by mobile nodes.
SL_ZIGBEE_EZSP_CONFIG_TX_POWER_MODE	0	3		0	Enables boost power mode and/or the alternate transmitter output.
SL_ZIGBEE_EZSP_CONFIG_DISABLE_RELAY	0	1		0	0: Allow this node to relay messages. 1: Prevent this node from relaying messages.

Configuration Value	Min.	Max.	Units	RAM Cost	Description
SL_ZIGBEE_EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE	0		entries	12	The maximum number of EUI64 to network address associations that the Trust Center can maintain. These address cache entries are reserved for and reused by the Trust Center when processing device join/rejoin authentications. This cache size limits the number of overlapping joins the Trust Center can process within a narrow time window (e.g. two seconds), and thus should be set to the maximum number of near simultaneous joins the Trust Center is expected to accommodate. (Note: The total number of such address associations maintained by the NCP is the sum of the value of this setting and the value of ::EZSP_CONFIG_ADDRESS_TABLE_SIZE.)
SL_ZIGBEE_EZSP_CONFIG_SOURCE_ROUTE_TABLE_SIZE	0		entries	4	The size of the source route table.
SL_ZIGBEE_EZSP_CONFIG_FRAGMENT_WINDOW_SIZE	0	8	blocks	0	The number of blocks of a fragmented message that can be sent in a single window.
SL_ZIGBEE_EZSP_CONFIG_FRAGMENT_DELAY_MS	0		milli-seconds	0	The time the stack will wait between sending blocks of a fragmented message.
SL_ZIGBEE_EZSP_CONFIG_KEY_TABLE_SIZE	0		entries	4	The size of the Key Table used for storing individual link keys (if the device is a Trust Center) or Application Link Keys (if the device is a normal node).
SL_ZIGBEE_EZSP_CONFIG_APS_ACK_TIMEOUT			milli-seconds	0	The APS ACK timeout value. The stack waits this amount of time between resends of APS retried messages.
SL_ZIGBEE_EZSP_CONFIG_END_DEVICE_BIND_TIMEOUT	1		seconds	0	The time the coordinator will wait for a second end device bind request to arrive.
SL_ZIGBEE_EZSP_CONFIG_PAN_ID_CONFLICT_REPORT_THRESHOLD	1	63	reports per minute	0	The number of PAN id conflict reports that must be received by the network manager within one minute to trigger a PAN id change.

Configuration Value	Min.	Max.	Units	RAM Cost	Description
SL_ZIGBEE_EZSP_CONFIG_REQUEST_KEY_TIMEOUT	0	10	minutes	0	The timeout value in minutes for how long the Trust Center or a normal node waits for the ZigBee Request Key to complete. On the Trust Center this controls whether or not the device buffers the request, waiting for a matching pair of ZigBee Request Key. If the value is non-zero, the Trust Center buffers and waits for that amount of time. If the value is zero, the Trust Center does not buffer the request and immediately responds to the request. Zero is the most compliant behavior.
SL_ZIGBEE_EZSP_CONFIG_CERTIFICATE_TABLE_SIZE	0	1		0	This value indicates the size of the runtime modifiable certificate table. Normally certificates are stored in MFG tokens but this table can be used to field upgrade devices with new Smart Energy certificates. This value cannot be set, it can only be queried.
SL_ZIGBEE_EZSP_CONFIG_APPLICATION_ZDO_FLAGS	0	255		0	This is a bitmask that controls which incoming ZDO request messages are passed to the application. The bits are defined in the EmberZdoConfigurationFlags enumeration. To see if the application is required to send a ZDO response in reply to an incoming message, the application must check the APS options bitfield within the incomingMessageHandler callback to see if the EMBER_APS_OPTION_ZDO_RESPONSE_REQUIRED flag is set.
SL_ZIGBEE_EZSP_CONFIG_BROADCAST_TABLE_SIZE	15	254	entries	6	The maximum number of broadcasts during a single broadcast timeout period.
SL_ZIGBEE_EZSP_CONFIG_MAC_FILTER_TABLE_SIZE	0	254	entries	2	The size of the MAC filter list table.
SL_ZIGBEE_EZSP_CONFIG_SUPPORTED_NETWORKS	1	2	entries	72	The number of supported networks.
SL_ZIGBEE_EZSP_CONFIG_SEND_MULTICASTS_TO_SLEEPY_ADDRESS	0	1		0	Whether multicasts are sent to the RxOnWhenIdle=true address (0xFFFD) or the sleepy broadcast address (0xFFFF). The RxOnWhenIdle=true address is the ZigBee compliant destination for multicasts. 0=false, 1=true
SL_ZIGBEE_EZSP_CONFIG_ZLL_GROUP_ADDRESSES	0	255		0	ZLL group address initial configuration.

Configuration Value	Min.	Max.	Units	RAM Cost	Description
`SL_ZIGBEE_EZSP_CONFIG_ZLL_RSSI_THRESHOLD`	-128	127		0	ZLL RSSI threshold initial configuration.
`SL_ZIGBEE_EZSP_CONFIG_RF4CE_PAIRING_TABLE_SIZE`	0	126	entries	48	The maximum number of pairings supported by the stack. Controllers must support at least one pairing table entry while targets must support at least five.
`SL_ZIGBEE_EZSP_CONFIG_RF4CE_PENDING_OUTGOING_PACKET_TABLE_SIZE`	0	16	entries	16	The maximum number of outgoing RF4CE packets supported by the stack.
`SL_ZIGBEE_EZSP_CONFIG_MTORR_FLOW_CONTROL`	0	1		0	Toggles the MTORR flow control in the stack. 0=false, 1=true
`(Deprecated)SL_ZIGBEE_EZSP_CONFIG_TRANSIENT_KEY_TIMEOUT_S`	0	65535	seconds	0	The amount of time a trust center will store a transient key with which a device can use to join the network.

2.3.2 Policy Settings

There are some situations when the NCP must decide but there is not enough time to consult with the host. The host can control what decision is made by setting the policy in advance. The NCP will then make decisions according to the current policy. The host is informed via callbacks each time a decision is made, but by the time the news reaches the host, it is too late to change that decision. You can change the policies at any time by using the `setPolicy` command.

A policy is used for trust center behavior, external binding modification requests, unicast replies, generating `pollHandler` callbacks, and the contents of the `messageSent` callback.

2.3.3 Unicast Replies

The policy for unicast replies allows the host to decide whether it wants to supply the NCP with a reply payload for every retried unicast received. If the host sets the policy to not supply a reply, the NCP will automatically send an empty reply (containing no payload) for every retried unicast received. If the host sets the policy to supply the reply, then the NCP will only send a reply when instructed by the host.

If the reply does not reach the sender before the APS retry timeout expires, the sender will transmit the unicast again. The host must process the incoming message and supply the reply quickly enough to avoid retransmission by the sender. Provided this timing constraint is met, multiple unicasts can be received before the first reply is supplied and the replies can be supplied in any order.

2.3.4 SPI Interface Callbacks

Asynchronous callbacks from the NCP are sent to the host as the response to a `callback` command. The NCP uses the interrupt line to indicate that the host should send a `callback` command. The NCP will queue multiple callbacks while it waits for the host. Each response only delivers one callback. If the NCP receives the `callback` command when there are no pending callbacks, it will reply with the `noCallbacks` response.

2.3.5 UART Interface Callbacks

By default, callbacks from the NCP are sent to the host asynchronously as soon as they occur, and the host never needs to send the `callback` command. The host can disable asynchronous callbacks by setting `SL_ZIGBEE_EZSP_VALUE_UART_SYNCH_CALLBACKS` to `1` using the `setValue` command. Callbacks will then only be sent to the host as the response to a callback command.

2.3.6 SPI Interface Power Management

The NCP always idles its processor whenever possible. To further reduce power consumption when connected using the SPI interface, the NCP can be put to sleep by the host. The UART interface is designed for gateway applications and does not support power management. In power down mode, only an external interrupt will wake the NCP. In deep sleep mode, the NCP will use its internal timer to wake up for scheduled events. The NCP provides two independent timers that the host can use for any purpose, including waking up the NCP from deep sleep mode. Timers are set using the `setTimer` command and generate `timerHandler` callbacks.

The frame control byte of every command tells the NCP which sleep mode to enter after it has responded to the command. Including this information in every command (instead of having a separate power management command) allows the NCP to be put to sleep faster. If the host needs to put the NCP to sleep without also performing another action, the `nop` command can be used.

In deep sleep mode, the NCP will wake up for an internal event. If the event does not produce a callback for the host, the NCP will go back to sleep once the event has been handled. If the event does produce a callback, the NCP will signal the host and remain awake waiting for the `callback` command. If the frame control byte of the `callback` command specifies deep sleep mode, then the NCP would normally go back to sleep after responding with the callback. However, if there is a second callback pending, the NCP will remain awake waiting for another `callback` command.

To avoid disrupting the operation of the network, only put the NCP to sleep when it is not joined to a network or when it is joined as a sleeping end device. If the NCP is joined as a sleeping end device, then it must poll its parent in order to receive messages. The host controls the polling behavior using the `pollForData` command. Polls are sent periodically with the interval set by the host or a single poll can be sent. The result of every poll attempt is optionally reported using the `pollCompleteHandler` callback.

2.3.7 Tokens

Some of the non-volatile storage on the NCP is made available for use by the host. Tokens stored in the NCP's non-volatile memory can be read and written using the `setToken` and `getToken` commands. Tokens preserve their values between reboots. The manufacturing tokens stored in the User Data and Lock Bits regions of the NCP can be read using the `getMfgToken` command.

2.3.8 NCP Status

The frame control byte of every response sent by the NCP contains four status fields:

- The overflow bit is set if the NCP ran out of memory at any time since the previous response was sent. If this bit is set, then messages may have been lost.
- The truncated bit is set if the NCP truncated the current response. If this bit is set, the command from the host produced a response larger than the maximum EZSP frame length.
- The callback pending bit is set if the NCP has one or more callbacks that have not been delivered to the host.
- The callback type field identifies a response as either an asynchronous callback (UART interface only), a synchronous callback, or not a callback.

You can use the `nop` command to check the status of the NCP without also performing another action.

2.3.9 Random Number Generator

The host can obtain a random number from the NCP using the `getRandomNumber` command. The random number is generated from analog noise in the radio and can be used to seed a random number generator on the host.

3 Protocol Format

Figure 3-1 illustrates the EZSP frame format.

Sequence (1 byte)	Frame Control (2 bytes)		Frame ID (2 bytes)	Parameters
	Low Byte	High Byte		

Figure 3-1. EZSP Frame Format

The first byte of all EZSP frames is a sequence number. The host should increment the sequence number each time a command is sent to the NCP. The response sent by the NCP uses the sequence number of the command, except when the response is a callback. Callback responses contain the sequence number of the last command seen at the time the callback occurred on the NCP. Starting with EZSP version 8, both Frame Control and Frame ID consist of two bytes. Table 3-1 shows a summary of the two-byte Frame Control. All Frame IDs are described in detail from section 4 Configuration Frames through section 16 Token Interface Frames.

The EZSP Version command is a special command. It is used by the Host to retrieve the EZSP version of the NCP to verify that the Host and NCP are working with the same EZSP version. An NCP will not accept other EZSP commands from the Host until after a Version command is successfully transacted. Because the EZSP frame format has evolved over software releases, the EZSP Version command must be interoperable between different EZSP versions. To support successful execution of a Version command between a Host and NCP that have different EZSP versions, the Version command additionally is executable using a legacy EZSP frame format. For practical purposes, the Version command should be executed using that legacy frame format.

Figure 3-2 illustrates the legacy frame format used for the EZSP Version command.

Sequence (1 byte)	Frame Control (1 byte)	Frame ID (1 byte)	Parameters

Figure 3-2. EZSP Version Command – Legacy Frame Format

- The single Frame Control byte corresponds to the Low Byte of the two-byte Frame Control of the regular frame format (for definitions of the bits).
- The 16-bit Version command code 0x0000 is shortened in the single-byte Frame ID of the Version legacy frame format to be 0x00.

Table 3-1. Frame Control Summary

Type	Table Number	Description
Frame Control Low Byte	Table 3-2	Frame control low byte
Frame Control Low Byte	Table 3-3	Sleep modes
Frame Control Low Byte	Table 3-4	Overflow status bit
Frame Control Low Byte	Table 3-5	Truncated status bit
Frame Control Low Byte	Table 3-6	Callback pending status bit
Frame Control Low Byte	Table 3-7	Callback types
Frame Control High Byte	Table 3-8	Extended frame control byte
Frame Control High Byte	Table 3-9	Security enabled status bit
Frame Control High Byte	Table 3-10	Padding enabled status bit
Frame Control High Byte	Table 3-11	Frame format version

Table 3-2. Frame Control Low Byte

Bit	Command	Response
7 (MSB)	0	1
6	networkIndex[1]	networkIndex[1]
5	networkIndex[0]	networkIndex[0]
4	0 (reserved)	callbackType[1]
3	0 (reserved)	callbackType[0]
2	0 (reserved)	callbackPending
1	sleepMode[1]	truncated
0 (LSB)	sleepMode[0]	overflow

Table 3-3. Sleep Modes

sleepMode[1]	sleepMode[0]	Description
1	1	Reserved
1	0	Power down
0	1	Deep sleep
0	0	Idle

Table 3-4. Overflow Status Bit

overflow	Description
1	The NCP ran out of memory since the previous response.
0	No memory shortage since the previous response.

Table 3-5. Truncated Status Bit

truncated	Description
1	The NCP truncated the current response to avoid exceeding the maximum EZSP frame length.
0	The current response was not truncated.

Table 3-6. Callback Pending Status Bit

callbackPending	Description
1	A callback is pending on the NCP. If this response is a callback, at least one more callback is available.
0	All callbacks have been delivered to the host.

Table 3-7. Callback Types

callbackType[1]	callbackType[0]	Description
1	1	Reserved.
1	0	(UART interface only) This response is an asynchronous callback. It was not sent in response to a callback command.
0	1	This response is a synchronous callback. It was sent in response to a callback command.
0	0	This response is not a callback.

Table 3-8. Extended Frame Control Byte

Bit	Command	Response
7 (MSB)	securityEnabled	securityEnabled
6	paddingEnabled	paddingEnabled
5	0 (reserved)	0 (reserved)
4	0 (reserved)	0 (reserved)
3	0 (reserved)	0 (reserved)
2	0 (reserved)	0 (reserved)
1	frameFormatVersion[1]	frameFormatVersion[1]
0 (LSB)	frameFormatVersion[0]	frameFormatVersion[0]

Table 3-9. Security Enabled Status Bit

securityEnabled	Description
1	Security is enabled.
0	Security is not enabled.

Table 3-10. Padding Enabled Status Bit

securityEnabled	Description
1	Padding is enabled.
0	Padding is not enabled.

Table 3-11. Frame Format Version

frameFormatVersion[1]	frameFormatVersion[0]	Description
1	1	Reserved
1	0	Reserved
0	1	Version 1
0	0	Version 0

3.1 Type Definitions

Type	Alias	Description
Bool	uint8_t	Boolean type with values true and false.
sl_zigbee_ezsp_config_id_t	uint8_t	Identifies a configuration value.
sl_zigbee_ezsp_value_id_t	uint8_t	Identifies a value.
sl_zigbee_ezsp_extended_value_id_t	uint8_t	Identifies a value based on specified characteristics. Each set of characteristics is unique to that value and is specified during the call to get the extended value.
sl_zigbee_ezsp_endpoint_flags_t	uint16_t	Flags associated with the endpoint data configured on the NCP.
EmberConfigTxPowerMode	uint16_t	Values for SL_ZIGBEE_EZSP_CONFIG_TX_POWER_MODE.
sl_zigbee_ezsp_policy_id_t	uint8_t	Identifies a policy.

Type	Alias	Description
sl_zigbee_ezsp_decision_bitmask_t	uint16_t	This is the policy decision bitmask that controls the trust center decision strategies. The bitmask is modified and extracted from the sl_zigbee_ezsp_decision_id_t for supporting bitmask operations.
sl_zigbee_ezsp_decision_id_t	uint8_t	Identifies a policy decision.
sl_zigbee_ezsp_mfg_token_id_t	uint8_t	Manufacturing token IDs used by sl_zigbee_ezsp_get_mfg_token().
sl_zigbee_ezsp_status_t	uint8_t	Status values used by EZSP.
sl_zigbee_af_status_t	uint8_t	A ZCL status. See relevant header files for enumeration and possible values.
sl_zigbee_event_units_t	uint8_t	Either marks an event as inactive or specifies the units for the event execution time.
sl_zigbee_node_type_t	uint8_t	The type of the node.
sl_zigbee_network_status_t	uint8_t	The possible join states for a node.
sl_zigbee_incoming_message_type_t	uint8_t	Incoming message types.
sl_zigbee_outgoing_message_type_t	uint8_t	Outgoing message types.
sl_zigbee_mac_passthrough_type_t	uint8_t	MAC passthrough message type flags.
sl_zigbee_binding_type_t	uint8_t	Binding types.
sl_zigbee_aps_option_t	uint16_t	Options to use when sending a message.
sl_zigbee_ezsp_network_scan_type_t	uint8_t	Network scan types.
sl_zigbee_join_decision_t	uint8_t	Decision made by the trust center when a node attempts to join.
sl_zigbee_leave_network_option_t	uint8_t	Use in case zigbee leave network with options.
sl_zigbee_initial_security_bitmask_t	uint16_t	This is the Initial Security Bitmask that controls the use of various security features.
sl_zigbee_current_security_bitmask_t	uint16_t	This is the Current Security Bitmask that details the use of various security features.
sl_zigbee_key_type_t	uint8_t	Describes the type of ZigBee security key.
sl_zigbee_key_struct_bitmask_t	uint16_t	Describes the presence of valid data within the EmberKeyStruct structure.
sl_zigbee_device_update_t	uint8_t	The status of the device update.
sl_zigbee_key_status_t	uint8_t	The status of the attempt to establish a key.
sl_zigbee_counter_type_t	uint8_t	Defines the events reported to the application by the *readAndClearCounters* command.
sl_zigbee_join_method_t	uint8_t	The type of method used for joining.
sl_zigbee_zdo_configuration_flags_t	uint8_t	Flags for controlling which incoming ZDO requests are passed to the application. To see if the application is required to send a ZDO response to an incoming message, the application must check the APS options bitfield within the incomingMessageHandler callback to see if the EMBER_APS_OPTION_ZDO_RESPONSE_REQUIRED flag is set.
EmberConcentratorType	uint16_t	Type of concentrator.
sl_zigbee_zll_state_t	uint16_t	ZLL device state identifier.
sl_zigbee_zll_key_index_t	uint8_t	ZLL key encryption algorithm enumeration.
sl_zigbee_ezsp_zll_network_operation_t	uint8_t	Differentiates among ZLL network operations.
sl_zigbee_network_init_bitmask_t	uint16_t	Bitmask options for sli_zigbee_stack_network_init()

Type	Alias	Description
sl_zigbee_multi_phy_nwk_config_t	uint8_t	Network configuration for the desired radio interface for multi-phy network.
sl_zigbee_duty_cycle_state_t	uint8_t	Duty cycle states.
sl_zigbee_radio_power_mode_t	uint8_t	Radio power modes.
sl_zigbee_entropy_source_t	uint8_t	Entropy sources.
sl_zigbee_sec_man_key_type_t	uint8_t	Key types recognized by Zigbee Security Manager.
sl_zigbee_sec_man_derived_key_type_t	uint16_t	Derived key types recognized by Zigbee Security Manager.
sl_zigbee_sec_man_flags_t	uint8_t	Flags for key operations.
sl_zigbee_leave_request_flags_t	uint8_t	Flags for NWK leave request command.
sl_802154_short_addr_t	uint16_t	16-bit ZigBee network address.
sl_status_t	uint32_t	See sl_status.h for an enumerated list.
sl_zigbee_gp_status_t	uint8_t	See enumeration in gp-types.h
sl_802154_pan_id_t	uint16_t	802.15.4 PAN ID.
sl_zigbee_multicast_id_t	uint16_t	16-bit ZigBee multicast group identifier.
sl_802154_long_addr_t	uint8_t[8]	EUI 64-bit ID (an IEEE address).
sl_zigbee_mac_interface_id_t	uint8_t	The 8-bit identifier to uniquely identify the interface.
sl_zigbee_manufacturing_string_t	uint8_t[16]	A 16-byte array for the manufacturing string.
sl_zigbee_duty_cycle_hecto_pct_t	uint16_t	The percent of duty cycle for a limit. Duty Cycle, Limits, and Thresholds are reported in units of Percent * 100 (i.e. 10000 = 100.00%, 1 = 0.01%).
sl_zigbee_library_id_t	uint8_t	A library identifier
sl_zigbee_library_status_t	uint8_t	The presence and status of the Ember library.
sl_zigbee_gp_security_level_t	uint8_t	The security level of the GPD.
sl_zigbee_gp_key_type_t	uint8_t	The type of security key to use for the GPD.
sl_zigbee_gp_proxy_table_entry_status_t	uint8_t	The proxy table entry status
sl_zigbee_gp_security_frame_counter_t	uint32_t	The security frame counter
sl_zigbee_gp_sink_table_entry_status_t	uint8_t	The sink table entry status

3.2 Structure Definitions

Structure	Field	Description
sl_zigbee_network_parameters_t		Network parameters.
	uint8_t[8] extendedPanId	The network's extended PAN identifier.
	uint16_t panId	The network's PAN identifier.
	uint8_t radioTxPower	A power setting, in dBm.
	uint8_t radioChannel	A radio channel.
	sl_zigbee_join_method_t joinMethod	The method used to initially join the network.
	sl_802154_short_addr_t nwkManagerId	NWK Manager ID. The ID of the network manager in the current network. This may only be set at joining when using SL_ZIGBEE_USE_CONFIGURED_NWK_STATE as the join method.

Structure	Field	Description
	uint8_t nwkUpdateId	NWK Update ID. The value of the ZigBee nwkUpdateId known by the stack. This is used to determine the newest instance of the network after a PAN ID or channel change. This may only be set at joining when using SL_ZIGBEE_USE_CONFIGURED_NWK_STATE as the join method.
	uint32_t channels	NWK channel mask. The list of preferred channels that the NWK manager has told this device to use when searching for the network. This may only be set at joining when using SL_ZIGBEE_USE_CONFIGURED_NWK_STATE as the join method.
sl_zigbee_alt_mac_config_t		Defines alternate MAC configuration parameters.
	uint16_t scanDuration	Scan duration over alternate MAC.
	MacTransmitCallback macTransmit	To register the transmit callback. Called when there is packet to transmit.
sl_zigbee_multi_phy_radio_parameters_t		Radio parameters.
	int8_t radioTxPower	A power setting, in dBm.
	uint8_t radioPage	A radio page.
	uint8_t radioChannel	A radio channel.
sl_zigbee_zigbee_network_t		The parameters of a ZigBee network.
	uint8_t channel	The 802.15.4 channel associated with the network.
	uint16_t panId	The network's PAN identifier.
	uint8_t[8] extendedPanId	The network's extended PAN identifier.
	bool allowingJoin	Whether the network is allowing MAC associations.
	uint8_t stackProfile	The Stack Profile associated with the network.
	uint8_t nwkUpdateId	The instance of the Network.
sl_zigbee_aps_frame_t		ZigBee APS frame parameters.
	uint16_t profileId	The application profile ID that describes the format of the message.
	uint16_t clusterId	The cluster ID for this message.
	uint8_t sourceEndpoint	The source endpoint.
	uint8_t destinationEndpoint	The destination endpoint.
	sl_zigbee_aps_option_t options	A bitmask of options.
	uint16_t groupId	The group ID for this message, if it is multicast mode.
	uint8_t sequence	The sequence number.
sl_zigbee_binding_table_entry_t		An entry in the binding table.
	sl_zigbee_binding_type_t type	The type of binding.
	uint8_t local	The endpoint on the local node.

Structure	Field	Description
	uint16_t clusterId	A cluster ID that matches one from the local endpoint's simple descriptor. This cluster ID is set by the provisioning application to indicate which part an endpoint's functionality is bound to this particular remote node and is used to distinguish between unicast and multicast bindings. Note that a binding can be used to send messages with any cluster ID, not just the one listed in the binding.
	uint8_t remote	The endpoint on the remote node (specified by identifier).
	sl_802154_long_addr_t identifier	A 64-bit identifier. This is either the destination EUI64 (for unicasts) or the 64-bit group address (for multicasts).
	uint8_t networkIndex	The index of the network the binding belongs to.
sl_zigbee_multicast_table_entry_t		A multicast table entry indicates that a particular endpoint is a member of a particular multicast group. Only devices with an endpoint in a multicast group will receive messages sent to that multicast group.
	sl_zigbee_multicast_id_t multicastId	The multicast group ID.
	uint8_t endpoint	The endpoint that is a member, or 0 if this entry is not in use (the ZDO is not a member of any multicast groups.)
	uint8_t networkIndex	The network index of the network the entry is related to.
sl_zigbee_key_data_t		A 128-bit key.
	uint8_t[16] contents	The key data.
sl_zigbee_certificate_data_t		The implicit certificate used in CBKE.
	uint8_t[48] contents	The certificate data.
sl_zigbee_public_key_data_t		The public key data used in CBKE.
	uint8_t[22] contents	The public key data.
sl_zigbee_private_key_data_t		The private key data used in CBKE.
	uint8_t[21] contents	The private key data.
sl_zigbee_smac_data_t		The Shared Message Authentication Code data used in CBKE.
	uint8_t[16] contents	The Shared Message Authentication Code data.
sl_zigbee_signature_data_t		An ECDSA signature
	uint8_t[42] contents	The signature data.
sl_zigbee_certificate_283k1_data_t		The implicit certificate used in CBKE.
	uint8_t[74] contents	The 283k1 certificate data.
sl_zigbee_public_key_283k1_data_t		The public key data used in CBKE.
	uint8_t[37] contents	The 283k1 public key data.
sl_zigbee_private_key_283k1_data_t		The private key data used in CBKE.
	uint8_t[36] contents	The 283k1 private key data.
sl_zigbee_signature_283k1_data_t		An ECDSA signature
	uint8_t[72] contents	The 283k1 signature data.
sl_zigbee_message_digest_t		The calculated digest of a message

Structure	Field	Description
	uint8_t[16] contents	The calculated digest of a message.
sl_zigbee_aes_mmo_hash_context_t		The hash context for an ongoing hash operation.
	uint8_t[16] result	The result of ongoing the hash operation.
	uint32_t length	The total length of the data that has been hashed so far.
sl_zigbee_beacon_data_t		Beacon data structure.
	uint8_t channel	The channel of the received beacon.
	uint8_t lqi	The LQI of the received beacon.
	int8_t rssi	The RSSI of the received beacon.
	uint8_t depth	The depth of the received beacon.
	uint8_t nwkUpdateId	The network update ID of the received beacon.
	int8_t power	The power level of the received beacon. This field is valid only if the beacon is an enhanced beacon.
	int8_t parentPriority	The TC connectivity and long uptime from capacity field.
	sl_802154_pan_id_t panId	The PAN ID of the received beacon.
	uint8_t[8] extendedPanId	The extended PAN ID of the received beacon.
	sl_802154_short_addr_t sender	The sender of the received beacon.
	bool enhanced	Whether or not the beacon is enhanced.
	bool permitJoin	Whether the beacon is advertising permit join.
	bool hasCapacity	Whether the beacon is advertising capacity.
sl_zigbee_beacon_classification_params_t		The parameters related to beacon prioritization.
	int8_t minRssiForReceivingPkts	The minimum RSSI value for receiving packets that is used in some beacon prioritization algorithms.
	uint16_t beaconClassificationMask	The beacon classification mask that identifies which beacon prioritization algorithm to pick and defines the relevant parameters.
sl_zigbee_neighbor_table_entry_t		A neighbor table entry stores information about the reliability of RF links to and from neighboring nodes.
	uint16_t shortId	The neighbor's two-byte network id
	uint8_t averageLqi	An exponentially weighted moving average of the link quality values of incoming packets from this neighbor as reported by the PHY.
	uint8_t inCost	The incoming cost for this neighbor, computed from the average LQI. Values range from 1 for a good link to 7 for a bad link.

Structure	Field	Description
	uint8_t outCost	The outgoing cost for this neighbor, obtained from the most recently received neighbor exchange message from the neighbor. A value of zero means that a neighbor exchange message from the neighbor has not been received recently enough, or that our id was not present in the most recently received one.
	uint8_t age	The number of aging periods elapsed since a link status message was last received from this neighbor. The aging period is 16 seconds.
	sl_802154_long_addr_t longId	The 8-byte EUI64 of the neighbor.
sl_zigbee_route_table_entry_t		A route table entry stores information about the next hop along the route to the destination.
	uint16_t destination	The short id of the destination. A value of 0xFFFF indicates the entry is unused.
	uint16_t nextHop	The short id of the next hop to this destination.
	uint8_t status	Indicates whether this entry is active (0), being discovered (1), unused (3), or validating (4).
	uint8_t age	The number of seconds since this route entry was last used to send a packet.
	uint8_t concentratorType	Indicates whether this destination is a High RAM Concentrator (2), a Low RAM Concentrator (1), or not a concentrator (0).
	uint8_t routeRecordState	For a High RAM Concentrator, indicates whether a route record is needed (2), has been sent (1), or is no long needed (0) because a source routed message from the concentrator has been received.
sl_zigbee_initial_security_state_t		The security data used to set the configuration for the stack, or the retrieved configuration currently in use.
	sl_zigbee_initial_security_bitmask_t bitmask	A bitmask indicating the security state used to indicate what the security configuration will be when the device forms or joins the network.
	sl_zigbee_key_data_t preconfiguredKey	The pre-configured Key data that should be used when forming or joining the network. The security bitmask must be set with the SL_ZIGBEE_HAVE_PRECONFIGURED_KEY bit to indicate that the key contains valid data.
	sl_zigbee_key_data_t networkKey	The Network Key that should be used by the Trust Center when it forms the network, or the Network Key currently in use by a joined device. The security bitmask must be set with SL_ZIGBEE_HAVE_NETWORK_KEY to indicate that the key contains valid data.
	uint8_t networkKeySequenceNumber	The sequence number associated with the network key. This is only valid if the SL_ZIGBEE_HAVE_NETWORK_KEY has been set in the security bitmask.

Structure	Field	Description
	sl_802154_long_addr_t preconfiguredTrustCenterEui64	This is the long address of the trust center on the network that will be joined. It is usually NOT set prior to joining the network and instead it is learned during the joining message exchange. This field is only examined if ::SL_ZIGBEE_HAVE_TRUST_CENTER_EUI64 is set in the sl_zigbee_initial_security_state_t::bitmask. Most devices should clear that bit and leave this field alone. This field must be set when using commissioning mode.
sl_zigbee_current_security_state_t		The security options and information currently used by the stack.
	sl_zigbee_current_security_bitmask_t bitmask	A bitmask indicating the security options currently in use by a device joined in the network.
	sl_802154_long_addr_t trustCenterLongAddress	The IEEE Address of the Trust Center device.
sl_zigbee_key_struct_t		A structure containing a key and its associated data.
	sl_zigbee_key_struct_bitmask_t bitmask	A bitmask indicating the presence of data within the various fields in the structure.
	sl_zigbee_key_type_t type	The type of the key.
	sl_zigbee_key_data_t key	The actual key data.
	uint32_t outgoingFrameCounter	The outgoing frame counter associated with the key.
	uint32_t incomingFrameCounter	The frame counter of the partner device associated with the key.
	uint8_t sequenceNumber	The sequence number associated with the key.
	sl_802154_long_addr_t partnerEUI64	The IEEE address of the partner device also in possession of the key.
sl_zigbee_network_init_struct_t		Network Initialization parameters.
	sl_zigbee_network_init_bitmask_t bitmask	Configuration options for network init.
sl_zigbee_zll_security_algorithm_data_t		Data associated with the ZLL security algorithm.
	uint32_t transactionId	Transaction identifier.
	uint32_t responseId	Response identifier.
	uint16_t bitmask	Bitmask.
sl_zigbee_zll_network_t		The parameters of a ZLL network.
	sl_zigbee_zigbee_network_t zigbeeNetwork	The parameters of a ZigBee network.
	sl_zigbee_zll_security_algorithm_data_t securityAlgorithm	Data associated with the ZLL security algorithm.
	sl_802154_long_addr_t eui64	Associated EUI64.
	sl_802154_short_addr_t nodeId	The node id.
	sl_zigbee_zll_state_t state	The ZLL state.
	sl_zigbee_node_type_t nodeType	The node type.
	uint8_t numberSubDevices	The number of sub devices.

Structure	Field	Description
	uint8_t totalGroupIdentifiers	The total number of group identifiers.
	uint8_t rssiCorrection	RSSI correction value.
sl_zigbee_zll_initial_security_state_t		Describes the initial security features and requirements that will be used when forming or joining ZLL networks.
	uint32_t bitmask	Unused bitmask; reserved for future use.
	sl_zigbee_zll_key_index_t keyIndex	The key encryption algorithm advertised by the application.
	sl_zigbee_key_data_t encryptionKey	The encryption key for use by algorithms that require it.
	sl_zigbee_key_data_t preconfiguredKey	The pre-configured link key used during classical ZigBee commissioning.
sl_zigbee_zll_device_info_record_t		Information about a specific ZLL Device.
	sl_802154_long_addr_t ieeeAddress	EUI64 associated with the device.
	uint8_t endpointId	Endpoint id.
	uint16_t profileId	Profile id.
	uint16_t deviceId	Device id.
	uint8_t version	Associated version.
	uint8_t groupIdCount	Number of relevant group ids.
sl_zigbee_zll_address_assignment_t		ZLL address assignment data.
	sl_802154_short_addr_t nodeId	Relevant node id.
	sl_802154_short_addr_t freeNodeIdMin	Minimum free node id.
	sl_802154_short_addr_t freeNodeIdMax	Maximum free node id.
	sl_zigbee_multicast_id_t groupIdMin	Minimum group id.
	sl_zigbee_multicast_id_t groupIdMax	Maximum group id.
	sl_zigbee_multicast_id_t freeGroupIdMin	Minimum free group id.
	sl_zigbee_multicast_id_t freeGroupIdMax	Maximum free group id.
sl_zigbee_tok_type_stack_zll_data_t		Public API for ZLL stack data token.
	uint32_t bitmask	Token bitmask.
	uint16_t freeNodeIdMin	Minimum free node id.
	uint16_t freeNodeIdMax	Maximum free node id.
	uint16_t myGroupIdMin	Local minimum group id.
	uint16_t freeGroupIdMin	Minimum free group id.
	uint16_t freeGroupIdMax	Maximum free group id.
	uint8_t rssiCorrection	RSSI correction value.
sl_zigbee_tok_type_stack_zll_security_t		Public API for ZLL stack security token.
	uint32_t bitmask	Token bitmask.
	uint8_t keyIndex	Key index.
	uint8_t[16] encryptionKey	Encryption key.
	uint8_t[16] preconfiguredKey	Preconfigured key.

Structure	Field	Description
sl_zigbee_duty_cycle_limits_t		A structure containing duty cycle limit configurations. All limits are absolute, and are required to be as follows: suspLimit > critThresh > limitThresh For example: suspLimit = 250 (2.5%), critThresh = 180 (1.8%), limitThresh 100 (1.00%).
	sl_zigbee_duty_cycle_hecto_pct_t limitThresh	The Limited Threshold in % * 100
	sl_zigbee_duty_cycle_hecto_pct_t critThresh	The Critical Threshold in % * 100.
	sl_zigbee_duty_cycle_hecto_pct_t suspLimit	The Suspended Limit (LBT) in % * 100.
sl_zigbee_per_device_duty_cycle_t		A structure containing per device overall duty cycle consumed (up to the suspend limit).
	sl_802154_short_addr_t nodeId	Node Id of device whose duty cycle is reported.
	sl_zigbee_duty_cycle_hecto_pct_t dutyCycleConsumed	Amount of overall duty cycle consumed (up to suspend limit).
sl_zigbee_transient_key_data_t		The transient key data structure.
	sl_802154_long_addr_t eui64	The IEEE address paired with the transient link key.
	sl_zigbee_key_data_t keyData	The key data structure matching the transient key.
	uint32_t incomingFrameCounter	The incoming frame counter associated with this key.
	sl_zigbee_key_struct_bitmask_t bitmask	This bitmask indicates whether various fields in the structure contain valid data.
	uint16_t remainingTimeSeconds	The number of seconds remaining before the key is automatically timed out of the transient key table.
	uint8_t networkIndex	The network index indicates which NWK uses this key.
sl_zigbee_child_data_t		A structure containing a child node's data.
	sl_802154_long_addr_t eui64	The EUI64 of the child
	sl_zigbee_node_type_t type	The node type of the child
	sl_802154_short_addr_t id	The short address of the child
	uint8_t phy	The phy of the child
	uint8_t power	The power of the child
	uint8_t timeout	The timeout of the child
sl_zb_sec_man_key_t		A 128-bit key.
	uint8_t[16] key	The key data.
sl_zb_sec_man_context_t		Context for Zigbee Security Manager operations.
	sl_zb_sec_man_key_type_t core_key_type	The type of key being referenced.
	uint8_t key_index	The index of the referenced key.
	sl_zb_sec_man_derived_key_type_t derived_type	The type of key derivation operation to perform on a key.
	sl_802154_long_addr_t eui64	The EUI64 associated with this key.
	uint8_t multi_network_index	Multi-network index.

Structure	Field	Description
	sl_zigbee_sec_man_flags_t flags	Flag bitmask.
	uint32_t psa_key_alg_permission	Algorithm to use with this key (for PSA APIs)
sl_zb_sec_man_network_key_info_t		Metadata for network keys.
	bool network_key_set	Whether the current network key is set.
	bool alternate_network_key_set	Whether the alternate network key is set.
	uint8_t network_key_sequence_number	Current network key sequence number.
	uint8_t alt_network_key_sequence_number	Alternate network key sequence number.
	uint32_t network_key_frame_counter	Frame counter for the network key.
sl_zb_sec_man_aps_key_metadata_t		Metadata for APS link keys.
	sl_zigbee_key_struct_bitmask_t bitmask	Bitmask of key properties
	uint32_t outgoing_frame_counter	Outgoing frame counter.
	uint32_t incoming_frame_counter	Incoming frame counter.
	uint16_t ttl_in_seconds	Remaining lifetime (for transient keys).
sl_zigbee_multiprotocol_priorities_t		Scheduler priorities for multiprotocol apps.
	uint8_t backgroundRx	background RX priority
	uint8_t tx	TX priority
	uint8_t activeRx	active RX priority
sl_zigbee_endpoint_description_t		Description of a particular endpoint.
	uint16_t profileId	The endpoint's application profile.
	uint16_t deviceId	The endpoint's device ID within the application profile.
	uint8_t deviceVersion	The endpoint's device version.
	uint8_t inputClusterCount	The number of input clusters.
	uint8_t outputClusterCount	The number of output clusters.
sl_zigbee_rx_packet_info_t		Incoming message Information
uint16_t sender_short_id	Short ID of the sender of the message.	
	sl_802154_long_addr_t sender_long_id	EUI64 of the sender of the message if the sender chose to this information in the message. The ::SL_ZIGBEE_APS_OPTION_SOURCE_EUI64 bit in the options field of the APS frame of the incoming message indicates that the EUI64 is present in the message.
	uint8_t binding_index	The index of the entry in the binding table that matches the sender of the message or 0xFF if there is no matching entry.
	uint8_t address_index	The index of the entry in the address table that matches the sender of the message or 0xFF if there is no matching entry.
	uint8_t lasy_hop_lqi	Link quality of the node that last relayed the current message.
	int8_t lasy_hop_rssi	Received signal strength indicator (RSSI) of the node that last relayed the message.
	uint32_t lasy_hop_timestamp	Timestamp of the moment when Start Frame Delimiter (SFD) was received.
sl_zigbee_gp_address_t		A GP address structure.

Structure	Field	Description
	uint8_t[8] id	Contains either a 4-byte source ID or an 8-byte IEEE address, as indicated by the value of the applicationId field.
	uint8_t applicationId	The GPD Application ID specifying either source ID (0x00) or IEEE address (0x02).
	uint8_t endpoint	The GPD endpoint.
sl_zigbee_gp_sink_list_entry_t		A sink list entry.
	uint8_t type	The sink list type.
	sl_802154_long_addr_t sinkEUI	The EUI64 of the target sink.
	sl_802154_short_addr_t sinkNodeId	The short address of the target sink.
sl_zigbee_gp_proxy_table_entry_t		The internal representation of a proxy table entry
	sl_zigbee_gp_proxy_table_entry_status_t status	Internal status of the proxy table entry.
	uint32_t options	The tunneling options (this contains both options and extendedOptions from the spec).
	sl_zigbee_gp_address_t gpd	The addressing info of the GPD.
	sl_802154_short_addr_t assignedAlias	The assigned alias for the GPD.
	uint8_t securityOptions	The security options field.
	sl_zigbee_gp_security_frame_counter_t gpdSecurityFrameCounter	The security frame counter of the GPD.
	sl_zigbee_key_data_t gpdKey	The key to use for GPD.
	sl_zigbee_gp_sink_list_entry_t sinkList[GP_SINK_LIST_ENTRIES]	The list of sinks (hardcoded to 2 which is the spec minimum).
	uint8_t groupcastRadius	The groupcast radius.
	uint8_t searchCounter	The search counter.
sl_zigbee_gp_sink_table_entry_t		The internal representation of a sink table entry.
	sl_zigbee_gp_sink_table_entry_status_t status	Internal status of the sink table entry.
	uint32_t options	The tunneling options (this contains both options and extendedOptions from the spec).
	sl_zigbee_gp_address_t gpd	The addressing info of the GPD.
	uint8_t deviceId	The device id for the GPD.
	sl_zigbee_gp_sink_list_entry_t sinkList[GP_SINK_LIST_ENTRIES]	The list of sinks (hardcoded to 2 which is the spec minimum).
	sl_802154_short_addr_t assignedAlias	The assigned alias for the GPD.
	uint8_t groupcastRadius	The groupcast radius.
	uint8_t securityOptions	The security options field.
		sl_zigbee_gp_security_frame_counter_t gpdSecurityFrameCounter
	sl_zigbee_key_data_t gpdKey	The key to use for GPD.
sl_zigbee_token_info_t		Information of a token in the token table.
	uint32_t nvm3Key	NVM3 key of the token
	bool isCnt	Token is a counter type
	bool isIdx	Token is an indexed token
	uint8_t size	Size of the token

Structure	Field	Description
	uint8_t arraySize	Array size of the token
sl_zigbee_token_data_t		Token Data
	uint32_t size	Token data size in bytes
	uint8_t[64] data	Token data pointer

3.3 Named Values

bool	Value	Description
false	0x00	An alias for zero, used for clarity.
true	0x01	An alias for one, used for clarity.

sl_zigbee_ezsp_config_id_t	Value	Description
SL_ZIGBEE_EZSP_CONFIG_PACKET_BUFFER_HEAP_SIZE	0x01	The NCP no longer supports configuration of packet buffer heap at runtime using this parameter. Packet buffer heap space must be configured using the SL_ZIGBEE_PACKET_BUFFER_HEAP_SIZE macro when building the NCP project.
SL_ZIGBEE_EZSP_CONFIG_NEIGHBOR_TABLE_SIZE	0x02	The maximum number of router neighbors the stack can keep track of. A neighbor is a node within radio range.
SL_ZIGBEE_EZSP_CONFIG_APS_UNICAST_MESSAGE_COUNT	0x03	The maximum number of APS retried messages the stack can be transmitting at any time.
SL_ZIGBEE_EZSP_CONFIG_BINDING_TABLE_SIZE	0x04	The maximum number of non-volatile bindings supported by the stack.
SL_ZIGBEE_EZSP_CONFIG_ADDRESS_TABLE_SIZE	0x05	The maximum number of EUI64 to network address associations that the stack can maintain for the application. (Note, the total number of such address associations maintained by the NCP is the sum of the value of this setting and the value of ::SL_ZIGBEE_EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE.
SL_ZIGBEE_EZSP_CONFIG_MULTICAST_TABLE_SIZE	0x06	The maximum number of multicast groups that the device may be a member of.
SL_ZIGBEE_EZSP_CONFIG_ROUTE_TABLE_SIZE	0x07	The maximum number of destinations to which a node can route messages. This includes both messages originating at this node and those relayed for others.
SL_ZIGBEE_EZSP_CONFIG_DISCOVERY_TABLE_SIZE	0x08	The number of simultaneous route discoveries that a node will support.
SL_ZIGBEE_EZSP_CONFIG_STACK_PROFILE	0x0C	Specifies the stack profile.
SL_ZIGBEE_EZSP_CONFIG_SECURITY_LEVEL	0x0D	The security level used for security at the MAC and network layers. The supported values are 0 (no security) and 5 (payload is encrypted and a four-byte MIC is used for authentication).
SL_ZIGBEE_EZSP_CONFIG_MAX_HOPS	0x10	The maximum number of hops for a message.
SL_ZIGBEE_EZSP_CONFIG_MAX_END_DEVICE_CHILDREN	0x11	The maximum number of end device children that a router will support.

sl_zigbee_ezsp_config_id_t	Value	Description
SL_ZIGBEE_EZSP_CONFIG_INDIRECT_TRANSMISSION_TIMEOUT	0x12	The maximum amount of time that the MAC will hold a message for indirect transmission to a child.
SL_ZIGBEE_EZSP_CONFIG_END_DEVICE_POLL_TIMEOUT	0x13	The maximum amount of time that an end device child can wait between polls. If no poll is heard within this timeout, then the parent removes the end device from its tables. Value range 0-14. The timeout corresponding to a value of zero is 10 seconds. The timeout corresponding to a nonzero value N is 2^N minutes, ranging from 2^1 = 2 minutes to 2^14 = 16384 minutes.
SL_ZIGBEE_EZSP_CONFIG_TX_POWER_MODE	0x17	Enables boost power mode and/or the alternate transmitter output.
SL_ZIGBEE_EZSP_CONFIG_DISABLE_RELAY	0x18	0: Allow this node to relay messages. 1: Prevent this node from relaying messages.
SL_ZIGBEE_EZSP_CONFIG_TRUST_CENTER_ADDRESS_CACHE_SIZE	0x19	The maximum number of EUI64 to network address associations that the Trust Center can maintain. These address cache entries are reserved for and reused by the Trust Center when processing device join/rejoin authentications. This cache size limits the number of overlapping joins the Trust Center can process within a narrow time window (e.g. two seconds), and thus should be set to the maximum number of near simultaneous joins the Trust Center is expected to accommodate. (Note, the total number of such address associations maintained by the NCP is the sum of the value of this setting and the value of ::SL_ZIGBEE_EZSP_CONFIG_ADDRESS_TABLE_SIZE.)
SL_ZIGBEE_EZSP_CONFIG_SOURCE_ROUTE_TABLE_SIZE	0x1A	The size of the source route table.
SL_ZIGBEE_EZSP_CONFIG_FRAGMENT_WINDOW_SIZE	0x1C	The number of blocks of a fragmented message that can be sent in a single window.
SL_ZIGBEE_EZSP_CONFIG_FRAGMENT_DELAY_MS	0x1D	The time the stack will wait (in milliseconds) between sending blocks of a fragmented message.
SL_ZIGBEE_EZSP_CONFIG_KEY_TABLE_SIZE	0x1E	The size of the Key Table used for storing individual link keys (if the device is a Trust Center) or Application Link Keys (if the device is a normal node).
SL_ZIGBEE_EZSP_CONFIG_APS_ACK_TIMEOUT	0x1F	The APS ACK timeout value. The stack waits this amount of time between resends of APS retried messages.
SL_ZIGBEE_EZSP_CONFIG_BEACON_JITTER_DURATION	0x20	The duration of a beacon jitter, in the units used by the 15.4 scan parameter (((1 << duration) + 1) * 15ms), when responding to a beacon request.
SL_ZIGBEE_EZSP_CONFIG_PAN_ID_CONFLICT_REPORT_THRESHOLD	0x22	The number of PAN id conflict reports that must be received by the network manager within one minute to trigger a PAN id change.
SL_ZIGBEE_EZSP_CONFIG_REQUEST_KEY_TIMEOUT	0x24	The timeout value in minutes for how long the Trust Center or a normal node waits for the ZigBee Request Key to complete. On the Trust Center this controls whether or not the device buffers the request, waiting for a matching pair

sl_zigbee_ezsp_config_id_t	Value	Description
		of ZigBee Request Key. If the value is non-zero, the Trust Center buffers and waits for that amount of time. If the value is zero, the Trust Center does not buffer the request and immediately responds to the request. Zero is the most compliant behavior.
SL_ZIGBEE_EZSP_CONFIG_CERTIFICATE_TABLE_SIZE	0x29	This value indicates the size of the runtime modifiable certificate table. Normally certificates are stored in MFG tokens but this table can be used to field upgrade devices with new Smart Energy certificates. This value cannot be set, it can only be queried.
SL_ZIGBEE_EZSP_CONFIG_APPLICATION_ZDO_FLAGS	0x2A	This is a bitmask that controls which incoming ZDO request messages are passed to the application. The bits are defined in the sl_zigbee_zdo_configuration_flags_t enumeration. To see if the application is required to send a ZDO response in reply to an incoming message, the application must check the APS options bitfield within the incomingMessageHandler callback to see if the SL_ZIGBEE_APS_OPTION_ZDO_RESPONSE_REQUIRED flag is set.
SL_ZIGBEE_EZSP_CONFIG_BROADCAST_TABLE_SIZE	0x2B	The maximum number of broadcasts during a single broadcast timeout period.
SL_ZIGBEE_EZSP_CONFIG_MAC_FILTER_TABLE_SIZE	0x2C	The size of the MAC filter list table.
SL_ZIGBEE_EZSP_CONFIG_SUPPORTED_NETWORKS	0x2D	The number of supported networks.
SL_ZIGBEE_EZSP_CONFIG_SEND_MULTICASTS_TO_SLEEPY_ADDRESS	0x2E	Whether multicasts are sent to the RxOnWhenIdle=true address (0xFFFD) or the sleepy broadcast address (0xFFFF). The RxOnWhenIdle=true address is the ZigBee compliant destination for multicasts.
SL_ZIGBEE_EZSP_CONFIG_ZLL_GROUP_ADDRESSES	0x2F	ZLL group address initial configuration.
SL_ZIGBEE_EZSP_CONFIG_ZLL_RSSI_THRESHOLD	0x30	ZLL rssi threshold initial configuration.
SL_ZIGBEE_EZSP_CONFIG_MTORR_FLOW_CONTROL	0x33	Toggles the MTORR flow control in the stack.
SL_ZIGBEE_EZSP_CONFIG_RETRY_QUEUE_SIZE	0x34	Setting the retry queue size. Applies to all queues. Default value in the sample applications is 16.
SL_ZIGBEE_EZSP_CONFIG_NEW_BROADCAST_ENTRY_THRESHOLD	0x35	Setting the new broadcast entry threshold. The number (BROADCAST_TABLE_SIZE - NEW_BROADCAST_ENTRY_THRESHOLD) of broadcast table entries are reserved for relaying the broadcast messages originated on other devices. The local device will fail to originate a broadcast message after this threshold is reached. Setting this value to BROADCAST_TABLE_SIZE and greater will effectively kill this limitation.
SL_ZIGBEE_EZSP_CONFIG_TRANSIENT_KEY_TIMEOUT_S	0x36	The length of time, in seconds, that a trust center will store a transient link key that a device can use to join its network. A transient key is added with a call to emberAddTransientLinkKey. After the transient key is added, it will be removed once this amount of time has passed. A joining device will not be able to use that key to join until it is

sl_zigbee_ezsp_config_id_t	Value	Description
		added again on the trust center. The default value is 300 seconds, i.e., 5 minutes.
SL_ZIGBEE_EZSP_CONFIG_BROADCAST_MIN_ACKS_NEEDED	0x37	The number of passive acknowledgements to record from neighbors before we stop re-transmitting broadcasts
SL_ZIGBEE_EZSP_CONFIG_TC_REJOINS_USING_WELL_KNOWN_KEY_TIMEOUT_S	0x38	The length of time, in seconds, that a trust center will allow a Trust Center (insecure) rejoin for a device that is using the well-known link key. This timeout takes effect once rejoins using the well-known key has been allowed. This command updates the sli_zigbee_allow_tc_rejoins_using_well_known_key_timeout_sec value.
SL_ZIGBEE_EZSP_CONFIG_CTUNE_VALUE	0x39	Valid range of a CTUNE value is 0x0000-0x01FF. Higher order bits (0xFE00) of the 16-bit value are ignored.
SL_ZIGBEE_EZSP_CONFIG_ASSUME_TC_CONCENTRATOR_TYPE	0x40	To configure non trust center node to assume a concentrator type of the trust center it join to, until it receive many-to-one route request from the trust center. For the trust center node, concentrator type is configured from the concentrator plugin. The stack by default assumes trust center be a low RAM concentrator that make other devices send route record to the trust center even without receiving a many-to-one route request. The default concentrator type can be changed by setting appropriate sl_zigbee_assume_trust_center_concentrator_type_t config value.
SL_ZIGBEE_EZSP_CONFIG_GP_PROXY_TABLE_SIZE	0x41	This is green power proxy table size. This value is read-only and cannot be set at runtime
SL_ZIGBEE_EZSP_CONFIG_GP_SINK_TABLE_SIZE	0x42	This is green power sink table size. This value is read-only and cannot be set at runtime
SL_ZIGBEE_EZSP_CONFIG_END_DEVICE_CONFIGURATION	0x43	This is The configuration advertised by the end device to the parent when joining/rejoining, either SL_ZIGBEE_END_DEVICE_CONFIG_NONE or SL_ZIGBEE_END_DEVICE_CONFIG_PERSIST_DATA_ON_PARENT.

sl_zigbee_ezsp_value_id_t	Value	Description
SL_ZIGBEE_EZSP_VALUE_TOKEN_STACK_NODE_DATA	0x00	The contents of the node data stack token.
SL_ZIGBEE_EZSP_VALUE_MAC_PASSTHROUGH_FLAGS	0x01	The types of MAC passthrough messages that the host wishes to receive.
SL_ZIGBEE_EZSP_VALUE_EMBERNET_PASSTHROUGH_SOURCE_ADDRESS	0x02	The source address used to filter legacy EmberNet messages when the SL_802154_PASSTHROUGH_EMBERNET_SOURCE flag is set in SL_ZIGBEE_EZSP_VALUE_MAC_PASSTHROUGH_FLAGS.
SL_ZIGBEE_EZSP_VALUE_BUFFER_HEAP_FREE_SIZE	0x03	The amount in bytes (max 2^16) of available general purpose heap memory
SL_ZIGBEE_EZSP_VALUE_UART_SYNCH_CALLBACKS	0x04	Selects sending synchronous callbacks in ezsp-uart.

sl_zigbee_ezsp_value_id_t	Value	Description
SL_ZIGBEE_EZSP_VALUE_MAXIMUM_INCOMING_TRANSFER_SIZE	0x05	The maximum incoming transfer size for the local node. Default value is set to 82 and does not use fragmentation. Sets the value in Node Descriptor. To set, this takes the input of a uint8 array of length 2 where you pass the lower byte at index 0 and upper byte at index 1.
SL_ZIGBEE_EZSP_VALUE_MAXIMUM_OUTGOING_TRANSFER_SIZE	0x06	The maximum outgoing transfer size for the local node. Default value is set to 82 and does not use fragmentation. Sets the value in Node Descriptor. To set, this takes the input of a uint8 array of length 2 where you pass the lower byte at index 0 and upper byte at index 1.
SL_ZIGBEE_EZSP_VALUE_STACK_TOKEN_WRITING	0x07	A bool indicating whether stack tokens are written to persistent storage as they change.
SL_ZIGBEE_EZSP_VALUE_STACK_IS_PERFORMING_REJOIN	0x08	A read-only value indicating whether the stack is currently performing a rejoin.
SL_ZIGBEE_EZSP_VALUE_MAC_FILTER_LIST	0x09	A list of sl_zigbee_mac_filter_match_data_t values.
SL_ZIGBEE_EZSP_VALUE_EXTENDED_SECURITY_BITMASK	0x0A	The Ember Extended Security Bitmask.
SL_ZIGBEE_EZSP_VALUE_NODE_SHORT_ID	0x0B	The node short ID.
SL_ZIGBEE_EZSP_VALUE_DESCRIPTOR_CAPABILITY	0x0C	The descriptor capability of the local node. Write only.
SL_ZIGBEE_EZSP_VALUE_STACK_DEVICE_REQUEST_SEQUENCE_NUMBER	0x0D	The stack device request sequence number of the local node.
SL_ZIGBEE_EZSP_VALUE_RADIO_HOLD_OFF	0x0E	Enable or disable radio hold-off.
SL_ZIGBEE_EZSP_VALUE_ENDPOINT_FLAGS	0x0F	The flags field associated with the endpoint data.
SL_ZIGBEE_EZSP_VALUE_MFG_SECURITY_CONFIG	0x10	Enable/disable the Mfg security config key settings.
SL_ZIGBEE_EZSP_VALUE_VERSION_INFO	0x11	Retrieves the version information from the stack on the NCP.
SL_ZIGBEE_EZSP_VALUE_LAST_REJOIN_REASON	0x13	This is the reason that the last rejoin took place. This value may only be retrieved, not set. The rejoin may have been initiated by the stack (NCP) or the application (host). If a host initiated a rejoin the reason will be set by default to SL_ZIGBEE_REJOIN_DUE_TO_APP_EVENT_1. If the application wishes to denote its own rejoin reasons it can do so by calling sl_zigbee_ezsp_set_value(EMBER_VALUE_HOST_REJOIN_REASON, SL_ZIGBEE_REJOIN_DUE_TO_APP_EVENT_X). X is a number corresponding to one of the app events defined. If the NCP initiated a rejoin it will record this value internally for retrieval by sl_zigbee_ezsp_get_value(EZSP_VALUE_REAL_REJOIN_REASON).
SL_ZIGBEE_EZSP_VALUE_NEXT_ZIGBEE_SEQUENCE_NUMBER	0x14	The next ZigBee sequence number.
SL_ZIGBEE_EZSP_VALUE_CCA_THRESHOLD	0x15	CCA energy detect threshold for radio.
SL_ZIGBEE_EZSP_VALUE_SET_COUNTER_THRESHOLD	0x17	The threshold value for a counter

sl_zigbee_ezsp_value_id_t	Value	Description
SL_ZIGBEE_EZSP_VALUE_RESET_COUNTER_THRESHOLDS	0x18	Resets all counters thresholds to 0xFF
SL_ZIGBEE_EZSP_VALUE_CLEAR_COUNTERS	0x19	Clears all the counters
SL_ZIGBEE_EZSP_VALUE_CERTIFICATE_283K1	0x1A	The node's new certificate signed by the CA.
SL_ZIGBEE_EZSP_VALUE_PUBLIC_KEY_283K1	0x1B	The Certificate Authority's public key.
SL_ZIGBEE_EZSP_VALUE_PRIVATE_KEY_283K1	0x1C	The node's new static private key.
SL_ZIGBEE_EZSP_VALUE_NWK_FRAME_COUNTER	0x23	The NWK layer security frame counter value
SL_ZIGBEE_EZSP_VALUE_APS_FRAME_COUNTER	0x24	The APS layer security frame counter value. Managed by the stack. Users should not set these unless doing backup and restore.
SL_ZIGBEE_EZSP_VALUE_RETRY_DEVICE_TYPE	0x25	Sets the device type to use on the next rejoin using device type
SL_ZIGBEE_EZSP_VALUE_ENABLE_R21_BEHAVIOR	0x29	Setting this byte enables R21 behavior on the NCP.
SL_ZIGBEE_EZSP_VALUE_ANTENNA_MODE	0x30	Configure the antenna mode(0-don't switch,1-primary,2-secondary,3-TX antenna diversity).
SL_ZIGBEE_EZSP_VALUE_ENABLE_PTA	0x31	Enable or disable packet traffic arbitration.
SL_ZIGBEE_EZSP_VALUE_PTA_OPTIONS	0x32	Set packet traffic arbitration configuration options.
SL_ZIGBEE_EZSP_VALUE_MFGLIB_OPTIONS	0x33	Configure manufacturing library options (0-non-CSMA transmits,1-CSMA transmits). To be used with Manufacturing Library.
SL_ZIGBEE_EZSP_VALUE_USE_NEGOTIATED_POWER_BY_LPD	0x34	Sets the flag to use either negotiated power by link power delta (LPD) or fixed power value provided by user while forming/joining a network for packet transmissions on sub-ghz interface. This is mainly for testing purposes.
SL_ZIGBEE_EZSP_VALUE_PTA_PWM_OPTIONS	0x35	Set packet traffic arbitration PWM options.
SL_ZIGBEE_EZSP_VALUE_PTA_DIRECTIONAL_PRIORITY_PULSE_WIDTH	0x36	Set packet traffic arbitration directional priority pulse width in microseconds.
SL_ZIGBEE_EZSP_VALUE_PTA_PHY_SELECT_TIMEOUT	0x37	Set packet traffic arbitration phy select timeout(ms).
SL_ZIGBEE_EZSP_VALUE_ANTENNA_RX_MODE	0x38	Configure the RX antenna mode: (0-do not switch; 1-primary; 2-secondary; 3-RX antenna diversity).
SL_ZIGBEE_EZSP_VALUE_NWK_KEY_TIMEOUT	0x39	Configure the timeout to wait for the network key before failing a join. Acceptable timeout range [3,255]. Value is in seconds.
SL_ZIGBEE_EZSP_VALUE_FORCE_TX_AFTER_FAILED_CCA_ATTEMPTS	0x3A	The number of failed CSMA attempts due to failed CCA made by the MAC before continuing transmission with CCA disabled. This is the same as calling the sli_zigbee_stack_force_tx_after_failed_cca(uint8_t csmaAttempts) API. A value of 0 disables the feature.

sl_zigbee_ezsp_value_id_t	Value	Description
SL_ZIGBEE_EZSP_VALUE_TRANSIENT_KEY_TIMEOUT_S	0x3B	The length of time, in seconds, that a trust center will store a transient link key that a device can use to join its network. A transient key is added with a call to sli_zigbee_stack_sec_man_import_transient_key. After the transient key is added, it will be removed once this amount of time has passed. A joining device will not be able to use that key to join until it is added again on the trust center. The default value is 300 seconds (5 minutes).
SL_ZIGBEE_EZSP_VALUE_COULOMB_COUNTER_USAGE	0x3C	Cumulative energy usage metric since the last value reset of the coulomb counter plugin. Setting this value will reset the coulomb counter.
SL_ZIGBEE_EZSP_VALUE_MAX_BEACONS_TO_STORE	0x3D	When scanning, configure the maximum number of beacons to store in cache. Each beacon consumes on average 32-bytes (+ buffer overhead) in RAM.
SL_ZIGBEE_EZSP_VALUE_END_DEVICE_TIMEOUT_OPTIONS_MASK	0x3E	Set the mask to filter out unacceptable child timeout options on a router.
SL_ZIGBEE_EZSP_VALUE_END_DEVICE_KEEP_ALIVE_SUPPORT_MODE	0x3F	The end device keep-alive mode supported by the parent.
SL_ZIGBEE_EZSP_VALUE_ACTIVE_RADIO_CONFIG	0x41	Return the active radio config. Read only. Values are 0: Default, 1: Antenna Diversity, 2: Co-Existence, 3: Antenna Diversity and Co-Existence.
SL_ZIGBEE_EZSP_VALUE_NWK_OPEN_DURATION	0x42	Return the number of seconds the network will remain open. A return value of 0 indicates that the network is closed. Read only.
SL_ZIGBEE_EZSP_VALUE_TRANSIENT_DEVICE_TIMEOUT	0x43	Timeout in milliseconds to store entries in the transient device table. If the devices are not authenticated before the timeout, the entry shall be purged
SL_ZIGBEE_EZSP_VALUE_KEY_STORAGE_VERSION	0x44	Return information about the key storage on an NCP. Returns 0 if keys are in classic key storage, and 1 if they are located in PSA key storage. Read only.
SL_ZIGBEE_EZSP_VALUE_DELAYED_JOIN_ACTIVATION	0x45	Return activation state about TC Delayed Join on an NCP. A return value of 0 indicates that the feature is not activated.
SL_ZIGBEE_EZSP_VALUE_MAX_NWK_RETRIES	0x46	The maximum number of NWK retries that will be attempted.
SL_ZIGBEE_EZSP_VALUE_REJOIN_MODE	0x47	Policies for allowing/disallowing rejoins.

sl_zigbee_ezsp_extended_value_id_t	Value	Description
SL_ZIGBEE_EZSP_EXTENDED_VALUE_ENDPOINT_FLAGS	0x00	The flags field associated with the specified endpoint.
SL_ZIGBEE_EZSP_EXTENDED_VALUE_LAST_LEAVE_REASON	0x01	This is the reason for the node to leave the network as well as the device that told it to leave. The leave reason is the 1st byte of the value while the node ID is the 2nd and 3rd byte. If the leave was caused due to an API call rather than an over the air message, the node ID will be SL_ZIGBEE_UNKNOWN_NODE_ID (0xFFFD).
SL_ZIGBEE_EZSP_EXTENDED_VALUE_GET_SOURCE_ROUTE_OVERHEAD	0x02	This number of bytes of overhead required in the network frame for source routing to a particular destination.

sl_zigbee_ezsp_endpoint_flags_t	Value	Description
SL_ZIGBEE_EZSP_ENDPOINT_DISABLED	0x00	Indicates that the endpoint is disabled and NOT discoverable via ZDO.
SL_ZIGBEE_EZSP_ENDPOINT_ENABLED	0x01	Indicates that the endpoint is enabled and discoverable via ZDO.

EmberConfigTxPowerMode	Value	Description
SL_ZIGBEE_TX_POWER_MODE_DEFAULT	0x00	Normal power mode and bi-directional RF transmitter output.
SL_ZIGBEE_TX_POWER_MODE_BOOST	0x01	Enable boost power mode. This is a high-performance radio mode which offers increased receive sensitivity and transmit power at the cost of an increase in power consumption.
SL_ZIGBEE_TX_POWER_MODE_ALTERNATE	0x02	Enable the alternate transmitter output. This allows for simplified connection to an external power amplifier via the RF_TX_ALT_P and RF_TX_ALT_N pins.
SL_ZIGBEE_TX_POWER_MODE_BOOST_AND_ALTERNATE	0x03	Enable both boost mode and the alternate transmitter output.

sl_zigbee_ezsp_policy_id_t	Value	Description
EZSP_TRUST_CENTER_POLICY	0x00	Controls trust center behavior.
L_ZIGBEE_EZSP_TRUST_CENTER_POLICY	0x00	Controls trust center behavior.
SL_ZIGBEE_EZSP_BINDING_MODIFICATION_POLICY	0x01	Controls how external binding modification requests are handled.
SL_ZIGBEE_EZSP_UNICAST_REPLIES_POLICY	0x02	Controls whether the Host supplies unicast replies.
SL_ZIGBEE_EZSP_POLL_HANDLER_POLICY	0x03	Controls whether pollHandler callbacks are generated.
SL_ZIGBEE_EZSP_MESSAGE_CONTENTS_IN_CALLBACK_POLICY	0x04	Controls whether the message contents are included in the messageSentHandler callback.
SL_ZIGBEE_EZSP_TC_KEY_REQUEST_POLICY	0x05	Controls whether the Trust Center will respond to Trust Center link key requests.
SL_ZIGBEE_EZSP_APP_KEY_REQUEST_POLICY	0x06	Controls whether the Trust Center will respond to application link key requests.

sl_zigbee_ezsp_policy_id_t	Value	Description
SL_ZIGBEE_EZSP_PACKET_VALIDATE_LIBRARY_POLICY	0x07	Controls whether ZigBee packets that appear invalid are automatically dropped by the stack. A counter will be incremented when this occurs.
SL_ZIGBEE_EZSP_ZLL_POLICY	0x08	Controls whether the stack will process ZLL messages.

sl_zigbee_ezsp_decision_bitmask_t	Value	Description
SL_ZIGBEE_EZSP_DECISION_BITMASK_DEFAULT_CONFIGURATION	0x0000	Disallow joins and rejoins.
SL_ZIGBEE_EZSP_DECISION_ALLOW_JOINS	0x0001	Send the network key to all joining devices.
SL_ZIGBEE_EZSP_DECISION_ALLOW_UNSECURED_REJOINS	0x0002	Send the network key to all rejoining devices.
SL_ZIGBEE_EZSP_DECISION_SEND_KEY_IN_CLEAR	0x0004	Send the network key in the clear.
SL_ZIGBEE_EZSP_DECISION_IGNORE_UNSECURED_REJOINS	0x0008	Do nothing for unsecured rejoins.
SL_ZIGBEE_EZSP_DECISION_JOINS_USE_INSTALL_CODE_KEY	0x0010	Allow joins if there is an entry in the transient key table.
SL_ZIGBEE_EZSP_DECISION_DEFER_JOINS	0x0020	Delay sending the network key to a new joining device.

sl_zigbee_ezsp_decision_id_t	Value	Description
SL_ZIGBEE_EZSP_DISALLOW_BINDING_MODIFICATION	0x10	SL_ZIGBEE_EZSP_BINDING_MODIFICATION_POLICY default decision. Do not allow the local binding table to be changed by remote nodes.
SL_ZIGBEE_EZSP_ALLOW_BINDING_MODIFICATION	0x11	SL_ZIGBEE_EZSP_BINDING_MODIFICATION_POLICY decision. Allow remote nodes to change the local binding table.
SL_ZIGBEE_EZSP_CHECK_BINDING_MODIFICATIONS_ARE_VALID_ENDPOINT_CLUSTERS	0x12	SL_ZIGBEE_EZSP_BINDING_MODIFICATION_POLICY decision. Allows remote nodes to set local binding entries only if the entries correspond to endpoints defined on the device, and for output clusters bound to those endpoints.
SL_ZIGBEE_EZSP_HOST_WILL_NOT_SUPPLY_REPLY	0x20	SL_ZIGBEE_EZSP_UNICAST_REPLIES_POLICY default decision. The NCP will automatically send an empty reply (containing no payload) for every unicast received.
SL_ZIGBEE_EZSP_HOST_WILL_SUPPLY_REPLY	0x21	SL_ZIGBEE_EZSP_UNICAST_REPLIES_POLICY decision. The NCP will only send a reply if it receives a sendReply command from the Host.
SL_ZIGBEE_EZSP_POLL_HANDLER_IGNORE	0x30	SL_ZIGBEE_EZSP_POLL_HANDLER_POLICY default decision. Do not inform the Host when a child polls.
SL_ZIGBEE_EZSP_POLL_HANDLER_CALLBACK	0x31	SL_ZIGBEE_EZSP_POLL_HANDLER_POLICY decision. Generate a pollHandler callback when a child polls.
SL_ZIGBEE_EZSP_MESSAGE_TAG_ONLY_IN_CALLBACK	0x40	SL_ZIGBEE_EZSP_MESSAGE_CONTENTS_IN_CALLBACK_POLICY default decision. Include only the message tag in the messageSentHandler callback.
SL_ZIGBEE_EZSP_MESSAGE_TAG_AND_CONTENTS_IN_CALLBACK	0x41	SL_ZIGBEE_EZSP_MESSAGE_CONTENTS_IN_CALLBACK_POLICY decision. Include both the

sl_zigbee_ezsp_decision_id_t	Value	Description
		message tag and the message contents in the messageSentHandler callback.
SL_ZIGBEE_EZSP_DENY_TC_KEY_REQUESTS	0x50	SL_ZIGBEE_EZSP_TC_KEY_REQUEST_POLICY decision. When the Trust Center receives a request for a Trust Center link key, it will be ignored.
SL_ZIGBEE_EZSP_ALLOW_TC_KEY_REQUESTS_AND_SEND_ CURRENT_KEY	0x51	SL_ZIGBEE_EZSP_TC_KEY_REQUEST_POLICY decision. When the Trust Center receives a request for a Trust Center link key, it will reply to it with the corresponding key.
SL_ZIGBEE_EZSP_ALLOW_TC_KEY_REQUEST_AND_GENERA TE_NEW_KEY	0x52	SL_ZIGBEE_EZSP_TC_KEY_REQUEST_POLICY decision. When the Trust Center receives a request for a Trust Center link key, it will generate a key to send to the joiner. After generation, the key will be added to the transient key tabe and After verification, this key will be added into the link key table
SL_ZIGBEE_EZSP_DENY_APP_KEY_REQUESTS	0x60	SL_ZIGBEE_EZSP_APP_KEY_REQUEST_POLIC Y decision. When the Trust Center receives a request for an application link key, it will be ignored.
SL_ZIGBEE_EZSP_ALLOW_APP_KEY_REQUESTS	0x61	SL_ZIGBEE_EZSP_APP_KEY_REQUEST_POLIC Y decision. When the Trust Center receives a request for an application link key, it will randomly generate a key and send it to both partners.
SL_ZIGBEE_EZSP_PACKET_VALIDATE_LIBRARY_CHECKS_EN ABLED	0x62	Indicates that packet validate library checks are enabled on the NCP.
SL_ZIGBEE_EZSP_PACKET_VALIDATE_LIBRARY_CHECKS_DI SABLED	0x63	Indicates that packet validate library checks are NOT enabled on the NCP.

sl_zigbee_ezsp_mfg_token_id_t	Value	Description
SL_ZIGBEE_EZSP_MFG_CUSTOM_VERSION	0x00	Custom version (2 bytes).
SL_ZIGBEE_EZSP_MFG_STRING	0x01	Manufacturing string (16 bytes).
SL_ZIGBEE_EZSP_MFG_BOARD_NAME	0x02	Board name (16 bytes).
SL_ZIGBEE_EZSP_MFG_MANUF_ID	0x03	Manufacturing ID (2 bytes).
SL_ZIGBEE_EZSP_MFG_PHY_CONFIG	0x04	Radio configuration (2 bytes).
SL_ZIGBEE_EZSP_MFG_BOOTLOAD_AES_KEY	0x05	Bootload AES key (16 bytes).
SL_ZIGBEE_EZSP_MFG_ASH_CONFIG	0x06	ASH configuration (40 bytes).
SL_ZIGBEE_EZSP_MFG_SL_ZIGBEE_EZSP_STORAGE	0x07	EZSP storage (8 bytes).
SL_ZIGBEE_EZSP_STACK_CAL_DATA	0x08	Radio calibration data (64 bytes). 4 bytes are stored for each of the 16 channels. This token is not stored in the Flash Information Area. It is updated by the stack each time a calibration is performed.
SL_ZIGBEE_EZSP_MFG_CBKE_DATA	0x09	Certificate Based Key Exchange (CBKE) data (92 bytes).
SL_ZIGBEE_EZSP_MFG_INSTALLATION_CODE	0x0A	Installation code (20 bytes).
SL_ZIGBEE_EZSP_STACK_CAL_FILTER	0x0B	Radio channel filter calibration data (1 byte). This token is not stored in the Flash Information Area. It is updated by the stack each time a calibration is performed.
SL_ZIGBEE_EZSP_MFG_CUSTOM_EUI_64	0x0C	Custom EUI64 MAC address (8 bytes).
SL_ZIGBEE_EZSP_MFG_CTUNE	0x0D	CTUNE value (2 byte).

sl_zigbee_ezsp_status_t	Value	Description
SL_ZIGBEE_EZSP_SUCCESS	0x00	Success.
SL_ZIGBEE_EZSP_SPI_ERR_FATAL	0x10	Fatal error.
SL_ZIGBEE_EZSP_SPI_ERR_NCP_RESET	0x11	The Response frame of the current transaction indicates the NCP has reset.
SL_ZIGBEE_EZSP_SPI_ERR_OVERSIZED_SL_ZIGBEE_EZSP_FRAME	0x12	The NCP is reporting that the Command frame of the current transaction is oversized (the length byte is too large).
SL_ZIGBEE_EZSP_SPI_ERR_ABORTED_TRANSACTION	0x13	The Response frame of the current transaction indicates the previous transaction was aborted (nSSEL deasserted too soon).
SL_ZIGBEE_EZSP_SPI_ERR_MISSING_FRAME_TERMINATOR	0x14	The Response frame of the current transaction indicates the frame terminator is missing from the Command frame.
SL_ZIGBEE_EZSP_SPI_ERR_WAIT_SECTION_TIMEOUT	0x15	The NCP has not provided a Response within the time limit defined by WAIT_SECTION_TIMEOUT.
SL_ZIGBEE_EZSP_SPI_ERR_NO_FRAME_TERMINATOR	0x16	The Response frame from the NCP is missing the frame terminator.
SL_ZIGBEE_EZSP_SPI_ERR_SL_ZIGBEE_EZSP_COMMAND_OVERSIZED	0x17	The Host attempted to send an oversized Command (the length byte is too large) and the AVR's spi-protocol.c blocked the transmission.
SL_ZIGBEE_EZSP_SPI_ERR_SL_ZIGBEE_EZSP_RESPONSE_OVERSIZED	0x18	The NCP attempted to send an oversized Response (the length byte is too large) and the AVR's spi-protocol.c blocked the reception.
SL_ZIGBEE_EZSP_SPI_WAITING_FOR_RESPONSE	0x19	The Host has sent the Command and is still waiting for the NCP to send a Response.
SL_ZIGBEE_EZSP_SPI_ERR_HANDSHAKE_TIMEOUT	0x1A	The NCP has not asserted nHOST_INT within the time limit defined by WAKE_HANDSHAKE_TIMEOUT.
SL_ZIGBEE_EZSP_SPI_ERR_STARTUP_TIMEOUT	0x1B	The NCP has not asserted nHOST_INT after an NCP reset within the time limit defined by STARTUP_TIMEOUT.
SL_ZIGBEE_EZSP_SPI_ERR_STARTUP_FAIL	0x1C	The Host attempted to verify the SPI Protocol activity and version number, and the verification failed.
SL_ZIGBEE_EZSP_SPI_ERR_UNSUPPORTED_SPI_COMMAND	0x1D	The Host has sent a command with a SPI Byte that is unsupported by the current mode the NCP is operating in.
SL_ZIGBEE_EZSP_ASH_IN_PROGRESS	0x20	Operation not yet complete.
SL_ZIGBEE_EZSP_HOST_FATAL_ERROR	0x21	Fatal error detected by host.

sl_zigbee_ezsp_status_t	Value	Description
SL_ZIGBEE_EZSP_ASH_NCP_FATAL_ERROR	0x22	Fatal error detected by NCP.
SL_ZIGBEE_EZSP_DATA_FRAME_TOO_LONG	0x23	Tried to send DATA frame too long.
SL_ZIGBEE_EZSP_DATA_FRAME_TOO_SHORT	0x24	Tried to send DATA frame too short.
SL_ZIGBEE_EZSP_NO_TX_SPACE	0x25	No space for tx'ed DATA frame.
SL_ZIGBEE_EZSP_NO_RX_SPACE	0x26	No space for rec'd DATA frame.
SL_ZIGBEE_EZSP_NO_RX_DATA	0x27	No receive data available.
SL_ZIGBEE_EZSP_NOT_CONNECTED	0x28	Not in Connected state.
SL_ZIGBEE_EZSP_ERROR_VERSION_NOT_SET	0x30	The NCP received a command before the EZSP version had been set.
SL_ZIGBEE_EZSP_ERROR_INVALID_FRAME_ID	0x31	The NCP received a command containing an unsupported frame ID.
SL_ZIGBEE_EZSP_ERROR_WRONG_DIRECTION	0x32	The direction flag in the frame control field was incorrect.
SL_ZIGBEE_EZSP_ERROR_TRUNCATED	0x33	The truncated flag in the frame control field was set, indicating there was not enough memory available to complete the response or that the response would have exceeded the maximum EZSP frame length.
SL_ZIGBEE_EZSP_ERROR_OVERFLOW	0x34	The overflow flag in the frame control field was set, indicating one or more callbacks occurred since the previous response and there was not enough memory available to report them to the Host.
SL_ZIGBEE_EZSP_ERROR_OUT_OF_MEMORY	0x35	Insufficient memory was available.
SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE	0x36	The value was out of bounds.
SL_ZIGBEE_EZSP_ERROR_INVALID_ID	0x37	The configuration id was not recognized.
SL_ZIGBEE_EZSP_ERROR_INVALID_CALL	0x38	Configuration values can no longer be modified.
SL_ZIGBEE_EZSP_ERROR_NO_RESPONSE	0x39	The NCP failed to respond to a command.
SL_ZIGBEE_EZSP_ERROR_COMMAND_TOO_LONG	0x40	The length of the command exceeded the maximum EZSP frame length.
SL_ZIGBEE_EZSP_ERROR_QUEUE_FULL	0x41	The UART receive queue was full causing a callback response to be dropped.
SL_ZIGBEE_EZSP_ERROR_COMMAND_FILTERED	0x42	The command has been filtered out by NCP.
SL_ZIGBEE_EZSP_ERROR_SECURITY_KEY_ALREADY_SET	0x43	EZSP Security Key is already set
SL_ZIGBEE_EZSP_ERROR_SECURITY_TYPE_INVALID	0x44	EZSP Security Type is invalid

sl_zigbee_ezsp_status_t	Value	Description
SL_ZIGBEE_EZSP_ERROR_SECURITY_PARAMETERS_INVALID	0x45	EZSP Security Parameters are invalid
SL_ZIGBEE_EZSP_ERROR_SECURITY_PARAMETERS_ALREADY_SET	0x46	EZSP Security Parameters are already set
SL_ZIGBEE_EZSP_ERROR_SECURITY_KEY_NOT_SET	0x47	EZSP Security Key is not set
SL_ZIGBEE_EZSP_ERROR_SECURITY_PARAMETERS_NOT_SET	0x48	EZSP Security Parameters are not set
SL_ZIGBEE_EZSP_ERROR_UNSUPPORTED_CONTROL	0x49	Received frame with unsupported control byte
SL_ZIGBEE_EZSP_ERROR_UNSECURE_FRAME	0x4A	Received frame is unsecure, when security is established
SL_ZIGBEE_EZSP_ASH_ERROR_VERSION	0x50	Incompatible ASH version
SL_ZIGBEE_EZSP_ASH_ERROR_TIMEOUTS	0x51	Exceeded max ACK timeouts
SL_ZIGBEE_EZSP_ASH_ERROR_RESET_FAIL	0x52	Timed out waiting for RSTACK
SL_ZIGBEE_EZSP_ASH_ERROR_NCP_RESET	0x53	Unexpected ncp reset
SL_ZIGBEE_EZSP_ERROR_SERIAL_INIT	0x54	Serial port initialization failed
SL_ZIGBEE_EZSP_ASH_ERROR_NCP_TYPE	0x55	Invalid ncp processor type
SL_ZIGBEE_EZSP_ASH_ERROR_RESET_METHOD	0x56	Invalid ncp reset method
SL_ZIGBEE_EZSP_ASH_ERROR_XON_XOFF	0x57	XON/XOFF not supported by host driver
SL_ZIGBEE_EZSP_ASH_STARTED	0x70	ASH protocol started
SL_ZIGBEE_EZSP_ASH_CONNECTED	0x71	ASH protocol connected
SL_ZIGBEE_EZSP_ASH_DISCONNECTED	0x72	ASH protocol disconnected
SL_ZIGBEE_EZSP_ASH_ACK_TIMEOUT	0x73	Timer expired waiting for ack
SL_ZIGBEE_EZSP_ASH_CANCELLED	0x74	Frame in progress cancelled
SL_ZIGBEE_EZSP_ASH_OUT_OF_SEQUENCE	0x75	Received frame out of sequence
SL_ZIGBEE_EZSP_ASH_BAD_CRC	0x76	Received frame with CRC error
SL_ZIGBEE_EZSP_ASH_COMM_ERROR	0x77	Received frame with comm error
SL_ZIGBEE_EZSP_ASH_BAD_ACKNUM	0x78	Received frame with bad ackNum
SL_ZIGBEE_EZSP_ASH_TOO_SHORT	0x79	Received frame shorter than minimum
SL_ZIGBEE_EZSP_ASH_TOO_LONG	0x7A	Received frame longer than maximum
SL_ZIGBEE_EZSP_ASH_BAD_CONTROL	0x7B	Received frame with illegal control byte
SL_ZIGBEE_EZSP_ASH_BAD_LENGTH	0x7C	Received frame with illegal length for its type
SL_ZIGBEE_EZSP_ASH_ACK_RECEIVED	0x7D	Received ASH Ack
SL_ZIGBEE_EZSP_ASH_ACK_SENT	0x7E	Sent ASH Ack
SL_ZIGBEE_EZSP_ASH_NAK_RECEIVED	0x7F	Received ASH Nak
SL_ZIGBEE_EZSP_ASH_NAK_SENT	0x80	Sent ASH Nak
SL_ZIGBEE_EZSP_ASH_RST_RECEIVED	0x81	Received ASH RST
SL_ZIGBEE_EZSP_ASH_RST_SENT	0x82	Sent ASH RST
SL_ZIGBEE_EZSP_ASH_STATUS	0x83	ASH Status

sl_zigbee_ezsp_status_t	Value	Description
SL_ZIGBEE_EZSP_ASH_TX	0x84	ASH TX
SL_ZIGBEE_EZSP_ASH_RX	0x85	ASH RX
SL_ZIGBEE_EZSP_CPC_ERROR_INIT	0x86	Failed to connect to CPC daemon or failed to open CPC endpoint
SL_ZIGBEE_EZSP_NO_ERROR	0xFF	No reset or error

sl_zigbee_event_units_t	Value	Description
SL_ZIGBEE_EVENT_INACTIVE	0x00	The event is not scheduled to run.
SL_ZIGBEE_EVENT_MS_TIME	0x01	The execution time is in approximate milliseconds.
SL_ZIGBEE_EVENT_QS_TIME	0x02	The execution time is in 'binary' quarter seconds (256 approximate milliseconds each).
SL_ZIGBEE_EVENT_MINUTE_TIME	0x03	The execution time is in 'binary' minutes (65536 approximate milliseconds each).

sl_zigbee_node_type_t	Value	Description
SL_ZIGBEE_UNKNOWN_DEVICE	0x00	Device is not joined.
SL_ZIGBEE_DEVICE_TYPE_UNCHANGED	0x00	Device type has not changed since last join.
SL_ZIGBEE_COORDINATOR	0x01	Will relay messages and can act as a parent to other nodes.
SL_ZIGBEE_ROUTER	0x02	Will relay messages and can act as a parent to other nodes.
SL_ZIGBEE_END_DEVICE	0x03	Communicates only with its parent and will not relay messages.

sl_zigbee_network_status_t	Value	Description
SL_ZIGBEE_NO_NETWORK	0x00	The node is not associated with a network in any way.
SL_ZIGBEE_JOINING_NETWORK	0x01	The node is currently attempting to join a network.
SL_ZIGBEE_JOINED_NETWORK	0x02	The node is joined to a network.
SL_ZIGBEE_JOINED_NETWORK_NO_PARENT	0x03	The node is an end device joined to a network but its parent is not responding.
SL_ZIGBEE_LEAVING_NETWORK	0x04	The node is in the process of leaving its current network.

sl_zigbee_incoming_message_type_t	Value	Description
SL_ZIGBEE_INCOMING_UNICAST	0x00	Unicast.
SL_ZIGBEE_INCOMING_UNICAST_REPLY	0x01	Unicast reply.
SL_ZIGBEE_INCOMING_MULTICAST	0x02	Multicast.
SL_ZIGBEE_INCOMING_MULTICAST_LOOPBACK	0x03	Multicast sent by the local device.
SL_ZIGBEE_INCOMING_BROADCAST	0x04	Broadcast.
SL_ZIGBEE_INCOMING_BROADCAST_LOOPBACK	0x05	Broadcast sent by the local device.
EMBER_INCOMING_MANY_TO_ONE_ROUTE_REQUEST	0x06	Many to one route request.

sl_zigbee_outgoing_message_type_t	Value	Description
SL_ZIGBEE_OUTGOING_DIRECT	0x00	Unicast sent directly to an sl_802154_short_addr_t.
SL_ZIGBEE_OUTGOING_VIA_ADDRESS_TABLE	0x01	Unicast sent using an entry in the address table.
SL_ZIGBEE_OUTGOING_VIA_BINDING	0x02	Unicast sent using an entry in the binding table.

sl_zigbee_outgoing_message_type_t	Value	Description
SL_ZIGBEE_OUTGOING_MULTICAST	0x03	Multicast message. This value is passed to sli_zigbee_stack_message_sent_handler() only. It may not be passed to sli_zigbee_stack_send_unicast().
SL_ZIGBEE_OUTGOING_BROADCAST	0x04	Broadcast message. This value is passed to sli_zigbee_stack_message_sent_handler() only. It may not be passed to sli_zigbee_stack_send_unicast().

sl_zigbee_mac_passthrough_type_t	Value	Description
SL_802154_PASSTHROUGH_NONE	0x00	No MAC passthrough messages.
SL_802154_PASSTHROUGH_SE_INTERPAN	0x01	SE InterPAN messages.
SL_802154_PASSTHROUGH_EMBERNET	0x02	Legacy EmberNet messages.
SL_802154_PASSTHROUGH_EMBERNET_SOURCE	0x04	Legacy EmberNet messages filtered by their source address.

sl_zigbee_binding_type_t	Value	Description
SL_ZIGBEE_UNUSED_BINDING	0x00	A binding that is currently not in use.
SL_ZIGBEE_UNICAST_BINDING	0x01	A unicast binding whose 64-bit identifier is the destination EUI64.
SL_ZIGBEE_MANY_TO_ONE_BINDING	0x02	A unicast binding whose 64-bit identifier is the aggregator EUI64.
SL_ZIGBEE_MULTICAST_BINDING	0x03	A multicast binding whose 64-bit identifier is the group address. A multicast binding can be used to send messages to the group and to receive messages sent to the group.

sl_zigbee_aps_option_t	Value	Description
EMBER_APS_OPTION_NONE	0x0000	No options.
EMBER_APS_OPTION_ENCRYPTION	0x0020	Send the message using APS Encryption, using the Link Key shared with the destination node to encrypt the data at the APS Level.
EMBER_APS_OPTION_RETRY	0x0040	Resend the message using the APS retry mechanism.
SL_ZIGBEE_APS_OPTION_NONE	0x0000	No options.
SL_ZIGBEE_APS_OPTION_ENCRYPTION	0x0020	Send the message using APS Encryption, using the Link Key shared with the destination node to encrypt the data at the APS Level.
SL_ZIGBEE_APS_OPTION_RETRY	0x0040	Resend the message using the APS retry mechanism.
SL_ZIGBEE_APS_OPTION_ENABLE_ROUTE_DISCOVERY	0x0100	Causes a route discovery to be initiated if no route to the destination is known.
SL_ZIGBEE_APS_OPTION_FORCE_ROUTE_DISCOVERY	0x0200	Causes a route discovery to be initiated even if one is known.
SL_ZIGBEE_APS_OPTION_SOURCE_EUI64	0x0400	Include the source EUI64 in the network frame.
SL_ZIGBEE_APS_OPTION_DESTINATION_EUI64	0x0800	Include the destination EUI64 in the network frame.
SL_ZIGBEE_APS_OPTION_ENABLE_ADDRESS_DISCOVERY	0x1000	Send a ZDO request to discover the node ID of the destination, if it is not already know.

sl_zigbee_ezsp_network_scan_type_t	Value	Description
SL_ZIGBEE_EZSP_ENERGY_SCAN	0x00	An energy scan scans each channel for its RSSI value.
SL_ZIGBEE_EZSP_ACTIVE_SCAN	0x01	An active scan scans each channel for available networks.

sl_zigbee_join_decision_t	Value	Description
SL_ZIGBEE_USE_PRECONFIGURED_KEY	0x00	Allow the node to join. The joining node should have a pre-configured key. The security data sent to it will be encrypted with that key.
SL_ZIGBEE_SEND_KEY_IN_THE_CLEAR	0x01	Allow the node to join. Send the network key in-the-clear to the joining device.
SL_ZIGBEE_DENY_JOIN	0x02	Deny join.
SL_ZIGBEE_NO_ACTION	0x03	Take no action.

sl_zigbee_leave_network_option_t	Value	Description
SL_ZIGBEE_LEAVE_NWK_WITH_NO_OPTION	0x00	Leave with no option.
SL_ZIGBEE_LEAVE_NWK_WITH_OPTION_REJOIN	0x20	Leave with option rejoin.
SL_ZIGBEE_LEAVE_NWK_IS_REQUESTED	0x40	Leave is requested.

sl_zigbee_initial_security_bitmask_t	Value	Description
SL_ZIGBEE_STANDARD_SECURITY_MODE	0x0000	This enables ZigBee Standard Security on the node.
SL_ZIGBEE_DISTRIBUTED_TRUST_CENTER_MODE	0x0002	This enables Distributed Trust Center Mode for the device forming the network. (Previously known as SL_ZIGBEE_NO_TRUST_CENTER_MODE)
SL_ZIGBEE_TRUST_CENTER_GLOBAL_LINK_KEY	0x0004	This enables a Global Link Key for the Trust Center. All nodes will share the same Trust Center Link Key.
SL_ZIGBEE_PRECONFIGURED_NETWORK_KEY_MODE	0x0008	This enables devices that perform MAC Association with a pre-configured Network Key to join the network. It is only set on the Trust Center.
SL_ZIGBEE_TRUST_CENTER_USES_HASHED_LINK_KEY	0x0084	This denotes that the preconfiguredKey is not the actual Link Key but a Secret Key known only to the Trust Center. It is hashed with the IEEE Address of the destination device in order to create the actual Link Key used in encryption. This is bit is only used by the Trust Center. The joining device need not set this.
SL_ZIGBEE_HAVE_PRECONFIGURED_KEY	0x0100	This denotes that the preconfiguredKey element has valid data that should be used to configure the initial security state.
SL_ZIGBEE_HAVE_NETWORK_KEY	0x0200	This denotes that the networkKey element has valid data that should be used to configure the initial security state.
SL_ZIGBEE_GET_LINK_KEY_WHEN_JOINING	0x0400	This denotes to a joining node that it should attempt to acquire a Trust Center Link Key during joining. This is only necessary if the device does not have a pre-configured key.
SL_ZIGBEE_REQUIRE_ENCRYPTED_KEY	0x0800	This denotes that a joining device should only accept an encrypted network key from the Trust Center (using its pre-configured key). A key sent in-the-clear by the Trust Center will be rejected and the join will fail. This option is only valid when utilizing a pre-configured key.

sl_zigbee_initial_security_bitmask_t	Value	Description
SL_ZIGBEE_NO_FRAME_COUNTER_RESET	0x1000	This denotes whether the device should NOT reset its outgoing frame counters (both NWK and APS) when ::sli_zigbee_stack_set_initial_security_state() is called. Normally it is advised to reset the frame counter before joining a new network. However in cases where a device is joining to the same network a again (but not using ::emberRejoinNetwork()) it should keep the NWK and APS frame counters stored in its tokens.
SL_ZIGBEE_GET_PRECONFIGURED_KEY_FROM_INSTALL_CODE	0x2000	This denotes that the device should obtain its preconfigured key from an installation code stored in the manufacturing token. The token contains a value that will be hashed to obtain the actual preconfigured key. If that token is not valid, then the call to sli_zigbee_stack_set_initial_security_state() will fail.
SL_ZIGBEE_HAVE_TRUST_CENTER_EUI64	0x0040	This denotes that the ::sl_zigbee_initial_security_state_t::preconfiguredTrustCenterEui64 has a value in it containing the trust center EUI64. The device will only join a network and accept commands from a trust center with that EUI64. Normally this bit is NOT set, and the EUI64 of the trust center is learned during the join process. When commissioning a device to join onto an existing network, which is using a trust center, and without sending any messages, this bit must be set and the field ::sl_zigbee_initial_security_state_t::preconfiguredTrustCenterEui64 must be populated with the appropriate EUI64.

sl_zigbee_current_security_bitmask_t	Value	Description
SL_ZIGBEE_STANDARD_SECURITY_MODE	0x0000	This denotes that the device is running in a network with ZigBee Standard Security.
SL_ZIGBEE_DISTRIBUTED_TRUST_CENTER_MODE	0x0002	This denotes that the device is running in a network without a centralized Trust Center.
SL_ZIGBEE_TRUST_CENTER_GLOBAL_LINK_KEY	0x0004	This denotes that the device has a Global Link Key. The Trust Center Link Key is the same across multiple nodes.
SL_ZIGBEE_HAVE_TRUST_CENTER_LINK_KEY	0x0010	This denotes that the node has a Trust Center Link Key.
SL_ZIGBEE_TRUST_CENTER_USES_HASHED_LINK_KEY	0x0084	This denotes that the Trust Center is using a Hashed Link Key.

sl_zigbee_key_type_t	Value	Description
SL_ZIGBEE_TRUST_CENTER_LINK_KEY	0x01	A shared key between the Trust Center and a device.
SL_ZIGBEE_CURRENT_NETWORK_KEY	0x03	The current active Network Key used by all devices in the network.
SL_ZIGBEE_NEXT_NETWORK_KEY	0x04	The alternate Network Key that was previously in use, or the newer key that will be switched to.
SL_ZIGBEE_APPLICATION_LINK_KEY	0x05	An Application Link Key shared with another (non-Trust Center) device.

sl_zigbee_key_struct_bitmask_t	Value	Description
SL_ZIGBEE_KEY_HAS_SEQUENCE_NUMBER	0x0001	The key has a sequence number associated with it.

sl_zigbee_key_struct_bitmask_t	Value	Description
SL_ZIGBEE_KEY_HAS_OUTGOING_FRAME_COUNTER	0x0002	The key has an outgoing frame counter associated with it.
SL_ZIGBEE_KEY_HAS_INCOMING_FRAME_COUNTER	0x0004	The key has an incoming frame counter associated with it.
SL_ZIGBEE_KEY_HAS_PARTNER_EUI64	0x0008	The key has a Partner IEEE address associated with it.

sl_zigbee_device_update_t	Value
SL_ZIGBEE_STANDARD_SECURITY_SECURED_REJOIN	0x0
SL_ZIGBEE_STANDARD_SECURITY_UNSECURED_JOIN	0x1
SL_ZIGBEE_DEVICE_LEFT	0x2
SL_ZIGBEE_STANDARD_SECURITY_UNSECURED_REJOIN	0x3

sl_zigbee_key_status_t	Value
SL_ZIGBEE_APP_LINK_KEY_ESTABLISHED	0x01
SL_ZIGBEE_TRUST_CENTER_LINK_KEY_ESTABLISHED	0x03
SL_ZIGBEE_KEY_ESTABLISHMENT_TIMEOUT	0x04
SL_ZIGBEE_KEY_TABLE_FULL	0x05
SL_ZIGBEE_TC_RESPONDED_TO_KEY_REQUEST	0x06
SL_ZIGBEE_TC_APP_KEY_SENT_TO_REQUESTER	0x07
SL_ZIGBEE_TC_RESPONSE_TO_KEY_REQUEST_FAILED	0x08
SL_ZIGBEE_TC_REQUEST_KEY_TYPE_NOT_SUPPORTED	0x09
SL_ZIGBEE_TC_NO_LINK_KEY_FOR_REQUESTER	0x0A
SL_ZIGBEE_TC_REQUESTER_EUI64_UNKNOWN	0x0B
SL_ZIGBEE_TC_RECEIVED_FIRST_APP_KEY_REQUEST	0x0C
SL_ZIGBEE_TC_TIMEOUT_WAITING_FOR_SECOND_APP_KEY_REQUEST	0x0D
SL_ZIGBEE_TC_NON_MATCHING_APP_KEY_REQUEST_RECEIVED	0x0E
SL_ZIGBEE_TC_FAILED_TO_SEND_APP_KEYS	0x0F
SL_ZIGBEE_TC_FAILED_TO_STORE_APP_KEY_REQUEST	0x10
SL_ZIGBEE_TC_REJECTED_APP_KEY_REQUEST	0x11

sl_zigbee_counter_type_t	Value	Description
SL_ZIGBEE_COUNTER_MAC_RX_BROADCAST	0	The MAC received a broadcast.
SL_ZIGBEE_COUNTER_MAC_TX_BROADCAST	1	The MAC transmitted a broadcast.
SL_ZIGBEE_COUNTER_MAC_RX_UNICAST	2	The MAC received a unicast.
SL_ZIGBEE_COUNTER_MAC_TX_UNICAST_SUCCESS	3	The MAC successfully transmitted a unicast.
SL_ZIGBEE_COUNTER_MAC_TX_UNICAST_RETRY	4	The MAC retried a unicast.
SL_ZIGBEE_COUNTER_MAC_TX_UNICAST_FAILED	5	The MAC unsuccessfully transmitted a unicast.
SL_ZIGBEE_COUNTER_APS_DATA_RX_BROADCAST	6	The APS layer received a data broadcast.
SL_ZIGBEE_COUNTER_APS_DATA_TX_BROADCAST	7	The APS layer transmitted a data broadcast.
SL_ZIGBEE_COUNTER_APS_DATA_RX_UNICAST	8	The APS layer received a data unicast.
SL_ZIGBEE_COUNTER_APS_DATA_TX_UNICAST_SUCCESS	9	The APS layer successfully transmitted a data unicast.
SL_ZIGBEE_COUNTER_APS_DATA_TX_UNICAST_RETRY	10	The APS layer retried a data unicast.

sl_zigbee_counter_type_t	Value	Description
SL_ZIGBEE_COUNTER_APS_DATA_TX_UNICAST_FAILED	11	The APS layer unsuccessfully transmitted a data unicast.
SL_ZIGBEE_COUNTER_ROUTE_DISCOVERY_INITIATED	12	The network layer successfully submitted a new route discovery to the MAC.
SL_ZIGBEE_COUNTER_NEIGHBOR_ADDED	13	An entry was added to the neighbor table.
SL_ZIGBEE_COUNTER_NEIGHBOR_REMOVED	14	An entry was removed from the neighbor table.
SL_ZIGBEE_COUNTER_NEIGHBOR_STALE	15	A neighbor table entry became stale because it had not been heard from.
SL_ZIGBEE_COUNTER_JOIN_INDICATION	16	A node joined or rejoined to the network via this node.
SL_ZIGBEE_COUNTER_CHILD_REMOVED	17	An entry was removed from the child table.
SL_ZIGBEE_COUNTER_ASH_OVERFLOW_ERROR	18	EZSP-UART only. An overflow error occurred in the UART.
SL_ZIGBEE_COUNTER_ASH_FRAMING_ERROR	19	EZSP-UART only. A framing error occurred in the UART.
SL_ZIGBEE_COUNTER_ASH_OVERRUN_ERROR	20	EZSP-UART only. An overrun error occurred in the UART.
SL_ZIGBEE_COUNTER_NWK_FRAME_COUNTER_FAILURE	21	A message was dropped at the network layer because the NWK frame counter was not higher than the last message seen from that source.
SL_ZIGBEE_COUNTER_APS_FRAME_COUNTER_FAILURE	22	A message was dropped at the APS layer because the APS frame counter was not higher than the last message seen from that source.
EMBER_COUNTER_UTILITY	23	Utility counter for general debugging use.
SL_ZIGBEE_COUNTER_APS_LINK_KEY_NOT_AUTHORIZED	24	A message was dropped at the APS layer because it had APS encryption but the key associated with the sender has not been authenticated, and thus the key is not authorized for use in APS data messages.
SL_ZIGBEE_COUNTER_NWK_DECRYPTION_FAILURE	25	An NWK encrypted message was received but dropped because decryption failed.
SL_ZIGBEE_COUNTER_APS_DECRYPTION_FAILURE	26	An APS encrypted message was received but dropped because decryption failed.
SL_ZIGBEE_COUNTER_ALLOCATE_PACKET_BUFFER_FAILURE	27	The number of times we failed to allocate a set of linked packet buffers. This doesn't necessarily mean that the packet buffer count was 0 at the time, but that the number requested was greater than the number free.
SL_ZIGBEE_COUNTER_RELAYED_UNICAST	28	The number of relayed unicast packets.
SL_ZIGBEE_COUNTER_PHY_TO_MAC_QUEUE_LIMIT_REACHED	29	The number of times we dropped a packet due to reaching the preset PHY to MAC queue limit (sli_802154mac_max_phy_to_mac_queue_length).
SL_ZIGBEE_COUNTER_PACKET_VALIDATE_LIBRARY_DROPPED_COUNT	30	The number of times we dropped a packet due to the packet-validate library checking a packet and rejecting it due to length or other formatting problems.
SL_ZIGBEE_COUNTER_TYPE_NWK_RETRY_OVERFLOW	31	The number of times the NWK retry queue is full and a new message failed to be added.
SL_ZIGBEE_COUNTER_PHY_CCA_FAIL_COUNT	32	The number of times the PHY layer was unable to transmit due to a failed CCA.
SL_ZIGBEE_COUNTER_BROADCAST_TABLE_FULL	33	The number of times an NWK broadcast was dropped because the broadcast table was full.
SL_ZIGBEE_COUNTER_PTA_LO_PRI_REQUESTED	34	The number of low priority packet traffic arbitration requests.

sl_zigbee_counter_type_t	Value	Description
SL_ZIGBEE_COUNTER_PTA_HI_PRI_REQUESTED	35	The number of high priority packet traffic arbitration requests.
SL_ZIGBEE_COUNTER_PTA_LO_PRI_DENIED	36	The number of low priority packet traffic arbitration requests denied.
SL_ZIGBEE_COUNTER_PTA_HI_PRI_DENIED	37	The number of high priority packet traffic arbitration requests denied.
SL_ZIGBEE_COUNTER_PTA_LO_PRI_TX_ABORTED	38	The number of aborted low-priority packet traffic arbitration transmissions.
SL_ZIGBEE_COUNTER_PTA_HI_PRI_TX_ABORTED	39	The number of aborted high-priority packet traffic arbitration transmissions.
SL_ZIGBEE_COUNTER_TYPE_COUNT	40	A placeholder giving the number of Ember counter types.

sl_zigbee_join_method_t	Value	Description
SL_ZIGBEE_USE_MAC_ASSOCIATION	0x0	Normally devices use MAC Association to join a network, which respects the "permit joining" flag in the MAC Beacon. This value should be used by default.
SL_ZIGBEE_USE_NWK_REJOIN	0x1	For those networks where the "permit joining" flag is never turned on, they will need to use a ZigBee NWK Rejoin. This value causes the rejoin to be sent without NWK security and the Trust Center will be asked to send the NWK key to the device. The NWK key sent to the device can be encrypted with the device's corresponding Trust Center link key. That is determined by the ::sl_zigbee_join_decision_t on the Trust Center returned by the ::sl_zigbee_internal_trust_center_join_handler().
SL_ZIGBEE_USE_NWK_REJOIN_HAVE_NWK_KEY	0x2	For those networks where the "permit joining" flag is never turned on, they will need to use an NWK Rejoin. If those devices have been preconfigured with the NWK key (including sequence number) they can use a secured rejoin. This is only necessary for end devices since they need a parent. Routers can simply use the ::SL_ZIGBEE_USE_CONFIGURED_NWK_STATE join method below.
SL_ZIGBEE_USE_CONFIGURED_NWK_STATE	0x3	For those networks where all network and security information is known ahead of time, a router device may be commissioned such that it does not need to send any messages to begin communicating on the network.

sl_zigbee_zdo_configuration_flags_t	Value	Description
SL_ZIGBEE_APP_RECEIVES_SUPPORTED_ZDO_REQUESTS	0x01	Set this flag in order to receive supported ZDO request messages via the incomingMessageHandler callback. A supported ZDO request is one that is handled by the EmberZNet stack. The stack will continue to handle the request and send the appropriate ZDO response even if this configuration option is enabled.
SL_ZIGBEE_APP_HANDLES_UNSUPPORTED_ZDO_REQUESTS	0x02	Set this flag in order to receive unsupported ZDO request messages via the incomingMessageHandler callback. An unsupported ZDO request is one that is not handled by the EmberZNet stack, other than to send a 'not supported' ZDO response. If this configuration option is enabled, the stack will no longer send any ZDO response, and it is the application's responsibility to do so.

sl_zigbee_zdo_configuration_flags_t	Value	Description
SL_ZIGBEE_APP_HANDLES_ZDO_ENDPOINT_REQUESTS	0x04	Set this flag in order to receive the following ZDO request messages via the incomingMessageHandler callback: SIMPLE_DESCRIPTOR_REQUEST, MATCH_DESCRIPTORS_REQUEST, and ACTIVE_ENDPOINTS_REQUEST. If this configuration option is enabled, the stack will no longer send any ZDO response for these requests, and it is the application's responsibility to do so.
SL_ZIGBEE_APP_HANDLES_ZDO_BINDING_REQUESTS	0x08	Set this flag in order to receive the following ZDO request messages via the incomingMessageHandler callback: BINDING_TABLE_REQUEST, BIND_REQUEST, and UNBIND_REQUEST. If this configuration option is enabled, the stack will no longer send any ZDO response for these requests, and it is the application's responsibility to do so.

EmberConcentratorType	Value	Description
SL_ZIGBEE_LOW_RAM_CONCENTRATOR	0xFFF8	A concentrator with insufficient memory to store source routes for the entire network. Route records are sent to the concentrator prior to every inbound APS unicast.
SL_ZIGBEE_HIGH_RAM_CONCENTRATOR	0xFFF9	A concentrator with sufficient memory to store source routes for the entire network. Remote nodes stop sending route records once the concentrator has successfully received one.

sl_zigbee_zll_state_t	Value	Description
SL_ZIGBEE_ZLL_STATE_NONE	0x0000	No state.
SL_ZIGBEE_ZLL_STATE_FACTORY_NEW	0x0001	The device is factory new.
SL_ZIGBEE_ZLL_STATE_ADDRESS_ASSIGNMENT_CAPABLE	0x0002	The device is capable of assigning addresses to other devices.
SL_ZIGBEE_ZLL_STATE_LINK_INITIATOR	0x0010	The device is initiating a link operation.
SL_ZIGBEE_ZLL_STATE_LINK_PRIORITY_REQUEST	0x0020	The device is requesting link priority.
SL_ZIGBEE_ZLL_STATE_NON_ZLL_NETWORK	0x0100	The device is on a non-ZLL network.

sl_zigbee_zll_key_index_t	Value	Description
SL_ZIGBEE_ZLL_KEY_INDEX_DEVELOPMENT	0x00	Key encryption algorithm for use during development.
SL_ZIGBEE_ZLL_KEY_INDEX_MASTER	0x04	Key encryption algorithm shared by all certified devices.
SL_ZIGBEE_ZLL_KEY_INDEX_CERTIFICATION	0x0F	Key encryption algorithm for use during development and certification.

sl_zigbee_ezsp_zll_network_operation_t	Value	Description
SL_ZIGBEE_EZSP_ZLL_FORM_NETWORK	0x00	ZLL form network command.
SL_ZIGBEE_EZSP_ZLL_JOIN_TARGET	0x01	ZLL join target command.

sl_zigbee_network_init_bitmask_t	Value	Description
SL_ZIGBEE_NETWORK_INIT_NO_OPTIONS	0x0000	No options for Network Init
SL_ZIGBEE_NETWORK_INIT_PARENT_INFO_IN_TOKEN	0x0001	Save parent info (node ID and EUI64) in a token during joining/rejoin, and restore on reboot.
SL_ZIGBEE_NETWORK_INIT_END_DEVICE_REJOIN_ON_REBOOT	0x0002	Send a rejoin request as an end device on reboot if parent information is persisted.

sl_zigbee_multi_phy_nwk_config_t		
SL_ZIGBEE_BROADCAST_SUPPORT	0x01	Enable broadcast support on Routers

sl_zigbee_duty_cycle_state_t		
SL_ZIGBEE_DUTY_CYCLE_TRACKING_OFF	0	No Duty cycle tracking or metrics are taking place.
SL_ZIGBEE_DUTY_CYCLE_LBT_NORMAL	1	Duty Cycle is tracked and has not exceeded any thresholds.
SL_ZIGBEE_DUTY_CYCLE_LBT_LIMITED_THRESHOLD_REACHED	2	We have exceeded the limited threshold of our total duty cycle allotment.
SL_ZIGBEE_DUTY_CYCLE_LBT_CRITICAL_THRESHOLD_REACHED	3	We have exceeded the critical threshold of our total duty cycle allotment
SL_ZIGBEE_DUTY_CYCLE_LBT_SUSPEND_LIMIT_REACHED	4	We have reached the suspend limit and are blocking all outbound transmissions.

sl_zigbee_radio_power_mode_t		
SL_ZIGBEE_RADIO_POWER_MODE_RX_ON	0	The radio receiver is switched on.
SL_ZIGBEE_RADIO_POWER_MODE_OFF	1	The radio receiver is switched off.

sl_zigbee_entropy_source_t		
SL_ZIGBEE_ENTROPY_SOURCE_ERROR	0	Entropy source error.
SL_ZIGBEE_ENTROPY_SOURCE_RADIO	1	Entropy source is the radio.
SL_ZIGBEE_ENTROPY_SOURCE_MBEDTLS_TRNG	2	Entropy source is the TRNG powered by mbed TLS.
SL_ZIGBEE_ENTROPY_SOURCE_MBEDTLS	3	Entropy source is powered by mbed TLS, the source is not TRNG.

sl_zigbee_sec_man_key_type_t		
SL_ZB_SEC_MAN_KEY_TYPE_NONE	0	No key type.
SL_ZB_SEC_MAN_KEY_TYPE_NETWORK	1	Network Key (either current or alternate).
SL_ZB_SEC_MAN_KEY_TYPE_TC_LINK	2	Preconfigured Trust Center Link Key.
SL_ZB_SEC_MAN_KEY_TYPE_TC_LINK_WITH_TIMEOUT	3	Transient key.
SL_ZB_SEC_MAN_KEY_TYPE_APP_LINK	4	Link key in table.

sl_zigbee_sec_man_key_type_t		
SL_ZB_SEC_MAN_KEY_TYPE_ZLL_ENCRYPTION_KEY	6	Encryption key in ZLL.
SL_ZB_SEC_MAN_KEY_TYPE_ZLL_PRECONFIGURED_KEY	7	Preconfigured key in ZLL.
SL_ZB_SEC_MAN_KEY_TYPE_GREEN_POWER_PROXY_TABLE_KEY	8	GP Proxy table key.
SL_ZB_SEC_MAN_KEY_TYPE_GREEN_POWER_SINK_TABLE_KEY	9	GP Sink table key.
SL_ZB_SEC_MAN_KEY_TYPE_INTERNAL	10	Generic key type available to use for crypto operations.

sl_zigbee_sec_man_derived_key_type_t		
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_NONE	0	No derivation (use core key type directly).
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_KEY_TRANSPORT_KEY	1	Hash core key with Key Transport Key hash.
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_KEY_LOAD_KEY	2	Hash core key with Key Load Key hash.
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_VERIFY_KEY	3	Perform Verify Key hash.
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_TC_SWAP_OUT_KEY	4	Perform a simple AES hash of the key for TC backup.
SL_ZB_SEC_MAN_DERIVED_KEY_TYPE_TC_HASHED_LINK_KEY	5	For a TC using hashed link keys, hashed the root key against the supplied EUI in context.

sl_zigbee_sec_man_flags_t		
ZB_SEC_MAN_FLAG_NONE	0	No flags on operation.
ZB_SEC_MAN_FLAG_KEY_INDEX_IS_VALID	1	Context has a valid key index.
ZB_SEC_MAN_FLAG_EUI_IS_VALID	2	Context has a valid EUI64.
ZB_SEC_MAN_FLAG_UNCONFIRMED_TRANSIENT_KEY	4	Transient key being added hasn't yet been verified.

sl_zigbee_leave_request_flags_t		
SL_ZIGBEE_ZIGBEE_LEAVE_AND_REJOIN	0x80	Leave and rejoin the network.
SL_ZIGBEE_ZIGBEE_LEAVE_WITHOUT_REJOIN	0x00	Leave the network and do not rejoin.

4 Configuration Frames

Name: version	**ID:** 0x0000
Description: The command allows the Host to specify the desired EZSP version and must be sent before any other command. The response provides information about the firmware running on the NCP.	
Command Parameters:	
uint8_t desiredProtocolVersion	The EZSP version the Host wishes to use. To successfully set the version and allow other commands, this must be same as EZSP_PROTOCOL_VERSION.
Response Parameters:	
uint8_t protocolVersion	The EZSP version the NCP is using.
uint8_t stackType	The type of stack running on the NCP (2).
uint16_t stackVersion	The version number of the stack.

Name: getConfigurationValue	**ID:** 0x0052
Description: Reads a configuration value from the NCP.	
Command Parameters:	
sl_zigbee_ezsp_config_id_t con-figId	Identifies which configuration value to read.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the value was read successfully, SL_STATUS_ZIGBEE_EZSP_ERROR (for SL_ZIGBEE_EZSP_ERROR_INVALID_ID) if the NCP does not recognize configId.
uint16_t value	The configuration value.

Name: setConfigurationValue	**ID:** 0x0053
Description: Writes a configuration value to the NCP. Configuration values can be modified by the Host after the NCP has reset. Once the status of the stack changes to SL_STATUS_NETWORK_UP, configuration values can no longer be modified and this command will respond with SL_ZIGBEE_EZSP_ERROR_INVALID_CALL.	
Command Parameters:	
sl_zigbee_ezsp_config_id_t configId	Identifies which configuration value to change.
uint16_t value	The new configuration value.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the configuration value was changed, SL_STATUS_ZIGBEE_EZSP_ERROR if there was an error. Retrievable EZSP errors can be SL_ZIGBEE_EZSP_ERROR_OUT_OF_MEMORY if the new value exceeded the available memory, SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE if the new value was out of bounds, SL_ZIGBEE_EZSP_ERROR_INVALID_ID if the NCP does not rec-ognize configId, SL_ZIGBEE_EZSP_ERROR_INVALID_CALL if configuration values can no longer be modified.

Name: readAttribute	**ID:** 0x0108
Description: Read attribute data on NCP endpoints.	
Command Parameters:	
uint8_t endpoint	Endpoint
uint16_t cluster	Cluster.
uint16_t attributeId	Attribute ID.
uint8_t mask	Mask.
uint16_t manufacturerCode	Manufacturer code.
Response Parameters:	
sl_zigbee_af_status_t af_status	An sl_zigbee_af_status_t value indicating success or the reason for failure, handled by the EZSP layer as a uint8_t. 255 indicates an EZSP-specific error.
uint8_t dataType	Attribute data type.
uint8_t readLength	Length of attribute data.
uint8_t[] dataPtr	Attribute data.

Name: WriteAttribute	**ID:** 0x0109
Description: Write attribute data on NCP endpoints.	
Command Parameters:	
uint8_t endpoint	Endpoint
uint16_t cluster	Cluster.
uint16_t attributeId	Attribute ID.
uint8_t mask	Mask.
uint16_t manufacturerCode	Manufacturer code.
bool overrideReadOn-lyAndDataType	Override read only and data type.
bool justTest	Override read only and data type.
uint8_t dataType	Attribute data type.
uint8_t dataLength	Attribute data length.
uint8_t[] data	Attribute data.
Response Parameters:	
sl_zigbee_af_status_t af_status	An sl_zigbee_af_status_t value indicating success or the reason for failure.

Name: addEndpoint	**ID:** 0x0002
Description: Configures endpoint information on the NCP. The NCP does not remember these settings after a reset. Endpoints can be added by the Host after the NCP has reset. Once the status of the stack changes to SL_STATUS_NETWORK_UP, endpoints can no longer be added and this command will respond with SL_ZIGBEE_EZSP_ERROR_INVALID_CALL.	
Command Parameters:	
uint8_t endpoint	The application endpoint to be added.
uint16_t profileId	The endpoint's application profile.
uint16_t deviceId	The endpoint's device ID within the application profile.
uint8_t appFlags	The device version and flags indicating description availability.
uint8_t inputClusterCount	The number of cluster IDs in *inputClusterList*.
uint8_t outputClusterCount	The number of cluster IDs in *outputClusterList*.
uint16_t[] inputClusterList	Input cluster IDs the endpoint will accept.
uint16_t[] outputClusterList	Output cluster IDs the endpoint may send.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the endpoint was added, SL_STATUS_ZIGBEE_EZSP_ERROR if there was an error. Errors could be SL_ZIGBEE_EZSP_ERROR_OUT_OF_MEMORY if there is not enough memory available to add the endpoint, SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE if the endpoint already exists, SL_ZIGBEE_EZSP_ERROR_INVALID_CALL if endpoints can no longer be added.

Name: setPolicy	**ID:** 0x0055
Description: Allows the Host to change the policies used by the NCP to make fast decisions.	
Command Parameters:	
sl_zigbee_ezsp_policy_id_t policyId	Identifies which policy to modify.
sl_zigbee_ezsp_decision_id_t decisionId	The new decision for the specified policy.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the policy was changed, SL_STATUS_ZIGBEE_EZSP_ERROR (for SL_ZIGBEE_EZSP_ERROR_INVALID_ID) if the NCP does not recognize policyId.

Name: getPolicy	**ID:** 0x0056
Description: Allows the Host to read the policies used by the NCP to make fast decisions.	
Command Parameters:	
sl_zigbee_ezsp_policy_id_t policyId	Identifies which policy to read.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the policy was read successfully, SL_STATUS_ZIGBEE_EZSP_ERROR (for SL_ZIGBEE_EZSP_ERROR_INVALID_ID) if the NCP does not recognize policyId.
sl_zigbee_ezsp_decision_id_t decisionId	The current decision for the specified policy.

Name: sendPanIdUpdate	**ID:** 0x0057
Description: Triggers a pan id update message.	
Command Parameters:	
sl_802154_pan_id_t newPan	The new Pan Id
Response Parameters:	
bool status	true if the request was successfully handed to the stack, false otherwise

Name: getValue	**ID:** 0x00AA
Description: Reads a value from the NCP.	
Command Parameters:	
sl_zigbee_ezsp_value_id_t valueId	Identifies which value to read.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the value was read successfully, SL_STATUS_ZIGBEE_EZSP_ERROR otherwise. Errors could be SL_ZIGBEE_EZSP_ERROR_INVALID_ID if the NCP does not recognize valueId, SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE if the length of the returned value exceeds the size of local storage allocated to receive it.
uint8_t valueLength	Both a command and response parameter. On command, the maximum size in bytes of local storage allocated to receive the returned *value*. On response, the actual length in bytes of the returned *value*.
uint8_t[] value	The value.

Name: getExtendedValue	**ID:** 0x0003
Description: Reads a value from the NCP but passes an extra argument specific to the value being retrieved.	
Command Parameters:	
sl_zigbee_ezsp_extended_value_id_t valueId	Identifies which extended value ID to read.
uint32_t characteristics	Identifies which characteristics of the extended value ID to read. These are specific to the value being read.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the value was read successfully, SL_STATUS_ZIGBEE_EZSP_ERROR otherwise. Errors could be SL_ZIGBEE_EZSP_ERROR_INVALID_ID if the NCP does not recognize valueId, SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE if the length of the returned value exceeds the size of local storage allocated to receive it.
uint8_t valueLength	Both a command and response parameter. On command, the maximum size in bytes of local storage allocated to receive the returned *value*. On response, the actual length in bytes of the returned *value*.
uint8_t[] value	The value.

Name: setValue	**ID:** 0x00AB
Description: Writes a value to the NCP.	
Command Parameters:	
sl_zigbee_ezsp_value_id_tvalueId	Identifies which value to change.
uint8_t valueLength	The length of the *value* parameter in bytes.
uint8_t[] value	The new value.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the value was changed, SL_STATUS_ZIGBEE_EZSP_ERROR otherwise. Errors could be SL_ZIGBEE_EZSP_ERROR_INVALID_VALUE if the new value was out of bounds, SL_ZIGBEE_EZSP_ERROR_INVALID_ID if the NCP does not recognize valueId, SL_ZIGBEE_EZSP_ERROR_INVALID_CALL if the value could not be modified.

Name: setPassiveAckConfig	**ID:** 0x0105
Description: Allows the Host to control the broadcast behaviour of a routing device used by the NCP	
Command Parameters:	
uint8_t config	Passive ack config enum.
uint8_t minAcksNeeded	The minimum number of acknowledgments (re-broadcasts) to wait for until deeming the broadcast transmission complete.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: setPendingNetworkUpdatePanId	**ID:** 0x011E
Description: Set the PAN ID to be accepted by the device in a NLME Network Update command. If this is set to a different value than its default 0xFFFF, NLME network update messages will be ignored if they do not match this PAN ID.	
Command Parameters:	
uint16_t panId	PAN ID to be accepted in a network update.
Response Parameters: None	

Name: getEndpoint	**ID:** 0x012E
Description: Retrieve the endpoint number located at the specified index.	
Command Parameters:	
uint8_t index	Index to retrieve the endpoint number for.
Response Parameters:	
uint8_t endpoint	Endpoint number at the index.

Name: getEndpointCount	**ID:** 0x012F
Description: Get the number of configured endpoints.	
Command Parameters: None	
Response Parameters:	
uint8_t count	Number of configured endpoints.

Name: getEndpointDescription	**ID:** 0x0130
Description: Retrieve the endpoint description for the given endpoint number.	
Command Parameters:	
uint8_t endpoint	Endpoint number to get the description of.
Response Parameters**:**	
sl_zigbee_endpoint_description_t result	Description of this endpoint.

Name: getEndpointCluster	**ID:** 0x0131
Description: Retrieve one of the cluster IDs associated with the given endpoint.	
Command Parameters:	
uint8_t endpoint	Endpoint number to get a cluster ID for.
uint8_t listId	Which list to get the cluster ID from. (0 for input, 1 for output).
uint8_t listIndex	Index from requested list to look at the cluster ID of.
Response Parameters:	
uint16_t endpoint_cluster	ID of the requested cluster.

5 Utilities Frames

Name: nop	**ID:** 0x0005
Description: A command which does nothing. The Host can use this to set the sleep mode or to check the status of the NCP.	
Command Parameters: None	
Response Parameters: None	

Name: echo	**ID:** 0x0081
Description: Variable length data from the Host is echoed back by the NCP. This command has no other effects and is designed for testing the link between the Host and NCP.	
Command Parameters:	
uint8_t dataLength	The length of the *data* parameter in bytes.
uint8_t[] data	The data to be echoed back.
Response Parameters:	
uint8_t echoLength	The length of the *echo* parameter in bytes.
uint8_t[] echo	The echo of the data.

Name: invalidCommand	**ID:** 0x0058
Description: Indicates that the NCP received an invalid command.	
This frame is a response to an invalid command.	
Response Parameters:	
sl_zigbee_ezsp_status_t reason	The reason why the command was invalid.

Name: callback	**ID:** 0x0006
Description: Allows the NCP to respond with a pending callback.	
Command Parameters: None	
The response to this command can be any of the callback responses.	

Name: noCallbacks	**ID:** 0x0007
Description: Indicates that there are currently no pending callbacks.	
This frame is a response to the *callback* command.	
Response Parameters: None	

Name: setToken	**ID:** 0x0009
Description: Sets a token (8 bytes of non-volatile storage) in the Simulated EEPROM of the NCP.	
Command Parameters:	
uint8_t tokenId	Which token to set.
uint8_t[8] tokenData	The data to write to the token.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getToken	**ID:** 0x000A
Description: Retrieves a token (8 bytes of non-volatile storage) from the Simulated EEPROM of the NCP.	
Command Parameters:	
uint8_t tokenId	Which token to read.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
uint8_t[8] tokenData	The contents of the token.

Name: getMfgToken	**ID:** 0x000B
Description: Retrieves a manufacturing token from the Flash Information Area of the NCP (except for SL_ZIGBEE_EZSP_STACK_CAL_DATA which is managed by the stack).	
Command Parameters:	
sl_zigbee_ezsp_mfg_token_id_t to-kenId	Which manufacturing token to read.
Response Parameters:	
uint8_t tokenDataLength	The length of the *tokenData* parameter in bytes.
uint8_t[] tokenData	The manufacturing token data.

Name: setMfgToken	**ID:** 0x000C
Description: Sets a manufacturing token in the Customer Information Block (CIB) area of the NCP if that token currently unset (fully erased). Cannot be used with SL_ZIGBEE_EZSP_STACK_CAL_DATA, SL_ZIGBEE_EZSP_STACK_CAL_FILTER, SL_ZIGBEE_EZSP_MFG_ASH_CONFIG, or SL_ZIGBEE_EZSP_MFG_CBKE_DATA token.	
Command Parameters:	
sl_zigbee_ezsp_mfg_token_id_t tokenId	Which manufacturing token to set.
uint8_t tokenDataLength	The length of the tokenData parameter in bytes.
uint8_t[] tokenData	The manufacturing token data.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: stackTokenChangedHandler	**ID:** 0x000D
Description: A callback invoked to inform the application that a stack token has changed.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint16_t tokenAddress	The address of the stack token that has changed.

Name: getRandomNumber	**ID:** 0x0049
Description: Returns a pseudorandom number.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	Always returns SL_STATUS_OK.
uint16_t value	A pseudorandom number.

Name: setTimer	**ID:** 0x000E
Description: Sets a timer on the NCP. There are 2 independent timers available for use by the Host. A timer can be cancelled by setting time to 0 or units to SL_ZIGBEE_EVENT_INACTIVE.	
Command Parameters:	
uint8_t timerId	Which timer to set (0 or 1).
uint16_t time	The delay before the *timerHandler* callback will be generated. Note that the timer clock is free running and is not synchronized with this command. This means that the actual delay will be between *time* and (*time* - 1). The maximum delay is 32767.
EmberEventUnits units	The units for *time*.
bool repeat	If true, a *timerHandler* callback will be generated repeatedly. If false, only a single *timer-Handler* callback will be generated.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getTimer	**ID:** 0x004E
Description: Gets information about a timer. The Host can use this command to find out how much longer it will be before a previously set timer will generate a callback.	
Command Parameters:	
uint8_t timerId	Which timer to get information about (0 or 1).
Response Parameters:	
uint16_t time	The delay before the *timerHandler* callback will be generated.
sl_zigbee_event_units_t units	The units for *time*.
bool repeat	True if a *timerHandler* callback will be generated repeatedly. False if only a single *timer-Handler* callback will be generated.

Name: timerHandler	**ID:** 0x000F
Description: A callback from the timer.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t timerId	Which timer generated the callback (0 or 1).

Name: debugWrite	**ID:** 0x0012
Description: Sends a debug message from the Host to the Network Analyzer utility via the NCP.	
Command Parameters:	
bool binaryMessage	true if the message should be interpreted as binary data, false if the message should be interpreted as ASCII text.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The binary message.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: readAndClearCounters	**ID:** 0x0065
Description: Retrieves and clears Ember counters. See the sl_zigbee_counter_type_t enumeration for the counter types.	
Command Parameters: None	
Response Parameters:	
uint16_t[SL_ZIGBEE_COUNTER_TYPE_COUNT]values	A list of all counter values ordered according to the EmberCounterType enumeration.

Name: readCounters	**ID:** 0x00F1
Description: Retrieves Ember counters. See the sl_zigbee_counter_type_t enumeration for the counter types.	
Command Parameters: None	
Response Parameters:	
uint16_t[SL_ZIGBEE_COUNTER_TYPE_COUNT] values	A list of all counter values ordered according to the sl_zigbee_counter_type_t enumeration.

Name: counterRolloverHandler	**ID:** 0x00F2
Description: This call is fired when a counter exceeds its threshold.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_counter_type_t type	Type of Counter

Name: delayTest	**ID:** 0x009D
Description: Used to test that UART flow control is working correctly.	
Command Parameters:	
uint16_t delay	Data will not be read from the host for this many milliseconds.
Response Parameters: None	

Name: getLibraryStatus	**ID:** 0x0001
Description: This retrieves the status of the passed library ID to determine if it is compiled into the stack.	
Command Parameters:	
sl_zigbee_library_id_t libraryId	The ID of the library being queried.
Response Parameters:	
sl_zigbee_library_status_t status	The status of the library being queried.

Name: getXncpInfo	**ID:** 0x0013
Description: Allows the HOST to know whether the NCP is running the XNCP library. If so, the response contains also the manufacturer ID and the version number of the XNCP application that is running on the NCP.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the NCP is running the XNCP library. SL_STATUS_INVALID_STATE otherwise.
uint16_t manufacturerId	The manufactured ID the user has defined in the XNCP application.
uint16_t versionNumber	The version number of the XNCP application.

Name: customFrame	**ID:** 0x0047
Description: Provides the customer a custom EZSP frame. On the NCP, these frames are only handled if the XNCP library is included. On the NCP side these frames are handled in the sl_zigbee_xncp_incoming_custom_ezsp_message_cb() callback function.	
Command Parameters:	
uint8_t payloadLength	The length of the custom frame payload (maximum 119 bytes).
uint8_t[] payload	The payload of the custom frame.
Response Parameters:	
sl_status_t status	The status returned by the custom command.
uint8_t replyLength	The length of the response.
uint8_t[] reply	The response.

Name: customFrameHandler	**ID:** 0x0054
Description: A callback indicating a custom EZSP message has been received.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t payloadLength	The length of the custom frame payload.
uint8_t[] payload	The payload of the custom frame.

Name: getEui64	**ID:**
Description: Returns the EUI64 ID of the local node.	
Command Parameters: None	
Response Parameters:	
sl_802154_long_addr_t eui64	The 64-bit ID.

Name: getNodeId	**ID:** 0x0027
Description: Returns the 16-bit node ID of the local node.	
Command Parameters: None	
Response Parameters:	
sl_802154_short_addr_t nodeId	The 16-bit ID.

Name: getPhyInterfaceCount	**ID:** 0x00FC
Description: Returns number of phy interfaces present.	
Command Parameters: None	
Response Parameters:	
uint8_t interfaceCount	Value indicate how many phy interfaces present.

Name: getTrueRandomEntropySource	**ID:** 0x004F
Description: Returns the entropy source used for true random number generation.	
Command Parameters: None	
Response Parameters:	
sl_zigbee_entropy_source_t entropySource	Value indicates the used entropy source.

Name: setupDelayedJoin	**ID:** 0x003A
Description: Extend a joiner's timeout to wait for the network key on the joiner default key timeout is 3 sec, and only values greater equal to 3 sec are accepted.	
Command Parameters:	
uint8_t networkKeyTimeoutS	Network key timeout
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: radioGetSchedulerPriorities	**ID:** 0x012A
Description: Get the current scheduler priorities for multiprotocol apps.	
Command Parameters: None	
Response Parameters:	
sl_zigbee_multiprotocol_priorities_t priorities	The current priorities.

Name: radioSetSchedulerPriorities	**ID:** 0x012B
Description: Set the current scheduler priorities for multiprotocol apps.	
Command Parameters:	
sl_zigbee_multiprotocol_priorities_t priorities	The current priorities.
Response Parameters: None	

Name: radioGetSchedulerSliptime	**ID:** 0x012C
Description: Get the current multiprotocol sliptime	
Command Parameters: None	
Response Parameters:	
uint32_t[1] slipTime	Value of the current slip time.

Name: radioSetSchedulerSliptime	**ID:** 0x012D
Description: Set the current multiprotocol sliptime	
Command Parameters:	
uint32_t slipTime	Value of the current slip time.
Response Parameters: None	

Name: counterRequiresPhyIndex	**ID:** 0x0132
Description: Check if a particular counter is one that could report from either a 2.4GHz or sub-GHz interface.	
Command Parameters:	
sl_zigbee_counter_type_t counter	The counter to be checked.
Response Parameters:	
bool requires	Whether this counter requires a PHY index when operating on a dual-PHY system.

Name: counterRequiresDestinationNodeId	**ID:** 0x0133
Description: Check if a particular counter can report on the destination node ID they have been triggered from.	
Command Parameters:	
sl_zigbee_counter_type_t counter	The counter to be checked.
Response Parameters:	
bool requires	Whether this counter requires the destination node ID.

6 Networking Frames

Name: setManufacturerCode	**ID:** 0x0015
Description: Sets the manufacturer code to the specified value. The manufacturer code is one of the fields of the node descriptor.	
Command Parameters:	
uint16_t code	The manufacturer code for the local node.
Response Parameters: sl_status_t status	

Name: getManufacturerCode	**ID:** 0x00CA
Description: Gets the manufacturer code to the specified value. The manufacturer code is one of the fields of the node descriptor.	
Command Parameters: None	
Response Parameters:	
uint16_t code	The manufacturer code for the local node.

Name: setPowerDescriptor	**ID:** 0x0016
Description: Sets the power descriptor to the specified value. The power descriptor is a dynamic value. Therefore, you should call this function whenever the value changes.	
Command Parameters:	
uint16_t descriptor	The new power descriptor for the local node.
Response Parameters: sl_status_t status	

Name: networkInit	**ID:** 0x0017
Description: Resume network operation after a reboot. The node retains its original type. This should be called on startup whether or not the node was previously part of a network. SL_STATUS_NOT_JOINED is returned if the node is not part of a network. This command accepts options to control the network initialization.	
Command Parameters:	
sl_zigbee_network_init_struct_t networkInitStruct	An sl_zigbee_network_init_struct_t containing the options for initialization.
Response Parameters:	
sl_status_t status	An sl_status_t value that indicates one of the following: successful initialization, SL_STATUS_NOT_JOINED if the node is not part of a network, or the reason for failure.

Name: networkState	**ID:** 0x0018
Description: Returns a value indicating whether the node is joining, joined to, or leaving a network.	
Command Parameters: None	
Response Parameters:	
sl_zigbee_network_status_t status	An sl_zigbee_network_status_t value indicating the current join status.

Name: stackStatusHandler	**ID:** 0x0019
Description: A callback invoked when the status of the stack changes. If the status parameter equals SL_STATUS_NETWORK_UP, then the getNetworkParameters command can be called to obtain the new network parameters. If any of the parameters are being stored in nonvolatile memory by the Host, the stored values should be updated.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	Stack status.

Name: startScan	**ID:** 0x001A
Description: This function will start a scan.	
Command Parameters:	
sl_zigbee_ezsp_network_scan_type_t scanType	Indicates the type of scan to be performed. Possible values are: SL_ZIGBEE_EZSP_ENERGY_SCAN and SL_ZIGBEE_EZSP_ACTIVE_SCAN. For each type, the respective callback for reporting results is: energyScanResultHandler and networkFoundHandler. The energy scan and active scan report errors and completion via the scanCompleteHandler.
uint32_t channelMask	Bits set as 1 indicate that this particular channel should be scanned. Bits set to 0 indicate that this particular channel should not be scanned. For example, a channelMask value of 0x00000001 would indicate that only channel 0 should be scanned. Valid channels range from 11 to 26 inclusive. This translates to a channel mask value of 0x07FFF800. As a convenience, a value of 0 is reinterpreted as the mask for the current channel.
uint8_t duration	Sets the exponent of the number of scan periods, where a scan period is 960 symbols. The scan will occur for ((2^duration) + 1) scan periods.
Response Parameters:	
sl_status_t status	SL_STATUS_OK signals that the scan successfully started. Possible error responses and their meanings: SL_STATUS_MAC_SCANNING, we are already scanning; SL_STATUS_BAD_SCAN_DURATION, we have set a duration value that is not 0..14 inclusive; SL_STATUS_MAC_INCORRECT_SCAN_TYPE, we have requested an undefined scanning type; SL_STATUS_INVALID_CHANNEL_MASK, our channel mask did not specify any valid channels.

Name: energyScanResultHandler	**ID:** 0x0048
Description: Reports the result of an energy scan for a single channel. The scan is not complete until the *scanCompleteHandler* callback is called.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t channel	The 802.15.4 channel number that was scanned.
int8s maxRssiValue	The maximum RSSI value found on the channel.

Name: networkFoundHandler	ID: 0x001B
Description: Reports that a network was found as a result of a prior call to startScan. Gives the network parameters useful for deciding which network to join.	
This frame is a response to the callback command.	
Response Parameters:	
sl_zigbee_zigbee_network_t networkFound	The parameters associated with the network found.
uint8_t lastHopLqi	The link quality from the node that generated this beacon.

Name: scanCompleteHandler	**ID:** 0x001C
Description: Returns the status of the current scan of type SL_ZIGBEE_EZSP_ENERGY_SCAN or SL_ZIGBEE_EZSP_ACTIVE_SCAN. SL_STATUS_OK signals that the scan has completed. Other error conditions signify a failure to scan on the channel specified.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t channel	The channel on which the current error occurred. Undefined for the case of SL_STATUS_OK.
sl_status_t status	The error condition that occurred on the current channel. Value will be SL_STATUS_OK when the scan has completed.

Name: unusedPanIdFoundHandler	**ID:** 0x00D2
Description: This function returns an unused panID and channel pair found via the find unused panId scan procedure.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_pan_id_t panId	The unused panID which has been found.
uint8_t channel	The channel that the unused panID was found on.

Name: findUnusedPanId	**ID:** 0x00D3
Description: This function starts a series of scans which will return an available panId.	
Command Parameters:	
uint32_t channelMask	The channels that will be scanned for available panIds.
uint8_t duration	The duration of the procedure.
Response Parameters:	
sl_status_t status	The error condition that occurred during the scan. Value will be SL_STATUS_OK if there are no errors.

Name: stopScan	**ID:** 0x001D
Description: Terminates a scan in progress.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: formNetwork	**ID:** 0x001E
Description: Forms a new network by becoming the coordinator.	
Command Parameters:	
sl_zigbee_network_parameters_t parameters	Specification of the new network.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: joinNetwork	**ID:** 0x001F
Description: Causes the stack to associate with the network using the specified network parameters. It can take several seconds for the stack to associate with the local network. Do not send messages until the *stackStatusHandler* callback informs you that the stack is up.	
Command Parameters:	
sl_zigbee_node_type_t nodeType	Specification of the role that this node will have in the network. This role must not be SL_ZIGBEE_COORDINATOR. To be a coordinator, use the formNetwork command.
sl_zigbee_network_parameters_t parameters	Specification of the network with which the node should associate.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: joinNetworkDirectly	**ID:** 0x003B
Description: Causes the stack to associate with the network using the specified network parameters in the beacon parameter. It can take several seconds for the stack to associate with the local network. Do not send messages until the *stackStatusHandler* callback informs you that the stack is up. Unlike ::emberJoinNetwork(), this function does not issue an active scan before joining. Instead, it will cause the local node to issue a MAC Association Request directly to the specified target node. It is assumed that the beacon parameter is an artifact after issuing an active scan. (For more information, see *emberGetBestBeacon* and *emberGetNextBeacon*.)	
Command Parameters:	
sl_zigbee_node_type_t localNodeType	Specifies the role that this node will have in the network. This role must not be SL_ZIGBEE_COORDINATOR. To be a coordinator, use the formNetwork command.
sl_zigbee_beacon_data_t beacon	Specifies the network with which the node should associate.
int8_t radioTxPower	The radio transmit power to use, specified in dBm.
bool clearBeaconsAfterNetworkUp	If true, clear beacons in cache upon join success. If join fail, do nothing.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: leaveNetwork	**ID:** 0x0020
Description: Causes the stack to leave the current network. This generates a *stackStatusHandler* callback to indicate that the network is down. The radio will not be used until after sending a *formNetwork* or *joinNetwork* command.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: findAndRejoinNetwork	**ID:** 0x0021
Description: The application may call this function when contact with the network has been lost. The most common usage case is when an end device can no longer communicate with its parent and wishes to find a new one. Another case is when a device has missed a Network Key update and no longer has the current Network Key. The stack will call sl_zigbee_ezsp_stack_status_handler to indicate that the network is down, then try to re-establish contact with the network by performing an active scan, choosing a network with matching extended pan id, and sending a ZigBee network rejoin request. A second call to the sl_zigbee_ezsp_stack_status_handler callback indicates either the success or the failure of the attempt. The process takes approximately 150 milliseconds per channel to complete.	
Command Parameters:	
bool haveCurrentNetworkKey	This parameter tells the stack whether to try to use the current network key. If it has the current network key it will perform a secure rejoin (encrypted). If this fails the device should try an unsecure rejoin. If the Trust Center allows the rejoin then the current Network Key will be sent encrypted using the device's Link Key.
uint32_t channelMask	A mask indicating the channels to be scanned. See sli_zigbee_stack_start_scan for format details. A value of 0 is reinterpreted as the mask for the current channel.
uint8_t reason	A sl_zigbee_rejoin_reason_t variable which could be passed in if there is actually a reason for rejoin, or could be left at 0xFF
uint8_t nodeType	The rejoin could be triggered with a different nodeType. This value could be set to 0 or SL_ZIGBEE_DEVICE_TYPE_UNCHANGED if not needed.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: permitJoining	**ID:** 0x0022
Description: Tells the stack to allow other nodes to join the network with this node as their parent. Joining is initially disabled by default.	
Command Parameters:	
uint8_t duration	A value of 0x00 disables joining. A value of 0xFF enables joining. Any other value enables joining for that number of seconds.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: childJoinHandler	**ID:** 0x0023
Description: Indicates that a child has joined or left.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t index	The index of the child of interest.
bool joining	True if the child is joining. False the child is leaving.
sl_802154_short_addr_t childId	The node ID of the child.
sl_802154_long_addr_t childEui64	The EUI64 of the child.
sl_zigbee_node_type_t childType	The node type of the child.

Name: energyScanRequest	**ID:** 0x009C
Description: Sends a ZDO energy scan request. This request may only be sent by the current network manager and must be unicast, not broadcast. See ezsp-utils.h for related macros sli_zigbee_stack_set_network_manager_request() and sl_zigbee_change_channel_request().	
Command Parameters:	
sl_802154_short_addr_t target	The network address of the node to perform the scan.
uint32_t scanChannels	A mask of the channels to be scanned.
uint8_t scanDuration	How long to scan on each channel. Allowed values are 0..5, with the scan times as specified by 802.15.4 (0 = 31ms, 1 = 46ms, 2 = 77ms, 3 = 138ms, 4 = 261ms, 5 = 507ms).
uint16_t scanCount	The number of scans to be performed on each channel (1..8).
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getNetworkParameters	**ID:** 0x0028
Description: Returns the current network parameters.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_node_type_t nodeType	An sl_zigbee_node_type_t value indicating the current node type.
sl_zigbee_network_parameters_t parameters	The current network parameters.

Name: getRadioParameters	**ID:** 0x00FD
Description: Returns the current radio parameters based on phy index.	
Command Parameters:	
uint8_t phyIndex	Desired index of phy interface for radio parameters.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_multi_phy_radio_parameters_t parameters	The current radio parameters based on provided phy index.

Name: getParentChildParameters	**ID:** 0x0029
Description: Returns information about the children of the local node and the parent of the local node.	
Command Parameters: None	
Response Parameters:	
uint8_t childCount	The number of children the node currently has.
sl_802154_long_addr_t parentEui64	The parent's EUI64. The value is undefined for nodes without parents (coordinators and nodes that are not joined to a network).
sl_802154_short_addr_t parentNodeId	The parent's node ID. The value is undefined for nodes without parents (coordinators and nodes that are not joined to a network).

Name: routerChildCount	**ID:** 0x013B
Description: Return the number of router children that the node currently has.	
Command Parameters: None	
Response Parameters:	
uint8_t routerChildCount	The number of router children.

Name: maxChildCount	**ID:** 0x013C
Description: Return the maximum number of children for this node. The return value is undefined for nodes that are not joined to a network.	
Command Parameters: None	
Response Parameters:	
uint8_t maxChildCount	The maximum number of children.

Name: maxRouterChildCount	**ID:** 0x013D
Description: Return the maximum number of router children for this node. The return value is undefined for nodes that are not joined to a network.	
Command Parameters: None	
Response Parameters:	
uint8_t maxRouterChildCount	The maximum number of router children.

Name: getParentIncomingNwkFrameCounter	**ID:** 0x013E
Command Parameters: None	
Response Parameters:	
uint32_t parentIncomingNwkFrameCounter	

Name: setParentIncomingNwkFrameCounter	**ID:** 0x013F
Command Parameters:	
uint32_t value	
Response Parameters:	
sl_status_t status	

Name: currentStackTasks	**ID:** 0x0145
Description: Return a bitmask indicating the stack's current tasks. The mask ::SL_ZIGBEE_HIGH_PRIORITY_TASKS defines which tasks are high priority. Devices should not sleep if any high priority tasks are active. Active tasks that are not high priority are waiting for messages to arrive from other devices. If there are active tasks, but no high priority ones, the device may sleep but should periodically wake up and call ::emberPollForData() in order to receive messages. Parents will hold messages for ::SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT milliseconds before discarding them.	
Command Parameters: None	
Response Parameters:	
uint16_t activeTasks	A bitmask of the stack's active tasks.

Name: okToNap	**ID:** 0x0146
Description: Indicate whether the stack is currently in a state where there are no high-priority tasks, allowing the device to sleep. There may be tasks expecting incoming messages, in which case the device should periodically wake up and call ::emberPollForData() in order to receive messages. This function can only be called when the node type is ::SL_ZIGBEE_SLEEPY_END_DEVICE	
Command Parameters: None	
Response Parameters:	
bool value	True if the application may sleep but the stack may be expecting incoming messages.

Name: parentTokenSet	**ID:** 0x0140
Description: Indicate whether the parent token has been set by association.	
Command Parameters: None	
Response Parameters:	
bool indicator	True if the parent token has been set.

Name: okToHibernate	**ID:** 0x0141
Description: Indicate whether the stack currently has any tasks pending. If no tasks are pending, ::emberTick() does not need to be called until the next time a stack API function is called. This function can only be called when the node type is ::SL_ZIGBEE_SLEEPY_END_DEVICE.	
Command Parameters: None	
Response Parameters:	
bool indicator	True if the application may sleep for as long as it wishes.

Name: okToLongPoll	**ID:** 0x0142
Description: Indicate whether the stack is currently in a state that does not require the application to periodically poll.	
Command Parameters: None	
Response Parameters:	
bool indicator	True if the device may poll less frequently.

Name: stackPowerDown	**ID:** 0x0143
Description: Calling this function will render all other stack functions except sli_zigbee_stack_stack_power_up() non-functional until the radio is powered back on.	
Command Parameters: None	
Response Parameters: None	

Name: stackPowerUp	**ID:** 0x0144
Description: Initialize the radio. Typically called coming out of deep sleep. For non-sleepy devices, also turns the radio on and leaves it in RX mode.	
Command Parameters: None	
Response Parameters: None	

Name: getChildData	**ID:** 0x004A
Description: Returns information about a child of the local node.	
Command Parameters:	
uint8_t index	The index of the child of interest in the child table. Possible indexes range from zero to SL_ZIGBEE_CHILD_TABLE_SIZE.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if there is a child at index. SL_STATUS_NOT_JOINED if there is no child at index.
sl_zigbee_child_data_t childData	The data of the child.

Name: setChildData	**ID:** 0x00AC
Description: Sets child data to the child table token.	
Command Parameters:	
uint8_t index	The index of the child of interest in the child table. Possible indexes range from zero to (SL_ZIGBEE_CHILD_TABLE_SIZE - 1).
sl_zigbee_child_data_t childData	The data of the child.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the child data is set successfully at index. SL_STATUS_INVALID_INDEX if provided index is out of range.

Name: childId	**ID:** 0x0106
Description: Convert a child index to a node ID	
Command Parameters:	
uint8_t childIndex	The index of the child of interest in the child table. Possible indexes range from zero to SL_ZIGBEE_CHILD_TABLE_SIZE.
Response Parameters:	
sl_802154_short_addr_t childId	The node ID of the child or SL_ZIGBEE_NULL_NODE_ID if there isn't a child at the childIndex specified

Name: childPower	**ID:** 0x0134
Description: Return radio power value of the child from the given childIndex	
Command Parameters:	
uint8_t childIndex	The index of the child of interest in the child table. Possible indexes range from zero to SL_ZIGBEE_CHILD_TABLE_SIZE.
Response Parameters:	
int8_t childPower	The power of the child or maximum radio power, which is the power value provided by the user while forming/joining a network if there isn't a child at the childIndex specified

Name: setChildPower	**ID:** 0x0135
Description: Set the radio power value for a given child index.	
Command Parameters:	
uint8_t childIndex	The index.
int8_t newPower	The new power value.
Response Parameters: None	

Name: childIndex	**ID:** 0x0107
Description: Convert a node ID to a child index	
Command Parameters:	
sl_802154_short_addr_t childId	The node ID of the child
Response Parameters:	
uint8_t childIndex	The child index or 0xFF if the node ID doesn't belong to a child

Name: getSourceRouteTableTotalSize	**ID:** 0x00C3
Description: Returns the source route table total size.	
Command Parameters: None	
Response Parameters:	
uint8_t sourceRouteTableTotalSize	Total size of source route table.

Name: getSourceRouteTableFilledSize	**ID:** 0x00C2
Description: Returns the number of filled entries in source route table.	
Command Parameters: None	
Response Parameters:	
uint8_t sourceRouteTableFilledSize	The number of filled entries in source route table.

Name: getSourceRouteTableEntry	**ID:** 0x00C1
Description: Returns information about a source route table entry	
Command Parameters:	
uint8_t index	The index of the entry of interest in the source route table. Possible indexes range from zero to SOURCE_ROUTE_TABLE_FILLED_SIZE.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if there is source route entry at index. SL_STATUS_NOT_FOUND if there is no source route at index.
sl_802154_short_addr_t destination	The node ID of the destination in that entry.
uint8_t closerIndex	The closer node index for this source route table entry

Name: getNeighbor	**ID:** 0x0079
Description: Returns the neighbor table entry at the given index. The number of active neighbors can be obtained using the neighborCount command.	
Command Parameters:	
uint8_t index	The index of the neighbor of interest. Neighbors are stored in ascending order by node id, with all unused entries at the end of the table.
Response Parameters:	
sl_status_t status	SL_STATUS_FAIL if the index is greater or equal to the number of active neighbors, or if the device is an end device. Returns SL_STATUS_OK otherwise.
sl_zigbee_neighbor_table_entry_t value	The contents of the neighbor table entry.

Name: getNeighborFrameCounter	**ID:** 0x003E
Description: Return sl_status_t depending on whether the frame counter of the node is found in the neighbor or child table. This function gets the last received frame counter as found in the Network Auxiliary header for the specified neighbor or child.	
Command Parameters:	
sl_802154_long_addr_t eui64	eui64 of the node
Response Parameters:	
sl_status_t status	Return SL_STATUS_NOT_FOUND if the node is not found in the neighbor or child table. Returns SL_STATUS_OK otherwise.
uint32_t returnFrameCounter	Return the frame counter of the node from the neighbor or child table

Name: setNeighborFrameCounter	**ID:** 0x00AD
Description: Sets the frame counter for the neighbor or child.	
Command Parameters:	
sl_802154_long_addr_t eui64	eui64 of the node
uint32_t frameCounter	Return the frame counter of the node from the neighbor or child table
Response Parameters:	
sl_status_t status	Return SL_STATUS_NOT_FOUND if the node is not found in the neighbor or child table. Returns SL_STATUS_OK otherwise

Name: setRoutingShortcutThreshold	**ID:** 0x00D0
Description: Sets the routing shortcut threshold to directly use a neighbor instead of performing routing.	
Command Parameters:	
uint8_t costThresh	The routing shortcut threshold to configure.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getRoutingShortcutThreshold	**ID:** 0x00D1
Description: Gets the routing shortcut threshold used to differentiate between directly using a neighbor vs. performing routing.	
Command Parameters: None	
Response Parameters:	
uint8_t routingShortcutThresh	The routing shortcut threshold

Name: neighborCount	**ID:** 0x007A
Description: Returns the number of active entries in the neighbor table.	
Command Parameters: None	
Response Parameters:	
uint8_t value	The number of active entries in the neighbor table.

Name: getRouteTableEntry	**ID:** 0x007B
Description: Returns the route table entry at the given index. The route table size can be obtained using the getConfigurationValue command.	
Command Parameters:	
uint8_t index	The index of the route table entry of interest.
Response Parameters:	
sl_status_t status	SL_STATUS_FAIL if the index is out of range or the device is an end device, and SL_STATUS_OK otherwise.
sl_zigbee_route_table_entry_t value	The contents of the route table entry.

Name: setRadioPower	**ID:** 0x0099
Description: Sets the radio output power at which a node is operating. Ember radios have discrete power settings. For a list of available power settings, see the technical specification for the RF communication module in your Developer Kit. Note: Care should be taken when using this API on a running network, as it will directly impact the established link qualities neighboring nodes have with the node on which it is called. This can lead to disruption of existing routes and erratic network behavior.	
Command Parameters:	
int8s power	Desired radio output power, in dBm.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: setRadioChannel	**ID:** 0x009A
Description: Sets the channel to use for sending and receiving messages. For a list of available radio channels, see the technical specification for the RF communication module in your Developer Kit. Note: Care should be taken when using this API, as all devices on a network must use the same channel.	
Command Parameters:	
uint8_t channel	Desired radio channel.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: getRadioChannel	**ID:** 0x00FF
Description: Gets the channel in use for sending and receiving messages.	
Command Parameters: None	
Response Parameters:	
uint8_t channel	Current radio channel.

Name: setRadioIeee802154CcaMode	**ID:** 0x0095
Description: Set the configured 802.15.4 CCA mode in the radio.	
Command Parameters:	
uint8_t ccaMode	A RAIL_IEEE802154_CcaMode_t value.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: setConcentrator	**ID:** 0x0010
Description: Enable/disable concentrator support.	
Command Parameters:	
bool on	If this bool is true the concentrator support is enabled. Otherwise is disabled. If this bool is false all the other arguments are ignored.
uint16_t concentratorType	Must be either SL_ZIGBEE_HIGH_RAM_CONCENTRATOR or SL_ZIGBEE_LOW_RAM_CONCENTRATOR. The former is used when the caller has enough memory to store source routes for the whole network. In that case, remote nodes stop sending route records once the concentrator has successfully received one. The latter is used when the concentrator has insufficient RAM to store all outbound source routes. In that case, route records are sent to the concentrator prior to every inbound APS unicast.
uint16_t minTime	The minimum amount of time that must pass between MTORR broadcasts.
uint16_t maxTime	The maximum amount of time that can pass between MTORR broadcasts.
uint8_t routeErrorThreshold	The number of route errors that will trigger a re-broadcast of the MTORR.
uint8_t deliveryFailureThreshold	The number of APS delivery failures that will trigger a re-broadcast of the MTORR.
uint8_t maxHops	The maximum number of hops that the MTORR broadcast will be allowed to have. A value of 0 will be converted to the SL_ZIGBEE_MAX_HOPS value set by the stack.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: concentratorStartDiscovery	**ID:** 0x014F
Description: Starts periodic many-to-one route discovery. Periodic discovery is started by default on bootup, but this function may be used if discovery has been stopped by a call to ::emberConcentratorStopDiscovery().	
Command Parameters: None	
Response Parameters: None	

Name: concentratorStopDiscovery	**ID:** 0x0150
Description: Stops periodic many-to-one route discovery.	
Command Parameters: None	
Response Parameters: None	

Name: concentratorNoteRouteError	**ID:** 0x0151
Description: Notes when a route error has occurred.	
Command Parameters:	
sl_status_t status	
sl_802154_short_addr_t nodeId	
Response Parameters: None	

Name: setBrokenRouteErrorCode	**ID:** 0x0011
Description: Sets the error code that is sent back from a router with a broken route.	
Command Parameters:	
uint8_t errorCode	Desired error code.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: multiPhyStart	**ID:** 0x00F8
Description: This causes to initialize the desired radio interface other than native and form a new network by becoming the coordinator with same panId as native radio network.	
Command Parameters:	
uint8_t phyIndex	Index of phy interface. The native phy index would be always zero hence valid phy index starts from one.
uint8_t page	Desired radio channel page.
uint8_t channel	Desired radio channel.
int8_t power	Desired radio output power, in dBm.
sl_zigbee_multi_phy_nwk_config_t bitmask	Network configuration bitmask.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: multiPhyStop	**ID:** 0x00F9
Description: This causes to bring down the radio interface other than native.	
Command Parameters:	
uint8_t phyIndex	Index of phy interface. The native phy index would be always zero hence valid phy index starts from one.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: multiPhySetRadioPower	**ID:** 0x00FA
Description: Sets the radio output power for desired phy interface at which a node is operating. Ember radios have discrete power settings. For a list of available power settings, see the technical specification for the RF communication module in your Developer Kit. Note: Care should be taken when using this api on a running network, as it will directly impact the established link qualities neighboring nodes have with the node on which it is called. This can lead to disruption of existing routes and erratic network behavior.	
Command Parameters:	
uint8_t phyIndex	Index of phy interface. The native phy index would be always zero hence valid phy index starts from one.
int8_t power	Desired radio output power, in dBm.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: sendLinkPowerDeltaRequest	**ID:** 0x00F7
Description: Send Link Power Delta Request from a child to its parent	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of sending the request.

Name: multiPhySetRadioChannel	**ID:** 0x00FB
Description: Sets the channel for desired phy interface to use for sending and receiving messages. For a list of available radio pages and channels, see the technical specification for the RF communication module in your Developer Kit. Note: Care should be taken when using this API, as all devices on a network must use the same page and channel.	
Command Parameters:	
uint8_t phyIndex	Index of phy interface. The native phy index would be always zero hence valid phy index starts from one.
uint8_t page	Desired radio channel page.
uint8_t channel	Desired radio channel.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.

Name: getDutyCycleState	**ID:** 0x0035
Description: Obtains the current duty cycle state.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.
sl_zigbee_duty_cycle_state_t returnedState	The current duty cycle state in effect.

Name: setDutyCycleLimitsInStack	**ID:** 0x0040
Description: Set the current duty cycle limits configuration. The Default limits set by stack if this call is not made.	
Command Parameters:	
sl_zigbee_duty_cycle_limits_t limits	The duty cycle limits configuration to utilize.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the duty cycle limit configurations set successfully, SL_STATUS_INVALID_PARAMETER if set illegal value such as setting only one of the limits to default or violates constraints Susp > Crit > Limi, SL_STATUS_INVALID_STATE if device is operating on 2.4Ghz

Name: getDutyCycleLimits	**ID:** 0x004B
Description: Obtains the current duty cycle limits that were previously set by a call to sli_zigbee_stack_set_duty_cycle_limits_in_stack(), or the defaults set by the stack if no set call was made.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating the success or failure of the command.
sl_zigbee_duty_cycle_limits_t returnedLimits	Return current duty cycle limits if returnedLimits is not NULL

Name: getCurrentDutyCycle	**ID:** 0x004C
Description: Returns the duty cycle of the stack's connected children that are being monitored, up to maxDevices. It indicates the amount of overall duty cycle they have consumed (up to the suspend limit). The first entry is always the local stack's nodeId, and thus the total aggregate duty cycle for the device. The passed pointer arrayOfDeviceDutyCycles MUST have space for maxDevices.	
Command Parameters:	
uint8_t maxDevices	Number of devices to retrieve consumed duty cycle.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the duty cycles were read successfully, SL_STATUS_INVALID_PARAMETER maxDevices is greater than SL_ZIGBEE_MAX_END_DEVICE_CHILDREN + 1.
uint8_t[134] arrayOfDeviceDutyCycles	Consumed duty cycles up to maxDevices. When the number of children that are being monitored is less than maxDevices, the sl_802154_short_addr_t element in the sl_zigbee_per_device_duty_cycle_t will be 0xFFFF.

Name: dutyCycleHandler	**ID:** 0x004D
Description: Callback fires when the duty cycle state has changed	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t channelPage	The channel page whose duty cycle state has changed.
uint8_t channel	The channel number whose duty cycle state has changed.
sl_zigbee_duty_cycle_state_t state	The current duty cycle state.
sl_zigbee_per_device_duty_cycle_t arrayOfDeviceDutyCycles	Consumed duty cycles of end devices that are being monitored. The first entry always be the local stack's nodeId, and thus the total aggregate duty cycle for the device.

Name: setNumBeaconsToStore	**ID:** 0x0037
Description: Configure the number of beacons to store when issuing active scans for networks.	
Command Parameters:	
uint8_t numBeacons	The number of beacons to cache when scanning.
Response Parameters:	
sl_status_t status	SL_STATUS_INVALID_PARAMETER if numBeacons is greater than SL_ZIGBEE_MAX_BEACONS_TO_STORE, otherwise SL_STATUS_OK

Name: getStoredBeacon	**ID:** 0x0004
Description: Fetches the specified beacon in the cache. Beacons are stored in cache after issuing an active scan.	
Command Parameters:	
uint8_t beacon_number	The beacon index to fetch. Valid values range from 0 to sli_zigbee_stack_get_num_stored_beacons-1.
Response Parameters:	
sl_status_t status	An appropriate sl_status_t status code.
sl_zigbee_beacon_data_t beacon	The beacon to populate upon success.

Name: getNumStoredBeacons	**ID:** 0x0008
Description: Returns the number of cached beacons that have been collected from a scan.	
Command Parameters: None	
Response Parameters:	
uint8_t numBeacons	The number of cached beacons that have been collected from a scan.

Name: clearStoredBeacons	**ID:** 0x003C
Description: Clears all cached beacons that have been collected from a scan.	
Command Parameters: None	
Response Parameters: sl_status_t status	

Name: setLogicalAndRadioChannel	**ID:** 0x00B9
Description: This call sets the radio channel in the stack and propagates the information to the hardware.	
Command Parameters:	
uint8_t radioChannel	The radio channel to be set.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: sleepyToSleepyNetworkStart	**ID:** 0x0119
Description: Form a new sleepy-to-sleepy network. If the network is using security, the device must call sli_zigbee_stack_set_initial_security_state() first.	
Command Parameters:	
sl_zigbee_network_parameters_t parameters	Specification of the new network.
bool initiator	Whether this device is initiating or joining the network.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or a reason for failure.

Name: sendZigbeeLeave	**ID:** 0x011A
Description: Send a Zigbee NWK Leave command to the destination.	
Command Parameters:	
sl_802154_pan_id_t destination	Node ID of the device being told to leave.
sl_zigbee_leave_request_flags_t flags	Bitmask indicating additional considerations for the leave request.
Response Parameters:	
sl_status_t status	Status indicating success or a reason for failure. Call is invalid if destination is on network or is the local node.

Name: getPermitJoining	**ID:** 0x011F
Description: Indicate the state of permit joining in MAC.	
Command Parameters: None	
Response Parameters:	
bool joiningPermitted	Whether the current network permits joining.

Name: getExtendedPanId	**ID:** 0x0127
Description: Get the 8-byte extended PAN ID of this node.	
Command Parameters: None	
Response Parameters:	
uint8_t[8] extendedPanId	Extended PAN ID of this node. Valid only if it is currently on a network.

Name: getCurrentNetwork	**ID:** 0x014E
Description: Get the current network.	
Command Parameters: None	
Response Parameters:	
uint8_t index	Return the current network index.

Name: setInitialNeighborOutgoingCost	**ID:** 0x0122
Description: Set initial outgoing link cost for neighbor.	
Command Parameters:	
uint8_t cost	The new default cost. Valid values are 0, 1, 3, 5, and 7.
Response Parameters:	
sl_status_t status	Whether or not initial cost was successfully set.

Name: getInitialNeighborOutgoingCost	**ID:** 0x0123
Description: Get initial outgoing link cost for neighbor.	
Command Parameters: None	
Response Parameters:	
uint8_t cost	The default cost associated with new neighbor's outgoing links.

Name: resetRejoiningNeighborsFrameCounter	**ID:** 0x0124
Description: Indicate whether a rejoining neighbor should have its incoming frame counter reset.	
Command Parameters:	
bool reset	Whether or not a neighbor's incoming FC should be reset upon re-joining (true or false).
Response Parameters: None	

Name: isResetRejoiningNeighborsFrameCounterEnabled	**ID:** 0x0125
Description: Check whether a rejoining neighbor will have its incoming frame counter reset based on the currently set policy.	
Command Parameters: None	
Response Parameters:	
bool getsReset	Whether or not a rejoining neighbor's incoming FC gets reset (true or false).

7 Binding Frames

Name: clearBindingTable	**ID:** 0x002A
Description: Deletes all binding table entries.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: setBinding	**ID:** 0x002B
Description: Sets an entry in the binding table.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
sl_zigbee_binding_table_entry_t value	The contents of the binding entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getBinding	**ID:** 0x002C
Description: Gets an entry from the binding table.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_binding_table_entry_t value	The contents of the binding entry.

Name: deleteBinding	**ID:** 0x002D
Description: Deletes a binding table entry.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: bindingIsActive	**ID:** 0x002E
Description: Indicates whether any messages are currently being sent using this binding table entry. Note that this command does not indicate whether a binding is clear. To determine whether a binding is clear, check whether the type field of the sl_zigbee_binding_table_entry_t has the value SL_ZIGBEE_UNUSED_BINDING.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
Response Parameters:	
bool active	True if the binding table entry is active, false otherwise.

Name: getBindingRemoteNodeId	**ID:** 0x002F
Description: Returns the node ID for the binding's destination, if the ID is known. If a message is sent using the binding and the destination's ID is not known, the stack will discover the ID by broadcasting a ZDO address request. The application can avoid the need for this discovery by using *setBindingRemoteNodeId* when it knows the correct ID via some other means. The destination's node ID is forgotten when the binding is changed, when the local node reboots or, much more rarely, when the destination node changes its ID in response to an ID conflict.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
Response Parameters:	
sl_802154_short_addr_t nodeId	The short ID of the destination node or SL_ZIGBEE_NULL_NODE_ID if no destination is known.

Name: setBindingRemoteNodeId	**ID:** 0x0030
Description: Set the node ID for the binding's destination. See *getBindingRemoteNodeId* for a description.	
Command Parameters:	
uint8_t index	The index of a binding table entry.
sl_802154_short_addr_t nodeId	The short ID of the destination node.
Response Parameters: None	

Name: remoteSetBindingHandler	**ID:** 0x0031
Description: The NCP used the external binding modification policy to decide how to handle a remote set binding request. The Host cannot change the current decision, but it can change the policy for future decisions using the *setPolicy* command.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_binding_table_entry_t entry	The requested binding.
uint8_t index	The index at which the binding was added.
sl_status_t policyDecision	SL_STATUS_OK if the binding was added to the table and any other status if not.

Name: remoteDeleteBindingHandler	**ID:** 0x0032
Description: The NCP used the external binding modification policy to decide how to handle a remote delete binding request. The Host cannot change the current decision, but it can change the policy for future decisions using the *setPolicy* command.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t index	The index of the binding whose deletion was requested.
sl_status_t policyDecision	SL_STATUS_OK if the binding was removed from the table and any other status if not.

8 Messaging Frames

Name: maximumPayloadLength	**ID:** 0x0033
Description: Returns the maximum size of the payload. The size depends on the security level in use.	
Command Parameters: None	
Response Parameters:	
uint8_t apsLength	The maximum APS payload length.

Name: sendUnicast	**ID:** 0x0034
Description: Sends a unicast message as per the ZigBee specification. The message will arrive at its destination only if there is a known route to the destination node. Setting the ENABLE_ROUTE_DISCOVERY option will cause a route to be discovered if none is known. Setting the FORCE_ROUTE_DISCOVERY option will force route discovery. Routes to end-device children of the local node are always known. Setting the APS_RETRY option will cause the message to be retransmitted until either a matching acknowledgement is received or three transmissions have been made. Note: Using the FORCE_ROUTE_DISCOVERY option will cause the first transmission to be consumed by a route request as part of discovery, so the application payload of this packet will not reach its destination on the first attempt. If you want the packet to reach its destination, the APS_RETRY option must be set so that another attempt is made to transmit the message with its application payload after the route has been constructed. Note: When sending fragmented messages, the stack will only assign a new APS sequence number for the first fragment of the message (i.e., SL_ZIGBEE_APS_OPTION_FRAGMENT is set and the low-order byte of the groupId field in the APS frame is zero). For all subsequent fragments of the same message, the application must set the sequence number field in the APS frame to the sequence number assigned by the stack to the first fragment.	
Command Parameters:	
sl_zigbee_outgoing_message_type_t type	Specifies the outgoing message type. Must be one of SL_ZIGBEE_OUTGOING_DIRECT, SL_ZIGBEE_OUTGOING_VIA_ADDRESS_TABLE, or SL_ZIGBEE_OUTGOING_VIA_BINDING.
sl_802154_short_addr_t indexOrDestination	Depending on the type of addressing used, this is either the sl_802154_short_addr_t of the destination, an index into the address table, or an index into the binding table.
sl_zigbee_aps_frame_t apsFrame	The APS frame which is to be added to the message.
uint8_t messageTag	A value chosen by the Host. This value is used in the *ezspMessageSentHandler* response to refer to this message.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	Content of the message.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
uint8_t sequence	The sequence number that will be used when this message is transmitted.

Name: sendBroadcast	**ID:** 0x0036
Description: Sends a broadcast message as per the ZigBee specification.	
Command Parameters:	
sl_802154_short_addr_t alias	The aliased source from which we send the broadcast. This must be SL_ZIGBEE_NULL_NODE_ID if we do not need an aliased source
sl_802154_short_addr_t destination	The destination to which to send the broadcast. This must be one of the three ZigBee broadcast addresses.
uint8_t nwkSequence	The alias nwk sequence number. this won't be used if there is no aliased source.
sl_zigbee_aps_frame_t apsFrame	The APS frame for the message.
uint8_t radius	The message will be delivered to all nodes within *radius* hops of the sender. A radius of zero is converted to EMBER_MAX_HOPS.
uint8_t messageTag	A value chosen by the Host. This value is used in the *ezspMessageSentHandler* response to refer to this message.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The broadcast message.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
uint8_t sequence	The sequence number that will be used when this message is transmitted.

Name: proxyNextBroadcastFromLong	**ID:** 0x0066
Description: Sends proxied broadcast message for another node in conjunction with sl_zigbee_proxy_broadcast where a long source is also specified in the NWK frame control.	
Command Parameters:	
uint8_t[8] euiSource	The long source from which to send the broadcast
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: sendMulticast	**ID:** 0x0038
Description: Sends a multicast message to all endpoints that share a specific multicast ID and are within a specified number of hops of the sender.	
Command Parameters:	
sl_zigbee_aps_frame_t aps-Frame	The APS frame for the message. The multicast will be sent to the groupId in this frame.
uint8_t hops	The message will be delivered to all nodes within this number of hops of the sender. A value of zero is converted to SL_ZIGBEE_MAX_HOPS.
uint16_t broadcastAddr	The number of hops that the message will be forwarded by devices that are not members of the group. A value of 7 or greater is treated as infinite.
uint16_t alias	The alias source address
uint8_t nwkSequence	the alias sequence number
uint16_t messageTag	A value chosen by the Host. This value is used in the sl_zigbee_ezsp_message_sent_handler response to refer to this message.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The multicast message.
Response Parameters:	
sl_status_t status	An sl_status_t value. For any result other than SL_STATUS_OK, the message will not be sent. SL_STATUS_OK - The message has been submitted for transmission. SL_STATUS_INVALID_INDEX - The bindingTableIndex refers to a non-multicast binding. SL_STATUS_NETWORK_DOWN - The node is not part of a network. SL_STATUS_MESSAGE_TOO_LONG - The message is too large to fit in a MAC layer frame. SL_STATUS_ALLOCATION_FAILED - The free packet buffer pool is empty. SL_STATUS_BUSY - Insufficient resources available in Network or MAC layers to send message.
uint8_t sequence	The sequence number that will be used when this message is transmitted.

Name: sendReply	**ID:** 0x0039
Description: Sends a reply to a received unicast message. The *incomingMessageHandler* callback for the unicast being replied to supplies the values for all the parameters except the reply itself.	
Command Parameters:	
sl_802154_short_addr_t sender	Value supplied by incoming unicast.
sl_zigbee_aps_frame_t apsFrame	Value supplied by incoming unicast.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The reply message.
Response Parameters:	
sl_status_t status	An sl_status_t value. SL_STATUS_INVALID_STATE - The SL_ZIGBEE_EZSP_UNICAST_REPLIES_POLICY is set to SL_ZIGBEE_EZSP_HOST_WILL_NOT_SUPPLY_REPLY. This means the NCP will automatically send an empty reply. The Host must change the policy to SL_ZIGBEE_EZSP_HOST_WILL_SUPPLY_REPLY before it can supply the reply. There is one exception to this rule: In the case of responses to message fragments, the host must call sendReply when a message fragment is received. In this case, the policy set on the NCP does

	not matter. The NCP expects a sendReply call from the Host for message fragments regardless of the current policy settings. SL_STATUS_ALLOCATION_FAILED - Not enough memory was available to send the reply. SL_STATUS_BUSY - Either no route or insufficient resources available. SL_STATUS_OK - The reply was successfully queued for transmission.

Name: messageSentHandler	**ID:** 0x003F
Description: A callback indicating the stack has completed sending a message.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	An sl_status_t value of SL_STATUS_OK if an ACK was received from the destination or SL_STATUS_ZIGBEE_DELIVERY_FAILED if no ACK was received.
sl_zigbee_outgoing_message_type_t type	The type of message sent.
uint16_t indexOrDestination	The destination to which the message was sent, for direct unicasts, or the address table or binding index for other unicasts. The value is unspecified for multicasts and broadcasts.
sl_zigbee_aps_frame_t apsFrame	The APS frame for the message.
uint16_t messageTag	The value supplied by the Host in the sl_zigbee_ezsp_send_unicast, sl_zigbee_ezsp_send_broadcast or sl_zigbee_ezsp_send_multicast command.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The unicast message supplied by the Host. The message contents are only included here if the decision for the messageContentsInCallback policy is messageTagAndContentsInCallback.

Name: sendManyToOneRouteRequest **ID:** 0x0041

Description: Sends a route request packet that creates routes from every node in the network back to this node. This function should be called by an application that wishes to communicate with many nodes, for example, a gateway, central monitor, or controller. A device using this function was referred to as an 'aggregator' in EmberZNet 2.x and earlier, and is referred to as a 'concentrator' in the ZigBee specification and EmberZNet 3.

This function enables large scale networks, because the other devices do not have to individually perform bandwidth-intensive route discoveries. Instead, when a remote node sends an APS unicast to a concentrator, its network layer automatically delivers a special route record packet first, which lists the network ids of all the intermediate relays. The concentrator can then use source routing to send outbound APS unicasts. (A source routed message is one in which the entire route is listed in the network layer header.) This allows the concentrator to communicate with thousands of devices without requiring large route tables on neighboring nodes.

This function is only available in ZigBee Pro (stack profile 2), and cannot be called on end devices. Any router can be a concentrator (not just the coordinator), and there can be multiple concentrators on a network.

Note that a concentrator does not automatically obtain routes to all network nodes after calling this function. Remote applications must first initiate an inbound APS unicast.

Many-to-one routes are not repaired automatically. Instead, the concentrator application must call this function to rediscover the routes as necessary, for example, upon failure of a retried APS message. The reason for this is that there is no scalable one-size-fits-all route repair strategy. A common and recommended strategy is for the concentrator application to refresh the routes by calling this function periodically.

Command Parameters:

uint16_t concentratorType	Must be either SL_ZIGBEE_HIGH_RAM_CONCENTRATOR or SL_ZIGBEE_LOW_RAM_CONCENTRATOR. The former is used when the caller has enough memory to store source routes for the whole network. In that case, remote nodes stop sending route records once the concentrator has successfully received one. The latter is used when the concentrator has insufficient RAM to store all outbound source routes. In that case, route records are sent to the concentrator prior to every inbound APS unicast.
uint8_t radius	The maximum number of hops the route request will be relayed. A radius of zero is converted to SL_ZIGBEE_MAX_HOPS
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the route request was successfully submitted to the transmit queue, and SL_STATUS_FAIL otherwise.

Name: pollForData	**ID:** 0x0042
Description: Periodically request any pending data from our parent. Setting interval to 0 or units to SL_ZIGBEE_EVENT_INACTIVE will generate a single poll.	
Command Parameters:	
uint16_t interval	The time between polls. Note that the timer clock is free running and is not synchronized with this command. This means that the time will be between *interval* and (*interval* - 1). The maximum interval is 32767.
sl_zigbee_event_units_t units	The units for *interval*.
uint8_t failureLimit	The number of poll failures that will be tolerated before a pollCompleteHandler callback is generated. A value of zero will result in a callback for every poll. Any status value apart from SL_STATUS_OK and SL_STATUS_MAC_NO_DATA is counted as a failure.
Response Parameters:	
sl_status_t status	The result of sending the first poll.

Name: pollCompleteHandler	**ID:** 0x0043
Description: Indicates the result of a data poll to the parent of the local node.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	An sl_status_t value: SL_STATUS_OK - Data was received in response to the poll. SL_STATUS_MAC_NO_DATA - No data was pending. SL_STATUS_ZIGBEE_DELIVERY_FAILED - The poll message could not be sent. SL_STATUS_MAC_NO_ACK_RECEIVED - The poll message was sent but not acknowledged by the parent.

Name: setMessageFlag	**ID:** 0x0136
Description: Set a flag to indicate that a message is pending for a child. The next time that the child polls, it will be informed that it has a pending message. The message is sent from emberPollHandler, which is called when the child requests data.	
Command Parameters:	
sl_802154_short_addr_t childId	The ID of the child that just polled for data.
Response Parameters:	
sl_status_t status	SL_STATUS_OK - The next time that the child polls, it will be informed that it has pending data. SL_STATUS_NOT_JOINED - The child identified by childId is not our child.

Name: clearMessageFlag	**ID:** 0x0137
Description: Clear a flag to indicate that there are no more messages for a child. The next time the child polls, it will be informed that it does not have any pending messages.	
Command Parameters:	
sl_802154_short_addr_t childId	The ID of the child that no longer has pending messages.
Response Parameters:	
sl_status_t status	SL_STATUS_OK - The next time that the child polls, it will be informed that it does not have any pending messages. SL_STATUS_NOT_JOINED - The child identified by childId is not our child.

Name: pollHandler	**ID:** 0x0044
Description: Indicates that the local node received a data poll from a child.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_short_addr_t childId	The node ID of the child that is requesting data.
bool transmitExpected	True if transmit is expected, false otherwise.

Name: addChild	**ID:** 0x0138
Description: Add a child to the child/neighbor table only on SoC, allowing direct manipulation of these tables by the application. This can affect the network functionality, and needs to be used wisely. If used appropriately, the application can maintain more than the maximum of children provided by the stack.	
Command Parameters:	
sl_802154_short_addr_t shortId	The preferred short ID of the node.
sl_802154_long_addr_t longId	The long ID of the node.
sl_zigbee_node_type_t nodeType	The nodetype e.g., SL_ZIGBEE_ROUTER defining, if this would be added to the child table or neighbor table.
Response Parameters:	
sl_status_t status	SL_STATUS_OK - This node has been successfully added. SL_STATUS_FAIL - The child was not added to the child/neighbor table.

Name: removeChild	**ID:** 0x0139
Description: Remove a node from child/neighbor table only on SoC, allowing direct manipulation of these tables by the application. This can affect the network functionality, and needs to be used wisely.	
Command Parameters:	
sl_802154_long_addr_t childEui64	The long ID of the node.
Response Parameters:	
sl_status_t status	SL_STATUS_OK - This node has been successfully removed. SL_STATUS_FAIL - The node was not found in either of the child or neighbor tables.

Name: removeNeighbor	**ID:** 0x013A
Description: Remove a neighbor from neighbor table only on SoC, allowing direct manipulation of neighbor table by the application. This can affect the network functionality, and needs to be used wisely.	
Command Parameters:	
sl_802154_short_addr_t shortId	The short ID of the neighbor.
sl_802154_long_addr_t longId	The long ID of the neighbor.
Response Parameters: None	

Name: incomingMessageHandler	**ID:** 0x0045
Description: A callback indicating a message has been received.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_incoming_message_type_t type	The type of the incoming message. One of the following: SL_ZIGBEE_INCOMING_UNICAST, SL_ZIGBEE_INCOMING_UNICAST_REPLY, SL_ZIGBEE_INCOMING_MULTICAST, SL_ZIGBEE_INCOMING_MULTICAST_LOOPBACK, SL_ZIGBEE_INCOMING_BROADCAST, SL_ZIGBEE_INCOMING_BROADCAST_LOOPBACK
sl_zigbee_aps_frame_t apsFrame	The APS frame from the incoming message.
sl_zigbee_rx_packet_info_t packetInfo	Miscellanous message information
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] message	The incoming message.

Name: setSourceRouteDiscoveryMode	**ID:** 0x005A
Description: Sets source route discovery(MTORR) mode to on, off, reschedule	
Command Parameters:	
uint8_t mode	Source route discovery mode: off:0, on:1, reschedule:2
Response Parameters:	
uint32_t remainingTime	Remaining time(ms) until next MTORR broadcast if the mode is on, MAX_INT32U_VALUE if the mode is off

Name: incomingManyToOneRouteRequestHandler	**ID:** 0x007D
Description: A callback indicating that a many-to-one route to the concentrator with the given short and long id is available for use.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_short_addr_t source	The short id of the concentrator.
sl_802154_long_addr_t longId	The EUI64 of the concentrator.
uint8_t cost	The path cost to the concentrator. The cost may decrease as additional route request packets for this discovery arrive, but the callback is made only once.

Name: incomingRouteErrorHandler	**ID:** 0x0080
Description: A callback invoked when a route error message is received. The error indicates that a problem routing to or from the target node was encountered.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	SL_STATUS_ZIGBEE_SOURCE_ROUTE_FAILURE or SL_STATUS_ZIGBEE_MANY_TO_ONE_ROUTE_FAILURE.
sl_802154_short_addr_t target	The short id of the remote node.

Name: incomingNetworkStatusHandler	**ID:** 0x00C4
Description: A callback invoked when a network status/route error message is received. The error indicates that there was a problem sending/receiving messages from the target node	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t errorCode	One byte over-the-air error code from network status message
sl_802154_short_addr_t target	The short ID of the remote node

Name: incomingRouteRecordHandler	**ID:** 0x0059
Description: Reports the arrival of a route record command frame.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_short_addr_t source	The source of the route record.
sl_802154_long_addr_t sourceEui	The EUI64 of the source.
uint8_t lastHopLqi	The link quality from the node that last relayed the route record.
int8_t lastHopRssi	The energy level (in units of dBm) observed during the reception.
uint8_t relayCount	The number of relays in relayList.
uint8_t[] relayList	The route record. Each relay in the list is an uint16_t node ID. The list is passed as uint8_t * to avoid alignment problems.

Name: setSourceRoute	**ID:** 0x00AE
Description: Supply a source route for the next outgoing message.	
Command Parameters:	
sl_802154_short_addr_t destination	The destination of the source route.
uint8_t relayCount	The number of relays in relayList.
uint16_t[] relayList	The source route.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the source route was successfully stored, and SL_STATUS_ALLOCATION_FAILED otherwise.

Name: unicastCurrentNetworkKey	**ID:** 0x0050
Description: Send the network key to a destination.	
Command Parameters:	
sl_802154_short_addr_t targetShort	The destination node of the key.
sl_802154_long_addr_t targetLong	The long address of the destination node.
sl_802154_short_addr_t parentShortId	The parent node of the destination node.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if send was successful

Name: addressTableEntryIsActive	**ID:** 0x005B
Description: Indicates whether any messages are currently being sent using this address table entry. Note that this function does not indicate whether the address table entry is unused. To determine whether an address table entry is unused, check the remote node ID. The remote node ID will have the value SL_ZIGBEE_TABLE_ENTRY_UNUSED_NODE_ID when the address table entry is not in use.	
Command Parameters:	
uint8_t addressTableIndex	The index of an address table entry.
Response Parameters:	
bool active	True if the address table entry is active, false otherwise.

Name: setAddressTableInfo	**ID:** 0x005C
Description: Sets the EUI64 and short ID of an address table entry. Usually the application will not need to set the short ID in the address table. Once the remote EUI64 is set the stack is capable of figuring out the short ID on its own. However, in cases where the application does set the short ID, the application must set the remote EUI64 prior to setting the short ID. This function will also check other address table entries, the child table and the neighbor table to see if the node ID for the given EUI64 is already known. If known then this function will set node ID. If not known it will set the node ID to SL_ZIGBEE_UNKNOWN_NODE_ID.	
Command Parameters:	
uint8_t addressTableIndex	The index of an address table entry.
sl_802154_long_addr_t eui64	The EUI64 to use for the address table entry.
sl_802154_short_addr_t id	The short ID corresponding to the remote node whose EUI64 is stored in the address table at the given index or SL_ZIGBEE_TABLE_ENTRY_UNUSED_NODE_ID which indicates that the entry stored in the address table at the given index is not in use.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the information was successfully set, and SL_STATUS_ZIGBEE_ADDRESS_TABLE_ENTRY_IS_ACTIVE otherwise.

Name: getAddressTableInfo	**ID:** 0x005E
Description: Gets the EUI64 and short ID of an address table entry.	
Command Parameters:	
uint8_t addressTableIndex	The index of an address table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_802154_short_addr_t nodeId	One of the following: The short ID corresponding to the remote node whose EUI64 is stored in the address table at the given index. SL_ZIGBEE_UNKNOWN_NODE_ID - Indicates that the EUI64 stored in the address table at the given index is valid but the short ID is currently unknown. SL_ZIGBEE_DISCOVERY_ACTIVE_NODE_ID - Indicates that the EUI64 stored in the address table at the given location is valid and network address discovery is underway. SL_ZIGBEE_TABLE_ENTRY_UNUSED_NODE_ID - Indicates that the entry stored in the address table at the given index is not in use.
sl_802154_long_addr_t eui64	The EUI64 of the address table entry is copied to this location.

Name: setExtendedTimeout	**ID:** 0x007E
Description: Tells the stack whether or not the normal interval between retransmissions of a retried unicast message should be increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT. The interval needs to be increased when sending to a sleepy node so that the message is not retransmitted until the destination has had time to wake up and poll its parent. The stack will automatically extend the timeout: - For our own sleepy children. - When an address response is received from a parent on behalf of its child. - When an indirect transaction expiry route error is received. - When an end device announcement is received from a sleepy node.	
Command Parameters:	
sl_802154_long_addr_t remoteEui64	The address of the node for which the timeout is to be set.
bool extendedTimeout	true if the retry interval should be increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT. false if the normal retry interval should be used.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the retry interval will be increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT and SL_STATUS_FAIL if the normal retry interval will be used.

Name: getExtendedTimeout	**ID:** 0x007F
Description: Indicates whether or not the stack will extend the normal interval between retransmissions of a retried unicast message by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT.	
Command Parameters:	
sl_802154_long_addr_t remoteEui64	The address of the node for which the timeout is to be returned.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the retry interval will be increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT and SL_STATUS_FAIL if the normal retry interval will be used.

Name: replaceAddressTableEntry	**ID:** 0x0082
Description: Replaces the EUI64, short ID and extended timeout setting of an address table entry. The previous EUI64, short ID and extended timeout setting are returned.	
Command Parameters:	
uint8_t addressTableIndex	The index of the address table entry that will be modified.
sl_802154_long_addr_t newEui64	The EUI64 to be written to the address table entry.
sl_802154_short_addr_t newId	One of the following: The short ID corresponding to the new EUI64. SL_ZIGBEE_UNKNOWN_NODE_ID if the new EUI64 is valid but the short ID is unknown and should be discovered by the stack. SL_ZIGBEE_TABLE_ENTRY_UNUSED_NODE_ID if the address table entry is now unused.
bool newExtendedTimeout	true if the retry interval should be increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT. false if the normal retry interval should be used.
Response Parameters:	

sl_status_t status	SL_STATUS_OK if the EUI64, short ID and extended timeout setting were successfully modified, and SL_STATUS_ZIGBEE_ADDRESS_TABLE_ENTRY_IS_ACTIVE otherwise.
sl_802154_long_addr_t oldEui64	The EUI64 of the address table entry before it was modified.
sl_802154_short_addr_t oldId	One of the following: The short ID corresponding to the EUI64 before it was modified. SL_ZIGBEE_UNKNOWN_NODE_ID if the short ID was unknown. SL_ZIGBEE_DISCOVERY_ACTIVE_NODE_ID if discovery of the short ID was underway. SL_ZIGBEE_TABLE_ENTRY_UNUSED_NODE_ID if the address table entry was unused.
bool oldExtendedTimeout	true if the retry interval was being increased by SL_ZIGBEE_INDIRECT_TRANSMISSION_TIMEOUT. false if the normal retry interval was being used.

Name: lookupNodeIdByEui64	**ID:** 0x0060
Description: Returns the node ID that corresponds to the specified EUI64. The node ID is found by searching through all stack tables for the specified EUI64.	
Command Parameters:	
sl_802154_long_addr_t eui64	The EUI64 of the node to look up.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the short ID was found, SL_STATUS_FAIL if the short ID is not known.
sl_802154_short_addr_t nodeId	The short ID of the node or SL_ZIGBEE_NULL_NODE_ID if the short ID is not known

Name: lookupEui64ByNodeId	**ID:** 0x0061
Description: Returns the EUI64 that corresponds to the specified node ID. The EUI64 is found by searching through all stack tables for the specified node ID.	
Command Parameters:	
sl_802154_short_addr_t nodeId	The short ID of the node to look up.
Response Parameters:	
sl_status_t status	SL_STATUS_OK if the EUI64 was found, SL_STATUS_FAIL if the EUI64 is not known.
sl_802154_long_addr_t eui64	The EUI64 of the node.

Name: getMulticastTableEntry	**ID:** 0x0063
Description: Gets an entry from the multicast table.	
Command Parameters:	
uint8_t index	The index of a multicast table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_multicast_table_entry_t value	The contents of the multicast entry.

Name: setMulticastTableEntry	**ID:** 0x0064
Description: Sets an entry in the multicast table.	
Command Parameters:	
uint8_t index	The index of a multicast table entry
sl_zigbee_multicast_table_entry_t value	The contents of the multicast entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: idConflictHandler	**ID:** 0x007C
Description: A callback invoked by the EmberZNet stack when an id conflict is discovered, that is, two different nodes in the network were found to be using the same short id. The stack automatically removes the conflicting short id from its internal tables (address, binding, route, neighbor, and child tables). The application should discontinue any other use of the id.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_short_addr_t id	The short id for which a conflict was detected

Name: sendRawMessage	**ID:** 0x0096
Description: Transmits the given message without modification. The MAC header is assumed to be configured in the message at the time this function is called.	
Command Parameters:	
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The raw message.
uint8_t priority	transmit priority.
bool useCca	Should we enable CCA or not.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: macPassthroughMessageHandler	**ID:** 0x0097
Description: A callback invoked by the EmberZNet stack when a MAC passthrough message is received.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_mac_passthrough_type_t messageType	The type of MAC passthrough message received.
sl_zigbee_rx_packet_info_t packetInfo	Information about the incoming packet.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The raw message that was received.

Name: macFilterMatchMessageHandler	**ID:** 0x0046
Description: A callback invoked by the EmberZNet stack when a raw MAC message that has matched one of the application's configured MAC filters.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t filterIndexMatch	The index of the filter that was matched.
sl_zigbee_mac_passthrough_type_t legacyPassthroughType	The type of MAC passthrough message received.
sl_zigbee_rx_packet_info_t packetInfo	Information about the incoming packet.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The raw message that was received.

Name: rawTransmitCompleteHandler	**ID:** 0x0098
Description: A callback invoked by the EmberZNet stack when the MAC has finished transmitting a raw message.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t messageLength	Length of the message that was transmitted.
uint8_t[] messageContents	The message that was transmitted.
sl_status_t status	SL_STATUS_OK if the transmission was successful, or SL_STATUS_ZIGBEE_DELIVERY_FAILED if not

Name: setMacPollFailureWaitTime	**ID:** 0x00F4
Description: This function is useful to sleepy end devices. This function will set the retry interval (in milliseconds) for mac data poll. This interval is the time in milliseconds the device waits before retrying a data poll when a MAC level data poll fails for any reason.	
Command Parameters:	
uint8_t waitBeforeRetryIntervalMs	Time in seconds the device waits before retrying a data poll when a MAC level data poll fails for any reason.
Response Parameters: None	

Name: getMaxMacRetries	**ID:** 0x006A
Description: Returns the maximum number of no-ack retries that will be attempted	
Command Parameters: None	
Response Parameters:	
uint8_t retries	Max MAC retries

Name: setBeaconClassificationParams	**ID:** 0x00EF
Description: Sets the priority masks and related variables for choosing the best beacon.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	The attempt to set the pramaters returns SL_STATUS_OK
sl_zigbee_beacon_classification_params_t param	Gets the beacon prioritization related variable

Name: setBeaconClassificationParams	**ID:** 0x00EF
Description: Sets the priority masks and related variables for choosing the best beacon.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	The attempt to get the pramaters returns SL_STATUS_OK
sl_zigbee_beacon_classification_params_t param	Gets the beacon prioritization related variable

Name: getBeaconClassificationParams	**ID:** 0x00F3
Description: Gets the priority masks and related variables for choosing the best beacon.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	The attempt to get the pramaters returns SL_STATUS_OK
sl_zigbee_beacon_classification_params_t param	Gets the beacon prioritization related variable

Name: pendingAckedMessages	**ID:** 0x0121
Description: Indicate whether there are pending messages in the APS retry queue.	
Command Parameters: None	
Response Parameters:	
bool pending_messages	True if there is a pending message for this network in the APS retry queue, false if not.

Name: rescheduleLinkStatusMsg	**ID:** 0x011B
Description: Reschedule sending link status message, with first one being sent immediately.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	

Name: setNwkUpdateId	**ID:** 0x011D
Description: Set the network update ID to the desired value. Must be called before joining or forming the network.	
Command Parameters:	
uint8_t nwkUpdateId	Desired value of the network update ID.
bool set_when_on_network	Set to true in case change should also apply when on network.
Response Parameters:	
sl_status_t status	Status of set operation for the network update ID.

9 Security Frames

Name: setInitialSecurityState	**ID:** 0x0068
Description: Sets the security state that will be used by the device when it forms or joins the network. This call **should not** be used when restoring saved network state via networkInit as this will result in a loss of security data and will cause communication problems when the device re-enters the network.	
Command Parameters:	
sl_zigbee_initial_security_state_t state	The security configuration to be set.
Response Parameters:	
sl_status_t success	The success or failure code of the operation.

Name: getCurrentSecurityState	**ID:** 0x0069
Description: Gets the current security state that is being used by a device that is joined in the network.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	The success or failure code of the operation.
sl_zigbee_current_security_state_t state	The security configuration in use by the stack.

Name: secManExportKey	**ID:** 0x0114
Description: Exports a key from security manager based on passed context.	
Command Parameters:	
sl_zigbee_sec_man_context_t context	Metadata to identify the requested key.
Response Parameters:	
sl_status_t status	The success or failure code of the operation.
sl_zigbee_sec_man_key_t key	Data to store the exported key in.

Name: secManImportKey	**ID:** 0x0115
Description: Imports a key into security manager based on passed context.	
Command Parameters:	
sl_zigbee_sec_man_context_t context	Metadata to identify where the imported key should be stored.
sl_zigbee_sec_man_key_t key	The key to be imported.
Response Parameters:	
sl_status_t status	The success or failure code of the operation.

Name: switchNetworkKeyHandler	**ID:** 0x006e
Description: A callback to inform the application that the Network Key has been updated and the node has been switched over to use the new key. The actual key being used is not passed up, but the sequence number is.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t sequenceNumber	The sequence number of the new network key.

Name: findKeyTableEntry	**ID:** 0x0075
Description: This function searches through the Key Table and tries to find the entry that matches the passed search criteria.	
Command Parameters:	
sl_802154_long_addr_t address	The address to search for. Alternatively, all zeros may be passed in to search for the first empty entry.
bool linkKey	This indicates whether to search for an entry that contains a link key or a master key. true means to search for an entry with a Link Key.
Response Parameters:	
uint8_t index	This indicates the index of the entry that matches the search criteria. A value of 0x00FF is returned if not matching entry is found.

Name: sendTrustCenterLinkKey	**ID:** 0x0067
Description: This function sends an APS TransportKey command containing the current trust center link key. The node to which the command is sent is specified via the short and long address arguments.	
Command Parameters:	
sl_802154_short_addr_t destinationNodeId	The short address of the node to which this command will be sent
sl_802154_long_addr_t destinationEui64	The long address of the node to which this command will be sent
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success of failure of the operation

Name: eraseKeyTableEntry	**ID:** 0x0076
Description: This function erases the data in the key table entry at the specified index. If the index is invalid, false is returned.	
Command Parameters:	
uint8_t index	This indicates the index of entry to erase.
Response Parameters:	
sl_status_t status	The success or failure of the operation.

Name: clearKeyTable	**ID:** 0x00B1
Description: This function clears the key table of the current network.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	The success or failure of the operation.

Name: requestLinkKey	**ID:** 0x0014
Description: A function to request a Link Key from the Trust Center with another device on the Network (which could be the Trust Center). A Link Key with the Trust Center is possible but the requesting device cannot be the Trust Center. Link Keys are optional in ZigBee Standard Security and thus the stack cannot know whether the other device supports them. If SL_ZIGBEE_REQUEST_KEY_TIMEOUT is non-zero on the Trust Center and the partner device is not the Trust Center, both devices must request keys with their partner device within the time period. The Trust Center only supports one outstanding key request at a time and therefore will ignore other requests. If the timeout is zero then the Trust Center will immediately respond and not wait for the second request. The Trust Center will always immediately respond to requests for a Link Key with it. Sleepy devices should poll at a higher rate until a response is received or the request times out. The success or failure of the request is returned via sl_zigbee_ezsp_zigbee_key_establishment_handler(...)	
Command Parameters:	
sl_802154_long_addr_t partner	This is the IEEE address of the partner device that will share the link key.
Response Parameters:	
sl_status_t status	The success or failure of sending the request. This is not the final result of the attempt. ezspZigbeeKeyEstablishmentHandler(...) will return that.

Name: updateTcLinkKey	**ID:** 0x006C
Description: Requests a new link key from the Trust Center. This function starts by sending a Node Descriptor request to the Trust Center to verify its R21+ stack version compliance. A Request Key message will then be sent, followed by a Verify Key Confirm message.	
Command Parameters:	
uint8_t maxAttempts	The maximum number of attempts a node should make when sending the Node Descriptor, Request Key, and Verify Key Confirm messages. The number of attempts resets for each message type sent (e.g., if maxAttempts is 3, up to 3 Node Descriptors are sent, up to 3 Request Keys, and up to 3 Verify Key Confirm messages are sent).
Response Parameters:	
sl_status_t status	The success or failure of sending the request. If the Node Descriptor is successfully transmitted, sl_zigbee_ezsp_zigbee_key_establishment_handler(...) will be called at a later time with a final status result.

Name: zigbeeKeyEstablishmentHandler	**ID:** 0x009B
Description: This is a callback that indicates the success or failure of an attempt to establish a key with a partner device.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_long_addr_t partner	This is the IEEE address of the partner that the device successfully established a key with. This value is all zeros on a failure.
sl_zigbee_key_status_t status	This is the status indicating what was established or why the key establishment failed.

Name: clearTransientLinkKeys	**ID:** 0x006B
Description: Clear all of the transient link keys from RAM.	
Command Parameters: None	
Response Parameters: None	

Name: secManGetNetworkKeyInfo	**ID:** 0x0116
Description: Retrieve information about the current and alternate network key, excluding their contents.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	Success or failure of retrieving network key info.
sl_zigbee_sec_man_network_key_info_t t network_key_info	Information about current and alternate network keys.

Name: secManGetApsKeyInfo	**ID:** 0x010C
Description: Retrieve metadata about an APS link key. Does not retrieve contents.	
Command Parameters:	
sl_zigbee_sec_man_context_t context_in	Context used to input information about key.
Response Parameters:	
sl_status_t status	Status of metadata retrieval operation.
sl_zigbee_sec_man_aps_key_metadata_t key_data	Metadata about the referenced key.

Name: secManImportLinkKey	**ID:** 0x010E
Description: Import an application link key into the key table.	
Command Parameters:	
uint8_t index	Index where this key is to be imported to.
sl_802154_long_addr_t address	EUI64 this key is associated with.
sl_zigbee_sec_man_key_t plaintext_key	The key data to be imported.
Response Parameters:	
sl_status_t status	Status of key import operation.

Name: secManExportLinkKeyByIndex	**ID:** 0x010F
Description: Export the link key at given index from the key table.	
Command Parameters:	
uint8_t index	Index of key to export.
Response Parameters:	
sl_status_t status	Status of key export operation.
sl_zigbee_sec_man_context_t context	Context referencing the exported key. Contains information like the EUI64 address it is associated with.
sl_zigbee_sec_man_key_t plaintext_key	The exported key.
sl_zigbee_sec_man_aps_key_metadata_t key_data	Metadata about the key.

Name: secManExportLinkKeyByEui	**ID:** 0x010D
Description: Export the link key associated with the given EUI from the key table.	
Command Parameters:	
sl_802154_long_addr_t eui	EUI64 associated with the key to export.
Response Parameters:	
sl_status_t status	Status of key export operation.
sl_zigbee_sec_man_context_t context	Context referring to the exported key, containing the table index that this key is located in.
sl_zigbee_sec_man_key_t plaintext_key	The exported key.
sl_zigbee_sec_man_aps_key_metadata_t key_data	Metadata about the key.

Name: secManCheckKeyContext	**ID:** 0x0110
Description: Check whether a key context can be used to load a valid key.	
Command Parameters:	
sl_zigbee_sec_man_context_t context	Context struct to check the validity of.
Response Parameters:	
sl_status_t status	Validity of the checked context.

Name: secManImportTransientKey	**ID:** 0x0111
Description: Import a transient link key.	
Command Parameters:	
sl_802154_long_addr_t eui64	EUI64 associated with this transient key.
sl_zigbee_sec_man_key_t plaintext_key	The key to import.
Response Parameters:	
sl_status_t status	Status of key import operation.

Name: secManExportTransientKeyByIndex	**ID:** 0x0112
Description: Export a transient link key from a given table index.	
Command Parameters:	
uint8_t index	Index to export from.
Response Parameters:	
sl_status_t status	Status of key export operation.
sl_zigbee_sec_man_context_t context	Context struct for export operation.
sl_zigbee_sec_man_key_t plaintext_key	The exported key.
sl_zigbee_sec_man_aps_key_metadata_t key_data	Metadata about the key.

Name: secManExportTransientKeyByEui	**ID:** 0x0113
Description: Export a transient link key associated with a given EUI64	
Command Parameters:	
sl_802154_long_addr_t eui	Index to export from.
Response Parameters:	
sl_status_t status	Status of key export operation.
sl_zigbee_sec_man_context_t context	Context struct for export operation.
sl_zigbee_sec_man_key_t plaintext_key	The exported key.
sl_zigbee_sec_man_aps_key_metadata_t key_data	Metadata about the key.

Name: setIncomingTcLinkKeyFrameCounter	**ID:** 0x0128
Description: Set the incoming TC link key frame counter to desired value.	
Command Parameters:	
uint32_t frameCounter	Value to set the frame counter to.
Response Parameters: None	

Name: apsCryptMessage	**ID:** 0x0129
Description: Encrypt/decrypt a message in-place using APS.	
Command Parameters:	
bool encrypt	Encrypt (true) or decrypt (false) the message.
uint8_t length_combined_arg	Length of the array containing message, needs to be long enough to include the auxiliary header and MIC.
uint8_t[] message	The message to be en/de-crypted.
uint8_t apsHeaderEndIndex	Index just past the APS frame.
sl_802154_long_addr_t remoteEui64	IEEE address of the device this message is associated with.
Response Parameters:	
sl_status_t status	Status of the encryption/decryption call.

10 Trust Center Frames

Name: trustCenterPostJoinHandler	**ID:** 0x0024
Description: The NCP uses the trust center behavior policy to decide whether to allow a new node to join the network (part of the trust center pre-join handler). The Host cannot change the current decision in this post-join callback, but it can change the policy for future decisions using the setPolicy command..	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_short_addr_t newNodeId	The Node Id of the node whose status changed
sl_802154_long_addr_t newNodeEui64	The EUI64 of the node whose status changed.
sl_zigbee_device_update_t status	The status of the node: Secure Join/Rejoin, Unsecure Join/Rejoin, Device left.
sl_zigbee_join_decision_t policyDecision	An sl_zigbee_join_decision_t reflecting the decision made.
sl_802154_short_addr_t parentOfNewNodeId	The parent of the node whose status has changed.

Name: broadcastNextNetworkKey	**ID:** 0x0073
Description: This function broadcasts a new encryption key, but does not tell the nodes in the network to start using it. To tell nodes to switch to the new key, use sl_zigbee_send_network_key_switch(). This is only valid for the Trust Center/Coordinator. It is up to the application to determine how quickly to send the Switch Key after sending the alternate encryption key.	
Command Parameters:	
sl_zigbee_key_data_t key	An optional pointer to a 16-byte encryption key (SL_ZIGBEE_ENCRYPTION_KEY_SIZE). An all zero key may be passed in, which will cause the stack to randomly generate a new key.
Response Parameters:	
sl_status_t status	sl_status_t value that indicates the success or failure of the command.

Name: broadcastNetworkKeySwitch	**ID:** 0x0074
Description: This function broadcasts a switch key message to tell all nodes to change to the sequence number of the previously sent Alternate Encryption Key.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	sl_status_t value that indicates the success or failure of the command.

Name: aesMmoHash	**ID:** 0x006F
Description: This routine processes the passed chunk of data and updates the hash context based on it. If the 'finalize' parameter is not set, then the length of the data passed in must be a multiple of 16. If the 'finalize' parameter is set then the length can be any value up 1-16, and the final hash value will be calculated.	
Command Parameters:	
sl_zigbee_aes_mmo_hash_context_t context	The hash context to update.

bool finalize	This indicates whether the final hash value should be calculated
uint8_t length	The length of the data to hash.
uint8_t[] data	The data to hash.
Response Parameters:	
sl_status_t status	The result of the operation
sl_zigbee_aes_mmo_hash_context_t returnContext	The updated hash context.

Name: removeDevice	**ID:** 0x00A8
Description: This command sends an APS remove device using APS encryption to the destination indicating either to remove itself from the network, or one of its children.	
Command Parameters:	
sl_802154_short_addr_t destShort	The node ID of the device that will receive the message
sl_802154_long_addr_t destLong	The long address (EUI64) of the device that will receive the message.
sl_802154_long_addr_t targetLong	The long address (EUI64) of the device to be removed.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success, or the reason for failure

Name: unicastNwkKeyUpdate	**ID:** 0x00A9
Description: This command will send a unicast transport key message with a new NWK key to the specified device. APS encryption using the device's existing link key will be used.	
Command Parameters:	
sl_802154_short_addr_t destShort	The node ID of the device that will receive the message
sl_802154_long_addr_t destLong	The long address (EUI64) of the device that will receive the message.
sl_zigbee_key_data_t key	The NWK key to send to the new device.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success, or the reason for failure

11 Certificate-Based Key Exchange (CBKE) Frames

Name: generateCbkeKeys	**ID:** 0x00A4
Description: This call starts the generation of the ECC Ephemeral Public/Private key pair. When complete it stores the private key. The results are returned via sl_zigbee_ezsp_generate_cbke_keys_handler().	
Command Parameters: None	
Response Parameters:	
sl_status_t status	

Name: generateCbkeKeysHandler	**ID:** 0x009E
Description: A callback by the Crypto Engine indicating that a new ephemeral public/private key pair has been generated. The public/private key pair is stored on the NCP, but only the associated public key is returned to the host. The node's associated certificate is also returned.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The result of the CBKE operation.
sl_zigbee_public_key_data_t ephemeralPublicKey	The generated ephemeral public key.

Name: calculateSmacs	**ID:** 0x009F
Description: Calculates the SMAC verification keys for both the initiator and responder roles of CBKE using the passed parameters and the stored public/private key pair previously generated with ezspGenerateKeysRetrieveCert(). It also stores the unverified link key data in temporary storage on the NCP until the key establishment is complete.	
Command Parameters:	
bool amInitiator	The role of this device in the Key Establishment protocol.
sl_zigbee_certificate_data_t partnerCertificate	The key establishment partner's implicit certificate.
sl_zigbee_public_key_data_t partnerEphemeralPublicKey	The key establishment partner's ephemeral public key
Response Parameters:	
sl_status_t status	

Name: calculateSmacsHandler	**ID:** 0x00A0
Description: A callback to indicate that the NCP has finished calculating the Secure Message Authentication Codes (SMAC) for both the initiator and responder. The associated link key is kept in temporary storage until the host tells the NCP to store or discard the key via sli_zigbee_stack_clear_temporary_data_maybe_store_link_key().	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The Result of the CBKE operation.
sl_zigbee_smac_data_t initiatorSmac	The calculated value of the initiator's SMAC
sl_zigbee_smac_data_t responderSmac	The calculated value of the responder's SMAC

Name: generateCbkeKeys283k1	**ID:** 0x00E8
Description: This call starts the generation of the ECC 283k1 curve Ephemeral Public/Private key pair. When complete it stores the private key. The results are returned via sl_zigbee_ezsp_generate_cbke_keys_283k1_handler().	
Command Parameters: None	
Response Parameters:	
sl_status_t status	

Name: generateCbkeKeys283k1Handler	**ID:** 0x00E9
Description: A callback by the Crypto Engine indicating that a new 283k1 ephemeral public/private key pair has been generated. The public/private key pair is stored on the NCP, but only the associated public key is returned to the host. The node's associated certificate is also returned.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The result of the CBKE operation.
sl_zigbee_public_key_283k1_data_t ephemeralPublicKey	The generated ephemeral public key.

Name: calculateSmacs283k1	**ID:** 0x00EA
Description: Calculates the SMAC verification keys for both the initiator and responder roles of CBKE for the 283k1 ECC curve using the passed parameters and the stored public/private key pair previously generated with sl_zigbee_ezsp_generate_keys_retrieve_cert_283k1(). It also stores the unverified link key data in temporary storage on the NCP until the key establishment is complete.	
Command Parameters:	
bool amInitiator	The role of this device in the Key Establishment protocol.
sl_zigbee_certificate_283k1_data_t partnerCertificate	The key establishment partner's implicit certificate.
sl_zigbee_public_key_283k1_data_t partnerEphemeralPublicKey	The key establishment partner's ephemeral public key
Response Parameters:	
sl_status_t status	

Name: calculateSmacs283k1Handler	**ID:** 0x00EB
Description: A callback to indicate that the NCP has finished calculating the Secure Message Authentication Codes (SMAC) for both the initiator and responder for the CBKE 283k1 Library. The associated link key is kept in temporary storage until the host tells the NCP to store or discard the key via sli_zigbee_stack_clear_temporary_data_maybe_store_link_key().	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The Result of the CBKE operation.
sl_zigbee_smac_data_t initiatorSmac	The calculated value of the initiator's SMAC
sl_zigbee_smac_data_t responderSmac	The calculated value of the responder's SMAC

Name: clearTemporaryDataMaybeStoreLinkKey	**ID:** 0x00A1
Description: Clears the temporary data associated with CBKE and the key establishment, most notably the ephemeral public/private key pair. If storeLinKey is true it moves the unverified link key stored in temporary storage into the link key table. Otherwise it discards the key.	
Command Parameters:	
bool storeLinkKey	A bool indicating whether to store (true) or discard (false) the unverified link key derived when ezspCalculateSmacs() was previously called.
Response Parameters:	
sl_status_t status	

Name: clearTemporaryDataMaybeStoreLinkKey283k1	**ID:** 0x00EE
Description: Clears the temporary data associated with CBKE and the key establishment, most notably the ephemeral public/private key pair. If storeLinKey is true it moves the unverified link key stored in temporary storage into the link key table. Otherwise it discards the key.	
Command Parameters:	
bool storeLinkKey	A bool indicating whether to store (true) or discard (false) the unverified link key derived when ezspCalculateSmacs() was previously called.
Response Parameters:	
sl_status_t status	

Name: getCertificate	**ID:** 0x00A5
Description: Retrieves the certificate installed on the NCP.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	
sl_zigbee_certificate_data_t localCert	The locally installed certificate.

Name: getCertificate283k1	**ID:** 0x00EC
Description: Retrieves the 283k certificate installed on the NCP.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	
sl_zigbee_certificate_283k1_data_t localCert	The locally installed certificate.

Name: dsaSign	**ID:** 0x00A6
Description: LEGACY FUNCTION: This functionality has been replaced by a single bit in the sl_zigbee_aps_frame_t, SL_ZIGBEE_APS_OPTION_DSA_SIGN. Devices wishing to send signed messages should use that as it requires fewer function calls and message buffering. The dsaSignHandler response is still called when SL_ZIGBEE_APS_OPTION_DSA_SIGN is used. However, this function is still supported. This function begins the process of signing the passed message contained within the messageContents array. If no other ECC operation is going on, it will immediately return with SL_STATUS_IN_PROGRESS to indicate the start of ECC operation. It will delay a period of time to let APS retries take place, but then it will shut down the radio and consume the CPU processing until the signing is complete. This may take up to 1 second. The signed message will be returned in the dsaSignHandler response. Note that the last byte of the messageContents passed to this function has special significance. As the typical use case for DSA signing is to sign the ZCL payload of a DRLC Report Event Status message in SE 1.0, there is often both a signed portion (ZCL payload) and an unsigned portion (ZCL header). The last byte in the content of messageToSign is therefore used as a special indicator to signify how many bytes of leading data in the array should be excluded from consideration during the signing process. If the signature needs to cover the entire array (all bytes except last one), the caller should ensure that the last byte of messageContents is 0x00. When the signature operation is complete, this final byte will be replaced by the signature type indicator (0x01 for ECDSA signatures), and the actual signature will be appended to the original contents after this byte..	
Command Parameters:	
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The message contents for which to create a signature. Per above notes, this may include a leading portion of data not included in the signature, in which case the last byte of this array should be set to the index of the first byte to be considered for signing. Otherwise, the last byte of messageContents should be 0x00 to indicate that a signature should occur across the entire contents.
Response Parameters:	
sl_status_t status	SL_STATUS_IN_PROGRESS if the stack has queued up the operation for execution. SL_STATUS_INVALID_STATE if the operation can't be performed in this context, possibly because another ECC operation is pending.

Name: dsaSignHandler	**ID:** 0x00A7
Description: The handler that returns the results of the signing operation. On success, the signature will be appended to the original message (including the signature type indicator that replaced the startIndex field for the signing) and both are returned via this callback.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The result of the DSA signing operation.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The message and attached which includes the original message and the appended signature.

Name: dsaVerify	**ID:** 0x00A3
Description: Verify that signature of the associated message digest was signed by the private key of the associated certificate.	
Command Parameters:	
sl_zigbee_message_digest_t digest	The AES-MMO message digest of the signed data. If dsaSign command was used to generate the signature for this data, the final byte (replaced by signature type of 0x01) in the messageContents array passed to dsaSign is included in the hash context used for the digest calculation.
sl_zigbee_certificate_data_t signerCertificate	The certificate of the signer. Note that the signer's certificate and the verifier's certificate must both be issued by the same Certificate Authority, so they should share the same CA Public Key.
sl_zigbee_signature_data_t receivedSig	The signature of the signed data.
Response Parameters:	
sl_status_t status	

Name: dsaVerifyHandler	**ID:** 0x0078
Description: This callback is executed by the stack when the DSA verification has completed and has a result. If the result is SL_STATUS_OK, the signature is valid. If the result is SL_STATUS_ZIGBEE_SIGNATURE_VERIFY_FAILURE then the signature is invalid. If the result is anything else then the signature verify operation failed and the validity is unknown.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	The result of the DSA verification operation.

Name: dsaVerify283k1	**ID:** 0x00B0
Description: Verify that signature of the associated message digest was signed by the private key of the associated certificate.	
Command Parameters:	
sl_zigbee_message_digest_t digest	The AES-MMO message digest of the signed data. If dsaSign command was used to generate the signature for this data, the final byte (replaced by signature type of 0x01) in the messageContents array passed to dsaSign is included in the hash context used for the digest calculation.
sl_zigbee_certificate_283k1_data_t signerCertificate	The certificate of the signer. Note that the signer's certificate and the verifier's certificate must both be issued by the same Certificate Authority, so they should share the same CA Public Key.
sl_zigbee_signature_283k1_data_t receivedSig	The signature of the signed data.
Response Parameters:	
sl_status_t status	

Name: setPreinstalledCbkeData	**ID:** 0x00A2
Description: Sets the device's CA public key, local certificate, and static private key on the NCP associated with this node.	
Command Parameters:	
sl_zigbee_public_key_data_t caPublic	The Certificate Authority's public key.
sl_zigbee_certificate_data_t myCert	The node's new certificate signed by the CA.
sl_zigbee_private_key_data_t myKey	The node's new static private key.
Response Parameters:	
sl_status_t status	

Name: savePreinstalledCbkeData283k1	**ID:** 0x00ED
Description: Sets the device's 283k1 curve CA public key, local certificate, and static private key on the NCP associated with this node.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	

12 Mfglib Frames

Name: mfglibInternalStart	**ID:** 0x0083
Description: Activate use of mfglib test routines and enables the radio receiver to report packets it receives to the mfgLibRxHandler() callback. These packets will not be passed up with a CRC failure. All other mfglib functions will return an error until the mfglibInternal-Start() has been called.	
Command Parameters:	
bool rxCallback	true to generate a mfglibRxHandler callback when a packet is received.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalEnd	**ID:** 0x0084
Description: Deactivate use of mfglib test routines; restores the hardware to the state it was in prior to mfglibInternalStart() and stops receiving packets started by mfglibInternalStart() at the same time.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalStartTone	**ID:** 0x0085
Description: Starts transmitting an unmodulated tone on the currently set channel and power level. Upon successful return, the tone will be transmitting. To stop transmitting tone, application must call mfglibInternalStopTone(), allowing it the flexibility to determine its own criteria for tone duration (time, event, etc.)	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalStopTone	**ID:** 0x0086
Description: Stops transmitting tone started by mfglibInternalStartTone ().	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalStartStream	**ID:** 0x0087
Description: Starts transmitting a random stream of characters. This is so that the radio modulation can be measured.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalStopStream	**ID:** 0x0088
Description: Stops transmitting a random stream of characters started by mfglibInternalStartStream ().	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalSendPacket	**ID:** 0x0089
Description: Sends a single packet consisting of the following bytes: packetLength, packetContents[0], ... , packetContents[packetLength - 3], CRC[0], CRC[1]. The total number of bytes sent is packetLength + 1. The radio replaces the last two bytes of packetContents[] with the 16-bit CRC for the packet.	
Command Parameters:	
uint8_t packetLength	The length of the packetContents parameter in bytes. Must be greater than 3 and less than 123.
uint8_t[] packetContents	The packet to send. The last two bytes will be replaced with the 16-bit CRC.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalSetChannel	**ID:** 0x008A
Description: Sets the radio channel. Calibration occurs if this is the first time the channel has been used.	
Command Parameters:	
uint8_t channel	The channel to switch to. Valid values are 11 to 26.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalGetChannel	**ID:** 0x008B
Description: Returns the current radio channel, as previously set via mfglibInternalSetChannel ().	
Command Parameters: None	
Response Parameters:	
uint8_t channel	The current channel.

Name: mfglibInternalSetPower	**ID:** 0x008C
Description: First select the transmit power mode, and then include a method for selecting the radio transmit power. The valid power settings depend upon the specific radio in use. Ember radios have discrete power settings, and then requested power is rounded to a valid power setting; the actual power output is available to the caller via mfglibInternalGetPower().	
Command Parameters:	
uint16_t txPowerMode	Power mode. Refer to txPowerModes in stack/include/sl_zigbee_types.h for possible values
int8_t power	Power in units of dBm. Refer to radio data sheet for valid range.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: mfglibInternalGetPower	**ID:** 0x008D
Description: Returns the current radio power setting, as previously set via mfglibInternalSetPower().	
Command Parameters: None	
Response Parameters:	
int8_t power	Power in units of dBm. Refer to radio data sheet for valid range.

Name: mfglibRxHandler	**ID:** 0x008E
Description: A callback indicating a packet with a valid CRC has been received.	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t linkQuality	The link quality observed during the reception
int8_t rssi	The energy level (in units of dBm) observed during the reception.
uint8_t packetLength	The length of the packetContents parameter in bytes. Will be greater than 3 and less than 123.
uint8_t[] packetContents	The received packet (last 2 bytes are not FCS / CRC and may be discarded).

13 Bootloader Frames

Name: launchStandaloneBootloader	**ID:** 0x008F
Description: Quits the current application and launches the standalone bootloader (if installed) The function returns an error if the standalone bootloader is not present	
Command Parameters:	
bool enabled	If true, launch the standalone bootloader. If false, do nothing.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: sendBootloadMessage	**ID:** 0x0090
Description: Transmits the given bootload message to a neighboring node using a specific 802.15.4 header that allows the EmberZNet stack as well as the bootloader to recognize the message, but will not interfere with other ZigBee stacks.	
Command Parameters:	
bool broadcast	If true, the destination address and pan id are both set to the broadcast address.
sl_802154_long_addr_t destEui64	The EUI64 of the target node. Ignored if the broadcast field is set to true.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The multicast message.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: getStandaloneBootloaderVersionPlatMicroPhy	**ID:** 0x0091
Description: Detects if the standalone bootloader is installed, and if so returns the installed version. If not return 0xffff. A returned version of 0x1234 would indicate version 1.2 build 34. Also return the node's version of PLAT, MICRO and PHY.	
Command Parameters: None	
Response Parameters:	
uint16_t bootloader_version	BOOTLOADER_INVALID_VERSION if the standalone bootloader is not present, or the version of the installed standalone bootloader.
uint8_t nodePlat	The value of PLAT on the node
uint8_t nodeMicro	The value of MICRO on the node
uint8_t nodePhy	The value of PHY on the node

Name: incomingBootloadMessageHandler	**ID:** 0x0092
Description: A callback invoked by the EmberZNet stack when a bootload message is received.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_802154_long_addr_t longId	The EUI64 of the sending node.
sl_zigbee_rx_packet_info_t packetInfo	Information about the incoming packet.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The bootload message that was sent.

Name: bootloadTransmitCompleteHandler	**ID:** 0x0093
Description: A callback invoked by the EmberZNet stack when the MAC has finished transmitting a bootload message.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	An sl_status_t value of SL_STATUS_OK if an ACK was received from the destination or SL_STATUS_ZIGBEE_DELIVERY_FAILED if no ACK was received.
uint8_t messageLength	The length of the *messageContents* parameter in bytes.
uint8_t[] messageContents	The message that was sent.

Name: aesEncrypt	**ID:** 0x0094
Description: Perform AES encryption on plaintext using key.	
Command Parameters:	
uint8_t[16] plaintext	16 bytes of plaintext.
uint8_t[16] key	The 16-byte encryption key to use.
Response Parameters:	
uint8_t[16] ciphertext	16 bytes of ciphertext.

Name: incomingMfgTestMessageHandler	**ID:** 0x0147
Description: A callback to be implemented on the Golden Node to process acknowledgements. If you supply a custom version of this handler, you must define SL_ZIGBEE_APPLICATION_HAS_INCOMING_MFG_TEST_MESSAGE_HANDLER in your application's CONFIGURATION_HEADER	
This frame is a response to the *callback* command.	
Response Parameters:	
uint8_t messageType	The type of the incoming message. Currently, the only possibility is MFG_TEST_TYPE_ACK.
uint8_t dataLength	The length of the incoming message.
uint8_t[1] data	A pointer to the data received in the current message.

Name: mfgTestSetPacketMode	**ID:** 0x0148
Description: A function used on the Golden Node to switch between normal network operation (for testing) and manufacturing configuration. Like emberSleep(), it may not be possible to execute this command due to pending network activity. For the transition from normal network operation to manufacturing configuration, it is customary to loop, calling this function alternately with emberTick() until the mode change succeeds.	
Command Parameters:	
bool beginConfiguration	Determines the new mode of operation. true causes the node to enter manufacturing configuration. false causes the node to return to normal network operation.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

Name: mfgTestSendRebootCommand	**ID:** 0x0149
Description: A function used during manufacturing configuration on the Golden Node to send the DUT a reboot command. The usual practice is to execute this command at the end of manufacturing configuration, to place the DUT into normal network operation for testing. This function executes only during manufacturing configuration mode and returns an error otherwise. If successful, the DUT acknowledges the reboot command within 20 milliseconds and then reboots.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

Name: mfgTestSendEui64	**ID:** 0x014A
Description: A function used during manufacturing configuration on the Golden Node to set the DUT's 8-byte EUI ID. This function executes only during manufacturing configuration mode and returns an error otherwise. If successful, the DUT acknowledges the new EUI ID within 150 milliseconds.	
Command Parameters:	
sl_802154_long_addr_t newId	The 8-byte EUID for the DUT.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

Name: mfgTestSendManufacturingString	**ID:** 0x014B
Description: A function used during manufacturing configuration on the Golden Node to set the DUT's 16-byte configuration string. This function executes only during manufacturing configuration mode and will return an error otherwise. If successful, the DUT will acknowledge the new string within 150 milliseconds.	
Command Parameters:	
sl_zigbee_manufacturing_string_t newString	The 16-byte manufacturing string.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

Name: mfgTestSendRadioParameters	**ID:** 0x014C
Description: A function used during manufacturing configuration on the Golden Node to set the DUT's radio parameters. This function executes only during manufacturing configuration mode and returns an error otherwise. If successful, the DUT acknowledges the new parameters within 25 milliseconds.	
Command Parameters:	
uint8_t supportedBands	Sets the radio band for the DUT. See ember-common.h for possible values.
int8_t crystalOffset	Sets the CC1020 crystal offset. This parameter has no effect on the EM2420, and it may safely be set to 0 for this RFIC.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

Name: mfgTestSendCommand	**ID:** 0x014D
Description: A function used in each of the manufacturing configuration API calls. Most implementations will not need to call this function directly. See mfg-test.c for more detail. This function executes only during manufacturing configuration mode and returns an error otherwise.	
Command Parameters:	
uint8_t[1] command	A pointer to the outgoing command string.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or failure of the command.

14 ZLL Frames

Name: zllNetworkOps	**ID:** 0x00B2
Description: A consolidation of ZLL network operations with similar signatures; specifically, forming and joining networks or touch-linking.	
Command Parameters:	
sl_zigbee_zll_network_t networkInfo	Information about the network.
sl_zigbee_ezsp_zll_network_operation_t op	Operation indicator.
int8_t radioTxPower	Radio transmission power.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: zllSetInitialSecurityState	**ID:** 0x00B3
Description: This call will cause the device to setup the security information used in its network. It must be called prior to forming, starting, or joining a network.	
Command Parameters:	
sl_zigbee_key_data_t networkKey	ZLL Network key.
sl_zigbee_zll_initial_security_state_t securityState	Initial security state of the network.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: zllSetSecurityStateWithoutKey	**ID:** 0x00CF
Description: This call will update ZLL security token information. Unlike sli_zigbee_stack_zll_set_initial_security_state, this can be called while a network is already established.	
Command Parameters:	
sl_zigbee_zll_initial_security_state_t securityState	Security state of the network.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: zllStartScan	**ID:** 0x00B4
Description: This call will initiate a ZLL network scan on all the specified channels.	
Command Parameters:	
uint32_t channelMask	The range of channels to scan.
int8_t radioPowerForScan	The radio output power used for the scan requests.
sl_zigbee_node_type_t nodeType	The node type of the local device.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: zllSetRxOnWhenIdle	**ID:** 0x00B5
Description: This call will change the mode of the radio so that the receiver is on for a specified amount of time when the device is idle.	
Command Parameters:	
uint32_t durationMs	The duration in milliseconds to leave the radio on.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: zllNetworkFoundHandler	**ID:** 0x00B6
Description: This call is fired when a ZLL network scan finds a ZLL network.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_zll_network_t networkInfo	Information about the network.
bool isDeviceInfoNull	Used to interpret deviceInfo field.
sl_zigbee_zll_device_info_record_t deviceInfo	Device specific information.
sl_zigbee_rx_packet_info_t packetInfo	Information about the incoming packet received from this network.

Name: zllScanCompleteHandler	**ID:** 0x00B7
Description: This call is fired when a ZLL network scan is complete.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	Status of the operation.

Name: zllAddressAssignmentHandler	**ID:** 0x00B8
Description: This call is fired when network and group addresses are assigned to a remote mode in a network start or network join request.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_zll_address_assignment_t addressInfo	Address assignment information.
sl_zigbee_rx_packet_info_t packetInfo	Information about the incoming packet.

Name: zllTouchLinkTargetHandler	**ID:** 0x00BB
Description: This call is fired when the device is a target of a touch link.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_zll_network_t networkInfo	Information about the network.

Name: zllGetTokens	**ID:** 0x00BC
Description: Get the ZLL tokens.	
Command Parameters: None	
Response Parameters:	
sl_zigbee_tok_type_stack_zll_data_t data	Data token return value.
sl_zigbee_tok_type_stack_zll_security_t security	Security token return value.

Name: zllSetDataToken	**ID:** 0x00BD
Description: Set the ZLL data token.	
Command Parameters:	
sl_zigbee_tok_type_stack_zll_data_t data	Data token to be set.
Response Parameters: None	

Name: zllSetNonZllNetwork	**ID:** 0x00BF
Description: Set the ZLL data token bitmask to reflect the ZLL network state.	
Command Parameters: None	
Response Parameters: None	

Name: isZllNetwork	**ID:** 0x00BE
Description: Is this a ZLL network?	
Command Parameters: None	
Response Parameters:	
bool isZllNetwork	ZLL network?

Name: zllSetRadioIdleMode	**ID:** 0x00D4
Description: This call sets the radio's default idle power mode.	
Command Parameters:	
sl_zigbee_radio_power_mode_t mode	The power mode to be set.
Response Parameters: None	

Name: zllGetRadioIdleMode	**ID:** 0x00BA
Description: This call gets the radio's default idle power mode.	
Command Parameters: None	
Response Parameters:	
uint8_t radioIdleMode	The current power mode.

Name: setZllNodeType	**ID:** 0x00D5
Description: This call sets the default node type for a factory new ZLL device.	
Command Parameters:	
sl_zigbee_node_type_t nodeType	The node type to be set.
Response Parameters: None	

Name: setZllAdditionalState	**ID:** 0x00D6
Description: This call sets additional capability bits in the ZLL state.	
Command Parameters:	
uint16_t state	A mask with the bits to be set or cleared.
Response Parameters: None	

Name: zllOperationInProgress	**ID:** 0x00D7
Description: Is there a ZLL (Touchlink) operation in progress?	
Command Parameters: None	
Response Parameters:	
bool zllOperationInProgress	ZLL operation in progress?

Name: zllRxOnWhenIdleGetActive	**ID:** 0x00D8
Description: Is the ZLL radio on when idle mode is active?	
Command Parameters: None	
Response Parameters:	
bool zllRxOnWhenIdleGetActive	ZLL radio on when idle mode is active?

Name: zllScanningComplete	**ID:** 0x00F6
Description: Informs the ZLL API that application scanning is complete	
Command Parameters: None	
Response Parameters: None	

Name: getZllPrimaryChannelMask	**ID:** 0x00D9
Description: Get the primary ZLL (touchlink) channel mask.	
Command Parameters: None	
Response Parameters:	
uint32_t zllPrimaryChannelMask	The primary ZLL channel mask

Name: getZllSecondaryChannelMask	**ID:** 0x00DA
Description: Get the secondary ZLL (touchlink) channel mask.	
Command Parameters: None	
Response Parameters:	
uint32_t zllSecondaryChannelMask	The secondary ZLL channel mask

Name: setZllPrimaryChannelMask	**ID:** 0x00DB
Description: Set the primary ZLL (touchlink) channel mask	
Command Parameters:	
uint32_t zllPrimaryChannelMask	The primary ZLL channel mask
Response Parameters: None	

Name: setZllSecondaryChannelMask	**ID:** 0x00DC
Description: Set the secondary ZLL (touchlink) channel mask.	
Command Parameters:	
uint32_t zllSecondaryChannelMask	The secondary ZLL channel mask
Response Parameters: None	

Name: zllClearTokens	**ID:** 0x0025
Description: Clear ZLL stack tokens.	
Command Parameters: None	
Response Parameters: None	

15 Green Power Frames

Name: gpProxyTableProcessGpPairing	**ID:** 0x00C9
Description: Update the GP Proxy table based on a GP pairing.	
Command Parameters:	
uint32_t options	The options field of the GP Pairing command.
sl_zigbee_gp_address_t addr	The target GPD.
uint8_t commMode	The communication mode of the GP Sink.
uint16_t sinkNetworkAddress	The network address of the GP Sink.
uint16_t sinkGroupId	The group ID of the GP Sink.
uint16_t assignedAlias	The alias assigned to the GPD.
uint8_t[8] sinkIeeeAddress	The IEEE address of the GP Sink.
sl_zigbee_key_data_t gpdKey	The key to use for the target GPD.
uint32_t gpdSecurityFrameCounter	The GPD security frame counter.
uint8_t forwardingRadius	The forwarding radius.
Response Parameters:	
bool gpPairingAdded	Whether a GP Pairing has been created or not.

Name: dGpSend	**ID:** 0x00C6
Description: Adds/removes an entry from the GP Tx Queue.	
Command Parameters:	
bool action	The action to perform on the GP TX queue (true to add, false to remove).
bool useCca	Whether to use ClearChannelAssessment when transmitting the GPDF.
sl_zigbee_gp_address_t addr	The Address of the destination GPD.
uint8_t gpdCommandId	The GPD command ID to send.
uint8_t gpdAsduLength	The length of the GP command payload.
uint8_t[] gpdAsdu	The GP command payload.
uint8_t gpepHandle	The handle to refer to the GPDF.
uint16_t gpTxQueueEntryLifetimeMs	How long to keep the GPDF in the TX Queue.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: dGpSentHandler	**ID:** 0x00C7
Description: A callback to the GP endpoint to indicate the result of the GPDF transmission.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
uint8_t gpepHandle	The handle of the GPDF.

Name: gpepIncomingMessageHandler	**ID:** 0x00C5
Description: A callback invoked by the ZigBee GP stack when a GPDF is received.	
This frame is a response to the *callback* command.	
Response Parameters:	
sl_zigbee_gp_status_t gp_status	The status of the GPDF receive.
uint8_t gpdLink	The gpdLink value of the received GPDF.
uint8_t sequenceNumber	The GPDF sequence number.
sl_zigbee_gp_address_t addr	The address of the source GPD.
sl_zigbee_gp_security_level_t gpdfSecurityLevel	The security level of the received GPDF.
sl_zigbee_gp_key_type_t gpdfSecurityKeyType	The securityKeyType used to decrypt/authenticate the incoming GPDF.
bool autoCommissioning	Whether the incoming GPDF had the auto-commissioning bit set.
uint8_t bidirectionalInfo	Bidirectional information represented in bitfields, where bit0 holds the rxAfterTx of incoming gpdf and bit1 holds if tx queue is available for outgoing gpdf.
uint32_t gpdSecurityFrameCounter	The security frame counter of the incoming GDPF.
uint8_t gpdCommandId	The gpdCommandId of the incoming GPDF.
uint32_t mic	The received MIC of the GPDF.
uint8_t proxyTableIndex	The proxy table index of the corresponding proxy table entry to the incoming GPDF.
uint8_t gpdCommandPayloadLength	The length of the GPD command payload.
uint8_t[] gpdCommandPayload	The GPD command payload.
sl_zigbee_rx_packet_info_t packetInfo	Rx packet information.

Name: gpProxyTableGetEntry	**ID:** 0x00C8
Description: Retrieves the proxy table entry stored at the passed index.	
Command Parameters:	
uint8_t proxyIndex	The index of the requested proxy table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_gp_proxy_table_entry_t entry	An sl_zigbee_gp_proxy_table_entry_t struct containing a copy of the requested proxy entry.

Name: gpProxyTableLookup	**ID:** 0x00C0
Description: Finds the index of the passed address in the gp table.	
Command Parameters:	
sl_zigbee_gp_address_t addr	The address to search for
Response Parameters:	
uint8_t index	The index, or 0x00FF for not found

Name: gpSinkTableGetEntry	**ID:** 0x00DD
Description: Retrieves the sink table entry stored at the passed index.	
Command Parameters:	
uint8_t sinkIndex	The index of the requested sink table entry.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_gp_sink_table_entry_t entry	An sl_zigbee_gp_sink_table_entry_t struct containing a copy of the requested sink entry.

Name: gpSinkTableLookup	**ID:** 0x00DE
Description: Finds the index of the passed address in the gp table.	
Command Parameters:	
sl_zigbee_gp_address_t addr	The address to search for.
Response Parameters:	
uint8_t index	The index, or 0xFF for not found

Name: gpSinkTableSetEntry	**ID:** 0x00DF
Description: Retrieves the sink table entry stored at the passed index.	
Command Parameters:	
uint8_t sinkIndex	The index of the requested sink table entry.
sl_zigbee_gp_sink_table_entry_t entry	An sl_zigbee_gp_sink_table_entry_t struct containing a copy of the sink entry to be updated.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: gpSinkTableRemoveEntry	**ID:** 0x00E0
Description: Removes the sink table entry stored at the passed index.	
Command Parameters:	
uint8_t sinkIndex	The index of the requested sink table entry.
Response Parameters: None	

Name: gpSinkTableFindOrAllocateEntry	**ID:** 0x00E1
Description: Finds or allocates a sink entry	
Command Parameters:	
sl_zigbee_gp_address_t addr	An sl_zigbee_gp_address_t struct containing a copy of the gpd address to be found.
Response Parameters:	
uint8_t index	An index of found or allocated sink or 0xFF if failed.

Name: gpSinkTableClearAll	**ID:** 0x00E2
Description: Clear the entire sink table	
Command Parameters: None	
Response Parameters: None	

Name: gpSinkTableInit	**ID:** 0x0070
Description: Initializes Sink Table	
Command Parameters: None	
Response Parameters: None	

Name: gpSinkTableSetSecurityFrameCounter	**ID:** 0x00F5
Description: Sets security framecounter in the sink table	
Command Parameters:	
uint8_t index	Index to the Sink table
uint32_t sfc	Security Frame Counter
Response Parameters: None	

Name: gpSinkCommission	**ID:** 0x010A
Description: Puts the GPS in commissioning mode.	
Command Parameters:	
uint8_t options	commissioning options
uint16_t gpmAddrForSecurity	gpm address for security.
uint16_t gpmAddrForPairing	gpm address for pairing.
uint8_t sinkEndpoint	sink endpoint.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: gpTranslationTableClear	**ID:** 0x010B
Description: Clears all entries within the translation table.	
Command Parameters: None	
Response Parameters: None	

Name: gpSinkTableGetNumberOfActiveEntries	**ID:** 0x0118
Description: Return number of active entries in sink table.	
Command Parameters: None	
Response Parameters:	
Uint_t number_of_entries	Number of active entries in sink table.

16 Token Interface Frames

Name: getTokenCount	**ID:** 0x0100
Description: Gets the total number of tokens.	
Command Parameters: None	
Response Parameters:	
uint8_t count	Total number of tokens.

Name: getTokenInfo	**ID:** 0x0101
Description: Gets the token information for a single token at provided index	
Command Parameters:	
uint8_t index	Index of the token in the token table for which information is needed.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_token_info_t tokenInfo	Token information.

Name: getTokenData	**ID:** 0x0102
Description: Gets the token data for a single token with provided key	
Command Parameters:	
uint32_t token	Key of the token in the token table for which data is needed.
uint32_t index	Index in case of the indexed token.
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.
sl_zigbee_token_data_t tokenData	Token Data

Name: setTokenData	**ID:** 0x0103
Description: Sets the token data for a single token with provided key	
Command Parameters:	
uint32_t token	Key of the token in the token table for which data is to be set.
uint32_t index	Index in case of the indexed token.
sl_zigbee_token_data_t tokenData	Token Data
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: resetNode	**ID:** 0x0104
Description: Reset the node by calling halReboot.	
Command Parameters: None	
Response Parameters: None	

Name: gpSecurity Test Vectors	**ID:** 0x0117
Description: Run GP security test vectors.	
Command Parameters: None	
Response Parameters:	
sl_status_t status	An sl_status_t value indicating success or the reason for failure.

Name: tokenFactoryReset	**ID:** 0x0077
Description: Factory reset all configured Zigbee tokens.	
Command Parameters:	
bool excludeOutgoingFC	Exclude network and APS outgoing frame counter tokens.
Bool excludeBootCounter	Exclude stack boot counter token.
Response Parameters: None	

17 Alphabetical List of Frames

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addEndpoint	0x0002
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aesEncrypt	0x0094
aesMmoHash	0x006F
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broadcastNetworkKeySwitch	0x0074
broadcastNextNetworkKey	0x0073
calculateSmacs	0x009F
calculateSmacs283k1	0x00EA
calculateSmacs283k1Handler	0x00EB
calculateSmacsHandler	0x00A0
callback	0x0006
childId	0x0106
childIndex	0x0107
childJoinHandler	0x0023
childPower	0x0134
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clearTransientLinkKeys	0x006B
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concentratorStartDiscovery	0x014F
concentratorStopDiscovery	0x0150
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counterRequiresPhyIndex	0x0132
counterRolloverHandler	0x00F2
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customFrameHandler	0x0054
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deleteBinding	0x002D
dsaSign	0x00A6
dsaSignHandler	0x00A7
dsaVerify	0x00A3
dsaVerify283k1	0x00B0
dsaVerifyHandler	0x0078
dutyCycleHandler	0x004D
echo	0x0081
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energyScanResultHandler	0x0048
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generateCbkeKeys	0x00A4
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generateCbkeKeys283k1Handler	0x00E9
generateCbkeKeysHandler	0x009E
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getBinding	0x002C
getBindingRemoteNodeId	0x002F
getCertificate	0x00A5
getCertificate283k1	0x00EC
getChildData	0x004A
getConfigurationValue	0x0052
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getDutyCycleState	0x0035
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getEndpointCluster	0x0131
getEndpointCount	0x012F
getEndpointDescription	0x0130
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getExtendedTimeout	0x007F
getExtendedValue	0x0003
getInitialNeighborOutgoingCost	0x0123
getLibraryStatus	0x0001
getManufacturerCode	0x00CA
getMaxMacRetries	0x006A
getMfgToken	0x000B
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getNeighbor	0x0079
getNeighborFrameCounter	0x003E
getNetworkParameters	0x0028
getNodeId	0x0027
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getParentChildParameters	0x0029
getParentIncomingNwkFrameCounter	0x013E
getPermitJoining	0x011F
getPhyInterfaceCount	0x00FC
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gpSinkTableFindOrAllocateEntry	0x00E1
gpSinkTableGetEntry	0x00DD
gpSinkTableGetNumberOfActiveEntries	0x0118
gpSinkTableInit	0x0070
gpSinkTableLookup	0x00DE
gpSinkTableRemoveEntry	0x00E0
gpSinkTableSetEntry	0x00DF
gpSinkTableSetSecurityFrameCounter	0x00F5
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mfgTestSetPacketMode	0x0148
mfglibInternalEnd	0x0084
mfglibInternalGetChannel	0x008B
mfglibInternalGetPower	0x008D
mfglibInternalSendPacket	0x0089
mfglibInternalSetChannel	0x008A
mfglibInternalSetPower	0x008C
mfglibInternalStart	0x0083
mfglibInternalStartStream	0x0087
mfglibInternalStartTone	0x0085
mfglibInternalStopStream	0x0088
mfglibInternalStopTone	0x0086
mfglibRxHandler	0x008E
multiPhySetRadioChannel	0x00FB
multiPhySetRadioPower	0x00FA
multiPhyStart	0x00F8
multiPhyStop	0x00F9
neighborCount	0x007A
networkFoundHandler	0x001B
networkInit	0x0017
networkState	0x0018
noCallbacks	0x0007
nop	0x0005
okToHibernate	0x0141
okToLongPoll	0x0142
okToNap	0x0146
parentTokenSet	0x0140
pendingAckedMessages	0x0121
permitJoining	0x0022
pollCompleteHandler	0x0043
pollForData	0x0042
pollHandler	0x0044
proxyNextBroadcastFromLong	0x0066
radioGetSchedulerPriorities	0x012A
radioGetSchedulerSliptime	0x012C
radioSetSchedulerPriorities	0x012B
radioSetSchedulerSliptime	0x012D
rawTransmitCompleteHandler	0x0098
readAndClearCounters	0x0065
readAttribute	0x0108
readCounters	0x00F1
remoteDeleteBindingHandler	0x0032
remoteSetBindingHandler	0x0031
removeChild	0x0139
removeDevice	0x00A8
removeNeighbor	0x013A
replaceAddressTableEntry	0x0082
requestLinkKey	0x0014
rescheduleLinkStatusMsg	0x011B
resetNode	0x0104
resetRejoiningNeighborsFrameCounter	0x0124
routerChildCount	0x013B
savePreinstalledCbkeData283k1	0x00ED

scanCompleteHandler	0x001C
secManCheckKeyContext	0x0110
secManExportKey	0x0114
secManExportLinkKeyByEui	0x010D
secManExportLinkKeyByIndex	0x010F
secManExportTransientKeyByEui	0x0113
secManExportTransientKeyByIndex	0x0112
secManGetApsKeyInfo	0x010C
secManGetNetworkKeyInfo	0x0116
secManImportKey	0x0115
secManImportLinkKey	0x010E
secManImportTransientKey	0x0111
sendBootloadMessage	0x0090
sendBroadcast	0x0036
sendLinkPowerDeltaRequest	0x00F7
sendManyToOneRouteRequest	0x0041
sendMulticast	0x0038
sendPanIdUpdate	0x0057
sendRawMessage	0x0051
sendReply	0x0039
sendTrustCenterLinkKey	0x0067
sendUnicast	0x0034
sendZigbeeLeave	0x011A
setAddressTableInfo	0x005C
setBeaconClassificationParams	0x00EF
setBinding	0x002B
setBindingRemoteNodeId	0x0030
setBrokenRouteErrorCode	0x0011
setChildData	0x00AC
setChildPower	0x0135
setConcentrator	0x0010
setConfigurationValue	0x0053
setDutyCycleLimitsInStack	0x0040
setExtendedTimeout	0x007E
setIncomingTcLinkKeyFrameCounter	0x0128
setInitialNeighborOutgoingCost	0x0122
setInitialSecurityState	0x0068
setLogicalAndRadioChannel	0x00B9
setMacPollFailureWaitTime	0x00F4
setManufacturerCode	0x0015
setMessageFlag	0x0136
setMfgToken	0x000C
setMulticastTableEntry	0x0064
setNeighborFrameCounter	0x00AD
setNumBeaconsToStore	0x0037
setNwkUpdateId	0x011D
setParentIncomingNwkFrameCounter	0x013F
setPassiveAckConfig	0x0105
setPendingNetworkUpdatePanId	0x011E
setPolicy	0x0055
setPowerDescriptor	0x0016
setPreinstalledCbkeData	0x00A2
setRadioChannel	0x009A
setRadioIeee802154CcaMode	0x0095

setRadioPower	0x0099
setRoutingShortcutThreshold	0x00D0
setSourceRoute	0x00AE
setSourceRouteDiscoveryMode	0x005A
setTimer	0x000E
setToken	0x0009
setTokenData	0x0103
setValue	0x00AB
setZllAdditionalState	0x00D6
setZllNodeType	0x00D5
setZllPrimaryChannelMask	0x00DB
setZllSecondaryChannelMask	0x00DC
setupDelayedJoin	0x003A
sleepyToSleepyNetworkStart	0x0119
stackPowerDown	0x0143
stackPowerUp	0x0144
stackStatusHandler	0x0019
stackTokenChangedHandler	0x000D
startScan	0x001A
stopScan	0x001D
switchNetworkKeyHandler	0x006E
timerHandler	0x000F
tokenFactoryReset	0x0077
trustCenterPostJoinHandler	0x0024
unicastCurrentNetworkKey	0x0050
unicastNwkKeyUpdate	0x00A9
unusedPanIdFoundHandler	0x00D2
updateTcLinkKey	0x006C
version	0x0000
writeAttribute	0x0109
writeNodeData	0x00FE
zigbeeKeyEstablishmentHandler	0x009B
zllAddressAssignmentHandler	0x00B8
zllClearTokens	0x0025
zllGetRadioIdleMode	0x00BA
zllGetTokens	0x00BC
zllNetworkFoundHandler	0x00B6
zllNetworkOps	0x00B2
zllOperationInProgress	0x00D7
zllRxOnWhenIdleGetActive	0x00D8
zllScanCompleteHandler	0x00B7
zllScanningComplete	0x00F6
zllSetDataToken	0x00BD
zllSetInitialSecurityState	0x00B3
zllSetNonZllNetwork	0x00BF
zllSetRadioIdleMode	0x00D4
zllSetRxOnWhenIdle	0x00B5
zllSetSecurityStateWithoutKey	0x00CF
zllStartScan	0x00B4
zllTouchLinkTargetHandler	0x00BB

18 Numeric List of Frames

ID	Name
0x0000	version
0x0001	getLibraryStatus
0x0002	addEndpoint
0x0003	getExtendedValue
0x0004	getStoredBeacon
0x0005	nop
0x0006	callback
0x0007	noCallbacks
0x0008	getNumStoredBeacons
0x0009	setToken
0x000A	getToken
0x000B	getMfgToken
0x000C	setMfgToken
0x000D	stackTokenChangedHandler
0x000E	setTimer
0x000F	timerHandler
0x0010	setConcentrator
0x0011	setBrokenRouteErrorCode
0x0012	debugWrite
0x0013	getXncpInfo
0x0014	requestLinkKey
0x0015	setManufacturerCode
0x0016	setPowerDescriptor
0x0017	networkInit
0x0018	networkState
0x0019	stackStatusHandler
0x001A	startScan
0x001B	networkFoundHandler
0x001C	scanCompleteHandler
0x001D	stopScan
0x001E	formNetwork
0x001F	joinNetwork
0x0020	leaveNetwork
0x0021	findAndRejoinNetwork
0x0022	permitJoining
0x0023	childJoinHandler
0x0024	trustCenterPostJoinHandler
0x0025	zllClearTokens
0x0026	getEui64
0x0027	getNodeId
0x0028	getNetworkParameters
0x0029	getParentChildParameters
0x002A	clearBindingTable
0x002B	setBinding
0x002C	getBinding
0x002D	deleteBinding
0x002E	bindingIsActive
0x002F	getBindingRemoteNodeId
0x0030	setBindingRemoteNodeId
0x0031	remoteSetBindingHandler

0x0032	remoteDeleteBindingHandler
0x0033	maximumPayloadLength
0x0034	sendUnicast
0x0035	getDutyCycleState
0x0036	sendBroadcast
0x0037	setNumBeaconsToStore
0x0038	sendMulticast
0x0039	sendReply
0x003A	setupDelayedJoin
0x003B	joinNetworkDirectly
0x003C	clearStoredBeacons
0x003D	-- unassigned --
0x003E	getNeighborFrameCounter
0x003F	messageSentHandler
0x0040	setDutyCycleLimitsInStack
0x0041	sendManyToOneRouteRequest
0x0042	pollForData
0x0043	pollCompleteHandler
0x0044	pollHandler
0x0045	incomingMessageHandler
0x0046	macFilterMatchMessageHandler
0x0047	customFrame
0x0048	energyScanResultHandler
0x0049	getRandomNumber
0x004A	getChildData
0x004B	getDutyCycleLimits
0x004C	getCurrentDutyCycle
0x004D	dutyCycleHandler
0x004E	getTimer
0x004F	getTrueRandomEntropySource
0x0050	unicastCurrentNetworkKey
0x0051	sendRawMessage
0x0052	getConfigurationValue
0x0053	setConfigurationValue
0x0054	customFrameHandler
0x0055	setPolicy
0x0056	getPolicy
0x0057	sendPanIdUpdate
0x0058	invalidCommand
0x0059	incomingRouteRecordHandler
0x005A	setSourceRouteDiscoveryMode
0x005B	addressTableEntryIsActive
0x005C	setAddressTableInfo
0x005D	-- unassigned --
0x005E	getAddressTableInfo
0x005F	-- unassigned --
0x0060	lookupNodeIdByEui64
0x0061	lookupEui64ByNodeId
0x0062	-- unassigned --
0x0063	getMulticastTableEntry
0x0064	setMulticastTableEntry
0x0065	readAndClearCounters
0x0066	proxyNextBroadcastFromLong
0x0067	sendTrustCenterLinkKey

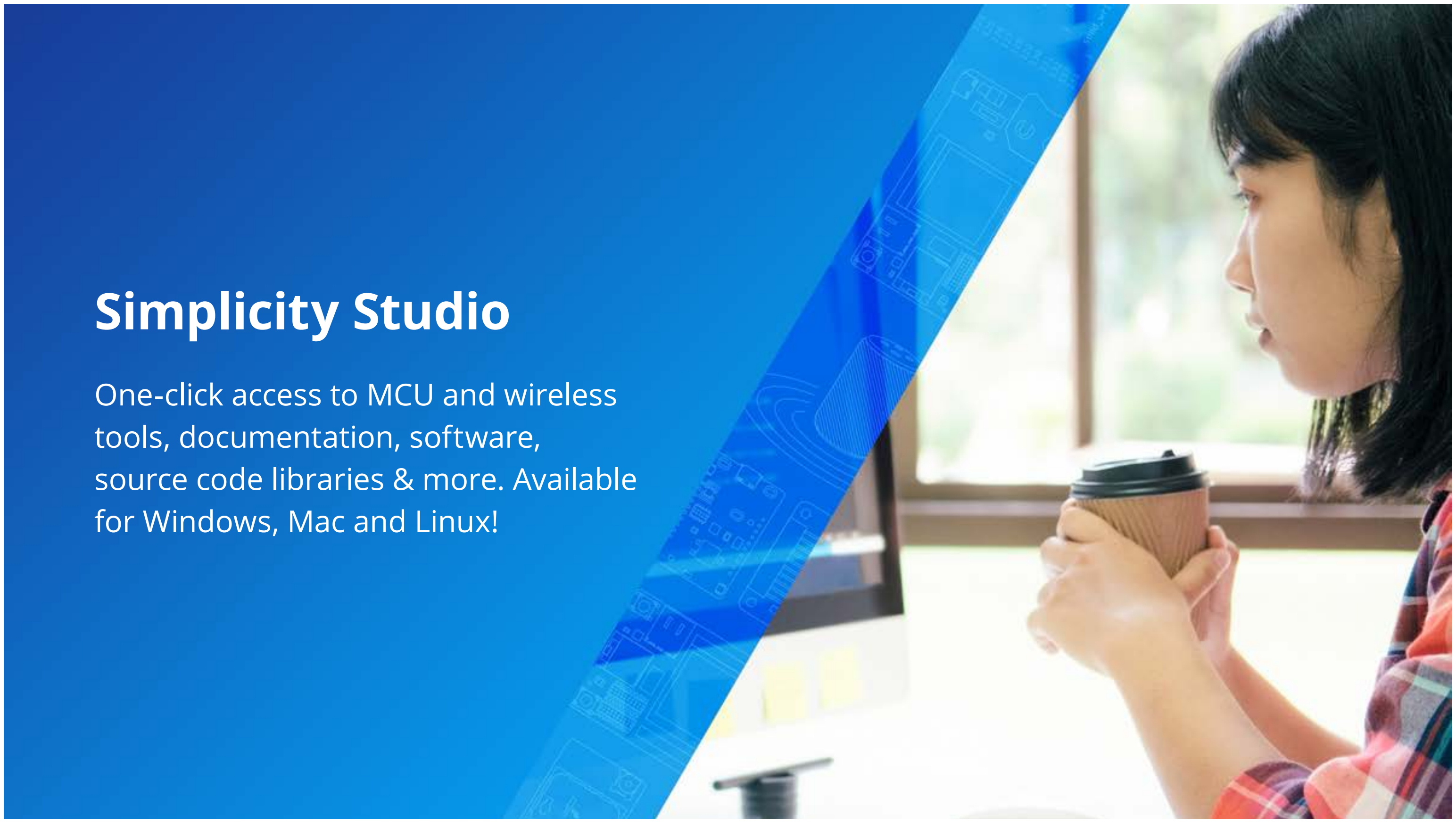
0x0068	setInitialSecurityState
0x0069	getCurrentSecurityState
0x006A	getMaxMacRetries
0x006B	clearTransientLinkKeys
0x006C	updateTcLinkKey
0x006D	-- unassigned --
0x006E	switchNetworkKeyHandler
0x006F	aesMmoHash
0x0070	gpSinkTableInit
0x0071	-- unassigned --
0x0072	-- unassigned --
0x0073	broadcastNextNetworkKey
0x0074	broadcastNetworkKeySwitch
0x0075	findKeyTableEntry
0x0076	eraseKeyTableEntry
0x0077	tokenFactoryReset
0x0078	dsaVerifyHandler
0x0079	getNeighbor
0x007A	neighborCount
0x007B	getRouteTableEntry
0x007C	idConflictHandler
0x007D	incomingManyToOneRouteRequestHandler
0x007E	setExtendedTimeout
0x007F	getExtendedTimeout
0x0080	incomingRouteErrorHandler
0x0081	echo
0x0082	replaceAddressTableEntry
0x0083	mfglibInternalStart
0x0084	mfglibInternalEnd
0x0085	mfglibInternalStartTone
0x0086	mfglibInternalStopTone
0x0087	mfglibInternalStartStream
0x0088	mfglibInternalStopStream
0x0089	mfglibInternalSendPacket
0x008A	mfglibInternalSetChannel
0x008B	mfglibInternalGetChannel
0x008C	mfglibInternalSetPower
0x008D	mfglibInternalGetPower
0x008E	mfglibRxHandler
0x008F	launchStandaloneBootloader
0x0090	sendBootloadMessage
0x0091	getStandaloneBootloaderVersionPlatMicroPhy
0x0092	incomingBootloadMessageHandler
0x0093	bootloadTransmitCompleteHandler
0x0094	aesEncrypt
0x0095	setRadioIeee802154CcaMode
0x0096	-- unassigned --
0x0097	macPassthroughMessageHandler
0x0098	rawTransmitCompleteHandler
0x0099	setRadioPower
0x009A	setRadioChannel
0x009B	zigbeeKeyEstablishmentHandler
0x009C	energyScanRequest
0x009D	delayTest

0x009E	generateCbkeKeysHandler
0x009F	calculateSmacs
0x00A0	calculateSmacsHandler
0x00A1	clearTemporaryDataMaybeStoreLinkKey
0x00A2	setPreinstalledCbkeData
0x00A3	dsaVerify
0x00A4	generateCbkeKeys
0x00A5	getCertificate
0x00A6	dsaSign
0x00A7	dsaSignHandler
0x00A8	removeDevice
0x00A9	unicastNwkKeyUpdate
0x00AA	getValue
0x00AB	setValue
0x00AC	setChildData
0x00AD	setNeighborFrameCounter
0x00AE	setSourceRoute
0x00AF	-- unassigned --
0x00B0	dsaVerify283k1
0x00B1	clearKeyTable
0x00B2	zllNetworkOps
0x00B3	zllSetInitialSecurityState
0x00B4	zllStartScan
0x00B5	zllSetRxOnWhenIdle
0x00B6	zllNetworkFoundHandler
0x00B7	zllScanCompleteHandler
0x00B8	zllAddressAssignmentHandler
0x00B9	setLogicalAndRadioChannel
0x00BA	zllGetRadioIdleMode
0x00BB	zllTouchLinkTargetHandler
0x00BC	zllGetTokens
0x00BD	zllSetDataToken
0x00BE	isZllNetwork
0x00BF	zllSetNonZllNetwork
0x00C0	gpProxyTableLookup
0x00C1	getSourceRouteTableEntry
0x00C2	getSourceRouteTableFilledSize
0x00C3	getSourceRouteTableTotalSize
0x00C4	incomingNetworkStatusHandler
0x00C5	gpepIncomingMessageHandler
0x00C6	dGpSend
0x00C7	dGpSentHandler
0x00C8	gpProxyTableGetEntry
0x00C9	gpProxyTableProcessGpPairing
0x00CA	getManufacturerCode
0x00CB	-- unassigned --
0x00CC	-- unassigned --
0x00CD	-- unassigned --
0x00CE	-- unassigned --
0x00CF	zllSetSecurityStateWithoutKey
0x00D0	setRoutingShortcutThreshold
0x00D1	getRoutingShortcutThreshold
0x00D2	unusedPanIdFoundHandler
0x00D3	findUnusedPanId

0x00D4	zllSetRadioIdleMode
0x00D5	setZllNodeType
0x00D6	setZllAdditionalState
0x00D7	zllOperationInProgress
0x00D8	zllRxOnWhenIdleGetActive
0x00D9	getZllPrimaryChannelMask
0x00DA	getZllSecondaryChannelMask
0x00DB	setZllPrimaryChannelMask
0x00DC	setZllSecondaryChannelMask
0x00DD	gpSinkTableGetEntry
0x00DE	gpSinkTableLookup
0x00DF	gpSinkTableSetEntry
0x00E0	gpSinkTableRemoveEntry
0x00E1	gpSinkTableFindOrAllocateEntry
0x00E2	gpSinkTableClearAll
0x00E3	-- unassigned --
0x00E4	-- unassigned --
0x00E5	-- unassigned --
0x00E6	-- unassigned --
0x00E7	-- unassigned --
0x00E8	generateCbkeKeys283k1
0x00E9	generateCbkeKeys283k1Handler
0x00EA	calculateSmacs283k1
0x00EB	calculateSmacs283k1Handler
0x00EC	getCertificate283k1
0x00ED	savePreinstalledCbkeData283k1
0x00EE	clearTemporaryDataMaybeStoreLinkKey283k1
0x00EF	setBeaconClassificationParams
0x00F0	-- unassigned --
0x00F1	readCounters
0x00F2	counterRolloverHandler
0x00F3	getBeaconClassificationParams
0x00F4	setMacPollFailureWaitTime
0x00F5	gpSinkTableSetSecurityFrameCounter
0x00F6	zllScanningComplete
0x00F7	sendLinkPowerDeltaRequest
0x00F8	multiPhyStart
0x00F9	multiPhyStop
0x00FA	multiPhySetRadioPower
0x00FB	multiPhySetRadioChannel
0x00FC	getPhyInterfaceCount
0x00FD	getRadioParameters
0x00FE	writeNodeData
0x00FF	getRadioChannel
0x0100	getTokenCount
0x0101	getTokenInfo
0x0102	getTokenData
0x0103	setTokenData
0x0104	resetNode
0x0105	setPassiveAckConfig
0x0106	childId
0x0107	childIndex
0x0108	readAttribute
0x0109	writeAttribute

0x010A	gpSinkCommission
0x010B	gpTranslationTableClear
0x010C	secManGetApsKeyInfo
0x010D	secManExportLinkKeyByEui
0x010E	secManImportLinkKey
0x010F	secManExportLinkKeyByIndex
0x0110	secManCheckKeyContext
0x0111	secManImportTransientKey
0x0112	secManExportTransientKeyByIndex
0x0113	secManExportTransientKeyByEui
0x0114	secManExportKey
0x0115	secManImportKey
0x0116	secManGetNetworkKeyInfo
0x0117	gpSecurityTestVectors
0x0118	gpSinkTableGetNumberOfActiveEntries
0x0119	sleepyToSleepyNetworkStart
0x011A	sendZigbeeLeave
0x011B	rescheduleLinkStatusMsg
0x011C	-- unassigned --
0x011D	setNwkUpdateId
0x011E	setPendingNetworkUpdatePanId
0x011F	getPermitJoining
0x0120	-- unassigned --
0x0121	pendingAckedMessages
0x0122	setInitialNeighborOutgoingCost
0x0123	getInitialNeighborOutgoingCost
0x0124	resetRejoiningNeighborsFrameCounter
0x0125	isResetRejoiningNeighborsFrameCounterEnabled
0x0126	-- unassigned --
0x0127	getExtendedPanId
0x0128	setIncomingTcLinkKeyFrameCounter
0x0129	apsCryptMessage
0x012A	radioGetSchedulerPriorities
0x012B	radioSetSchedulerPriorities
0x012C	radioGetSchedulerSliptime
0x012D	radioSetSchedulerSliptime
0x012E	getEndpoint
0x012F	getEndpointCount
0x0130	getEndpointDescription
0x0131	getEndpointCluster
0x0132	counterRequiresPhyIndex
0x0133	counterRequiresDestinationNodeId
0x0134	childPower
0x0135	setChildPower
0x0136	setMessageFlag
0x0137	clearMessageFlag
0x0138	addChild
0x0139	removeChild
0x013A	removeNeighbor
0x013B	routerChildCount
0x013C	maxChildCount
0x013D	maxRouterChildCount
0x013E	getParentIncomingNwkFrameCounter
0x013F	setParentIncomingNwkFrameCounter

0x0140	parentTokenSet
0x0141	okToHibernate
0x0142	okToLongPoll
0x0143	stackPowerDown
0x0144	stackPowerUp
0x0145	currentStackTasks
0x0146	okToNap
0x0147	incomingMfgTestMessageHandler
0x0148	mfgTestSetPacketMode
0x0149	mfgTestSendRebootCommand
0x014A	mfgTestSendEui64
0x014B	mfgTestSendManufacturingString
0x014C	mfgTestSendRadioParameters
0x014D	mfgTestSendCommand
0x014E	getCurrentNetwork
0x014F	concentratorStartDiscovery
0x0150	concentratorStopDiscovery
0x0151	concentratorNoteRouteError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