## UHF Reader

## Get transmitting power

**Command Frame Definition**

Get transmitting power of the reader as below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | B7 | 00 | 00 | B7 | 7E |

Frame Type: 0x00

Command code: 0xB7

Command Parameter Length PL: 0x0000

Checksum: 0xB7

**Response Frame Definition**

If the operation to get the channel is correct, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Pow(MSB) | Pow(LSB) | Checksum |
| BB | 01 | B7 | 00 | 02 | 07 | D0 | 91 |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x01

Command Code: 0xB7

Command Parameter Length PL: 0x0002

Power Parameter Pow: 0x07D0(Current power is decimalism 2000，i.e 20dBm)

Checksum: 0x91

## Set transmitting power

**Command Frame Definition**

Set transmitting power of the reader as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Pow(MSB) | Pow(LSB) | Checksum |
| BB | 00 | B6 | 00 | 02 | 07 | D0 | 8F |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x00

Command code: 0xB6

Command Parameter Length PL: 0x0002

Command Parameter Pow: 0x07D0(Current power is decimalism 2000，i.e 20dBm)

Checksum: 0x8F

**Response Frame Definition**

If the operation to get the channel is correct, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | B6 | 00 | 01 | 00 | B8 | 7E |

Frame Type: 0x01

Command code: 0xB6

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xB8

## Single polling command

Command frame definition:

finish the polling one time under EPC Class1 Gen2 portocol, will operate the inventory. The command is not including the Select operation. The speaker will be open or close before or after the polling command operation. At Single polling Inventory command, Query operate parameter is configurated by another command, and the firmware has the initial data. The single polling command is as below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | 22 | 00 | 00 | 22 | 7E |

Frame Type: 0x00

Command: 0x22

PL: 0x0000

Checksum: 0x22

Notice frame definition:

The chip received single polling command, if it could read the CRC correct tag, the MCU will return data consists of RSSI、PC、EPC and CRC. If it read a EPC of tag will return a response command, and many tags then many response commands. Such as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | RSSI | PC(MSB) | PC(LSB) |
| BB | 02 | 22 | 00 | 11 | C9 | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | CRC(MSB) | CRC(LSB) | Checksum | End |
| E3 | D5 | 0D | 70 | 3A | 76 | EF | 7E |

Frame Type: 0x02

Command: 0x22

PL: 0x0011

RSSI: 0xC9

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

CRC : 0x3A76

Checksum: 0xEF

RSSI is stands for the signal size of the chip input, it’s excluding the antenna gain and directional-coupler attenuator etc. RSSI is the signal strength of chip input, it’s hexadecimal, the unit is dBm. The above RSSI is 0xC9, stands for the chip input signal strength is -55dBm。

Response command definition

If no tag return or return data CRC parity error, will return the error code 0x15, such as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 15 | 16 | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x01

Parameter: 0x15

Checksum: 0x16

## Several times polling command:

Command frame definition:

The command require chip MCU go with several times polling Inventory operation, the polling times limitation is 0-65535 times. If the polling times is 10000 times, the command is as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Reserved | CNT(MSB) | CNT(LSB) |
| BB | 00 | 27 | 00 | 03 | 22 | 27 | 10 |
| Checksum | End |  |  |  |  |  |  |
| 83 | 7E |  |  |  |  |  |  |

Frame Type: 0x00

Command: 0x27

PL: 0x0003

Reserved: 0x22

CNT: 0x2710

Checksum: 0x83

Notice frame definition

The format of Several times polling Inventory command response frame and single polling Inventory response is the same, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | RSSI | PC(MSB) | PC(LSB) |
| BB | 02 | 22 | 00 | 11 | C9 | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | CRC(MSB) | CRC(LSB) | Checksum | End |
| E3 | D5 | 0D | 70 | 3A | 76 | EF | 7E |

Frame Type: 0x02

Command: 0x27

PL: 0x0011

RSSI: 0xC9

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

CRC : 0x3A76

Checksum: 0xEF

Response frame definition:

It no tag return or return data CRC parity error, it will return the error code 0x15, such as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 15 | 16 | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x01

Parameter: 0x15

Checksum: 0x16

## Stop several times frame command

Command frame definition

During the chip internal MCU is operated several times polling procedure, could stop the several times polling operation, not the pause stop, the command is as below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | 28 | 00 | 00 | 28 | 7E |

Frame Type: 0x00

Command: 0x28

PL: 0x0000

Checksum: 0x28

Response frame command definition:

If stop the several times polling command operated successfully, the firmware will response as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | 28 | 00 | 01 | 00 | 2A | 7E |

Frame Type: 0x01

Command: 0x28

PL: 0x0001

Parameter: 0x00

Checksum: 0x2A

## Set Select parameter command

Command frame definition:

Set Select parameter, and set the Select mode to be 0x02. To send Select command before operating the polling. And if multi-tags, then could do polling, read and writing only for special tags according to the Select parameter. Such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | SelParam | Ptr(MSB) |  |
| BB | 00 | 0C | 00 | 13 | 01 | 00 | 00 |
|  | Ptr(LSB) | MaskLen | Truncate | Mask(MSB) |  |  |  |
| 00 | 20 | 60 | 00 | 30 | 75 | 1F | EB |
|  |  |  |  |  |  |  | Mask(LSB) |
| 70 | 5C | 59 | 04 | E3 | D5 | 0D | 70 |
| Checksum | End |  |  |  |  |  |  |
| AD | 7E |  |  |  |  |  |  |

Frame Type: 0x00

Command: 0x0C

PL：0x0013

SelParam: 0x01 (Target: 3’b000, Action: 3’b000, MemBank: 2’b01)

Ptr: 0x00000020(unit is bit, not word) start from EPC bit.

Mask Length: 0x60(6 words, 96bits)

Whether Truncate or not: 0x00(0x00 is Disable truncation, 0x80 is Enable truncation)

Mask: 0x30751FEB705C5904E3D50D70

Checksum: 0xAD

SelParam is with Byte，and Target owns 3bits, Action owns the 3bits in middle, MemBank owns the last 2bits.

MemBank definition as below:

2’b00: RFU data storage area of tag.

2’b00: EPC data storage area of tag.

2’b00: TID data storage area of tag.

2’b00: User data storage area of tag.

Target and Action detail definition, please check EPC Gen2 protocol.

When Select Mask length is longer than 80 bits(5 words), send Select command to set all tags under Inventoried Flag with A，SL Fla with ~SL condition. Then operate based on Action have been chosen. When Select Mask length is shorter than 80 bits(5 words), it will not appear the situation above mentioned.

**Response frame definition:**

When the Select parameter set successfully, the firmware return as the below showed:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Data | Checksum | End |
| BB | 01 | 0C | 00 | 01 | 00 | 0E | 7E |

Frame Type: 0x01

Command: 0x0C

PL: 0x0001

Data: 0x00

Checksum: 0x0E

## Set Select mode

Command frame definition:

If the Select parameter set successfully already, operate the command will set the Select mode. For example, if want to cancel the Select command:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Mode | Checksum | End |
| BB | 00 | 12 | 00 | 01 | 01 | 14 | 7E |

Frame Type: 0x00

Command: 0x12

PL: 0x0001

Command parameter, Select mode: 0x01

Checksum: 0x14

Select Mode definition:

0x00: to choose the special tags through sending Select command before all opearations.

0x01: No sending Select command before tags operation.

0x02: only send Select command before tag operation(excluding the several times polling Inventory tags), such as

Before Reading, Writing, Locking, Killing, will choose the special tags through Select.

**Response frame definition:**

When cancel or send Select command successfully, the firmware return as the following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Data | Checksum | End |
| BB | 01 | 0C | 00 | 01 | 00 | 0E | 7E |

Frame Type: 0x01

Command: 0x0C

PL: 0x0001

Data: 0x00(operate successfully)

Checksum: 0x0E

## Read data storage area of tag

**Command frame definition:**

For single tag, read the appointed address and length data in the memory bank of tag data storage area. Read the tag data area address offset SA and tag data storage length DL, their unit is Word, is 2Byte/16 Bits. And before this command, need set Select parameter to make choose appointed tag to write available. If Access Password are all”0”, then it will not send Access command.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | AP(MSB) |  |  |
| BB | 00 | 39 | 00 | 09 | 00 | 00 | FF |
| AP(LSB) | MemBank | SA(MSB) | SA(LSB) | DL(MSB) | DL(LSB) | Checksum | End |
| FF | 03 | 00 | 00 | 00 | 02 | 45 | 7E |

Frame Type: 0x00

Command: 0x39

PL：0x0009

Access Password: 0x0000FFFF

MemBank: 0x03(User area)

Tag data area address offset SA: 0x0000

tag data storage length DL: 0x0002

Checksum: 0x45

**Response frame definition:**

Read the appointed tag data storage area, and parity CRC is correct, then return as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | 39 | 00 | 13 | 0E | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Data(MSB) |  |  | Data(LSB) |
| E3 | D5 | 0D | 70 | 12 | 34 | 56 | 78 |
| Checksum | End |  |  |  |  |  |  |
| B0 | 7E |  |  |  |  |  |  |

Frame Type: 0x01

Command: 0x39

PL: 0x0013

opearate tag PC+EPC length UL: 0x0E

operate PC: 0x3400

operate EPC: 0x30751FEB705C5904E3D50D70

Return Data: 0x12345678

Checksum: 0xB0

If the tag is not in the appointed zone or appointed EPC is wrong, will return error code 0x09, such as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | Checksum | End |
| BB | 01 | FF | 00 | 01 | 09 | 0A | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x0001

Error Code: 0x09

Checksum: 0x0A

If Access Password is wrong, then the return error code is 0x16, and will return the PC+EPC that operated, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | 16 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 75 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0010

Error Code: 0x16

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x75

If the operate tag return the Erroe codes ruled by EPC Gen2 protocol, the response frame will return the error codes returned or after 0xA0. Because the error codes ruled by EPC Gen2 is valid only with 4bits.

For example if the address offset or data length in command parameter sent is not correct, the data reading length is longer than tag data storage length, according to the EPC Gen2 protocol, the tag will return error code 0x03(storage area is over Memory Overrun). The response frame will return the error code 0xA3 and back to the PC+EPC of the operated tag, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | A3 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 02 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0010

Error Code: 0xA3

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x02

## Write Data storage area of tag

Command frame definition:

For single tag, read the appointed address and length data in the memory bank of tag data storage area. Read the tag data area address offset SA and tag data storage length DL, their unit is Word, is 2Byte/16 Bits. And before this command, need set Select parameter to make choose appointed tag to write available. If Access Password are all”0”, then it will not send Access command.

Data length is shorter than 30words(64bytes/512bits) that be written to the data storage area, it means.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | AP(MSB) |  |  |
| BB | 00 | 49 | 00 | 0D | 00 | 00 | FF |
| AP(LSB) | MemBank | SA(MSB) | SA(LSB) | DL(MSB) | DL(LSB) | DT(MSB) |  |
| FF | 03 | 00 | 00 | 00 | 02 | 12 | 34 |
|  | DT(LSB) | Checksum | End |  |  |  |  |
| 56 | 78 | 6D | 7E |  |  |  |  |

Frame Type: 0x00

Command code: 0x39

PL: 0x000D

Access Password: 0x0000FFFF

MemBank: 0x03

Tag data storage offset SA: 0x0000

DL: 0x0002

DT: 0x12345678

Checksum: 0x6D

**Response frame definition:**

After writing the data to the tag data storage area, if the reader chip receive the tag return data correct, the response frame will be as the following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | 49 | 00 | 10 | 0E | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | A9 | 7E |  |

Frame Type: 0x01

Command: 0x49

PL: 0x0010

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Parameter: 0x00(operated successfully)

Checksum: 0xA9

If the tag is not in the appointed area or appointed EPC code is wrong, the return error code will be 0x10, such as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 10 | 0A | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x0001

Parameter: 0x10

Checksum: 0x0A

If Access Password is wrong, the return error code is 0x16, and back to the PC+EPC of the operated tag, such as the following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | 16 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 75 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0016

Error Code: 0x16

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x75

If the operate tag return the Erroe codes ruled by EPC Gen2 protocol, the response frame will return the error codes returned or after 0xB0.

For example if the address offset or data length in command parameter sent is not correct, the data writing length is longer than tag data storage length, according to the EPC Gen2 protocol, the tag will return error code 0x03(storage area is over Memory Overrun). The response frame will return the error code 0xB3 and back to the PC+EPC of the operated tag, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | B3 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 12 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0010

Error Code: 0xB3

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x12

## Lock data storage of tag

Command frame definition:

For single tag, Lock or Unlock its data storage area. Before sending the command, you need set Select parameter to choose the appointed tag to do the lock operation. For example, if you need lock Access Password, the command is as the following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | AP(MSB) |  |  |
| BB | 00 | 82 | 00 | 07 | 00 | 00 | FF |
| AP(LSB) | LD(MSB) |  | LD(LSB) | Checksum | End |  |  |
| FF | 02 | 00 | 80 | 09 | 7E |  |  |

Frame Type: 0x00

Command: 0x82

PL: 0x0007

Access Password: 0x0000FFFF

Lock operate data LD: 0x020080

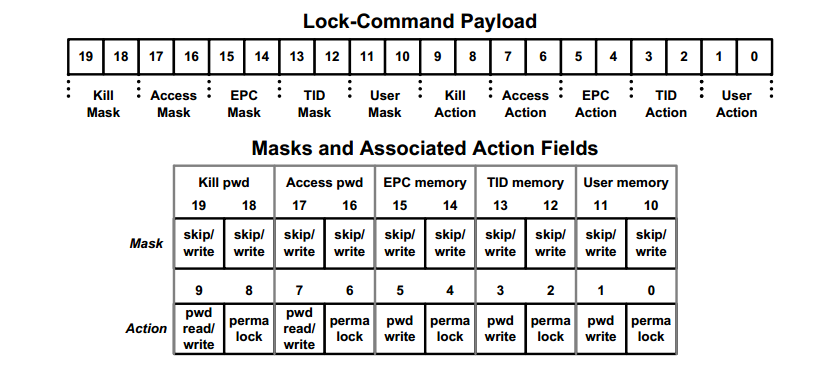
Checksum: 0x09

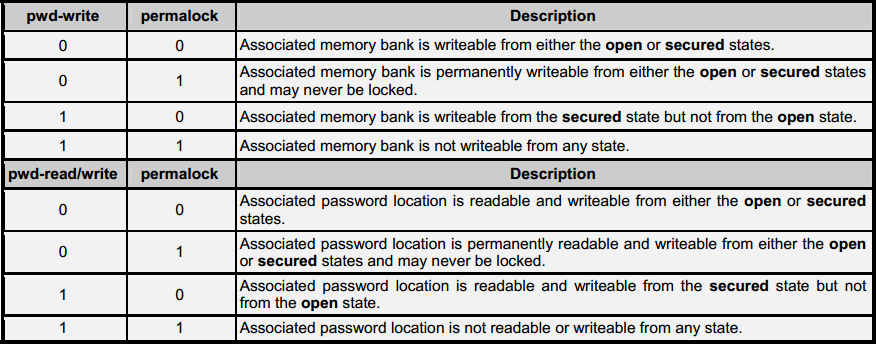
The high 4bit of the Lock operate parameter LD is the remain bit, the last 20bits is the payload of Lock.(including Mask and Actition, each be 10 bits from the high to the low by turns). More details please operate according to the Chapter 6.3.2.11.3.5 of EPC Gen2 protocol 1.2.0 version.

Mask is a mask off code, the Active will be valid only with the mask bit is 1. The active of each data area have 2 bits, 00~11, it’s the under the turns to be open, permanent open, lock, permanent lock.

For example, Kill Mask is 2bits 00. No matter what’s the Kill Action, Kill Action will not take effect. When the Kill Mask is 2bits 10, stands for the Kill Password is Locked (No Perma Lock), only could be read through effective Access Password.

The bit’s definition of Mask and Action is as the following:





**Response frame definition:**

If Lock command operate correct, the tag return is valid, and the response frame is as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | 82 | 00 | 10 | 0E | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | E2 | 7E |  |

Frame Type: 0x01

Command: 0x82

PL: 0x0010

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Parameter: 0x00(operate successfully)

Checksum: 0xE2

If the tag is not in the area or appointed EPC code is wrong, will return the error code 0x13, such as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 13 | 14 | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x0001

Parameter: 0x13

Checksum: 0x14

If the Access Password is not correct, the return error code is 0x16, and back to the PC+EPC of the operate tag, such as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | 16 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 75 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0016

Error Code: 0x16

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x75

If the operate tag return the error codes ruled by EPC Gen2 protocol, and response frame will return the error code or return after 0xC0.

For example, if the TID have been permanent locked, and Set the TID underopen situation through Lock command. According to EPC Gen2 protocol, the tag will return error code 0x04(storage area locked, Memory Locked). Then response frame return error code 0xC4, and back to PC+EPC of operated tag, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | C4 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 23 | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0010

Command parameter Error Code: 0xC4

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x23

## Inactivate the tag

**Command frame definition:**

Before the command, you need set Select parameter to operate the Inactivate for the appointed tags. Inactivate the single tag as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | KP(MSB) |  |  |
| BB | 00 | 65 | 00 | 04 | 00 | 00 | FF |
| KP(LSB) | Checksum | End |  |  |  |  |  |
| FF | 67 | 7E |  |  |  |  |  |

Frame Type: 0x00

Command: 0x65

PL: 0x0012

Kill Password: 0x0000FFFF

Checksum: 0x67

**Response frame definition:**

If the inactivate(kill)command operate successfully, the tag return CRC correct, the response frame is as the below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | 65 | 00 | 10 | 0E | 34 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | C5 | 7E |  |

Frame Type: 0x01

Command: 0x65

PL: 0x0010

PC+EPC length UL:0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Command Parameter: 0x00(operate successfully)

Checksum: 0xC5

If the tag is not in area or appointed EPC code is wrong, will return the error code 0x12, such as the following:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 12 | 13 | 7E |

Frame Type: 0x01

Command: 0xFF

PL: 0x0001

Parameter: 0x12

Checksum: 0x13

If the operate tag return the error codes ruled by EPC Gen2 protocol, and response frame will return the error code or return after 0xD0.

Note: If tag did not been set with Kill Password, means the Kill Passwordis 0, the tag will not be killed according to the EPC GEN2 protocol. The return error code is 0xD0, such as:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Error Code | UL | PC(MSB) |
| BB | 01 | FF | 00 | 10 | D0 | 0E | 34 |
| PC(LSB) | EPC(MSB) |  |  |  |  |  |  |
| 00 | 30 | 75 | 1F | EB | 70 | 5C | 59 |
|  |  |  |  | EPC(LSB) | Checksum | End |  |
| 04 | E3 | D5 | 0D | 70 | 2F | 7E |  |

Frame Type: 0x01

Command: 0xFF

PL: 0x0010

Error Code: 0xD0

PC+EPC length UL: 0x0E

PC: 0x3400

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x2F