# Setting Baud Rate:

# For setting the baud rate of UHF lite module, enter the below command

|  |  |
| --- | --- |
| Type | Baud Rate(bps) |
| 0xB0 | 9600 |
| 0xB1 | 19200 |
| 0xB2 | 28800 |
| 0xB3 | 38400 |
| 0xB4 | 57600 |
| 0xB5 | 115200 |

# 1.Command introduction

## Instruction frame format

Command is consisting of frame header (FH), frame type, command code, command data length, command parameter length, checksum and frame end. They’re all in hexadecimal. For example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 00 | 07 | 00 | 01 | 01 | 09 | 7E |

## 1.2Command frame type

|  |  |
| --- | --- |
| Type | Description |
| 0x00 | Command frame: send from PC to UHF LITE MODULE chip |
| 0x01 | Response frame: send from UHF LITE MODULE chip to pc |
| 0x02 | Notice frame: send from UHF LITE MODULE chip to PC |

It will have a response frame to match with the command frame. The response frame is standing for the command is to be operated or not.

Single polling command and several times polling commands have related notice frame. The amount of the notice frames is according to the reading of the MCU and send to pc automatically. It will send one notice frame when the reader read out one tag, and if more tags, then more notice frames.

# 2.Firmware command definition

## 2.1 Get the reader module information

**Command frame definition**

Get the reader module information, such as hardware version, software version, and manufacture information.

Frame type： 0x00

Command code： 0x03

parameter：

hardware version： 0x00

software version： 0x01

manufacture： 0x02

**example**： get reader module hardware version information

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 00 | 03 | 00 | 01 | 00 | 04 | 7E |

Frame Type: 0x00

Command: 0x03

PL: 0x0001

Parameter: 0x00(get the hardware version)

Checksum: 0x04

**Response frame type:** 0x01

Command： 0x03

data： Variable (ASCII code)

**example**： hardware version

response data 0 is the module information type.

Hardware version： 0x00

Software version： 0x01

manufacture： 0x02

the latter date is the module information ASCII code.

Get response of module hardware version information as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Info Type | Info |  |
| BB | 01 | 03 | 00 | 0B | 00 | 4D (‘M’) | 31 (‘1’) |
|  |  |  |  |  |  |  |  |
| 30 (‘0’) | 30 (‘0’) | 20 (‘ ‘) | 56 (‘V’) | 31 (‘1’) | 2E (‘.’) | 30 (‘0’) | 30 (‘0’) |
| Checksum | End |  |  |  |  |  |  |
| 22 | 7E |  |  |  |  |  |  |

Frame Type: 0x01

Command: 0x03

PL: 0x000B

Info Type: 0x00 (hardware version)

Info: 4D 31 30 30 20 56 31 2E 30 30(“M100 V1.00” ASCII code)

Checksum: 0x22

## 2.2Single polling command

**Command frame definition:**

finish the polling one time under EPC Class1 Gen2 protocol, 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

## 2.3 Several times polling command

**Command frame definition:**

The command requires 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

2.6 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

2.8 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

2.9 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

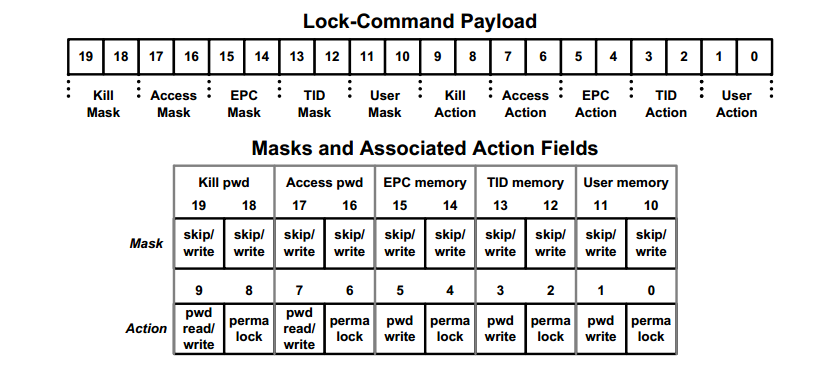
Checksum: 0x09

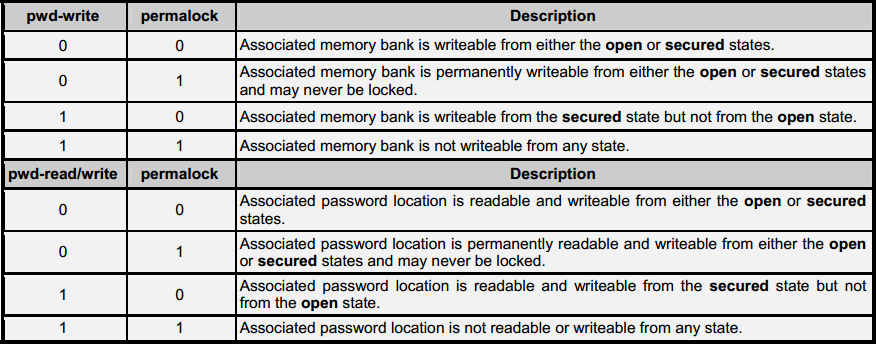
The high 4bit of the Lock operate parameter LD is the remain bit, the last 20bits is the payload of Lock.(including Mask and Actition, each be 10 bits from the high to the low by turns). More details please operate according to the Chapter 6.3.2.11.3.5 of EPC Gen2 protocol 1.2.0 version.

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

## Get Query parameter

**Command frame definition:**

Get related Query command parameter. The command is as below:

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

Frame Type: 0x00

Command: 0x0D

PL: 0x0000

Checksum: 0x0D

**Response frame definition:**

If the Query parameter set operated correct, the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Para(MSB) | Para(LSB) | Checksum |
| BB | 01 | 0D | 00 | 02 | 10 | 20 | 40 |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x01

Command: 0x0D

PL: 0x0002

Query Parameter: 0x1020

Checksum: 0x40

Parameter is 2bytes, is consists of the detail parameter as below. The above response frame related Query parameter is as the following：

DR=8, M=1, TRext=Use pilot tone, Sel=00, Session=00, Target=A, Q=4

And:

DR(1 bit): DR=8(1’b0), DR=64/3(1’b1). Only support DR=8 mode

M(2 bit): M=1(2’b00), M=2(2’b01), M=4(2’b10), M=8(2’b11). Only support M=1 mode

TRext(1 bit): No pilot tone(1’b0), Use pilot tone(1’b1). Only support Use pilot tone(1’b1)mode

Sel(2 bit): ALL(2’b00/2’b01), ~SL(2’b10), SL(2’b11)

Session(2 bit): S0(2’b00), S1(2’b01), S2(2’b10), S3(2’b11)

Target(1 bit): A(1’b0), B(1’b1)

Q(4 bit): 4’b0000-4’b1111

## Set Query parameter

**Command frame definition:**

Set related parameter of Query command. Parameter is 2bytes, is consists of detail parameter as the below:

DR(1 bit): DR=8(1’b0), DR=64/3(1’b1). Only support DR=8 mode

M(2 bit): M=1(2’b00), M=2(2’b01), M=4(2’b10), M=8(2’b11). Only support M=1mode

TRext(1 bit): No pilot tone(1’b0), Use pilot tone(1’b1). Only support Use pilot tone(1’b1)mode

Sel(2 bit): ALL(2’b00/2’b01), ~SL(2’b10), SL(2’b11)

Session(2 bit): S0(2’b00), S1(2’b01), S2(2’b10), S3(2’b11)

Target(1 bit): A(1’b0), B(1’b1)

Q(4 bit): 4’b0000-4’b1111

If DR=8, M=1, TRext=Use pilot tone, Sel=00, Session=00, Target=A, Q=4, the command is as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Para(MSB) | Para(LSB) | Checksum |
| BB | 00 | 0E | 00 | 02 | 10 | 20 | 40 |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x00

Command: 0x0E

PL: 0x0002

Query Parameter: 0x1020

Checksum: 0xC6

**Response frame definition:**

If Query parameter set operated correct, the response frame is as below:

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

Frame Type: 0x01

Command: 0x0E

PL: 0x0001

Command Parameter: 0x00

Checksum: 0x10

2.11 Get Query Parameter

**Command Frame Definition**

Get the Query command related parameter of the firmware. The command as below:

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

Frame Type Type: 0x00

Command Code: 0x0D

Command Parameter Length PL: 0x0000

Check Digit Checksum: 0x0D

**Response Frame Definition**

If set the Query parameter command to operate correctly, the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Para(MSB) | Para(LSB) | Checksum |
| BB | 01 | 0D | 00 | 02 | 10 | 20 | 40 |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x01

Command Code: 0x0D

Command Parameter Length PL: 0x0002

Query Parameter: 0x1020

Checksum: 0x40

The parameter is 2 bytes, which jointed by the digits of the specific parameter below. Above response frame’s corresponding Query parameter is:

DR=8, M=1, TRext=Use pilot tone, Sel=00, Session=00, Target=A, Q=4

Among:

DR(1 bit): DR=8(1’b0), DR=64/3(1’b1). Only support DR=8 model

M(2 bit): M=1(2’b00), M=2(2’b01), M=4(2’b10), M=8(2’b11). Only support M=1 model

TRext(1 bit): No pilot tone(1’b0), Use pilot tone(1’b1). Only support Use pilot tone(1’b1) Model

Sel(2 bit): ALL(2’b00/2’b01), ~SL(2’b10), SL(2’b11)

Session(2 bit): S0(2’b00), S1(2’b01), S2(2’b10), S3(2’b11)

Target(1 bit): A(1’b0), B(1’b1)

Q(4 bit): 4’b0000-4’b1111

## Get Query Parameter

Command frame definition

Set related parameter of Query command. The parameter is 2 bytes, which jointed by the digits of the specific parameter below.

DR(1 bit): DR=8(1’b0), DR=64/3(1’b1). Only support DR=8 model.

M(2 bit): M=1(2’b00), M=2(2’b01), M=4(2’b10), M=8(2’b11). Only support M=1 model.

TRext(1 bit): No pilot tone(1’b0), Use pilot tone(1’b1). Only support Use pilot tone(1’b1) model.

Sel(2 bit): ALL(2’b00/2’b01), ~SL(2’b10), SL(2’b11)

Session(2 bit): S0(2’b00), S1(2’b01), S2(2’b10), S3(2’b11)

Target(1 bit): A(1’b0), B(1’b1)

Q(4 bit): 4’b0000-4’b1111

If DR=8, M=1, TRext=Use pilot tone, Sel=00, Session=00, Target=A, Q=4, then command as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Para(MSB) | Para(LSB) | Checksum |
| BB | 00 | 0E | 00 | 02 | 10 | 20 | 40 |
| End |  |  |  |  |  |  |  |
| 7E |  |  |  |  |  |  |  |

Frame Type: 0x00

Command Code: 0x0E

Command Parameter Length PL: 0x0002

Query Parameter: 0x1020

Checksum: 0xC6

**Response Frame Definition**

If set the Query parameter command to operate correctly, the response frame is:

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

Frame Type: 0x01

Command code: 0x0E

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0x10

## Set Working Place

**Command Frame Definition**

Set the working place of the reader, if it is in China 900MHz frequency, as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Region | Checksum | End |
| BB | 00 | 07 | 00 | 01 | 01 | 09 | 7E |

Frame Type: 0x00

Command code: 0x07

Command Parameter Length PL: 0x0001

Region: 0x01

Checksum: 0x09

Country code as below:

|  |  |
| --- | --- |
| Region | Parameter |
| China 900MHz | 01 |
| China 800MHz | 04 |
| USA | 02 |
| Europe | 03 |
| South Korea | 06 |

Response Frame Definition

If the work place setting is operating correctly, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | 07 | 00 | 01 | 00 | 09 | 7E |

Frame Type: 0x01

Command code: 0x07

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0x09

## Set Working Channel

**Command Frame Definition**

If the frequency is 900MHz, set the working channel of reader to 920.125MHz, as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | CH Index | Checksum | End |
| BB | 00 | AB | 00 | 01 | 01 | AC | 7E |

Frame Type: 0x00

Command code: 0xAB

Command Parameter Length PL: 0x0001

Channel Index: 0x01

Checksum: 0xAC

China 900MHz channel parameter calculation, Freq\_CH is channel frequency:

CH\_Index = (Freq\_CH-920.125M)/0.25M

China 800MHz channel parameter calculation, Freq\_CH is channel frequency:

CH\_Index = (Freq\_CH-840.125M)/0.25M

USA channel parameter calculation, Freq\_CH is channel frequency:

CH\_Index = (Freq\_CH-902.25M)/0.5M

Europe channel parameter calculation, Freq\_CH is channel frequency:

CH\_Index = (Freq\_CH-865.1M)/0.2M

South Korea channel parameter calculation, Freq\_CH is channel frequency:

CH\_Index = (Freq\_CH-917.1M)/0.2M

**Response Frame Definition**

If the channel setting operates correctly, then the response frame is:

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

Frame Type: 0x01

Command code: 0xAB

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xAD

## Get Working Channel

**Command Frame Definition**

In current working zone of reader, get the working channel as below:

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

Frame Type: 0x00

Command code: 0xAA

Command Parameter Length PL: 0x0000

Checksum: 0xAA

**Response Frame Definition**

If the operatation to get channel is correct, then the command frame is:

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

Frame Type: 0x01

Command code: 0xAA

Command Parameter Length PL: 0x0001

Command Parameter: 0x00(Channel\_Index为0x00)

Checksum: 0xAC

China 900MHz channel parameter calculation, Freq\_CH is channel frequency:

Freq\_CH = CH\_Index \* 0.25M + 920.125M

China 800MHz channel parameter calculation, Freq\_CH is channel frequency:

Freq\_CH = CH\_Index \* 0.25M + 840.125M

USA channel parameter calculation, Freq\_CH is channel frequency: Freq\_CH = CH\_Index \* 0.5M + 902.25M

Europe channel parameter calculation, Freq\_CH is channel frequency: Freq\_CH = CH\_Index \* 0.2M + 865.1M

South Korea channel parameter calculation, Freq\_CH is channel frequency: Freq\_CH = CH\_Index \* 0.2M + 917.1M

## Set frequency adjustment automatically

**Command Frame Definition**

Set frequency adjustment automatically mode or cancel frequency adjustment automatically mode, as below:

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

Frame Type: 0x00

Command Code: 0xAD

Command Parameter Length PL: 0x0001

Command Parameter: 0xFF(0xFF is to set frequency adjustment automatically，0x00 is to cancel is to cancel frequency adjustment automatically)

Checksum: 0xAD

**Response Frame Definition**

If set or cancel frequency adjustment automatically correctly, then the response frame is:

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

Frame Type: 0x01

Command code: 0xAD

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xAF

## 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 decimalize 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 decimalize 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

## Set transmit continuous carrier

**Command Frame Definition**

Set transmit continuous carrier or off set transmit continuous carrier as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 00 | B0 | 00 | 01 | FF | B0 | 7E |

Frame Type: 0x00

Command Code: 0xB0

Command Parameter Length PL: 0x0001

Command Parameter: 0xFF (0xFF is to set continuous carrier, 0x00 is to off continuous carrier)

Checksum: 0xB0

**Response Frame Definition**

If the setting operation is correct, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | B0 | 00 | 01 | 00 | B2 | 7E |

Frame Type: 0x01

Command code: 0xB0

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xB2

## Get parameter of receiving modem

**Command Frame Definition**

Get parameter of receiving modem. The modem parameter has Mixer gain, IF AMP gain and signal demodulator value. For example:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | F1 | 00 | 00 | F1 | 7E |

Frame Type: 0x00

Command Code: 0xF1

Command Parameter Length PL: 0x0000

Checksum: 0xF1

**Response Frame Definition**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Mixer\_G | IF\_G | Thrd(MSB) |
| BB | 01 | F1 | 00 | 04 | 03 | 06 | 01 |
| Third (LSB) | Checksum | End |  |  |  |  |  |
| B0 | B0 | 7E |  |  |  |  |  |

Frame Type: 0x01

Command code: 0xF1

Command Parameter Length PL: 0x0004

Mixer Gain Mixer\_G: 0x03(Mixer Gain is 9dB)

IF Amplifier IF\_G: 0x06(IF Amplifier IF AMP Gain is 36dB)

Signal demodulator value Thrd: 0x01B0 (The smaller the Signal demodulated value is, the less demodulator tag return to RSSI, but also with less stable; it will unable to be demodulated if lower than a certain value; on the contrary, the bigger value, the more demodulated tags return to RSSI; the nearer the distance, the more stable). 0x01B0 is the recommended smallest value.

Checksum: 0xB0

Mixer Gain Chart

|  |  |
| --- | --- |
| Type | Mixer G(dB) |
| 0x00 | 0 |
| 0x01 | 3 |
| 0x02 | 6 |
| 0x03 | 9 |
| 0x04 | 12 |
| 0x05 | 15 |
| 0x06 | 16 |

IF AMP Gain Chart

|  |  |
| --- | --- |
| Type | IF\_G(dB) |
| 0x00 | 12 |
| 0x01 | 18 |
| 0x02 | 21 |
| 0x03 | 24 |
| 0x04 | 27 |
| 0x05 | 30 |
| 0x06 | 36 |
| 0x07 | 40 |

## Set parameter of receiving modem

**Command Frame Definition**

Get parameter of receiving modem. The modem parameter has Mixer gain, IF AMP gain and signal demodulator value. For example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Mixer G | IF\_G | Thrd(MSB) |
| BB | 00 | F0 | 00 | 04 | 03 | 06 | 01 |
| Thrd(LSB) | Checksum | End |  |  |  |  |  |
| B0 | AE | 7E |  |  |  |  |  |

Frame Type: 0x00

Command code: 0xF0

Command Parameter Length PL: 0x0004

Mixer Gain Mixer\_G: 0x03(Mixer Gain is 9dB)

IF Amplifier IF\_G: 0x06(IF Amplifier IF AMP Gain is 36dB)

Signal demodulator value Thrd: 0x01B0 (The smaller the Signal demodulated value is, the less demodulator tag return to RSSI, but also with less stable; it will unable to be demodulated if lower than a certain value; on the contrary, the bigger value, the more demodulated tags return to RSSI; the nearer the distance, the more stable). 0x01B0 is the recommended smallest value.

Checksum: 0xAE

Mixer Gain Chart

|  |  |
| --- | --- |
| Type | Mixer\_G(dB) |
| 0x00 | 0 |
| 0x01 | 3 |
| 0x02 | 6 |
| 0x03 | 9 |
| 0x04 | 12 |
| 0x05 | 15 |
| 0x06 | 16 |

IF AMP Gain Chart

|  |  |
| --- | --- |
| Type | IF\_G(dB) |
| 0x00 | 12 |
| 0x01 | 18 |
| 0x02 | 21 |
| 0x03 | 24 |
| 0x04 | 27 |
| 0x05 | 30 |
| 0x06 | 36 |
| 0x07 | 40 |

**Response Frame Definition**

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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | F0 | 00 | 01 | 00 | F2 | 7E |

Frame Type: 0x01

Command Code: 0xF0

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xF1

## Test RFID input blocking signal

**Command Frame Definition**

Test RFID input blocking signal Scan Jammer, for testing the reader antenna’s blocking signal in every channel in current area.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | F2 | 00 | 00 | F2 | 7E |

Frame Type: 0x00

Command Code: 0xF2

Command Parameter Length PL: 0x0000

Checksum: 0xF2

**Response Frame Definition**

If in China 900MHz frequency, there are 20 channels totally, test if the radio input blocking signal Scan Jammer channel operates correctly, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | CH\_L | CH\_H | JMR(MSB) |
| BB | 01 | F2 | 00 | 16 | 00 | 13 | F2 |
|  |  |  |  |  |  |  |  |
| F1 | F0 | EF | EC | EA | E8 | EA | EC |
|  |  |  |  |  |  |  |  |
| EE | F0 | F1 | F5 | F5 | F5 | F6 | F5 |
|  |  | JMR(LSB) | Checksum | End |  |  |  |
| F5 | F5 | F5 | DD | 7E |  |  |  |

Frame Type: 0x01

Command code: 0xF2

Command Parameter Length PL: 0x0016

Test initial channel CH\_L: 0x00(Test initial channel Index is 0)

Test final channel CH\_H: 0x13(Test final channel Index is 19)

Channel blocking signal JMR: 0xF2F1F0EFECEAE8EAECEEF0F1F5F5F5F6F5F5F5F5(其中0xF2为-14dBm)

Checksum: 0xDD

## 2.23 Test Channel RSSI

**Command Frame Definition**

Test radio input RSSI signal is for testing if there is reader works in current condition. For example:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | F3 | 00 | 00 | F3 | 7E |

Frame Type: 0x00

Command code: 0xF3

Command Parameter Length PL: 0x0000

Checksum: 0xF3

**Response Frame Definition**

If in China 900MHz frequency, there are 20 channels totally, test if the radio input blocking signal Scan Jammer channel operates correctly, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | CH\_L | CH\_H | RSSI(MSB) |
| BB | 01 | F3 | 00 | 16 | 00 | 13 | BA |
|  |  |  |  |  |  |  |  |
| BA | BA | BA | BA | BA | BA | BA | BA |
|  |  |  |  |  |  |  |  |
| BA | BA | BA | BA | BA | BA | BA | BA |
|  |  | RSSI(LSB) | Checksum | End |  |  |  |
| BA | BA | BA | A5 | 7E |  |  |  |

Frame Type: 0x01

Command code: 0xF2

Command Parameter Length PL: 0x0016

Test initial channel CH\_L: 0x00(Test initial channel Index is 0)

Test final channel CH\_H: 0x13(Test final channel Index is 19)

Channel blocking signal JMR: 0xBABABABABABABABABABABABABABABABABABABABA (Among 0xBA is -70dBm, test RSSI is the least value)

Checksum: 0xDD

## 2.24 Control IO port

Command Frame Definition

Set IO port direction, read the electrical level and set the electrical level. As below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter0 | Parameter1 | Parameter2 |
| BB | 01 | 1A | 00 | 03 | 00 | 04 | 01 |
| Checksum | End |  |  |  |  |  |  |
| 22 | 7E |  |  |  |  |  |  |

Frame Type: 0x00

Command code: 0x1A

Command Parameter Length PL: 0x0003

Command Parameter: 0x00 0x04 0x01

Checksum: 0x22

**Parameter explanation:**

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Description | Length | Explanation |
| 0 | Parameter 0 | 1 byte | Choose the operation:  0x00： Set IO direction；  0x01：Set IO electrical level；  0x02： Read IO electrical level。  Pin for operation is assigned in parameter 1. |
| 1 | Parameter 1 | 1 byte | Parameter value range is 0x01~0x04, correspond to port IO1~IO4 for operation. |
| 2 | Parameter 2 | 1 byte | The parameter value is 0x00 or 0x01.   |  |  |  | | --- | --- | --- | | Parameter0 | Parameter2 | Description | | 0x00 | 0x00 | IO setting is input model | | 0x00 | 0x01 | IO setting is output model | | 0x01 | 0x00 | Set IO output as low electrical level | | 0x01 | 0x01 | Set IO output as high electrical level |   When parameter 0 is 0x02, this parameter is insignificance. |

**Response Frame Definition**

Response Frame Definition is：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter0 | Parameter1 | Parameter2 |
| BB | 01 | 1A | 00 | 03 | 00 | 04 | 01 |
| Checksum | End |  |  |  |  |  |  |
| 23 | 7E |  |  |  |  |  |  |

Frame Type: 0x01

Command code: 0x1A

Command Parameter Length PL: 0x0003

Command Parameter: 0x00 0x04 0x01

Checksum: 0x23

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Description | Length | Explanation |
| 0 | Parameter 0 | 1 byte | Choose the operation:  0x00： Set IO direction；  0x01：Set IO electrical level；  0x02： Read IO electrical level。  Pin for operation is assigned in parameter 1. |
| 1 | Parameter 1 | 1 byte | Parameter value range is 0x01~0x04, correspond to port IO1~IO4 for operation. |
| 2 | Parameter 2 | 1 byte | The parameter value is 0x00 or 0x01.   |  |  |  | | --- | --- | --- | | Parameter0 | Parameter2 | Description | | 0x00 | 0x00 | IO setting failed | | 0x00 | 0x01 | IO setting success | | 0x01 | 0x00 | IO output failed | | 0x01 | 0x01 | IO output success | | 0x02 | 0x00 | Correspond port is low electrical level | | 0x02 | 0x01 | Correspond port is high electrical level | |

## 2.25 NXP Read Protect/Reset Read Protect Command

NXP G2X tag supports Read Protect/Reset Read Protect command. When the tag operates Read Protect command successfully, tag’s Protect EPC and Protect TID bit will be set as ’1’, and the tag will inter the data protection state. If let the tag back to normal state from data protection state, will need to operate Reset Read Protect command. Before operating this command, the Select parameter needs to be set for choosing certain tag to operate.

**Command Frame Definition**

Read Protect/Reset Read Protect command frame definition as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | AP(MSB) |  |  |
| BB | 00 | E1 | 00 | 05 | 00 | 00 | FF |
| AP(LSB) | Reset | Checksum | End |  |  |  |  |
| FF | 00 | E4 | 7E |  |  |  |  |

Frame Type: 0x00

Command code: 0xE1

Command Parameter Length PL: 0x0005

Kill Password: 0x0000FFFF

Read Protect/Reset Read Protect: 0x00(0x00 means to operate ReadProtect，0x01 means to operate Reset Read Protect)

Checksum: 0x0B

**Response Frame Definition**

If the Read Protect command operates correctly, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | E1 | 00 | 10 | 0E | 30 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | 3D | 7E |  |

Frame Type: 0x01

Command Code: 0xE1

Command Parameter Length PL: 0x0010

PC+EPC length UL: 0x0E

PC: 0x3000

EPC: 0x30751FEB705C5904E3D50D70

Command Parameter: 0x00(operate successfully)

Checksum: 0x3D

If the Read Protect command operates correctly, then the response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | E2 | 00 | 10 | 0E | 30 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | 3E | 7E |  |

Frame Type: 0x01

Command code: 0xE2

Command Parameter Length PL: 0x0010

PC+EPC length UL: 0x0E

PC: 0x3000

EPC: 0x30751FEB705C5904E3D50D70

Command Parameter: 0x00(operate successfully)

Checksum: 0x3E

When operate Read Protect (Set/Reset parameter is 0x00) command, if the tag is out of zone, assigned EPC code is wrong or tag no response, will return to error code 0x2A, as below:

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

Frame Type: 0x01

Command code: 0xFF

Command Parameter Length PL: 0x0001

Command Parameter: 0x2A

Checksum: 0x2B

When operate Read Protect (Set/Reset parameter is 0x01) command, if the tag is out of zone, assigned EPC code is wrong or tag no response, will return to error code 0x2B, as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 2B | 2C | 7E |

Frame Type: 0x01

Command code: 0xFF

Command Parameter Length PL: 0x0001

Command Parameter: 0x2B

Checksum: 0x2C

If Access Password is wrong, then will return to wrong code 0x16 and will return all PC+EPC of the operated tag, as 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 | 71 | 7E |  |

Frame Type: 0x01

Command code: 0xFF

Command Parameter Length PL: 0x0016

Command Parameter Error Code: 0x16

PC+EPC length UL: 0x0E

PC: 0x3000

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x71

2.26 NXP Change EAS Command

NXP G2X tag supports Change EAS command. When the tag operates Change EAS command successfully, tag’s PSF bit will be set as ’1’ or ‘0’. When set the PSF bit as ‘1’, the tag will response EAS\_Alarm command, or the tag will fail to response EAS\_Alarm command. Before operating this command, the Select parameter needs to be set for choosing a certain tag to operate.

**Command Parameter**

Change EAS command frame as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | AP(MSB) |  |  |
| BB | 00 | E3 | 00 | 05 | 00 | 00 | FF |
| AP(LSB) | PSF | Checksum | End |  |  |  |  |
| FF | 01 | E7 | 7E |  |  |  |  |

Frame Type: 0x00

Command code: 0xE3

Command Parameter Length PL: 0x0005

Kill Password: 0x0000FFFF

Set/Reset: 0x01(0x01 means to set PSF bit as ’1’，0x00 means to set PSF bit as ’0’)

Checksum: 0xE7

**Response Frame Definition**

If Change EAS command operates correctly, then the response frame is：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | UL | PC(MSB) | PC(LSB) |
| BB | 01 | E3 | 00 | 10 | 0E | 30 | 00 |
| EPC(MSB) |  |  |  |  |  |  |  |
| 30 | 75 | 1F | EB | 70 | 5C | 59 | 04 |
|  |  |  | EPC(LSB) | Parameter | Checksum | End |  |
| E3 | D5 | 0D | 70 | 00 | 3F | 7E |  |

Frame Type: 0x01

Command code: 0xE3

Command Parameter Length PL: 0x0010

PC+EPC length UL: 0x0E

PC: 0x3000

EPC: 0x30751FEB705C5904E3D50D70

Command Parameter: 0x00(operate successfully)

Checksum: 0x3F

When operate Change EAS command, if the tag is out of zone, certain EPC code is wrong or tag no response, will return to error code 0x1B as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 1B | 1C | 7E |

Frame Type: 0x01

Command code: 0xFF

Command Parameter Length PL: 0x0001

Command Parameter: 0x1B

Checksum: 0x1C

If Access Password is wrong, then will return to error code 0x16, and will return to PC+EPC of all operated tags, as 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 | 71 | 7E |  |

Frame Type: 0x01

Command Code: 0xFF

Command Parameter Length PL: 0x0016

Command Parameter Error Code: 0x16

PC+EPC length UL: 0x0E

PC: 0x3000

EPC: 0x30751FEB705C5904E3D50D70

Checksum: 0x71

## 2.27 NXP EAS\_Alarm Command

NXP G2X tag supports EAS\_Alarm command. When the tag receives EAS\_Alarm command, the tag will return to 64bits EAS-Alarm code immediately. Please note the tags will response EAS\_Alarm command only when the PSF bit is set as ‘1’, or the tag will fail to response EAS\_Alarm command. This command is suitable for electrical product security system.

**Command Frame Definition**

EAS\_Alarm Command.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Checksum | End |
| BB | 00 | E4 | 00 | 00 | E4 | 7E |

Frame Type: 0x00

Command code: 0xE4

Command Parameter Length PL: 0x0000

Checksum: 0xE4

**Response Frame Definition**

If EAS\_Alarm command operates successfully, tag will response and return to correct 64bits EAS-Alarm code, then response frame is:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | EAS-Alarm code (MSB) |  |  |
| BB | 01 | E4 | 00 | 08 | 69 | 0A | EC |
|  |  |  |  | EAS-Alarm code (LSB) | Checksum | End |  |
| 7C | D2 | 15 | D8 | F9 | 80 | 7E |  |

Frame Type: 0x01

Command Code: 0xE3

Command Parameter Length PL: 0x0001

Command Parameter: 0x00

Checksum: 0xE5

When operate EAS\_Alarm command, if no tag responses, will return to error code 0x1D as below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Header | Type | Command | PL(MSB) | PL(LSB) | Parameter | Checksum | End |
| BB | 01 | FF | 00 | 01 | 1D | 1E | 7E |

Frame Type: 0x01

Command Code: 0xFF

Command Parameter Length PL: 0x0001

Command Parameter: 0x1D

Checksum: 0x1E

## **4. Command Summary**

|  |  |
| --- | --- |
| Code | Description |
| 0x03 | Get reader’s module information |
| 0x22 | Single polling command |
| 0x27 | Several times polling command: |
| 0x28 | Stop several times frame command |
| 0x0C | Set Select Parameter command |
| 0x12 | Set Send Select command |
| 0x39 | Read data storage area of tag |
| 0x49 | Write Data storage area of tag |
| 0x82 | Lock data storage of tag |
| 0x65 | Inactivate kill the tag |
| 0x0D | Get Query Parameter |
| 0x0E | Set Query Parameter |
| 0x07 | Set working zone |
| 0xAB | Set working channel |
| 0xAA | Get working channel |
| 0xAD | Set frequency adjustment automatically |
| 0xB7 | Get transmitting power |
| 0xB6 | Set transmitting power |
| 0xB0 | Set transmit continuous carrier |
| 0xF1 | Get parameter of receiving modem |
| 0xF0 | Set parameter of receiving modem |
| 0xF2 | Test RFID input blocking signal |
| 0xF3 | [Test RSSI](#_测试信道RSSI) channel |
| 0x1A | [Control IO port](#_控制IO端口) |
| 0xE1 | NXP Read Protec/Reset Read Protect command |
| 0xE3 | NXP Change EAS command |
| 0xE4 | NXP EAS-Alarm command |

# 5. Command frame operates failure summary

If command frame fails to operate, then VM-5GA chip send the operate failure response frame to upper computer. The operate failure response frame share command code 0xFF. If fail to get tag’s EPC before operate failure, then command parameter fix is 1-byte error code. If success to get tag’s EPC, then response parameter is 1-byte error code plus tag’s PC+EPC data.

For example, if polling command frame fail to operate, fail to receive tag return or return data CRC ECC error, then will return error code 0x15.

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

Frame Type: 0x01

Command code: 0xFF (0xFF represents command frame operates fail)

Command Parameter Length PL: 0x01

Command Parameter: 0x15(error code is a return code from fail operation)

Checksum: 0x16

**Error Command Summary as below:**

|  |  |  |
| --- | --- | --- |
| Type | Code | Description |
| Command Error | 0x17 | Command code error in command frame. |
| FHSS Fail | 0x20 | Frequency Hopping searching channel time out. All channels are occupied during this period. |
| Inventory Fail | 0x15 | Polling operates failure. No tag return or return data CRC ECC error. |
| Access Fail | 0x16 | Access tag fail, maybe the access password is wrong. |
| Read Fail | 0x09 | Fail to read tag data storage zone. Tags fail to return or return data CRC ECC error. |
| Read Error | 0xA0 | Error code | Fail to read tag data storage zone. Return code is got from 0xA0 or Error Code. Detail error Code information please sees below chart. |
| Write Fail | 0x10 | Fail to write tag data storage zone. Tags fail to return or return data CRC ECC error. |
| Write Error | 0xB0 | Error code | Fail to write tag data storage zone. Return code is got from 0xB0 or Error Code. Detail error Code information please sees below chart. |
| Lock Fail | 0x13 | Fail to lock tag data storage zone. Tags fail to return or return data CRC ECC error. |
| Lock Error | 0xC0 | Error code | Fail to lock tag data storage zone. Return code is got from 0xC0 or Error Code. Detail error Code information please sees below chart. |
| Kill Fail | 0x12 | Fail to kill tag. Tags fail to return or return data CRC ECC error. |
| Kill Error | 0xD0 | Error code | Fail to kill tag. Return code is got from 0xC0 or Error Code. Detail error Code information please sees below chart. |

**NXP G2X Tag specific command error code**：

|  |  |  |
| --- | --- | --- |
| Read Protect Fail | 0x2A | Read Protect Fail command, Tags fail to return or return data CRC ECC error. |
| Reset Read Protect Fail | 0x2B | Reset Read Protect Fail command, Tags fail to return or return data CRC ECC error. |
| Change EAS Fail | 0x1B | Change EAS Fail, Tags fail to return or return data CRC ECC error. |
| NXP TAG specific return command error code | 0xE0 | Error code | NXP TAG specific return command error code, error code is got from 0xE0 or previous tag return Error Code. |

**EPC Gen2 protocol tag return error code:**

Tag error-code

|  |  |  |  |
| --- | --- | --- | --- |
| Error-code Support | Error Code | Error code Name | Error Description |
| Error-specific | 000000002 | Other error | Other error didn’t inform in this chart. |
| 000000112 | Memory overrun | Specific tag data storage zone no exists; or this tag didn’t support specific length of EPC, such as XPC. |
| 000001002 | Memory locked | Specific tag data storage zone is locked and/or locked forever, and locking state cannot be written or read. |
| 000010112 | Insufficient power | Tag didn’t have sufficient power to write. |
| Non-specific | 000011112 | Non-specific error | Tag didn’t support Error-code return. |