UHF Lite Module

Setting Baud Rate:

For setting the baud rate of the 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

1.1 Instruction frame format

A Command is consisting of a 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 the command frame. The response frame is standing for whether the command is to be operated or not.

Single polling commands and several times polling commands have related notice frames. 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 reads 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 manufacturer 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 the 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 consisting of RSSI、PC、EPC, and CRC. If it read an EPC of the 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 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, and the unit is dBm. The above RSSI is 0xC9, which 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 to go with several times polling Inventory operation, the polling times limitation is 0-65535 times. If the polling time 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

2.4 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 respond 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

2.5 Set Select parameter command

Command frame definition:

Set the Select parameter, and set the Select mode to 0x02. To send Select command before operating the polling. And if our multi-tags, then could do polling, reading, 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 a bit, not a 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, and MemBank owns the last 2bits.

MemBank definition as below:

2’b00: RFU data storage area of the tag.

2’b00: EPC data storage area of the tag.

2’b00: TID data storage area of the tag.

2’b00: User data storage area of the tag.

For target and Action detail definition, please check the EPC Gen2 protocol.

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

Response frame definition:

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

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 is 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 by sending a Select command before all operations.

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, and Killing will choose the special tags through Select.

Response frame definition:

When canceling or sending the Select command successfully, the firmware returns 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

2.7 Read the data storage area of the tag

Command frame definition:

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

operate 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 the 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 returns the Error codes ruled by the EPC Gen2 protocol, the response frame will return the error codes returned or after 0xA0. Because the error codes ruled by EPC Gen2 are valid only with 4bits.

For example, if the address offset or data length in the command parameter sent is not correct, the data reading length is longer than the 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 the Data storage area of the tag

Command frame definition:

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

Data length is shorter than 30 words (64bytes/512bits) that be written to the data storage area, which 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 receives the tag return data correctly, 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 the 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 returns the Error codes ruled by the 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 the command parameter sent is not correct, the data writing length is longer than the 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 a single tag, Lock or Unlock its data storage area. Before sending the command, you need to set the Select parameter to choose the appointed tag to do the lock operation. For example, if you need to 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

The lock operates data LD: 0x020080

Checksum: 0x09

The high 4 bits of the Lock operate parameter LD is the remaining bit, and the last 20 bits are the payload of Lock. (including Mask and Action, each be 10 bits from the high to the low by turns). For more details please operate according to 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 activity of each data area has 2 bits, 00~11, it's the under the turns to be open, permanently 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:

Lock-Command Payload

19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Kill Mask		Access Mask		EPC Mask		TID Mask		User Mask		Kill Action		Access Action		EPC Action		TID Action		User Action	

Masks and Associated Action Fields

	Kill pwd		Access pwd		EPC memory		TID memory		User memory	
	19	18	17	16	15	14	13	12	11	10
Mask	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write	skip/ write
	9	8	7	6	5	4	3	2	1	0
Action	pwd read/ write	perma lock	pwd read/ write	perma lock	pwd write	perma lock	pwd write	perma lock	pwd write	perma lock

pwd-write	permalock	Description
0	0	Associated memory bank is writeable from either the **open** or **secured** states.
0	1	Associated memory bank is permanently writeable from either the **open** or **secured** states and may never be locked.
1	0	Associated memory bank is writeable from the **secured** state but not from the **open** state.
1	1	Associated memory bank is not writeable from any state.
pwd-read/write	**permalock**	**Description**
0	0	Associated password location is readable and writeable from either the **open** or **secured** states.
0	1	Associated password location is permanently readable and writeable from either the **open** or **secured** states and may never be locked.
1	0	Associated password location is readable and writeable from the **secured** state but not from the **open** state.
1	1	Associated password location is not readable or writeable from any state.

Response frame definition:

If the Lock command operates correctly, the tag return is valid, and the response frame is as 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 the 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 returns the error codes ruled by the EPC Gen2 protocol, and response frame will return the error code or return after 0xC0.

For example, if the TID has been permanently locked, Set the TID under an open situation through the Lock command. According to the EPC Gen2 protocol, the tag will return error code 0x04(storage area locked, Memory Locked). The response frame return error code 0xC4, and back to 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	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 to set the Select parameter to operate the Inactivate for the appointed tags. Inactivate the single tag as 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 operates successfully, the tag return CRC correct, and the response frame is as 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 the area or the 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 returns the error codes ruled by the EPC Gen2 protocol, and response frame will return the error code or return after 0xD0.

Note: If the tag did not been set with Kill Password, means the Kill Password is 0, and 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 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: 0x0D

PL: 0x0002

Query Parameter: 0x1020

Checksum: 0x40

The parameter is 2bytes, it 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

2.10 Set Query parameter

Command frame definition:

Set the related parameter of the Query command. The parameter is 2bytes, is consists of detail parameters as 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 the Query parameter set operated correctly, 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 is 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 is joined by the digits of the specific parameter below. The 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 the 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

2.11 Get Query Parameter

Command frame definition

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

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

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

2.12 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 workplace 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

2.13 Set Working Channel

Command Frame Definition

If the frequency is 900MHz, set the working channel of the 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

2.14 Get Working Channel

Command Frame Definition

In the current working zone of a 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 operation to get the 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

2.15 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 frequency adjustment automatically)

Checksum: 0xAD

Response Frame Definition

If the set or cancel frequency adjustment is automatically correct, 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

2.16 Get transmitting power

Command Frame Definition

Get the 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

2.17 Set transmitting power

Command Frame Definition

Set the 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

2.18 Set transmit a 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

2.19 Get the parameter of receiving modem

Command Frame Definition

Get the 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 Third: 0x01B0 (The smaller the Signal demodulated value is, the less the 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

2.20 Set the parameter of receiving modem

Command Frame Definition

Get the 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	Third(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 Third: 0x01B0 (The smaller the Signal demodulated value is, the less the 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 the 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

2.21 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 the 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 in total, 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 in total, 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:
0xBABABABABABABABABABABABABABABABABABABA (Among 0xBA is -70dBm, test RSSI is the least value)

Checksum: 0xDD

2.24 Control IO port

Command Frame Definition

Set the 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:

<table>
<tr><th>No.</th><th>Description</th><th>Length</th><th>Explanation</th></tr>
<tr><td>0</td><td>Parameter 0</td><td>1 byte</td><td>Choose the operation:
0x00： Set IO direction；
0x01：Set IO electrical level；
0x02： Read IO electrical level。
The pin for the operation is assigned in parameter 1.</td></tr>
<tr><td>1</td><td>Parameter 1</td><td>1 byte</td><td>The parameter value range is 0x01~0x04, corresponding to port IO1~IO4 for operation.</td></tr>
<tr><td>2</td><td>Parameter 2</td><td>1 byte</td><td>The parameter value is 0x00 or 0x01.
<table>
<tr><th>Parameter 0</th><th>Parameter2</th><th>Description</th></tr>
<tr><td>0x00</td><td>0x00</td><td>IO setting is the input model</td></tr>
<tr><td>0x00</td><td>0x01</td><td>IO setting is the output model</td></tr>
<tr><td>0x01</td><td>0x00</td><td>Set IO output as a low electrical level</td></tr>
<tr><td>0x01</td><td>0x01</td><td>Set IO output as a high electrical level</td></tr>
</table>
When parameter 0 is 0x02, this parameter is insignificant.</td></tr>
</table>

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

<table>
<tr><th>No.</th><th>Description</th><th>Length</th><th>Explanation</th></tr>
<tr><td>0</td><td>Parameter 0</td><td>1 byte</td><td>Choose the operation:
0x00： Set IO direction ;
0x01：Set IO electrical level ;
0x02： Read IO electrical level。
The pin for the operation is assigned in parameter 1.</td></tr>
<tr><td>1</td><td>Parameter 1</td><td>1 byte</td><td>The parameter value range is 0x01~0x04, corresponding to port IO1~IO4 for operation.</td></tr>
<tr><td>2</td><td>Parameter 2</td><td>1 byte</td><td>The parameter value is 0x00 or 0x01.
<table>
<tr><th>Parameter 0</th><th>Parameter2</th><th>Description</th></tr>
<tr><td>0x00</td><td>0x00</td><td>IO setting failed</td></tr>
<tr><td>0x00</td><td>0x01</td><td>IO setting success</td></tr>
</table></td></tr>
</table>

0x01	0x00	IO output failed
0x01	0x01	IO output success
0x02	0x00	Correspond port is a low electrical level
0x02	0x01	Correspond port is a 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 the Read Protect command successfully, the tag's Protect EPC and Protect TID bit will be set as '1', and the tag will enter the data protection state. If let the tag is back to the normal state from the data protection state, will need to operate the Reset Read Protect command. Before operating this command, the Select parameter needs to be set for choosing a 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 operating Read Protect (Set/Reset parameter is 0x00) command, if the tag is out of the zone, the assigned EPC code is wrong or the tag has 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 operating Read Protect (Set/Reset parameter is 0x01) command, if the tag is out of the zone, the assigned EPC code is wrong or the tag has 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 the 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 the Change EAS command. When the tag operates the Change EAS command successfully, the tag's PSF bit will be set as '1' or '0'. When setting the PSF bit as '1', the tag will respond EAS_Alarm command, or the tag will fail to respond EAS_Alarm command. Before operating this command, the Select parameter needs to be set for choosing a certain tag to operate.

Command Parameter

Change the 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 the 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 operating the Change EAS command, if the tag is out of the zone, a certain EPC code is wrong or the tag has 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 the 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 the data storage area of the tag
0x49	Write the Data storage area of the 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 a continuous carrier
0xF1	Get the parameter of receiving modem
0xF0	Set the parameter of receiving modem
0xF2	Test RFID input-blocking signal
0xF3	Test RSSI channel
0x1A	Control IO port
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 the command frame fails to operate, then the VM-5GA chip sends the operate failure response frame to the upper computer. The operate failure response frame shares command code 0xFF. If fail to get the tag's EPC before operating failure, then the command parameter fix is a 1-byte error code. If successful to get the tag's EPC, then the response parameter is a 1-byte error code plus the tag's PC+EPC data.

For example, if the polling command frame fails to operate, fails to receive tag return, or returns 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 the failed 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 returns or return data CRC ECC error.
Access Fail	0x16	The access tag failed, 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 the 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 the 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 the 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 the 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	Error Code	Error code	Error Description
Error-specific	000000002	Other error	Other errors didn't inform in this chart.
	000000112	Memory overrun	A specific tag data storage zone no exists; or this tag didn't support the specific length of EPC, such as XPC.
	000001002	Memory locked	The specific tag data storage zone is locked and/or locked forever, and the locking state cannot be written or read.
	000010112	Insufficient power	Tag didn't have sufficient power to write.

Non-specific	000011112	Non-specific error	The tag didn’t support an Error-code return.